

TRANSFORM

PROGRAM & ABSTRACTS

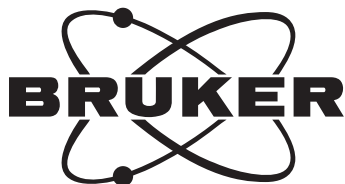
MAY 3-JUNE 24



american
institute for
conservation

Preserving Cultural
Heritage





Art & Conservation Analysis at the Elemental Level

Works of art, historic documents, or the diverse museum objects record deeper histories than what is apparent at first glance. Bruker allows you to access the diversity of art with the latest in non-invasive elemental analyzers.



TRACER
Handheld XRF



ELIO
Portable-Scanning XRF



CRONO
Mobile MA- XRF



M6 JETSTREAM
MA-XRF



QUANTAX
EDS for SEM

Join us in our Virtual Booth at AIC 2021!

To organize a one-on-one meeting with a member of our Art & Conservation team during AIC, or set up a meeting another time, scan the QR code or email us at: info.bna@bruker.com

Visit www.bruker.com/art-conservation





TRANSFORM 2021

Joining the Meeting

Access the meeting by visiting our dedicated conference website at <https://learning.culturalheritage.org/aic2021> and log in using the button on the left side.

- To join a session, navigate to the current week using the Access Sessions tab in the navigation menu, then find the day and title of the track. Expand the track to see the session titles, then click **ATTEND**.
- During a live session, you can join the chat for Q&A.
- To watch a recorded session, follow the same instructions as a live session and click **ATTEND**.

Frequently Asked Questions

Find answers to question about access, registration, and technical help at <https://learning.culturalheritage.org/aic2021-faqs>.

Visit our Resources section for:

- Hosting an Inclusive Meeting
- Accessibility Guidelines
- Speaker Resources
- Guide to Land Acknowledgements
- Guide to SPNHC Sessions
- Annual Meeting Community

Visit our **Exhibit Hall** to learn more about our exhibitors and sponsors.

Explore the **Access Sessions** tab to add your favorite sessions.

Table of Contents

Welcome & People	6-7
Awards & Special Thanks.....	9
Calendar At a Glance.....	11
Workshops	12
Highlights and Social Events	15
General Sessions	16
<i>General & Concurrent Sessions</i>	16
<i>Creating Connections & Community During COVID</i>	16
<i>On Display</i>	16
<i>Transformative Research and Treatment in the Care of Natural History Collections (SPNHC)</i>	16, 18
<i>Collaborating with Stakeholder Communities</i>	18
Specialty Tracks	18
<i>Architecture</i>	18
<i>Book and Paper</i>	18, 20
<i>Collection Care</i>	20, 22
<i>Contemporary Art</i>	22
<i>Emerging Conservation Professionals Network</i>	22-23
<i>Electronic Media</i>	23
<i>Health & Safety</i>	23
<i>Imaging Working Group</i>	24
<i>Objects</i>	24
<i>Paintings</i>	24-25
<i>Photographic Materials</i>	25-26
<i>Research and Technical Studies</i>	26
<i>SPNHC</i>	26, 28-29
<i>Sustainability</i>	29
<i>Textiles</i>	29-30
<i>Wooden Artifacts</i>	30
Poster Sessions.....	33-34
2021 Exhibitor Profiles	37-40, 43-46
2021 Abstracts	49-119

Advertising

Bruker Corporation	2
Conserv	14
Click Netherfield	10
Crystalizations Systems, Inc.....	36
Foster + Freeman.....	13
G.C. Laser Systems.....	17
Getty Conservation Institute.....	4
Getty Publications.....	48
Goppion.....	5
Kremer Pigments Inc.....	21
Hollinger Metal Edge Inc.....	19

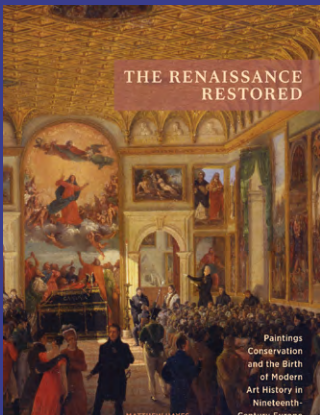
NanoRay.....	27
Onset HOBO Data Loggers.....	36
Opus Instruments	42
Picturae.....	31
Prairie Paper.....	42
REL Inc	41
SACI Program	47
SmallCorp	41
TandD	32
Tru Vue, Inc.	8
University Products, Inc.	35



Getty Conservation Institute

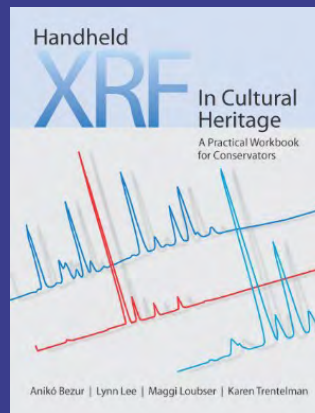
ADVANCING CONSERVATION PRACTICE

[About the Conservation Institute](#) [Our Projects](#) [Core Areas of Work](#) [Publications and Resources](#)



Books for Purchase

30% off select titles at
shop.getty.edu with
code GPAIC21



FREE PDF Publications

Nearly 200 and with
more to come

[Browse our PDF
catalogue and
download your selection](#)

Teaching and Learning Resources



Materials available to use and adapt

AATA Online



Search over 156,000 abstracts related to
preservation and conservation



Conservation Perspectives

Our biannual magazine
exploring topics in
conservation through
in-depth articles and
roundtable discussion

[Subscribe to
Conservation Perspectives](#)



GCI Bulletin

Our bimonthly bulletin
provides updates on
our activities and
timely information for
conservation professionals

[Subscribe to the
GCI Bulletin](#)

Getty



In Step with the Future

The world is on the threshold of a new era of innovation and change. Heightened levels of connectivity have revolutionized global systems through networks of devices, objects and places embedded with sensors. This deeper meshing with the digital world is profoundly transforming daily life, including the way museums operate and interact with visitors.

Goppion's Intelligent Display Case utilizes embedded sensors and advanced instrumentation to permit the collection and analysis of large amounts of data to monitor and control conservation and security requirements.

The museum's administrative, commercial and technical departments can access data in real time, creating an optimized experience for museum visitors.



Founded in 1952, Goppion is the recognized world leader in the engineering, manufacturing, and installation of state-of-the-art museum showcases that protect the world's most significant icons of cultural heritage, as the Mona Lisa, the Crown Jewels of England, many Leonardo da Vinci manuscripts.

Goppion Technology

info@goppion.com - T +39 02 4844971
www.goppion.com

People

2021 AIC Board of Directors

President: Margaret Holben Ellis / Suzanne Davis
Vice President: Suzanne Davis / Corina Rogge
Secretary: Jennifer McGlinchey Sexton
Treasurer: Elmer Eusman
Director, Committees & Task Forces: Thomas J. Braun / Samantha Springer
Director, Communications: Brenda Bernier
Director, Professional Education: Molly C. Gleeson
Director, Specialty Groups: Sarah Melching

2021 Program Committees

Opening and Concurrent General Sessions

General: Jessica Betz Abel, Catherine (Cat) Coueignoux London, Suzanne Davis (Chair), Madeleine Neiman, Michaela Paulson, Sarah Reidell, Fran Ritchie, Kate Smith, Marc Vermeulen

Specialty & Interest Sessions

Architecture: Sherry DeFreece Emery, Lacey Bubnash, Helen Thomas

Book and Paper: Andrea Knowlton, Katie Mullen, Rebecca Pollak, Melina Avery

Collection Care: Rachael Perkins Arenstein, Claire Curran, Lisa Elkin, Lisa Goldberg, Laura Resch, Samantha Snell

Contemporary Art: Luca Ackerman, Jen Hickey, Caitlin Mahony, Kate Moomaw-Taylor, Guiliana Moretto, Jen Munch, Martha Singer

Electronic Media: Shu-wen Lin, Alexandria Nichols, Brian Castriota, Flaminia Fortunato, Diego Mellado

Health & Safety: Sue Costello, Tara Kennedy

Objects: Megan Emery, LeeAnn Gordon

Paintings: Mary Catherine Betz, Bianca Garcia, Kat Harada, Cindy Schwarz, Jose Luis Lazarte, Erin Stephenson

Photographic Materials: Katie Sanderson, Amanda Maloney, Fernanda Valverde, Ronel Namde, Marie-lou Beauchamp, Barbara Lemmen

Private Practice: Lauren Fly, Karen Zukor

Research & Technical Studies: Gregory Bailey, Jane Klinger, Federica Pozzi, Julia Sybalsky, Keats Webb

SPNHC: Tiffany S Adrain, Liath Appleton, Andrew Charles Bentley, Mariel Campbell, Julian Carter, Mariana Di Giacomo, Laura Eklund, Irene Finkelde, Moe Flannery, Shelley James, Erica Krimmel, Amanda Lawrence, Elise Lecompte, Paul Mayer, Anna Monfils, Rebecca Newberry, Cindy Optiz, Theresa

2021 SPNHC Council

President: Paul Mayer
President-Elect: Julian Carter
Past President: Barbara Thiers
Treasurer: Theresa Reilly
Secretary: Cindy Optiz
Managing Editor: Mariel Campbell
Members-at-Large: Talia Karim, Fran Ritchie, Anna Monfils, Breda Zimkus, Shelley James, Randy Singer

Reilly, Fran Ritchie, Randy Singer, Hayley Singleton, Barbara Thiers, Gregory Watkins-Colwell, Tim White, Breda Zimkus, Rob Zschernitz

Sustainability: Roxy Sperber, Rachel Marie Childers, Christine Oricchio, Annabelle Camp, Kate Fugett

Textiles: Beth Szuhay, Ann Frisina, Alison Castaneda

Wooden Artifacts: Trevor Boyd, Elizabeth L. Peirce, Christine Storti

Poster Sessions

Poster Committee: Suzanne Davis (chair), Fletcher Durant, Caitlin Richeson, Joan Walker, Fred Wallace

AIC & FAIC Staff

Executive Director: Eryl P. Wentworth

Finance Director: Linda Budhinata

Programs Director & Administrative Manager: Tiffani Emig

Membership Operations Assistant: Erika Goergen

Emergency Programs Coordinator: Elaina Gregg

CAP Assistant: Elizabeth Handwerk Kurt

Communications Associate: Carmina Lamare-Bertrand

Outreach Coordinator: Katelin Lee

Communications & Membership Director: Bonnie Naugle

Institutional Advancement Director: Eric Pourchot

Education Manager: Sarah Saetren

Meetings & Advocacy Director: Ruth Seyler

Membership Manager: Ryan Winfield



american
institute for
conservation
Preserving Cultural
Heritage



Welcome From The Presidents

PLEASE JOIN US FOR THE FIRST ever joint meeting of AIC and SPNHC, two organizations with many complementary interests. This is the second virtual meeting for each of us, reflecting the dramatic changes we have faced over the past year due to the global pandemic. It is fitting that our theme reflects this upheaval: **Transform 2021**.

For the general sessions of our 2021 annual conference, we sought submissions that challenge “normal” and “normalizing.” How can we transform our field, and how can our work transform the world? Let’s imagine and share projects that incite and foster institutional change; create inclusive and welcoming environments in our museums and



**Margaret (Peggy)
Holben Ellis**

AIC President



Paul Mayer

SPNHC President

studios; and take on big challenges, whether they do so in ways that are large or small.

We hope you find presentations and events that inform your work, delight you, and inspire deeper consideration. For SPNHC members who are new to an AIC meeting, we highlight talks that were proposed

with you in mind – you can find these in our [Guide to SPNHC Sessions](#).

For those of you interested in talks of a certain material or specialty, you can explore the program directly, using the filters on the right to sort the talks. However, we have grouped together topics wherever possible to make it easy to engage with them.

We invite you to explore more than just talks! We are hosting business meetings, social events, meet and greets, and a full virtual exhibit hall. This has truly been a year of transformation and change, and we look forward to sharing this rare time of connection and collaboration with you.

—Peggy and Paul



ANTI-REFLECTIVE ACRYLIC AND GLASS SOLUTIONS

For Protection & Display of Cultural Heritage and Fine Art Collections



Funerary papri on display in *The Tomb* exhibition. © of National Museums Scotland.



The reframed *Adoration of the Magi* in situ, Exeter College Chapel, University of Oxford. Image: Studio8



Installation view, *Arts of Korea*, Brooklyn Museum, on view beginning September 15, 2017. (Photo: Brooklyn Museum)



The restored Chinese screen in the Dining Cove at Taliesin West. Photo by Andrew Pielage. Courtesy the Frank Lloyd Wright Foundation. Scottsdale, AZ

Optium Museum Acrylic® | UltraVue® Laminated Glass

FOR USE IN A RANGE OF APPLICATIONS:
VITRINES • GLASS DISPLAY CASES • CABINET DOORS
WALL NICHES • BOX FRAMES
STAND-OFFS • TRADITIONAL FRAMING

For samples or questions, visit tru-vue.com/museums-collections or contact fineart@tru-vue.com.

TRUSTED ACRYLIC & GLASS SOLUTIONS FOR NEARLY 50 YEARS



ANTI-REFLECTIVE | ABRASION RESISTANT | CONSERVATION GRADE UV PROTECTION | COLOR NEUTRAL | SAFETY & SECURITY

Tru Vue®, the Tru Vue logo, Optium Museum Acrylic® and UltraVue® Laminated Glass are registered trademarks of Tru Vue, Inc, McCook, IL USA. © 2019 Copyright Tru Vue, Inc. All rights reserved.

Congratulations to AIC's 2021 Award Recipients

Awards were presented via Zoom on Monday, May 10. Enjoy the celebration at <https://learning.culturalheritage.org/p/2021awards>.

David Magoon-University Products Conservation Advocacy Award

Barbara Appelbaum and Paul Himmelstein, conservators and consultants with Appelbaum & Himmelstein, will receive the David Magoon-University Products Conservation Advocacy Award, which honors conservation professionals who have advanced the field of conservation and furthered the cause of conservation through substantial efforts in outreach and advocacy.

Allied Professionals Award

Jontyle Robinson, PhD, First Curator of The Legacy Museum, will receive the Allied Professionals Award, recognizing her work and contributions as a professional in another field to the advancement of the conservation profession.

Robert L. Feller Lifetime Achievement Award

Pamela Hatchfield, Robert P. and Carol T. Henderson Head of Objects Conservation Emerita at the Museum of Fine Arts, Boston, and Coordinator of Held in Trust, will receive the Robert L. Feller Lifetime Achievement Award for her exceptional contributions to the field throughout her career.

Rutherford John Gettens Award

Sanchita Balachandran, Associate Director of the Johns Hopkins Archaeology Museum, will receive the Rutherford John Gettens Award for her outstanding service to the association.

Honorary Membership

Rustin (Rusty) Levenson, founder of Art Care Conservation, will receive Honorary Membership for her outstanding contributions to the conservation profession.

Sheldon & Caroline Keck Award

Michele Marincola, chair of the Conservation Center, Institute of Fine Arts, New York University, and Kate Smith, Conservator of Paintings and Head of Paintings Lab at the Harvard Art Museums Straus Center for Conservation and Technical Studies, will receive the Sheldon & Caroline Keck Award for excellence in the education and training of conservation professionals.

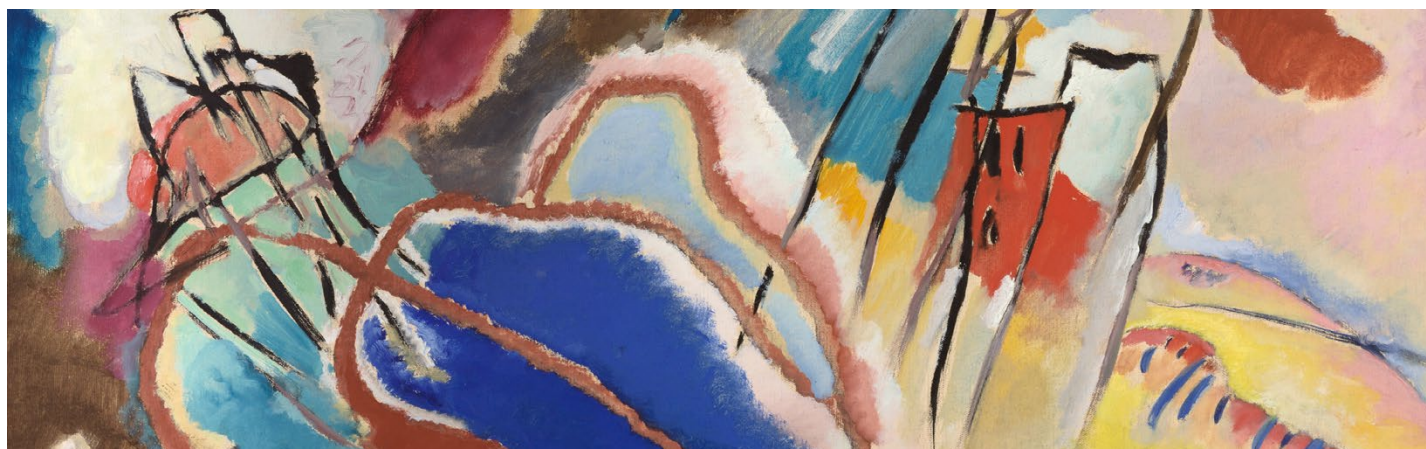
Publication Award

Lisa Elkin, Chief Registrar and Director of Conservation at the American Museum of Natural History, and **Chris Norris**, Senior Collection Manager at the Yale Peabody Museum of Natural History, co-editors of *Preventive Conservation: Collection Storage* (2018), will receive the Publication Award for excellence in a book on conservation.

President's Award

Nancy Pollak and Deborah Trupin, conservators in private practice, will receive the President's Award for their steadfast work in steering the organization through a revision of its membership categories.

Find more information about our awards at www.culturalheritage.org/awards.



GLOBALLY RENOWNED MUSEUM SHOWCASE EXPERTS

© Science Museum Group



BY APPOINTMENT TO
HER MAJESTY THE QUEEN
DISPLAY CASE SUPPLIERS
CLICK NETHERFIELD LTD
LIVINGSTON



**CLICK
NETHERFIELD**
SHOWCASING YOUR VISION

www.clicknetherfield.com

Week by Week

Week 1, May 3-7:

Pre-sessions, Workshops

Week 2, May 10-14:

General & concurrent general sessions, Keynote & Awards

Week 3, May 17-21:

Architecture, Book & Paper, and ECPN sessions

Plus: Posters, Exhibitor Showcase

Week 4, May 24-29:

Research & Technical Studies, SPNHC, Imaging, and Wooden Artifacts sessions

Plus: Posters, Health & Safety, social events

Week 5, June 1-4:

Collection Care and SPNHC sessions

Week 6, June 7-11:

Contemporary Art, Electronic Media, and SPNHC sessions

Plus: Exhibitor Showcase, social events, workshop

Week 7, June 14-18:

Sustainability, Photographic Materials, Book & Paper, Textile, and SPNHC sessions

Plus: Posters, social events, workshop

Week 8, June 21-25:

Paintings, Objects and SPNHC sessions

Plus: Exhibitor Showcase, Posters, social events

Sessions by Topic

Architecture

Sessions and posters: May 18, 19

ADG Business Meeting: May 20, 3pm

ASG Business Meeting: May 21, 12pm

Book & Paper

Sessions and posters: May 18, 19, 20, 24*, June 15

Book & Paper Wiki: May 20, 3pm

LACDG session: May 21, 12pm

BPG Business Meeting: May 17, 3pm

*posters only

Collection Care

Sessions: June 2, 3, 4

Contemporary Art

Sessions: June 7, 8, 9, 10

CAN Business Meeting: June 11, 12pm

Emerging Conservation Professionals

Session and posters: May 18

Town Hall/Happy Hour: May 18

Electronic Media

Sessions: June 8, 9, 10

EMG Business Meeting: June 11, 3pm

Health & Safety

Session: May 27, 3pm

Imaging (Working Group)

Sessions: May 25, 26

Social: May 25, 5pm

Objects

Sessions and posters: June 21, 22, 23, 24

OSG Business Meeting: June 25, 3pm

Paintings

Sessions and posters: June 22, 23, 24

PSG Business Meeting: June 24, 3pm

Photographic Materials

Sessions: June 15, 16, 17

PMG Business Meeting: June 18, 3pm

Research and Technical Studies

Sessions and posters: May 25, 26, 27
RATS Business Meeting: May 28, 12pm

Sustainability

Session: June 14, 12pm

SPNHC

Sessions: May 13, 20, 27, June 1, 10, 17, 21, 24, 25

SPNHC Business Meeting: May 27, 9:30am

Textiles

Sessions and posters: June 15, 16
TSG Business Meeting: June 17, 3pm

Wooden Artifacts

Sessions: May 25, 26

WAG Business Meeting: May 28, 1pm

Workshops

We are excited to offer seven workshops in conjunction with the 2021 AIC Virtual Meeting.

They will be held during the weeks of May 3, June 7, and June 14.

Each workshop requires advance registration.

Learn more at www.culturalheritage.org/2021-meeting-workshops.

Email questions to learning@culturalheritage.org.

- Each workshop will include at least one live online session as well as access to the course portal where participants will find resources and opportunity for discussion. Workshops with two dates listed include two live sessions with a continuation of content on the second date (not two presentations of the same content).
- Recordings of the live sessions will also be available in the course portals for participants who can't attend or wish to re-watch the presentation.
- Participants will have access to the course portal beginning one week prior to the live session and ending on July 31, 2021.

Building Imaging Workflows

Monday, May 3 and

Wednesday, May 5 at 12-2pm EDT

Instructor: Jennifer McGlinchey Sexton

This workshop will provide instruction and facilitate discussion about building an imaging workflow for conservation.

Stressed About Pests? Integrated Pest Management for Heritage Preservation Professionals

Monday, May 3 and

Wednesday, May 5 at 3-5pm EDT

Instructors: Rachael Perkins

Arenstein and Patrick Kelley

This workshop will introduce participants to multiple aspects of sound Integrated Pest Management policy and procedures.

Strategic Management of Collections

Tuesday, May 4 and Thursday, May 6 at 12-2pm EST

Instructors: Robert Huxley, Carol Butler, Christiane Quaisser

This workshop will help managers (new and established) with responsibility for collections to adopt an evidence-based approach to planning, executing and achieving their goals.

Identification and Preservation of Archival Materials

Tuesday, May 4 and Thursday, May 6 at 3-5pm EDT

Instructors: Tatiana Cole, Allison Holcomb

This workshop will allow participants to identify archival materials and plan for long-term preservation.

How to Label and Mark Your Collections

Friday, May 7 at 12-2pm EDT

Instructors: Eugenie Milroy, Fran Ritchie

This workshop will prepare participants for the decision-making process involved when choosing among the variety of techniques available to label complex collections.

Silver Image Chemistry and Deterioration

Monday, June 14 and Friday, June 18 at 3-5pm EDT

Instructors: Douglas Nishimura, Scott Williams

This workshop is designed to provide an in-depth discussion on the unique chemical properties and vulnerabilities of silver image material.

Conservation Through Transformation: Keeping Performance Art Alive in The Museum

Monday, June 7 and Friday, June 11 at 12-2pm EDT

Instructors: Louise Lawson, Helia Marcal

This workshop will draw on the practice of conservation developed at Tate to explore the material possibilities afforded by the care of performance art.

foster+freeman

leading forensic innovation

DOCUMENT EXAMINATION SYSTEM

The latest digital imaging and multi-wavelength LED technology
with advanced software interface

*Trusted by Museums, Galleries,
Libraries and National Archives
Worldwide*



usoffice@fosterfreeman.com | 888 445 5048 | www.fosterfreeman.com



Conserv gives you peace of mind so you can focus on doing your best work—transforming the conservation field.

We partner with researchers to build the next generation of sensors and software to ensure the best ideas turn into practical applications.

Environmental and pest monitoring, sensors, software, easy-to-use analytics, and support.

conserv.io



Highlights and Social Events

SPNHC

Opening Mixer.....	May 7, 5pm
Emerging Professionals Happy Hour	May 13, 5:30pm
Social Coffee and Drinks Hours.....	May 24, 9am; June 9, 9am
“Old Croones Day” Social.....	June 4, 5pm
Virtual Collection Tours	May 19, 10am; May 26, 6pm; June 2, 10am; June 9, 6pm
Special Interest Groups Open Session	June 25, 12pm

AIC

ECPN Town Hall and Happy Hour	May 18, 4:30pm
Imaging Working Group Social Hour	May 25, 5pm
WUDPAC Reunions	May 27, 5:30pm
Special Interest Groups Open Session	June 25, 12pm

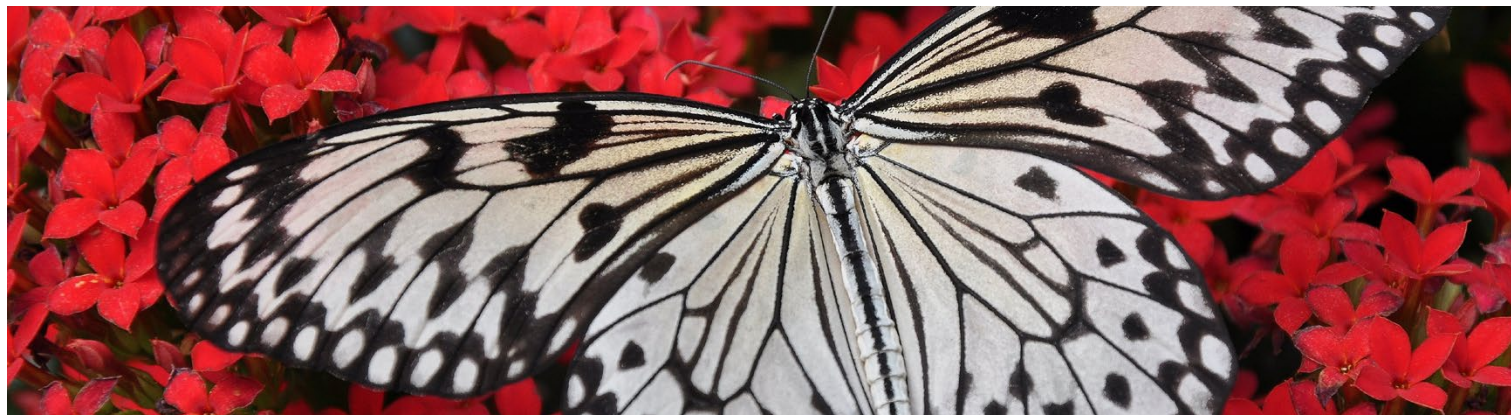
ASSOCIATION MEETINGS

AIC Member Business Meeting	May 14, 12pm
SPNHC Annual Business Meeting	May 27, 9:30am

EVENTS OF INTEREST

Current IMLS Funding Opportunities.....	May 20, 2:30pm
A Failure Shared is Not a Failure: Learning from Our Mistakes.....	May 21, 3pm
NCPTT Technology Showcase.....	May 24, 3pm
Health & Safety: Get the Lead Out	May 27, 3pm
JAIC Scholarly Writing Seminar.....	June 4, 10:30am

Note all times are Eastern Daylight Time.



General & Concurrent Sessions – May 10, 11, 12

Monday, May 10

Concurrent Sessions

Confronting our Biases to Transform Conservation, 12-2pm

Panel; Porchia Moore, Seema Rao, Stephanie A. Johnson-Cunningham

NEH Held in Trust Keynote Presentation and AIC Awards Presentation, 3-5pm

Tuesday, May 11

General Session

Opening Session, 12-3pm

Who is a conservator? What is conservation? Evolving our identities and practice to thrive in an inclusive world; Joelle Wickens

Are you biased? I am.; Anisha Gupta

Conservation Unfixed: Queer Visions for Transformative Practices; Sasha Arden

Politics, Race, and Objectification: Uncomfortable Encounters in the Conservation Lab; Sasha Arden

Exhibitor: Getty Publications

Exhibitor: Huntington T. Block

A Local Approach to the Global Problems of 2020: The Washington Conservation Guild and its Responses to the Black Lives Matter; Jayne Girod Holt

Shining Light on Labels in the Dark: Guidelines for Offensive Collections Materials; Laura Briscoe

Trailblazing Rapid Enhancement of Biodiversity Collections Data to Address the Urgent Challenge of COVID-19; Austin Mast

Cultures of extinction and contemporary art conservation research; Rebecca Gordon

Discussion

Wednesday, May 12

Concurrent General Sessions

Creating Connections & Community During COVID, Part 1, 12-2pm

Lights! Camera! Action! Virtual Couriering: The New Normal?; Per Knutås and Jennifer Levy

Creating Competences: Conservation Class in a Box; Ellen Pearlstein

Exhibitor Experience - Goppion

Caring for Family Treasures: Providing Practical Preservation Advice during a Pandemic; Annabelle Camp

Creating Connections & Community During COVID, Part 2, 3-5pm

Teaching conservation in the time of COVID-19; Madeline Hagerman and Nina Owczarek

IPM in the Time of COVID-19: An Unexpected Unifier and Trigger for Change; Madeline Corona

Exhibitor Experience - Tru Vue

Put It On The Wall: Conservation Content at the Harvard Art Museums; Kate Smith

On Display, Part 1, 12-2pm

Alternative Strategies: De-installation, treatment, and reproduction of a historic Chinese import wallpaper for Jekyll Island Museum; David Joyall and Luana Maekawa

Fantastic Beasts: A manuscript leaf approach for the display of a python skin. A collaborative project between paper and objects conservators; Konstantina Konstantinidou

Exhibitor Experience - Getty Conservation Institute

The Materials Selection and Specification Working Group: Paving the Path to for Choosing Safe Materials to Display; Lisa Elkin, Rebecca A. Kaczowski, Rachael Perkins Arenstein

On Display, Part 2, 3-5pm

National History, Local Stories: Sharing National Archive Collections?; Kate Narewski

A Memorial on Middagh Street: The Treatment and Display of a Firehouse Door Mural; Maureen Merrigan

Exhibitor Experience - Hollinger Metal Edge, Inc.

Exhibit Case as a Compatible/Incompatible Object?; Ellen Carrlee



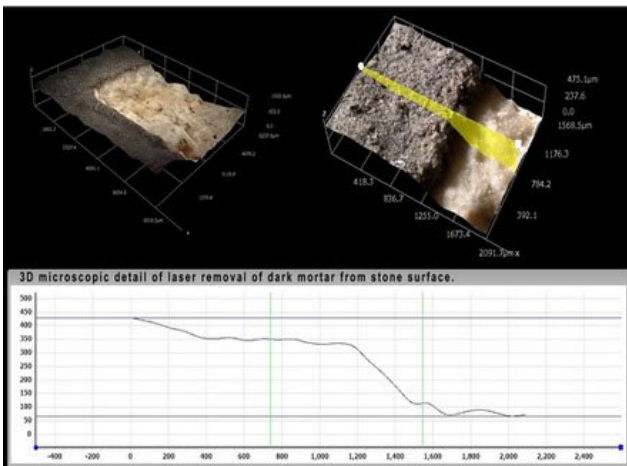
Art Conservation Laser System Rentals, Sales, and Training



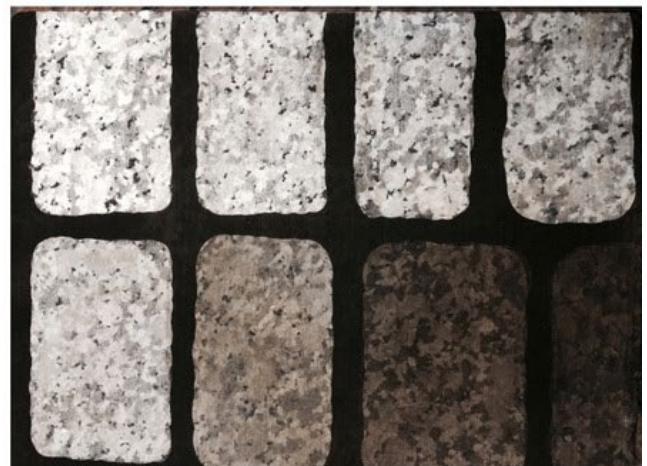
No Damage to Substrate



The Patented GC-1 Laser System



Free Testing and Analysis
Send us your samples!



Precise Control Over Cleaning
Decide How Much To Remove

G.C. Laser Systems Inc.
900 S Des Plaines Ave
Forest Park, IL 60130
USA

844-532-1064
Info@GCLasers.com

LaserCleanIt.com

G.C. Laser Systems Inc.
1720 W. 19th Street
Broadview, IL 60155
USA

Concurrent & Specialty Sessions – May 13, 17, 18

Thursday, May 13

Transformative Research and Treatment in the Care of Natural History Collections, Part 1, 12-2pm

Addressing our Colonial History in the Herbarium of the New York Botanical Garden - The Folder Project; Nicole Tarnowsky

Test and Repeat: Assessing and Caring for Hazardous Natural History Collections at the Royal Alberta Museum; Carmen Li

Exhibitor Experience - Bruker

Birds of a Feather... Community-driven Research Informing Best Practices for Cleaning Feathers; Julia Sybalsky

Transformative Research and Treatment in the Care of Natural History Collections, Part 2, 3-5pm

Rehydrate This! Challenges in Preserving and Treating Fluid Specimens; Arianna Bernucci

Planning a Quantitative Risk Analysis to Determine Storage Enclosure Options for Large Vertebrate Specimens; Melissa King

Exhibitor Experience - Click Netherfield

The Hidden Tooth: Reversal of Unstable Mammoth Tusks, and Significance of Conservation Records; Genevieve Kulis

Collaborating with Stakeholder Communities, Part 1, 12-2pm

The Implications of Basketry Kits and How-to Books for Authenticity; Ellen Pearlstein and Bryn Barabas Potter

Collaborating with Indigenous Communities to Deinstall the Native North American Hall at the Field Museum; Erin Murphy and Nicole Passerotti

Exhibitor Experience - University Products

Consultation and Collaboration: Renovation of the Northwest Coast Hall at the American Museum of Natural History; Amy Tjong

Discussion; led by Ellen Carrlee and Cheyenne Caraway

Collaborating with Stakeholder Communities, Part 2, 3-5pm

Building a Conservation Partnership between Yale University Art Gallery and National Museum, Lagos during the Global Pandemic; Anne Turner Gunnison, Geo Barrios

Exhibitor Experience - TandD US LLC

Conservator and Stakeholder: Lessons from Unearthing a Time Capsule underneath a Confederate Monument; Sue Donovan

Cancelling Neutrality: A Manifesto for Rewriting Conservation Codes of Ethics; Cathie Magee, Anisha Gupta

Discussion; led by Laleña Vellanoweth and Nylah Byrd

Monday, May 17

Book and Paper

BPG Business Meeting, 3pm

Tuesday, May 18

Architecture

Architecture Session 1, 12-2pm

Evaluating One-step Cleaning Methods for Heritage Building Materials Impacted by Wildland Fire Chemicals; Kaitlyn Eldredge

Exhibitor Experience: G.C. Laser Systems, Inc.

Removal of Crude Oil from Cultural Resources; Vrinda Jariwala

Glazed to Perfection: Conserving the Historic Spanish Tile Fountains of Gulfport Florida's Rolyat Resort Hotel; Kelly Ciociola

Book and Paper

Book & Paper Session 1, 12-2pm

Re-centering the Bench; Kristen St. John and Aisha Wahab

Exhibitor Experience: Foster & Freeman

Playing with Time - Budgeting Light Induced Damage to Manage Light Risk Associated with the M+ Opening Display; Christel Pesme and JoFan Huang

Exhibitor Experience: Colibri Systems

Beyond the Manila Folder - Sharing Heritage Data; Andrew Forsberg

Book & Paper Session 2, 3-5pm

Changing Practices - Reviewing the Evolution of Treatment Approaches for the Collection of the Board of Trade and Design Registers 1839-1991 at the National Archives UK; Barbara Borghese



HOLLINGER METAL EDGE

Archival Storage Materials

We care about our quality! We care about our service!
We care about your professional needs!



Contact: ABBY SHAW • Cell 215.990.5306 • abbyashaw@me.com
hollingermetaledge.com 800-634-0491

Specialty Tracks – May 18, 19, 20

Exhibitor Experience: Hollinger Metal Edge, Inc.

Tango with Cows: Balancing Access and Preservation in a Research Collection; Melissa Huddleston and Rachel Rivenc

Conservation Treatment of Atlases, Foldouts, and Guarded Structures; Katherine Kelly

Emerging Conservation Professionals Network

Moderated Panel, 3pm

Conservation in a Changing World; Glenn Wharton, Sanchita Balachandran, Anisha Gupta, Joy Bloser, and Kris Cnossen

Poster Session, 4:30pm

Knowledge is Power: Take-aways from the Emerging Conservation Professionals Network 2018 Compensation Survey; Ashley Stanford, Michaela Paulson, Caitlin Richeson

Social Event, 5pm

Town Hall and Happy Hour; Emerging Conservation Professionals Network Officers

Wednesday, May 19

Architecture

Architecture Session 2, 12-2pm

A Tale of Two Cemeteries—Comparing Two Cemetery Surveys Conducted at Old City Cemetery in Jacksonville FL and the City of Miami Cemetery in Miami, FL; Caroline Dickensheets

Exhibitor Experience: National Center for Preservation Technology and Training (NCPTT)

Grave Goods Gone: The Lost (and Found) African-American Burials of Sandy Ground; Stephanie Hoagland

The Deinstallation of the Ancient Egyptian Tomb of Akhmerutnisut (c. 2500-2350 BCE) at the Museum of Fine Arts Boston: Creatively Overcoming Unknowns and Constraints to Safely Move Large Fragile Stones; William Remsen and Ian Stewart

Architecture Focused Posters; see posters p 33-34

ADG Business Meeting, 3pm

Book and Paper

Book & Paper Session 3, 12-2pm

An Investigation into the Stability of Thermal Copying Records in the US National Archives Produced from the 1950s to the 1970s; Henry Duan and Lisa Isbell

Exhibitor Experience: University Products

Does Iron-Gall Ink Corrosion Benefit from Nanocellulose-Phytate Treatment?; Laura Völkel and Antje Potthast

A Digital Imaging Tool for Identifying Photo-active Zinc Oxide Watercolor Pigments; Vanessa Johnson

Book & Paper Session 4, 3-5pm

Concepts and Components: A Discussion of the Preservation of Print Portfolios, Artists' Multiples and Commissioned Editions; Joan Weir

Exhibitor Experience: Getty Conservation Institute

From Prints to Paintings: The Transformation of Maria Sibylla Merian's Counterproofs; Catherine Stephens

Thursday, May 20

SPNHC

Session 1: Specimen Spotlight, 12-2pm

A Chance Encounter with a Coloring Book; Amy Pool

A-Maizing Paper; Susie Cobbledick

Hole-in-the-Water: Historic Preservation, Diving History, and the Creature from the Black Lagoon; Amy Jones Abbe

Gold, Deforestation, and the Demise of a Wet Evergreen Forest in Nicaragua; Amy Pool

The Deep Sea Comes to the MCZ; Jennifer Trimble

Frozen in Time: Documenting the Spread of Potato Blight in New England on Tomatoes; Michaela Schull

Fossil Cephalopod Species Known from a Single Specimen; Paul Mayer

Tunneling for the Future Reveals an Ancient Burrow (Thalassinoides); Patricia Coorrough Burke

Initiating the Red Wolf Repository at Arkansas State University: Combining Old Techniques to Spark a New Conservation Program and Natural History Collection; Kari Harris and Tracy Klotz

KREMER
PIGMENTE

MAYA BLUES

BLUE FINE ARTIST INKS

BLUE WATERCOLORS

LAPIS LAZULI

SMALT

AZURITE

**You can find a large
selection of blue colors
in our online shop**

www.kremerpigments.com

Specialty Tracks – May 21, 24, 25

Exhibitor Experience: Axiell

Promoting Exhibit Access and Safety: A Collaborative Approach to Collections Care; Samantha Snell, Jeff Hirsch, and Cali Martin

Book and Paper

Book & Paper Session 5, 12–2pm

Defending the Diefenbunker’s Murals: Conservation and Protection of Two Murals Displayed Three Stories Underground; Kyla Ubbink and Sean Campbell

Exhibitor Experience: Prairie Paper

Conserving the Australian Characeae Collection; Briony Pemberton and Katy Glen

From Book to Breechblock: A Preliminary Study of the Conservation of Waterlogged Paper Fragments from Site 31cr314, Queen Anne’s Revenge/La Concorde; Emily Rainwater and Kimberly Kenyon

BPG Wiki Session, 3–5pm

BPG Wiki Discussion Session; Diane Knauf, Michelle Smith

Friday, May 21

Architecture

ASG Business Meeting, 12pm

Book and Paper

LACDG Session, 12–2pm

Library and Archives Conservation: Priorities of the Past, Present, and Future; Amy Lubick and Lauren Telepak

Exhibitor Experience: NEDCC

Monday, May 24

Book and Paper

Poster Session 2, 12–2pm

Books, Paper, Photos Care and Research Focused Posters; see page 33–34. Moderator: Fletcher Durant

Tuesday, May 25

Research & Technical Studies

Advancement of Science and Technology, 12–2pm

Cultural Heritage Meets Biotechnology: Nature-Science Collaborations in the Symbiocene; Theanne Schiros

How Modern Mass Spectrometry is Reshaping What We Can Learn About Paintings, Objects, and Cultural Heritage; Caroline Tokarski

Exhibitor Experience: TandD US, LLC

Of Light and Darkness: The Use of Microfadometry in Loan Decisions; Emilie Cloos

Diving Deeper into the Origins and Intent of Organic Materials in Cultural Heritage by Combining DNA and Mass Spectrometry; Julie Arslanoglu

Wooden Artifacts

Wooden Artifacts Session 1, 12–2pm

Exhibit Case as a Compatible/Incompatible Object? - Part 2 for Wooden Artifacts (see Part 1 in Concurrent General Sessions); Ellen Carrlee

Exhibitor Experience: G.C. Laser Systems

String Theory: The Comparative Treatments of Two Musical Instruments; Emily Brzezinski, Sarah Towers

Treating an Oil-Gilt J.M.W. Turner Picture Frame; Ines Bravo

Demonstration of Gilding Methods, Materials, and Techniques; Behrooz Salimnejad

RATS & Imaging Working Group

Joint Session, 3–5pm

The Discovery of Community Stakeholders Through the Technical Imaging Analysis of Georgia O’Keefe’s “Pelvis Series, Red and Yellow,” 1946, Oil on Canvas, 36’ x 48”; Dale Kronkright

Exhibitor Experience: Getty Conservation Institute

Building Reliable and Reusable Complex Digital Representations: The Digital Lab Notebook; Carla Shroer

Exhibitor Experience: Hirox

Virtual Reality: A Useful Tool for Historic Preservation; Yeneneh Terefe

Imaging Working Group Social Hour, 5pm

Wednesday, May 26

RATS & Imaging Working Group

Joint Session: Case Studies and Applications, 12–2pm

Recapturing Ancient Identities: Challenges and Discoveries from the Multispectral Imaging of Roman Egyptian Stelae at the Kelsey Museum; Caroline Roberts

Exhibitor Experience: Onset

Practical LED-based Multispectral Imaging of Cultural Heritage Materials; Olivia Kuzio

Optical 3D Scanning System to Enable 3D Viewing, Sharing, and Printing of Artworks; Yi Yang

Exhibitor Experience: Opus Instruments

Titian's Rape of Europa: Artist's Pigments and Changes Revealed through Macro-XRF Mapping; Jessica Chloros, Aaron Shugar

Wooden Artifacts

Wooden Artifacts Session 2, 12–2pm

Assessing the Interaction of Commonly Used Wood Adhesives and Fillers in Conservation for Hardwood and Softwood, and Their Behavior in Monsoon Conditions; Cindy Lau

Exhibitor Experience: G.C. Laser Systems, Inc.

The Efficient Methods of Studying Previous Interventions, Materials, and Techniques Used in Tutankhamun's Painted Wooden Bed; Mohamed Moustafa

A Gothic Revival: Treatment of a 19th-century Red Goatskin Leather Tufted Sofa; Gert van Gerven

Research & Technical Studies

Case Studies, 3–5pm

The Development and Application of Instrumental Methods for the Identification of Materials and Processes Used in the Manufacture of Orotone Photographs; Ivanny Jacome Ottati

Exhibitor Experience: Middleton Spectral Vision

A Low-cost, Open Source Micro-fading Tester: Construction, Characterization, and Use; JP Brown, Jacob Thomas

Principles on Paper: Using FTIR Spectroscopy and Chemometrics for Non-Invasive Media Analysis; Julie Wertz, Leonie Müller

Exhibitor Experience: Picturae

Elucidation of Natural Organic Red Colorants on Paper via Microsampling and Surface Enhanced Raman Spectroscopy; Lyndsay Kissell

Thursday, May 27

RATS & SPNHC

Joint Session, 12–2pm

Comparing Accelerated Weathering and Degradation of Consolidants Used to Stabilize Paper Shale Fossils; Catherine Cooper

Reconstructing Asia's Ancient Ivory Trade: PCR and NGS DNA Analysis of Elephant Tusk Sections from the Field Museum's Java Sea Shipwreck Collection; Stephanie Hornbeck

Exhibitor Experience: Barnett Technical Services

Put the Lime in the Coconut: An Investigation of the Mechanical and Aging Properties of Coconut Shell and Recommendations for Compatible Conservation Materials; Elena Bowen

Exhibitor Experience: Applied Surface Technologies

Mineral Transformations on Pyrite: Microscopic to Macroscopic Perspectives; Chris Tacker

Early Plastics, Taxidermy, and Conservation at the Field Museum; Daniel Kaping

Health & Safety

Get the Lead Out, 3–5pm

Handling and treatment of lead-containing materials; Monona Rossol

Friday, May 28

Research & Technical Studies

RATS Business Meeting, 12pm

Wooden Artifacts

WAG Business Meeting, 1pm

Specialty Tracks – June 1, 2, 3, 4

Tuesday, June 1

SPNHC

Digitization and Data Management in the Preservation of Natural History – Part 1, 12–2pm

Workflow for Digitizing Ordovician Fossil Invertebrates via Batch Image Uploads; Catherine Wiegand

Exhibitor Experience: Digital Transitions, Inc.

Bringing the Past into the Present: Digitizing Specimen Inventory and Micro-CT Scans for Upload to Open Access Platforms; Lyndell Bade and Jordan Zajac

BugFlow: A Community-Driven Repository for Entomology Digitization Resources; Tommy McElrath

Wednesday, June 2

Collection Care and Health & Safety

Joint Session, Hazardous Materials, 12–2pm

Consequences of p-Dichlorobenzene Treatments: Collection Access Restrictions, Case Decontamination Labor and Residual Health Risk; Kathryn Makos and Catherine Hawks

Exhibitor Experience: Talas

Arsenic and Old Feathers: A Survey of Detection, Mitigation and Treatment Approaches for Pesticide-Affected Objects and Creating a Treatment Protocol at SUNY Buffalo State; Liatte Dotan

Exhibitor Experience: BMS CAT

When the Dust Isn't Settled: Stakeholder Conversations in the Removal of Hazardous Material from World Trade Center Artifacts; Lisa Conte and Kerith Koss Schrager

Collection Care

Integrated Pest Management, 3–5pm

Museum Pest Control: A Survey of Collections Care Trends; Lisa Goldberg and Julie Unruh

Buggin Out; Heather Parks

Exhibitor Experience: Conserv

Lizards in the Library: A Case Study of an Established Resident Population of Mediterranean House Geckos in Collections Storage Areas and the Potential Impact of Global Warming on Other Institutions; Alan Van Dyke

Exhibitor Experience: Zone Display Cases

An Odd Problem to Face: Integrated Pest Management and *Thyloglyphus contractus* (Odd Beetle); Rebecca Newberry

Thursday, June 3

Collection Care

Collection Care Adaptations, 12–2pm

Learning from Incidents: Artwork Interaction Reporting and Lessons; Samantha Owens

A Slack-Filled (r)evolution: Working Remotely Planet-Wide, Together; Genevieve E. Tocci and Deborah L. Paul

Exhibitor Experience: Crystallizations Systems

Collections Care From Home: Lessons Learned From the COVID-19 Pandemic; Alan Van Dyke and Genevieve Pierce

Distance Management for Collection Preservation: Is this the Future?; Lisa Elkin and Julia Sybalsky

Exhibitor Experience: Museum Services Corporation

Twelve Months, 2,500 Objects: Condition Reporting During Deinstallation of Exhibits at the Yale Peabody Museum of Natural History; Mariana Di Giacomo

Friday, June 4

2021 Scholarly Writing Session, 10:30am

Collection Care

Storage, 12–2pm

Boxing with Leopold von Ranke; David Stokoe

Stewardship and Storage: Rehousing and Reorganizing NMAI's Textile Collection; Hanna Muchnick and Nora Frankel

Exhibitor Experience: Goppion

Plastics in Natural History Collections – A Case Study; Peter Giere

Safe to Shelf? Unusual Enclosures for Challenging Materials; Susie Cobbledick

Exhibitor Experience: Gaylord Archival

An Affordable System for Converting Pallet Rack Shelving to Bin Storage for Framed Works of Art; T. Ashley McGrew

Storage Improvements for Tanned Mammal Skins at the Michigan State University Museum; Laura Abraczinskas and Barbara Lundrigan

June 7, 8, 9, 10 – Specialty Tracks

Monday, June 7

Contemporary Art

Contemporary Art Session 1, 3–5pm

How to Cure a Headache: A Collaborative Approach to Unfreezing the Motion of Claes Oldenburg's Ice Bag; Céline Chrétien

Exhibitor Experience: BMS CAT

I See What I See: Identification of Gas Composition of "Neon" Light Units in Artworks; Taylor Healy

Problem d5-Solved! Removing Adhered and Imbedded Tissue Paper from the Entire Surface of an Oversized, Heavily Impasto, and Topographical Contemporary Acrylic Painting Using the Modular Cleaning Program; Elise Yvonne Rousseau

Visit the Exhibitor Showcases on June 7 & 21 at 12pm EDT for practical applications, demos, and video introductions to our 2021 exhibitors. Giveaway drawings will be held during the showcases – just be present to win!

Tuesday, June 8

Contemporary Art

Contemporary Art Session 2, 12–2pm

Spaces That Evolve and the Artist's Intent: Integrity in Public Art Conservation; Ruth del Fresno-Guillem and Rita Amor

Exhibitor Experience: Onset

Adapting for the Long Term: The Realization of Robert Gober's Untitled, 1992 as a Lasting Installation; Samantha Owens and Austin Anderson

Phantom Thread: Research and Preparation for the Care of a Delicate Silk and Metal Sculpture by Doris Salcedo; Megan Salas

Electronic Media

Electronic Media Session 1, 3–5pm

Building Preventative Conservation & Documentation into a Private Digital Art Collection; Kate Weinstein

Divergent Conservation: Cultural Sector Opportunities and Challenges Relating to the Development of Time-Based Art Conservation in Australasia; Asti Sherring

Collecting in the Shadow of the State: Acquiring performance at IMMA and institutions of care in the Irish context; Brian Castriota

Wednesday, June 9

Contemporary Art & Electronic Media

Joint Session 1: Transforming Ownership into a Network of Care, 12–2pm

In Search of Sustainable Care for Digital Art: Establishing Networks, Enhancing Collaboration and Shifting from Ownership to Commons; Panel with Annet Dekker, Marina Valle Noronha, and Aga Wielocha

Exhibitor Experience: Gaylord Archival

Electronic Media

Electronic Media Session 2, 3–5pm

Sine Waves, Sounds and Sensations; Agathe Jarczyk and Sophie Bunz

Exhibitor Experience

The Installation and Long-Term Preservation of Alex Da Corte's Rubber Pencil Devil at the Dallas Museum of Art; Elena Torok

Why Ask a 60 Year Old to Run a Daily Marathon? The Conundrum of Documenting and Displaying Kinetic Art by Jean Tinguely; Jane Gillies

Thursday, June 10

SPNHC

Digitization and Data Management in the Preservation of Natural History – Part 2, 12–2pm

Stop Digitizing YOUR Collection: Notes from Idigbio's Southern Rocky Mountain Thematic Collections Network to Help Strategize Digitization across Consortia and Regional Projects; Ryan Allen

Ch-ch-ch-ch-CHANGES: Turn and Face the Strange, Amounts of Ecological Data Hidden in Natural Resource Surveys; Randy Singer

Exhibitor Experience: Picturae

Arctos: The Community Model for Museum Biorepositories; Mariel Campbell

Exhibitor Experience: OPUS Instruments (ATIK Cameras)

Specialty Tracks – June 11, 14, 15

Appreciating the Little Things in Life: Molecular Technologies Driving New Methodologies in Specimen Preservation and Management; James Macklin

Contemporary Art & Electronic Media

Joint Session 2: Transforming Ownership into a Network of Care, 12–2pm

New Art and New Ways of Institutional Collecting: From Possession to Partnership; Aga Wielocha

Exhibitor Experience: Kremer Pigments, Inc.

How to Lose Control and Learn to like It (the Story of Planetary); Jessica Walthew and Ben Fino-Radin

Trust and Oral Tradition as a Proposed Strategy for the Conservation of Performance Art: Indigenous Approach and Inclusivity; Ruth del Fresno-Guillem

Joint Session 3: Transforming Ownership into a Network of Care, 12–2pm 3–5pm

Murals and the Matter of Cultural Heritage; Lorraine Lezama Lazard

SFMOMA Policy on Reprinting: New Challenges and Opportunities; Roberta Piantavigna

Developing a Community of Practice between M+ and AGNSW for the Preservation of Two Editions of a Complex Time-Based Media Installation Artwork, Yin Xiuzhen's Beijing Opera (2000, 2001); Asti Sherring and Rebecca Barnott-Clement

Friday, June 11

Contemporary Art

CAN! Business Meeting, 12pm

Electronic Media

EMG Business Meeting, 3pm

Monday, June 14

Sustainability

Sustainability, 12–2pm

Evaluating the Effects of COVID-19 Changes in Mechanical System Operation on Collections Environments; Kelly Krish

The Migration of Coconuts: The Historic Uses of Coconut Shell Across Cultures and its Presence in Museum Collections; Elena Bowen

Sustainability Committee Open House

SPNHC

Collection Theft and Security – Monitoring of Collections, 12–2pm

Security and Collection Theft; Paul Mayer

Exhibitor Experience: Bioshare Digitization

Turning Lemons into Lemonade: Managing Security and Risk at the Yale Peabody Museum of Natural History; Russell D. White

Virtual Security of Museum Collections; Breda Zimkus

Tuesday, June 15

Textiles

Textiles Session 1, 12–2pm

Re-Examining Surfactant Choices in Textile Conservation; Callie Jerman

“How Does My Stitch Work?” an Attempt to Evaluate Stitching Methods in Tapestry Conservation; Eva Catic

Exhibitor Experience: Dorfman

Testing Urease and Protease Enzymes for Use with Cellulosic Textiles; Zoey Hasselbring

Little Friends, Big Problems: Treatment and Analysis of the Garments on the Libbey Doll Collection; Marissa Stevenson

Book & Paper and Photographic Materials

Joint Session 1, 12–2pm

Photograph Albums: Cross-disciplinary Decisions for These Most Delicate Bound Volumes; Georgia Southworth

Exhibitor Experience: Carestream

Revisiting and Reconsidering Disbound Albums; Anne Marigza

Japanese Tourist Albums in the Collection of the Art Institute Chicago: their complex interpretation and material deterioration; Nayla Maaruf

Joint Session 2, 3–5pm

Camera Work: One Size Treatment Does Not Fit All; Sophie Barbisan

Exhibitor Experience: Foster + Freeman

Lord Fitzwilliam's Print Albums as Evidence; Harry Metcalf

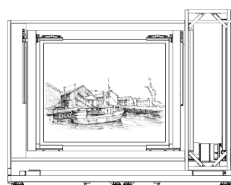
Art X-Ray Inspection



NanoRay has successfully developed a portfolio of intelligent Automated Art X-Ray Inspection Solutions, with patented Transmission X-Ray Technology, to help in **preventive maintenance, restoration and research** of **Paintings, Sculptures, Artifacts** etc. and ensure the safe keep of priceless heritage of mankind.

Product

PXR Series



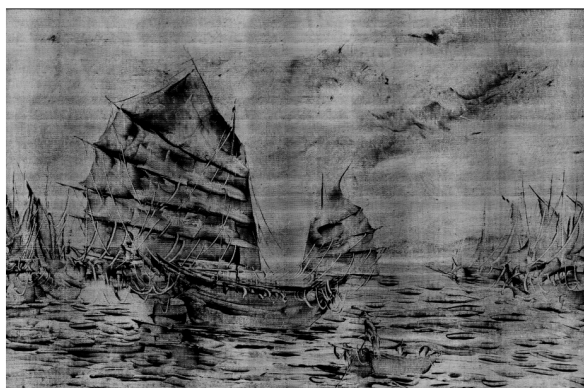
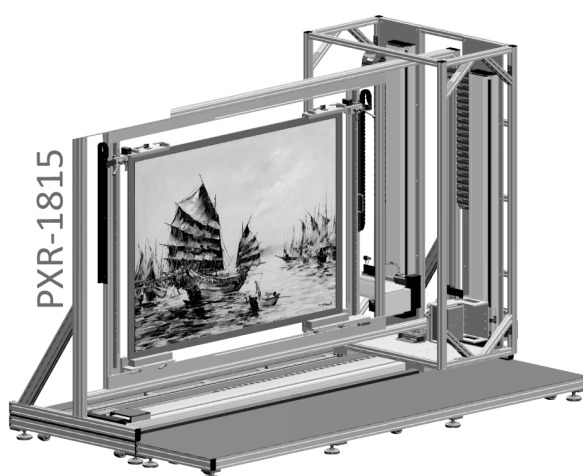
360Ray Series



PortaRay Series



Benchtop Series



Key Features

Auto Positioning



Wide Angle



Auto Stitching



Safe and Gentle



Intelligent Analysis



Custom Design



Application

Preventive Maintenance

Restoration

Authentication

Art Study

Reach us at partners@nanoray.com

www.artxray.net
www.nanoray.com

Specialty Tracks – June 16, 17

The Jessie Fuller Scrapbook: Balancing access and context in the treatment of an important Black Sorority Scrapbook from 1949 with a unique but damaging structure; Sue Donovan and Krystal Appiah

Textiles

Poster Session 3, 3–5pm

Textile Focused Posters; see posters p 33-34

Wednesday, June 16

Photographic Materials

Photographic Materials Session 1, 12–2pm

Disinfection of Photographic Materials with Ethanol Vapours: Preliminary Evaluation of the Effects on Chromogenic Prints; Chloé Lucas

Exhibitor Experience: Polygon

Mass-Treatment of E. S. Curtis' the North American Indian Photogravures Mass-Treatment of E. S. Curtis' the North American Indian Photogravures; Richard Stenman and Sara Bone

Scanning Micro-Xrf for Historical Photography; Nigel Kelly

Textiles

Textiles Session 2, Lessons Learned: Pandemic Edition, 12–2pm

Taking It “off the Wall”: Deinstallation during a Pandemic; Sara Reiter

Drains and Flies during the Time of COVID: A Review of Treating Inactive Drains; Ann Frisina

Exhibitor Experience: Test Fabrics

Mentoring – How It Can Be Used to Share Information with the Next Generation of Conservators; Gail Niinima

Mentoring – Protect & Supervise: Managing Staff Risk during COVID to Continue in Person Conservation Mentoring and Lab Activity; Gretchen Guidess

Exhibitor Experience: Tru Vue

Embroidery up Close: Public Programming during Quarantine; Laura Mina and Kate Sahmel

Photographic Materials

Photographic Materials Session 2, 3–5pm

Photography beyond Two Dimensions – Exhibition and Re-Valuation of Materiality; Catarina Pereira

Exhibitor Experience: Prairie Paper

International Collaboration, and the Potential of Virtual Condition Surveys - the Conservation Assessment of a Collection of Linnaeus Tripe Photographs at the University of Yangon Central Library, Myanmar; Tess Hamilton and Natasha Kung

The Transformation and Printing of Claude Marie Ferrier's Albumen on Glass Negatives by Robert Jefferson Bingham; Nicholas Burnett

Thursday, June 17

Photographic Materials

Photographic Materials Session 3, 12–2pm

The Treatment and Preservation of the Emily Howland Photograph Album; Jennifer Evers and Alisha Chipman

Exhibitor Experience: Print File

Rare Findings – Pannotypes in the Design Registers of the Board of Trade Collection at the National Archives; Ioannis Vasallos

Intervention Criteria of Two Photographic Albums; Pablo Ruiz

SPNHC

Using Natural History Collections as an Education Tool, 12–2pm

Using Natural History Collections to Communicate Social Issues: The Hand Lens; Nicole Tarnowsky and Laura Briscoe

Building Bridges between Classrooms and Collections at California Botanic Garden: A Pilot Study; Mare Nazaire

Exhibitor Experience: Spacesaver

Student-Focused, Career-Driven, Exploration in Natural History Museums through Experiential Education and Mentorship; Adania Flemming

“We Found the Passenger Pigeon?!”: Hands on Student-Involvement in Preservation and Curation of a Neglected and Historic Natural History Collection at a Small Undergraduate Institution; Lyndell Bade

Photographic Materials

Photographic Materials Session 4, 3–5pm

A Sticky Situation: The Preservation of Self-Adhesive Photograph Albums; Amber Kehoe

Exhibitor Experience: MICRO

June 18, 21, 22 – Specialty Tracks

Material Characterization and Decision Making in the Conservation of ICT's Photographic Album; Joana Sobral and Élia Roldão

Tips Session

Textiles

TSG Business Meeting, 3pm

Friday, June 18

Photographic Materials

PMG Business Meeting, 1pm

Monday, June 21

Visit the Exhibitor Showcase on June 21 at 12pm EDT for practical applications, demos, and video introductions to our 2021 exhibitors. Giveaway drawings will be held during the showcases – just be present to win!

SPNHC

Digitized Specimen Data Use by Non-academic and Non-museum Agencies, 11am–2pm

Finding the Lost Herbaria in Arkansas; Diana Soteropoulos

The Fishes of Texas Project's Impact on both Conservation Science and Management and a Fish Collection; Dean A. Hendrickson and Adam E. Cohen

Bringing the Extended Specimen into Adaptive Management: Collections informing Conservation; Anna Monfils

Student-led Entomology Collection Digitization and Protocol Development for TCN; Monique Raymond and Jenna O'del

Exhibitor Experience: MICRO

Use of Digitized Natural History Collections Data to Inform Conservation Management Decisions for RTE Plant Species in South Carolina; Herrick Brown

Lessons in data collection, management, and dissemination across multiple biodiversity projects; Rachel Hackett

Extending Herbarium Specimen Data Beyond the Ivory Walls – A Case Study from the Consortium of Pacific

Northwest Herbaria Online Database; David Giblin

Mining the Digital Treasure Trove: The Value of Digitized Herbarium Specimens to State Natural Heritage Programs, and Recommendations for Enhancing the Value of Future Collections; Theo Witsell

How Digitized Herbarium Specimens Contribute to Biodiversity Inventory and Conservation Planning in a Rapidly Developing Region of Northwest Arkansas; Theo Witsell

Objects

Poster Session 4, 3–5pm

Objects Focused Posters; see posters p 33–34

Tuesday, June 22

Objects

Objects Session 1, 12–2pm

Horse on Parade: Conservation of a 17th century Bamen Mask; Jane Gillies

Tlingit Strong Suits: The Collaborative Treatment and Mounting of Tlingit Armor at the American Museum of Natural History; Amanda Chau and Amy Tjong

Exhibitor Experience: Delta Designs

Picking up the Pieces: Stabilization and Repair of a Mask from Papua New Guinea; Megan Salas

Objects Session 2, 3–5pm

Stained Glass: The impact of Florida's Tropical Environment on These Pieces Indoors and the Transformative Effect of Treatment; Julie Flynn

The Conservation of the San Xavier Mission Bells; Nancy Odegaard

Exhibitor Experience: Goppion

Living the Life of Riley: Treatment of a Wooden Display Horse; Alison Fleming

Natural History 101: Considerations for Conservators; Bethany Palumbo

Paintings

Paintings Session 1, 12–2pm

Reframing Black Art: William H. Johnson's Fighters for Freedom Series; Keara Teeter

"If I Could Say It In Words, There Would Be No Reason To Paint." – E. Hopper; Gwen Manthey

Specialty Tracks – June 23, 24, 25

Exhibitor Experience: Bruker

Training the next generation: A Conserving Canvas collaboration between The Ringling and ArtCare Conservation; Megan Salazar-Walsh and Barbara Ramsay

Poster Session 5, 3-5pm

Paintings Focused Posters; see posters p 33-34

Wednesday, June 23

Paintings

Paintings Session 2, 12-2pm

She Persisted: The Evolving Painting Practice of Alma Woodsey Thomas; Sydney Nikolaus and Gwen Manthey

Forgotten histories: The treatment of Kumi Sugai's 'Fuyu'; Ruby Awburn

Exhibitor Experience: Crystalizations Systems

Paintings Transport by Sea: A Special Case Study for Vibration Risk Analysis; William Wei

Titian's Rape of Europa: Conservation, Restoration and Observations on the Artist's Technique (Part II); Gianfranco Pocobene

Objects

Objects Session 3, 12-2:30pm

Materials and Meaning in the Study of a Kongo Nkisi Nkondi: The power of collaboration; Kate Gabrielli

In the Market for Repairs: Early 20th Century African Objects at the Fowler Museum; Marci Burton

Exhibitor Experience: SmallCorp

Technical Study of an Egyptian Cast Plaster Mummy Mask in the Collection of the Harvard Art Museums; Haddon Dine

A Specific Object's Journey from Green Gallery to the National Mall: A Comparison of Two Donald Judd Works; Elena Bowen and LaStarsha McGarity

Thursday, June 24

Paintings

Paintings Session 2, 12-2pm

Redefining seeing: Toni Laselle's studio practice and working methodologies; Corina E. Rogge

Untangling Truth, Authenticity, and Lies in Metaphysical Paintings by Giorgio de Chirico; Corina E. Rogge

Exhibitor Experience: Zarbeco

Lady in Blue: Mitigation of Blanching Through Varnish Application on a 16th Century Portrait; Rachel Childers

Objects and SPNHC

Joint Session, 12-2pm

Lascaux and its application in the restoration of taxidermy and entomology collections; Bethany Palumbo

Off the Wall - The study and repair of a shattered taxidermy Mouflon shoulder mount; Nicole Feldman

Exhibitor Experience: Bruker

Conservation of 18th century bound herbaria - three visions of ethical treatment; Magdalena Grenda-Kurmanow

Objects

Poster Session 6, 3-5pm

Objects Focused Posters; see posters p 33-34

Paintings

PSG Business Meeting, 3pm

Friday, June 25

Objects

OSG Business Meeting, 3pm


SPNHC

Open Session, 12-2pm

SPNHC Special Interest Groups Open Session



**Is your herbarium ready
to turn over a new leaf?**


PICTURAE
www.picturae.com

We image 200.000 herbarium
sheets per week.

Preservation . . . Based on Data !!

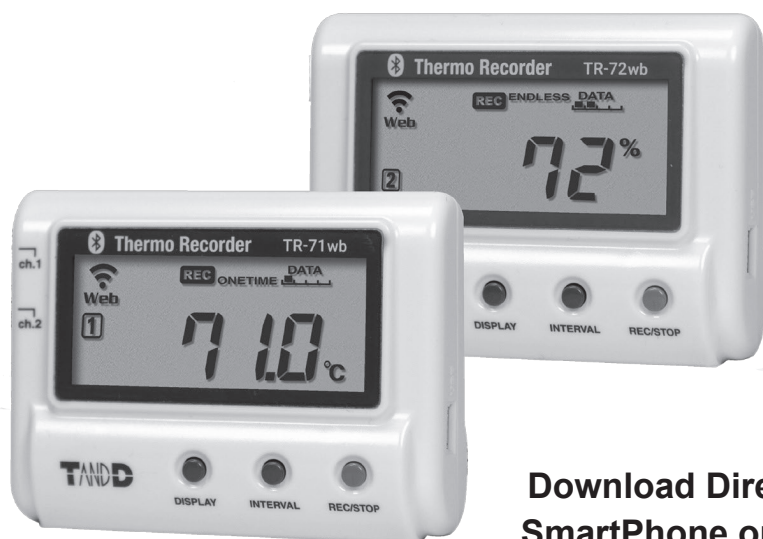
Essential Tools for Conservators

Real-Time Monitoring
with E-Mail Alerts

No Monthly
Fees!



Free T&D Thermo
App for
iOS & Android!



Wi-Fi or
Ethernet

Download Directly to
SmartPhone or Tablet
via Bluetooth



**Automated Error-Free Data Collection
With Free Cloud Storage!**

**TR-7 Temperature & Humidity
Battery Powered Data Loggers**

***from* TANDD**

ECPN Poster

Tuesday, May 18, 4:30-6pm

Knowledge is Power: Take-aways from the Emerging Conservation Professionals Network 2018 Compensation Survey; Ashley Stanford, Michaela Paulson, Caitlin Richeson

AIC's Emerging Conservation Professionals Network Liaison Program; Ashley Stanford

Architecture Focused Posters

Wednesday, May 19, 3-5pm

Dealing with Death and Digital Assets: Crowdsourced Transcription of a Cemetery's Pre-existing Digital Surrogates During a Pandemic; Thom Burns and Elizabeth Mauer Casner

Preserving Heritage Preservation: A Website and Database for Exploring the Organization's History; Madeline Hagerman and Rebecca A. Rushfield

Book, Paper, and Photo Care and Research Focused Posters

Monday, May 24, 12-2pm

Collection Care Solutions for Plastics in Library and Archival Collections—An Update; Chantal Stein

Aluminum Foil as a Cathodic Protector to Prevent Silver Mirroring on Silver Based Photographic Materials; Mohamed Hendy and Reham Tarck

Balancing Tertiary Institutions' Expansion Drive with Conservation Needs of Their Libraries: The Case of the Book Binding Unit in the Library of the Midlands State University in Zimbabwe; Davison Chiwara

Exhibitor Experience

Tidelines: Too Hot To Handle? Thermal Observations of the Wet-Dry Interface; Grace Walters

Between Originality and Functionality. Conservation Challenges of Two Photographic Albums Belonging to the Saturnino Herrán Foundation; Ariadna Rodriguez

Examination of the Effects of Various Water Emergency Scenarios on Inkjet Prints Past to Present; Daniel Burge

Preservation of a 15th Century Spanish Antiphonary; Christopher Saclolo

28 Feet Long! 1910 Railroad Elevation Map Conserved; Luana Maekawa and Terrance D'Ambrosio

A Delicate Balance: Preparing a Parchment Fragment for Posterity; Maren Rozumalski

Reproduction of an 18th Century Paper Mould and Deckle; Emily Mercer

Leather Selection and Use: The Impact of Conservators' Choices; Kristi Wright

Textile Focused Posters

Tuesday, June 15, 3-5pm

Beyond Stain Reduction: A Collaborative Solution for Reducing the Appearance of a Stubborn Stain; Katherine Sahmel

Markings of the Turning Point: Preserving the Last Surviving Example of Invasion Stripes on a World War II Bomber; Karen Wilcox

An Evaluating Study of Using Biotechnology Process in Egyptian Historical Textile Conservation: A Practical Application; Harby Ahmed

Objects Focused Posters

Monday, June 21, 3-5pm

The use of Additive Manufacturing technology for the aesthetic restoration of ceramic and glass artefacts: the research so far; Erato Kartaki

A Minimally Invasive Treatment on an Églomisé Looking Glass; Caroline Shaver

From Books to Boots; James Davis

Shifu: The Ancient Craft of Handmade Paper Thread and Its Application in the Treatment of a Hupa Indian Basketry Hat; Christine Manwiller

Conservation Processes of a Painted Wooden Coffin at Saqqara Area; Abdelmoniem M. Abdelmoniem

Application Methods of a Black Resin Layer on the Funerary Equipment from the New Kingdom to the Ptolemaic era of Egypt; Abdelmoniem M. Abdelmoniem

Restoration of a Victorian Bird Display: A Case Study; Gretchen Anderson

Aqueous Cleaning of The Surveying of Washington DC by Benjamin Banneker; LaStarsha McGarity

Approaches to Collaborative Conservation at the Field Museum During the Age of Covid-19; Erin Murphy

An Atypical Approach for a Typical Problem: Loss Compensation for a 19th Century Quilt; Jacquelyn Peterson-Grace

Poster Sessions

Paintings Focused Posters

Tuesday, June 22, 3-5pm

Cleaning of matte white polyvinyl acetate paint with Nanorestore Gels; Anne Schmid

Data Visualization for Understanding Widespread Efflorescence Formation on a Collection of Oil Paintings by Edwin Austin Abbey; Katherine (Kiki) Peters

Mining the archives: Pigment availability in 18th-century Philadelphia; Mina Porell

Migration of Colors: Digital Consolidation and Mapping of Material Art History; Thiago Piwowarczyk

Magnetic holders with pressure adjustment – new possibilities in the conservation of paintings and displaying works of art and artifacts; Zuzanna Szozda

Objects Focused Posters

Thursday, June 24, 3-5pm

Objects of Power: protocols developed in partnership with Northwest Coast native communities; Michaela Paulson and Amy Tijong

Printed Manufacture Techniques Identifying 3D Printed Manufacture Techniques; Stephanie Guidera

Out with the old and in with the new? A preliminary assessment of storage conditions in the Yale Babylonian Collection; Aliza Taft

Preventive Conservation at University of Sao Paulo: challenges for collections storage; Ina Hergert and Juliana Saft

Evaluation of two-part barrier systems to prevent siloxane staining on porous archaeological surfaces; Kasey Hamilton

Tough Love for Magnesium; Daniel Ravizza

I'm Rubber and You're Glue: Preliminary Investigations into Compatible Adhesives for Elastomeric Materials; Marci Jefcoat Burton

Beva Gel as a fill material for wax artwork; Megan Randall

Visit the Exhibitor Showcases on June 7 & 21 at 12pm EDT for practical applications, demos, and video introductions to our 2021 exhibitors.

Giveaway drawings will be held during the showcases – just be present to win!



As 2020 clearly showed us...
we can do ANYTHING, ANYWHERE,
as long as we have the right TOOLS



**UNIVERSITY
PRODUCTS**
THINKING IN & OUT OF THE BOX SINCE 1968

The right tools & supplies for conservation professionals
WWW.UNIVERSITYPRODUCTS.COM

INFO@UNIVERSITYPRODUCTS.COM OR CALL 800.628.1912

WE LISTENED. WE LEARNED. WE INNOVATED.

CSI Transporter* and PerfectFit™ systems are changing the way collections are organized, stored and moved.

CSI Transporter systems arrive fully assembled. Their superior maneuverability makes them ideal for tight confines.

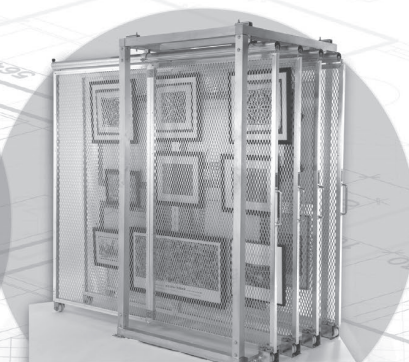
The easy to assemble, PerfectFit™ moving painting storage comes as a kit and requires no loading dock or freight elevator.

Both are precision-engineered of lightweight, non-outgassing aluminum and available in standard and customized configurations for museums, private collections, labs, and historic houses.

For demonstration videos, visit our website.



TRANSPORTER



PERFECTFIT™

CSI

Crystalizations Systems, Inc.

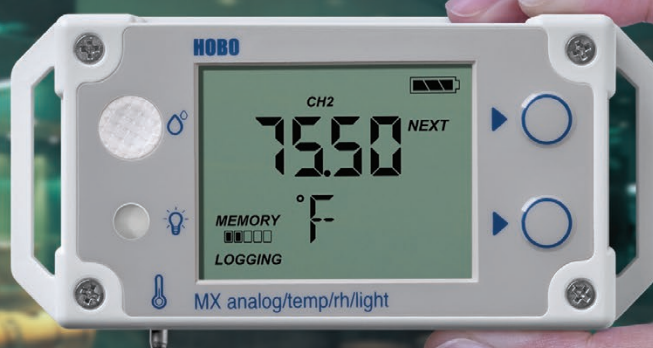
Visit us online,
and we hope to
see you next year!

*Patent Pending

Crystalizations Systems, Inc.
1401 Lincoln Avenue • Holbrook, NY 11741 USA • www.csistorage.com • 631-467-0090

NEW! HOBO MX Multi-Channel Data Loggers

- Convenient wireless setup and easy data offload via BLE
- Highly-accurate measurements and large memory
- Fast deployment using optional Self-Describing sensors with automatic configuration
- Optional MX Gateway for near real-time, remote access to data in cloud-based HOBOLink software



Visit onsetcomp.com/aic
Call 1-800-LOGGERS
Email sales@onsetcomp.com

HOBO by Onset

2021 Exhibitor Profiles

Visit the Exhibitor Showcases on June 7 & 21 at 12pm EDT for practical applications, demos, and video introductions to our 2021 exhibitors.

Giveaway drawings will be held during the showcases – just be present to win!

PLATINUM LEVEL

BRUKER CORPORATION

Exhibitor Experience:

- May 13 @ 1:00 – 1:10 pm, Transformative Research and Treatment in the Care of Natural History Collections, Part 1
- June 22 @ 1:00 – 1:10 pm, Paintings Session 1
- June 23 @ 4:00 – 4:10 pm, Paintings Session 3

5465 E. Cheryl Parkway, Madison, WI 53711 USA

Contact: Kodi Morton

Ph: 608-276-3017 Fx: 608-276-3006

Email: kodi.morton@bruker.com

Website: www.bruker.com

Bruker is one of the world's leading analytical instrumentation companies. We cover a broad spectrum of advanced solutions in all fields of research and development. Bruker's innovative methods and non-destructive analytical techniques help to protect and preserve artifacts and historical monuments all over the world.

GETTY CONSERVATION INSTITUTE

Exhibitor Experience:

- May 12 @ 1:00 – 1:10 pm, Creating Connections & Community During COVID, Part 1
- May 19 @ 4:00 – 4:10 pm, Book & Paper Session 4
- May 25 @ 4:00 – 4:10 pm, Research & Technical Studies Session 2

1200 Getty Center Dr., Ste. 700, Los Angeles, CA 90049 USA

Contact: Anna Zagorski

Ph: 310-440-7325

Email: azagorski@getty.edu

Website: www.getty.edu/conservation

The Getty Conservation Institute (GCI) works internationally to advance conservation practice in the visual arts—broadly interpreted to include objects, collections, architecture, and sites. The Institute serves the conservation community through scientific research, education and training, field projects, and the dissemination of information. In all its endeavors, the GCI creates and delivers knowledge that contributes to the conservation of the world's cultural heritage.

GOPPION

Exhibitor Experience:

- May 12 @ 1:00 – 1:10 pm, On Display, Part 1
- June 4 @ 12:55 – 1:10 pm, CCN Session 4
- June 22 @ 3:50 – 4:00 pm, Objects Session 1

205 Mount Auburn St.,

Watertown, MA 02472 USA

Contact: Bruno Goppion, Ted Paschkis

Ph: 617-297-2546 Fx: 617-848-2641

Email: bgoppion@goppion-us.com,

tpaschkis@goppion-us.com

Website: www.goppion.com

Goppion designs, develops, builds, and installs state-of-the-art display cases and museum installations. We work with curators, designers, and conservators to resolve all exhibition display-related issues with engineering solutions. Our tradition of innovation is sustained by our collaborations with our clients, including some of the most highly regarded architects, designers, and cultural institutions throughout the world.

DIAMOND LEVEL

TRU VUE, INC

Exhibitor Experience:

- May 12 @ 4:00 – 4:10 pm, On Display – Part 2
- June 16 @ 12:30 – 12:40 pm, Textiles Session 2

9400 West 55th St., Countryside, IL 60525 USA

Contact: Yadin Larochette

Ph: 312-758-3737 Fx: 708-854-2660

Email: ylarochette@tru-vue.com

Website: www.tru-vue.com/museums-collections

With nearly 50 years of proven protection and preservation, Tru Vue fine art acrylic and glass solutions, including Optium Museum Acrylic and UltraVue Laminated Glass, are trusted by conservation and fine art professionals to protect and display the most celebrated artworks in the world. We work closely with the museum community to develop products that meet superior aesthetic and conservation standards. For more information visit our website.

GOLD LEVEL

CLICK NETHERFIELD

Exhibitor Experience:

- May 13 @ 4:00 – 4:10 pm, Transformative Research and Treatment in the Care of Natural History Collections, Part 2

1103 Laurel Oak Rd., Ste. 107, Voorhees, NJ 08043 USA

Contact: Ryan Skorch

Ph: 856-313-6688

Email: r.skorch@clicknetherfield.com

2021 Exhibitor Profiles

Website: www.clicknetherfield.com

With over 70 years of museum showcase experience across the globe, Click Netherfield is one of the leading international showcase producers, highly regarded for personal attention to detail, and relentless commitment to our Clients' conservation standards. With Click Netherfield, "Showcasing Your Vision" is a trustworthy partnership based on collaboration and the ability to tailor and adapt plans at every stage of your project. We do this through our unique ability to handle every part of your project in-house to exacting standards by experienced staff who work collaboratively, listening as much as managing, in every aspect of your project.

FOSTER + FREEMAN USA, INC.

Exhibitor Experience:

- May 18 @ 1:00 – 1:10 pm, Book & Paper Session 1
- June 15 @ 4:00 – 4:10 pm, Book & Paper and Photographic Materials Joint Session 2

46030 Manekin Plaza, Ste. 170, Sterling, VA 20166 USA

Contact: David Tobin

Ph: 888-445-5048 Fx: 888-445-5049

Email: usoffice@foosterfreeman.com

Website: www.foosterfreeman.com

Manufacturer of the Video Spectral Comparator (or "VSC") range of instruments for examining documents, paintings, and similar items. Also showing a new system suitable for larger items, called the Crime-lite ML-PRO. Sophisticated optics and specialized lighting allow viewing at various magnifications, throughout the UV, visible and infrared wavebands. Images are easily captured, analyzed, and compared via the user-friendly software.

G.C. LASER SYSTEMS, INC.

Exhibitor Experience:

- May 18 @ 1:00 – 1:10 pm, Architecture Session 1
- May 25 @ 12:50 – 1:00 pm, Wooden Artifacts Session 1

900 S. Des Plaines Ave., Forest Park, IL 60130 USA

Contact: Magdalena Dajnowski

Ph: 844-532-10641 Fx: 773-353-8699

Email: magdalena@gclasers.com

Website: www.gclasers.com

G.C. Laser Systems, Inc. designs and builds unique laser systems specifically for art and architecture conservation. Our compact and portable systems, such as the GC-1, offer unmatched precision and control over the level of cleaning. We also offer custom built laser cleaning solutions and laser cleaning training.

HOLLINGER METAL EDGE, INC.

Exhibitor Experience:

- May 12 @ 4:00 – 4:10 pm, Creating Connections & Community During COVID – Part 1

- May 18 @ 4:00 – 4:10 pm, Book & Paper Session 2

9401 Northeast Drive, Fredericksburg, VA 22408 USA

Contact: Bob Henderson

Ph: 800-634-0491 Fx: 800-947-8814

Email: info@hollingermetaledge.com

Website: www.hollingermetaledge.com

Hollinger Metal Edge, Inc. has been the leading supplier of archival storage products for Conservators, Museums, Government and Institutional Archives, Historical Societies, Libraries, Universities, Galleries and Private Collectors for over 65 years. Famous for The Hollinger Box – the metal edged gray document cases that fill the shelves of thousands of organizations, we offer a wide variety of box styles made with various appropriate materials to store any collectible. We also supply conservation materials, inert polyester, polypropylene and Tyvek products, archival folders, buffered and unbuffered envelopes, Permalife bond papers, and buffered and unbuffered tissue paper. Hollinger Metal Edge manufactures custom orders on a daily basis and is committed to educational support for preservation workshops. Please contact us regarding your workshop, and we will provide free catalogs and samples as required.

NANORAY

Exhibitor Experience:

- June 23 @ 1:00 – 1:10 pm, Objects Session 3

7F, No. 91, Xinhua 1st Rd., Neihs District, Taipei 114 Taiwan

Contact: Ranganath Varma

Tel: +886 2-2796-8909 Fx: +886 2-2796-8910

Email: varma@nanoray.com

Website: www.artxray.net; www.nanoray.com

NanoRay, headquartered in Taiwan, has pioneered the design and development of Transmission X-Ray technology for its application in Non-Destructive Testing – Automated Art Inspection. NanoRay has successfully developed a portfolio of intelligent Automated Art X-Ray Inspection solutions, with patented Transmission X-Ray Technology, to help in preventive maintenance, restoration and research of art objects like Paintings, Sculptures, Relics, artifacts etc and ensure the safe keep of priceless heritage of mankind.

TandD US, LLC.

Exhibitor Experience:

- May 13 @ 4:00 – 4:10, Collaborating with Stakeholder Communities, Part 2
- May 25 @ 12:50 – 1:00 pm, Research & Technical Studies Session 1

534 N. Guadalupe St., Unit 32886, Santa Fe, NM 87501

Contact: Steve Knuth

Ph: 518-669-9227

Email: sbknuth@tandd.com

Website: www.tandd.com

T&D Corporation manufactures a complete line of network connected and stand-alone Data Loggers that are optimized

for automated, error free data collection, remote monitoring and warning notification. T&D's products offer an extensive array of connectivity options including loggers with built-in network interfaces, wireless handheld data shuttles, network and cellular gateways, and even Bluetooth interfaces for direct connection to smart phones and tablets. Developed specifically for Museum and Archive applications, T&D produces 4 in 1 loggers that record Temperature, Humidity, Illuminance, and Ultra Violet light, that also maintain internal running exposure totals. T&D offers an exceptional value proposition to its customers through its completely free WebStorage Service. T&D Corporation, the world's leading supplier of wireless data loggers, is headquartered in Matsumoto Japan, and has been engaged in the design, development and manufacture of high reliability, high quality electronic measurement systems since 1986.

UNIVERSITY PRODUCTS, INC.

Exhibitor Experience:

- May 13 @ 1:00 – 1:10, Collaborating with Stakeholder Communities – Part 1
- May 19 @ 1:00 – 1:10 pm, Book & Paper – Session 3

PO Box 101, Holyoke, MA 01041 USA
 Contact: John A. Dunphy
 Ph: 413-532-3372 Fx: 800-532-9281
 Email: jadunphy@universityproducts.com
 Website: www.universityproducts.com

University Products, the leading supplier of conservation tools, equipment and archival storage enclosures, provides a variety of new tools and equipment for conservation. Working with our international partners, Preservation Equipment (PEL) in Europe and Marco Polo in Mexico, University Products selection of tools and equipment is the most complete selection of products specifically designed for AIC members. In addition, our Lineco division offers a variety of conservation framing materials including Klucel G and wheat and rice starch, as well as a many conservation quality papers and tapes.

SILVER LEVEL

BMS CAT

Exhibitor Experience:

- June 2 @ 1:00 – 1:10 pm, CCN – Session 1
- June 7 @ 4:00 – 4:10 pm, CAN! – Session 1

5718 Airport Freeway, Haltom City, TX 76117 USA
 Contact: Matt Jaroma
 Ph: 313-320-1877
 Email: mjaroma@bmecat.com
 Website: www.bmecat.com

BMS CAT offers restoration and reconstruction services to customers all over the world. Over the years, we have helped thousands of clients recover from disasters – both

big and small. By providing recovery services to mitigate fire, water and storm damage, we help reestablish businesses and restore communities. When Mother Nature or man-made accidents strike, we are there for you with a full range of disaster recovery and restoration services. Founded in 1948, our company has the experience, equipment and people to handle any size restoration job.

CRYSTALIZATIONS SYSTEMS, INC.

Exhibitor Experience:

- June 3 @ 1:00 – 1:10 pm, CCN – Session 3
- June 23 @ 1:00 – 1:10 pm, Paintings – Session 2

1401 Lincoln Ave., Holbrook, NY 11741 USA
 Contact: Patricia Ellenwood
 Ph: 631-467-0090 Fx: 631-467-0061
 Email: info@csistorage.com
 Website: www.csistorage.com

CSI's newest innovation, the secure and eminently maneuverable Transporter System, arrives fully assembled and is changing how you move collections and exhibitions, room to room, gallery to gallery, location to location.

CSI has manufactured storage solutions for leading museums, galleries, and private collections since 1976. All CSI storage systems, including our well-known Moving Painting, Rolled Textile and PerfectFit™ Kits, incorporate the masterful application of superior design, quality aluminum materials and aerospace engineering manufacturing techniques.

GAYLORD ARCHIVAL

Exhibitor Experience:

- June 2 @ 3:50 – 4:00 pm, CCN – Session 2
- June 9 @ 1:30 – 2:00 pm, CAN!/EMG Joint Session: Transforming Ownership into a Network of Care – Part 1

PO Box 4901, Syracuse, NY 13212 USA
 Contact: Ronda Buck
 Ph: 800-448-6160 Fx: 800-272-3412
 Email: sales@gaylord.com
 Website: www.gaylord.com

Visit Gaylord Archival to see our new and innovative Frank Showcase System! It's the first patented, fully demountable acrylic showcase system in the world—it ships flat! Let us help you bring your exhibit to life with our unparalleled selection of cases, as well as everything you need to prepare, install, display and protect your collections. If you are looking for something specific, we offer unlimited options for customization. We also carry a comprehensive selection of preservation products and conservation materials, many of which are handcrafted at our headquarters, so we can respond quickly to your custom requirements. Our wide array of museum-quality cabinets, art storage systems and flat files address your long-term storage needs. To maintain your storage environment, look to Gaylord Archival for envi-

2021 Exhibitor Profiles

ronmental controls and monitoring devices that will suit any need or budget. Learn more about our products by visiting our website.

ONSET HOBO DATA LOGGERS

Exhibitor Experience:

- May 26 @ 12:50 – 1:00 pm, Research & Technical Studies Session 3
- June 8 @ 1:00 – 1:10 pm, CAN! – Session 2

470 McArthur Blvd., Bourne, MA 05232 USA

Contact: Sean Kelly

Ph: 508-743-3155

Email: sean_kelly@onsetcomp.com

Website: www.onsetcomp.com

Used in museums, archives, and exhibit spaces worldwide, Onset's award-winning Bluetooth-enabled HOBO temperature and humidity data loggers protect irreplaceable objects, including the best-surviving copy of the Magna Carta, which was on display to commemorate the document's 800-year anniversary. And with the new MX Gateway, users can remotely manage data, receive alarm notifications via email or text, and create custom dashboards in HOBOLink, Onset's cloud software. Based on Cape Cod, Massachusetts, Onset has been designing and manufacturing its products on site since the company's founding in 1981.

OPUS INSTRUMENTS (ATIK CAMERAS)

Exhibitor Experience:

- May 26 @ 12:30 pm, Research & Technical Studies Session 3
- June 10 @ 1:30 – 2:00 pm, CAN!/EMG Joint Session, Transforming Ownership into a Network of Care, Part 2

Unit 8 Lodge Farm Barns, New Rd., Norwich, Norfolk NR9 3LZ United Kingdom

Contact: Catherine Wilkinson

Ph: 011-44-(0)1603-740397

Email: catherine.wilkinson@atik-cameras.com

Website: www.opusinstruments.com

Opus Instruments are the team behind the world's leading cameras for Infrared Reflectography. The renowned Apollo camera has been used to examine hundreds of artworks at leading institutions, galleries and auction houses around the globe, making notable contributions within the fields of both art conservation and art history. Apollo allows you to capture and explore infrared reflectographs in more depth and detail than ever before.

PRAIRIE PAPER, UNIVERSITY OF ILLINOIS, LIBRARY

Exhibitor Experience:

- May 20 @ 1:00 – 1:10 pm, Book & Paper Session 5
- June 16 @ 4:00 – 4:10 pm, Photographic Materials

Session 2

1408 West Gregory Dr., Rm 425, Urbana, IL 61801 USA

Contact: Jennifer Hain Teper

Ph: 217-244-5689

Email: jhain@illinois.edu

Website: freshpress.studio/prairiepaper

Prairie Paper is a sustainable option for conservation and the fine arts, ideal for case bindings, printable, and available in multiple weights. All papers have a relatively stable pH and minimal color change after artificial aging. Our carbon footprint is significantly lower than traditional paper-making studios from using locally sourced ingredients, solar powered studios, and high-efficiency stoves for cooking fibers.

SMALLCORP

Exhibitor Experience:

- June 23 @ 4:00 – 4:10 pm, Objects Session 4

19 Butternut St., Greenfield, MA 01301 USA

Contact: Michael Dunphy

Ph: 413-772-0889 Fx: 413-773-7386

Email: mdunphy@smallcorp.com

Website: www.smallcorp.com

SmallCorp manufactures products for the display, conservation and storage of works of art, textiles and objects. Our frames and display cases figure prominently in museum and corporate collections. SmallCorp customers include picture framers, galleries, art conservators and related institutions, and professionals.

STUDIO ARTS COLLEGE INTERNATIONAL

454 W. 19th St., New York, NY 10011 USA

Contact: Racini Aranda

Ph: 212-248-7225 Fx: 212-248-7222

Email: raranda@saci-florence.edu

Website: saci-florence.edu

Studio Arts College International (SACI) is more than an opportunity to study abroad in Florence, the birthplace of the Renaissance. Accredited by the National Association of Schools of Art and Design (NASAD), SACI offers a wide range of innovative, hands-on graduate and undergraduate programs in traditional and contemporary studio arts, design, conservation, art history, and Italian language and culture. Programs integrate diverse disciplines and emphasize the essential role of art and design in how we shape and sustain our planet both socially and environmentally.

STANDARD LEVEL

APPLIED SURFACE TECHNOLOGIES

Exhibitor Experience:

- May 27 @ 1:30 – 1:40 pm, Research & Technical Studies and SPNHC Joint Session

15 Hawthorne Drive, New Providence, NJ 07974 USA



Examine, Restore, and
Conserve Art with
REL LED UV-A LAMPS

relinc.com



VISIT US AT THE AIC **VIRTUAL** ANNUAL MEETING

SMALLCORP

THE SMALL CORPORATION

Archival Products for Conservation & Exhibition

- *Microclimate Cases*
- *Mounting & Support*
- *Storage & Installation*
- *Museum Picture Frames*
- *Custom Fabrication*

800-392-9500 ■ HAND-MADE IN MASSACHUSETTS WITH SOLAR ELECTRICITY ■ SMALLCORP.COM

DISCOVER THE MYSTERIES BENEATH

The Apollo is the gold standard in infrared reflectography.

Following in the footsteps of the world-renowned Osiris Camera, Apollo uses an internal scanning mechanism to produce high-quality, high-resolution infrared reflectograms with an unparalleled level of clarity and detail.

These can be used to study various aspects of a painting, from changes to underdrawings and pentimenti in the work, to underpainting and transmission of pigments at different wavelengths when using our Filter Set. If you're looking to create detailed, high quality, high resolution infrared images, Apollo is the IR camera system for you.

OPUS
INSTRUMENTS
opusinstruments.com



PRAIRIE
PAPER

A sustainable option for conservation and the fine arts, our papers are tested for longevity and engineered for optimal working properties. Our carbon footprint is significantly lower than traditional paper-making studios from using locally-sourced ingredients, solar powered studios, and high-efficiency stoves for cooking fibers. All papers have a relatively stable, slightly basic pH and exhibit minimal color change after artificial aging. Ideal for case bindings, printable, and available in multiple weights. For more information and inquiries, see our website at:

www.freshpress.studio/prairiepaper

2021 Exhibitor Profiles

Contact: Robert Sherman
Ph: 908-464-6675
Email: roberts@co2clean.com
Website: www.co2clean.com

Applied Surface Technologies will demonstrate CO2 Snow Cleaning as applied to cleaning and restoring art. We will demonstrate the CO2 Snow Cleaning units, with and without heated compressed air about the CO2 snow stream, for cleaning different materials and items. CO2 snow can remove soot, hydrocarbon oils, fingerprints, dust, particles of all sizes, polishing residues and more. Examples shown include fingerprints on a polymer structure, polishing and wax residues, soot and, more.

AXIELL

Exhibitor Experience:

- May 20 @ 1:00 – 1:10 pm, SPNHC – Specimen Spotlight

600-80 Richmond St. W., Toronto, ON M5H 2A4 Canada
Contact: Rielle Ullberg
Ph: +1-416-238-5032
Email: sales-alm@axiell.com; rielle.ullberg@axiell.com
Website: www.axiell.com

Axiell provides software and services which help institutions organize and share culture and knowledge with the world. Our solutions help our community of global customers to manage their collections, encourage reading, preserve cultural heritage, improve learning, and increase engagement with the public.

BARNETT TECHNICAL SERVICES

Exhibitor Experience:

- May 27 @ 1:30 – 1:40 pm, Research & Technical Studies and SPNHC Joint Session

5050 Laguna Blvd., Ste. 112-620, Elk Grove, CA 95758 USA
Contact: Steve Barnett
Ph: 916-549-4423
Email: info@barnett-technical.com
Website: barnett-technical.com

Supplier of Micro Support bench top micromanipulators for precise micro-sampling on a scale that is invisible to the naked eye. We also supply larger systems to assist with restoration. Our systems include probes, knives, and scrapers to facilitate chemical analysis or cleaning. Systems can be full micromanipulators with arms or individual arms for sampling on larger works.

BIOSHARE DIGITIZATION

Exhibitor Experience:

- June 14 @ 12:55 – 1:05 pm, SPNHC – Collection Theft and Security: Monitoring of Collections

Ukkolantie 18 A 2, Joensuu, 80130 Joensuu, Finland
Contact: Hannu Saarenmaa
Ph: +358 401 75 0427
Email: hannu@bioshare.com

Website: www.bioshare.com

Bioshare builds conveyor-driven mass-digitization lines for natural history collections. Our lines can be flexibly converted for several object types such as herbarium sheets, whole insect drawers, pinned individual insects, samples stored in liquids, bones, skins, etc. There is worldwide delivery and support. Bioshare also offers mass-digitization service at its base in Finland. Our staff has been involved in biodiversity informatics since 1990's, and is experienced in large international projects.

CARESTREAM NON-DESTRUCTIVE TESTING

Exhibitor Experience:

- June 15 @ 1:00 – 1:10 pm, Book & Paper and Photographic Materials Joint Session 1

150 Verona St., Rochester, NY 14608 USA
Contact: Stephen Pflanz
Ph: 585-627-6705; Cell: 585-230-0972
Email: stephen.pflanz@carestream.com
Website: www.carestream.com/nondestructivetesting.html

Carestream NDT is a worldwide provider of X-ray imaging systems used by Art Conservatories around the world. Products include digital computed radiography (CR) systems, digital radiography (DR) systems, imaging plates, cassettes, DICONDE archiving, conventional film & chemicals, automatic film processing equipment and accessories. Our innovative solutions enable our customers' success and reveal critical information on priceless works of art and artifacts. Our award-winning products keep conservators at the forefront of technological advancements in art imaging.

COLIBRI SYSTEM

Exhibitor Experience:

- May 19 @ 4:00 – 4:10 pm, Book & Paper Session 4

8616 La Tijera Blvd., Ste. 512, Los Angeles, CA 90045 USA
Contact: Tommaso Garavaglia
Ph: 415-746-0867
Email: garavaglia@colibrisystem.com
Website: www.colibriusa.com

The CoLibri Cover System offers the most advanced, highest quality book covering system available worldwide. Our easy and innovative system allows any type and size of book to be covered with the touch of a button. The system consists of a simple desktop machine and polyethylene covers. This carefully designed system is the simplest and most practical book covering system available.

CONSERV

Exhibitor Experience:

- June 2 @ 3:50 pm, Collections Care Network

5600 9th Ave S., Birmingham, AL 35212 USA
Contact: Melissa King
Ph: 617-721-4804
Email: melissa@conserv.io

2021 Exhibitor Profiles

Website: www.conserv.io

Conserv is a platform for preventive conservation – integrating risk management for environment, pests, and other agents of deterioration into a single tool for collections. We sell subscriptions for wireless sensors that measure temperature, relative humidity, and light and utilize LoRaWAN technology with cellular network capabilities for extended range. Our subscription also includes access to expert preventive conservation consultations, regular software updates, and triennial calibration, battery replacement, and sensor hardware upgrades. We offer free software analytic tools for environmental monitoring and integrated pest management. Conserv is partnering with researchers and practitioners to build the next generation of sensors and software for cultural heritage preservation.

DELTA DESIGN LTD.

Exhibitor Experience:

- June 22 @ 1:10 pm, Objects Session 1

1535 NW 25th St., Topeka, KS 66618 USA
Contact: Peter Doucette
Ph: 785-234-2244 Ext. 220 Fx: 785-233-1020
Email: pdoucette@deltadesignsltd.com
Website: www.deltadesignsltd.com

Delta Designs specializes in the custom designs, professional manufacture and personal installation of quality museum storage equipment. Our products meet the highest standards of conservation practice for historical artifacts, art objects, textiles, scientific specimens and archival materials.

DIGITAL TRANSITIONS

Exhibitor Experience:

- June 1 @ 1:30 pm, Society for the Preservation of Natural History Collections (SPNHC)

35 W. 35th St., Floor 10, Suite #1001-1002, New York, NY 10001
Contact: Kate Stone
Ph: 212-529-6825
Email: info@digitaltransitions.com
Website: www.digitaltransitions.com

DT Heritage is the leading manufacturer of digitization solutions including advanced copy systems, scanning platforms, and automation software for your collections. Using our diverse backgrounds in engineering, photography, conservation, and collections management, we provide custom solutions to enhance productivity without sacrificing image quality. Our service division, Pixel Acuity, delivers preservation-grade digitization to our clients. Equipped for all material types, our team of imaging experts are prepared for the challenges of your collection.

DORFMAN MUSEUM FIGURES, INC.

Exhibitor Experience:

- June 15 @ 1:00 pm, Textiles Session 1

6224 Holabird Ave., Baltimore, MD 21224 USA

Contact: Chad Grob

Ph: 410-284-3248 Fx: 410-284-3249

Email: chad@museumfigures.com

Website: www.museumfigures.com

Dorfman Museum Figures, Inc. is the leader in creating three-dimensional Ethafoam Conservation Forms for archival display and storage of your artifact garments. Choose between our full Economy Ethafoam Man and Woman, Dress and Suit Forms, Classic Forms, Storage Hat Mounts, Conservation Hangers, and more. In addition to our standard product line, we can create custom Ethafoam forms to fit specific needs.

GETTY PUBLICATIONS

Exhibitor Experience:

- May 11, Opening General Session

1200 Getty Center Dr., Ste. 500, Los Angeles, CA 90049 USA
Contact: Kimberley Westad
Ph: 310-440-7506 Fx: 310-440-7758
Email: kwestad@getty.edu
Website: www.getty.edu/publications

Getty Publications produces award-winning titles that result from or complement the work of the J. Paul Getty Museum, the Getty Conservation Institute, and the Getty Research Institute. This wide variety of books covers the fields of art, photography, archaeology, architecture, conservation, and the humanities for both the general public and specialists.

HIROX-USA, INC.

Exhibitor Experience:

- May 25 @ 4:00pm, Research & Technical Studies 2

100 Commerce Way, Ste. 4, Hackensack, NJ 07601 USA
Contact: Edvina Bassano
Ph: 201-342-2600 Ext 205 Fx: 201-342-7322
Email: info@hirox-usa.com
Website: www.hirox-usa.com

Hirox is the pioneer of 3D Digital Microscope System. Our digital microscope system is a versatile tool for measurement, recording, and see things "as they truly are." Hirox's high-quality optical and lighting designs allow a magnification range of 0x-10,000x, live focus, and real-time 2D/3D tiling with an automated XY stage.

HUNTINGTON T. BLOCK INSURANCE AGENCY, INC.

Exhibitor Experience:

- May 11, Opening General Session

1120 20th St. NW, Ste. 600, Washington, DC 20036 USA
Contact: Ever Song
Ph: 202-429-8506 Fx: 312-381-0698
Email: ever_song@aon.com
Website: www.huntingtontblock.com

The American Institute for Conservation (AIC) and Huntington T. Block Insurance Agency, Inc. (HTB) have partnered to provide

AIC's members with the Conservator's Insurance Program – an insurance solution customized to your unique exposures.

JACK RICHESON & CO.

Exhibitor Experience:

- June 23 @ 1:00 – 1:10 pm, Paintings Session 2

557 Marcella St., Kimberly, WI 54136 USA

Contact: Chrissy Stuczynski

Ph: 920-738-0744 Fx: 920-738-9156

Email: chrissys@richesonart.com

Website: richesonart.com

Jack Richeson & Co. is a manufacturer of fine art materials and BEST stretcher bars. We are dedicated to ensuring that you receive a quality product that is always in stock with on-time shipments and superior customer service. BEST museum quality stretcher bars are available in six profiles from 8" to 144" every bar is selected from the finest raw materials and must be free of knots and completely straight.

MICRO - microCT IMAGING

Exhibitor Experience:

- June 17 @ 4:00 – 4:10 pm, Photographic Materials Session 3
- June 21 @ 11-2pm SPNHC Digitized Specimen Data

227 N. Harmon Ave., JBHT-304, Fayetteville, AR 72701 USA

Contact: Manon Wilson

Ph: 479-575-6159

Email: micro@uark.edu

Website: <https://micro.uark.edu>

MICRO offers microCT scanning of cultural artifacts and other natural history specimens and samples. Working with conservators, we have scanned pottery, musical instruments, seed bags, sherds, coral, fossils, recent zoological specimens, and geological samples. Created in 2018, MICRO has one of the newest models of micro-CT scanners, with three X-ray emitting targets that penetrate low and high-density objects to provide crystal-clear imaging. MICRO is a world leader in diceCT scanning. Our technician has ten years of museum artifact handling experience and will take great care of your objects.

MIDDLETON SPECTRAL VISION

Exhibitor Experience:

- May 26 @ 3:50 – 4:00 pm, Research & Technical Studies Session 4

8505 University Green, Middleton, WI 53562 USA

Contact: Chris Draves

Ph: 608-831-2141 Fx: 608-831-3076

Email: chris.draves@middletonspectral.com

Website: www.middletonspectral.com

Middleton Spectral Vision is an innovative company specializing in hyperspectral imaging and spectroscopy. Art

and cultural heritage are an important area of interest to us. Hyperspectral imaging is a proven technique for looking at underdrawings in paintings, color analysis, and chemical composition. We seek to develop easy to use systems that deliver high-quality images along with powerful analysis software to assist in the understanding of valuable works of art.

MUSEUM SERVICES CORPORATION

Exhibitor Experience:

June 3 @ 1:00 – 1:10 pm, CCN – Session 3

385 Bridgepoint Way, South St. Paul, MN 55075 USA

Contact: Linda Butler

Ph: 651-450-8954 Fx: 651-554-9217

Email: info@museumservicescorporation.com

Website: www.museumservicescorporation.com

Museum Services Corporation would like to thank the art conservation community for its support in this, our 40th anniversary year. Museum Services Corporation remains committed to safely and efficiently serving you with equipment, supplies and services. Please check out our newly launched website and call or email us with your conservation equipment and supply needs.

NATIONAL CENTER FOR PRESERVATION TECHNOLOGY & TRAINING (NCPTT)

Exhibitor Experience:

- May 19 @ 1:00 – 1:10 pm, Architecture – Session 2

645 University Parkway, Natchitoches, LA 71457 USA

Contact: Jason Church

Ph: 318-356-7444 Fx: 318-356-9119

Email: jason_church@contractor.nps.gov

Website: www.ncptt.nps.gov

The National Park Service's National Center for Preservation Technology and Training protects America's historic legacy by equipping professionals in the field of historic preservation with progressive technology-based research and training. Since its founding in 1994, NCPTT has awarded over \$7 million in grants for research that fulfills its mission of advancing the use of science and technology in the fields of archaeology, architecture, landscape architecture and materials conservation.

NEDCC | NORTHEAST DOCUMENT CONSERVATION CENTER

Exhibitor Experience:

- May 21 @ 1:00 – 1:10 pm, Book & Paper Discussion Session

100 Brickstone Square., Andover, MA 01810 USA

Contact: Bill Veillette

Ph: 978-470-1010

Email: info@nedcc.org

Website: www.nedcc.org

Founded in 1973, NEDCC | Northeast Document Conserva-

2021 Exhibitor Profiles

tion Center specializes in the preservation of paper-based materials for cultural institutions, government agencies, and private collections. NEDCC serves clients nationwide, providing conservation treatment for book, photograph, and paper collections, including works of art on paper, Asian art, and oversize works. NEDCC provides digital imaging, audio preservation, assessments, consultations, training, and disaster assistance, and is a trusted resource for preservation information worldwide.

POLYGON US CORPORATION

Exhibitor Experience:

- June 16 @ 1:00 pm, Photographic Materials Session 1

7377 William Ave., Ste. 100, Allentown, PA 18106 USA

Contact: Matt DeCirce

Ph: 732-567-0440

Email: matt.decirce@polygongroup.com

Website: www.polygongroup.us

Polygon owns state-of-the-art vacuum freeze-drying chambers that utilize low pressure to create the most effective drying solution for archives damaged by fire, water, and mold. Polygon offers services such as archive cleaning, mold remediation, pest eradication (blast freezing), digital imaging and secured destruction. Polygon can also recover all types of film media. Polygon provides 24/7 emergency response, with 26 office locations throughout North America and 3 dedicated archive recovery centers.

PRINT FILE, INC.

Exhibitor Experience:

- June 17 @ 1:00 – 1:10 pm, Photographic Materials Session 3

1846 S. Orange Blossom Trl., Apopka, FL 32703 USA

Contact: Gene Amoroso

Ph: 407-886-3100 Fx: 407-886-0008

Email: gene@printfile.com

Website: www.printfile.com

Print File Archival Storage at www.printfile.com is your complete source for innovative product solutions that include traditional or digital photographic presentation and storage needs as well as the lowest prices on all document and paper-borne storage materials. With Print File's expertise, spanning more than 50 years, institutions have been using Print File products in housing their valuable collections and archives. Print File's commitment to deliver only the highest quality products throughout the world has established our reputation as the world leader in museum quality storage. Print File Archival Storage will continue to be your partner in preserving the memories of yesterday, for the appreciation of tomorrow's generations.

RH CONSERVATION ENGINEERING

Exhibitor Experience:

- June 22 @ 1:00 pm, Paintings Session 1

"Meakins Rise" 16 Meakins Rd., Flinders, Victoria 3929, Australia

Contact: Robin Hodgson

Ph: +61 419-892919

Email: rhe@rhconservationeng.com

Website: www.rhconservationeng.com

Established in 1991 by conservator Robin Hodgson, RH Conservation Engineering is a research driven supplier of the most innovative, technically advanced and aesthetically pleasing equipment available, providing consistent quality results in the conservation of human artistic and cultural heritage. Many of the materials and manufacturing techniques used in our equipment come from the aerospace, electronics, and advanced manufacturing industries.

SPACESAVER

Exhibitor Experience:

- June 17 @ 1:00 pm, SPNHC Educational Tools

1450 Janesville Ave., Fort Atkinson, WI 53538 USA

Contacts: Ben Adamitus

Ph: 920-563-0782

Email: badamitus@spacesaver.com

Website: www.spacesaver.com

Protect the past and prepare for the future with reconfigurable museum cabinets, shelving, art screens, compactors, and more. Spacesaver's engineers and project managers team up with your local distributor to provide design assistance, installation, and maintenance for any collections care space, large or small. Call 800-255-8170 to arrange a free on-site consultation or visit us at Spacesaver.com.

TALAS

Exhibitor Experience:

- June 2 @ 1:00 – 1:10 pm, CCN Session 1

330 Morgan Ave., Brooklyn, NY 11211 USA

Contacts: Jacob Salik

Ph: 212-219-0770

Email: jake@talasonline.com

Website: www.talasonline.com

Bookbinding, Conservation and Archival supplies. Visit our website to see our most recent catalogs and featured new products.

TESTFABRICS, INC

Exhibitor Experience:

- June 16 @ 1:45 – 2:00 pm, Textiles Session 2

415 Delaware Ave., W Pittston, PA 18643 USA

Contact: Normandy Klaas

Ph: 570-603-0432

Email: mandy@testfabrics.com

Website: www.testfabrics.com

Testfabrics, Inc. is a worldwide supplier and producer of textile testing materials. While used primarily in quality assurance testing, our fabrics have found their way into

countless other applications. We stock an inventory of 'clean' fabrics, free of sizings, dyes, and finishes. Conservators and museum clients have been using Testfabrics as a resource for over forty years and are critical to our continued product development. We now stock Fosshape as well a wide range of conservation friendly textiles and tools. Requests, questions, and feedback are always welcome and help us provide the conservation world the best service possible.

ZARBECO, LLC

Exhibitor Experience:

- June 24 @ 1:00 – 1:10 pm, Paintings Session 4

52 Main St., Ste. 1, Succasunna, NJ 07876 USA

Contact: Meryl Zweig

Ph: 973-933-2043 Fx: 973-933-2336

Email: mzweig@zarbeco.com

Website: www.zarbeco.com

We will be presenting our MiScope Megapixel MP3 and our new "premium plus" MiScope Megapixel MP4K. These USB 3 powered devices are portable, lightweight, have a small footprint, and are available for every budget. Their micron level resolution, excellent color accuracy and included precision measurement software with patented calibration tools will improve your process and documentation to image and record the finest details and color pigments for your own purposes or to share with colleagues, or customers. We will

demonstrate how the MiScope can be used for art conservation and restoration to image book and paper, photographs, fabric, paintings, objects, historic buildings, sculptures, and anywhere you want to image for damages, to compare and match pigments, or to look to see if something is an original or a copy. Proudly designed and built in New Jersey since 2001.

ZONE DISPLAY CASES

Exhibitor Experience:

- June 2 @ 3:50 – 4:00 pm, CCN Session 2

660 rue de l'Argon, Quebec, QC, G2N 2G5 Canada

Contact: Stephanie Bilodeau

Ph: 1-877-941-4004 ext 103

Email: steph@zonedisplaycases.com

Website: www.zonedisplaycases.com

Zone Display Cases is a leading designer and manufacturer of high-end museum quality display cases made in glass. Based in Canada, we deliver and install our display cases in North America. We provide outstanding customer service and offer fully customizable turnkey solutions that will meet the most demanding conservation requirements and solve complex design and constructability challenges. Our ultimate goal is to present, preserve, and protect your valuable and sensitive artifacts in the most aesthetical and discreet manner.





STUDIO
ARTS
COLLEGE
INTERNATIONAL

**Post-Baccalaureate
Certificate in Conservation**
FLORENCE, ITALY

Pursue one year of intensive conservation graduate study in a hands-on, U.S.-accredited post-baccalaureate program in Florence, Italy.

Flexible one-year study abroad program designed for students who want to pursue graduate study and/or careers in art conservation

Rare hands-on opportunities to learn traditional and contemporary conservation techniques

Field trips throughout Florence and Italy with extensive on-site learning experiences

Accredited by the National Association of Schools of Art and Design (NASAD)

DISCOVER MORE & APPLY NOW:

www.saci-florence.edu

NEW & FORTHCOMING



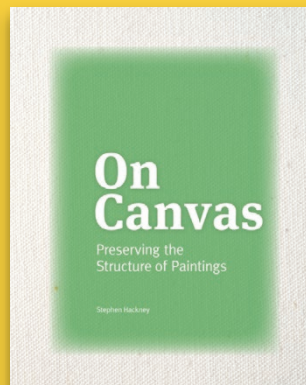
The Renaissance Restored
Paintings Conservation and the Birth of Modern Art History in Nineteenth-Century Europe
Matthew Hayes
This handsomely illustrated book traces the intersections of art history and paintings restoration in nineteenth-century Europe and proposes a model for a new conservation history.

Museum Lighting
A Guide for Conservators and Curators
David Saunders
"Well researched and clearly written. . . . With its forward-thinking approach to lighting and the updated information on technology, sustainability, and guidelines used in museum lighting, this publication will quickly become an invaluable resource for conservators, curators, and other museum professionals."
—Diane E. Knauf, *News in Conservation*



Managing Energy Use in Modern Buildings
Case Studies in Conservation Practice
Edited by Bernard Flaman and Chandler McCoy
This timely volume contains ten case studies that examine the unique challenges for buildings built between 1931 and 1969 and offers valuable lessons for other structures facing similar issues.

The Conservation of Medieval Polychrome Wood Sculpture
History, Theory, Practice
Michele D. Marincola and Lucretia Kargère
"A comprehensive, profound survey of various important aspects of sculpture preservation, including materials, carving and painting techniques, methods of examination, documentation, conservation, and restoration. An absolute must-have."
—Michael Rief, conservator, head of collections and deputy director of the Suermondt-Ludwig-Museum Aachen



On Canvas
Preserving the Structure of Paintings
Stephen Hackney
"Essential reading for the conservation student and is a useful source of reference for the professional too. . . . This comprehensive book will empower conservators to care for canvas paintings more effectively."
—Christine Braybook, *ICON News*



Herculaneum and the House of the Bicentenary
History and Heritage
Sarah Court and Leslie Rainer
"Ambitious. . . . One cannot help but be impressed by the accessibility of the text, which is well supported by excellent photographs and illustrations. . . . A good addition to a recommended reading list for beginning students of archaeology, conservation, and classical studies yet also presents an interesting read for a professional conservator."
—Dr. Alaina Schmisser, *ICON News*

Getty Publications
getty.edu/publications

30% off select titles at shop.getty.edu with code GPAIC21

Abstracts - Table of Contents

Opening General Session	50
Concurrent General Sessions.....	52
Confronting our Biases to Transform Conservation.....	52
Creating Connections & Community During COVID	52
On Display	54
Transformative Research and Treatment in the Care of Natural History Collections.....	56
Collaborating with Stakeholder Communities	58
Architecture.....	60
Book & Paper	62
Collection Care	68
CCN Pre-session: The Materials Selection and Specification Working Group.....	68
Hazardous Materials / Joint with Health & Safety Network	68
Joint Sessions: Collection Care + SPNHC	69
Integrated Pest Management	69
Collection Care Adaptations	70
Collection Care: Storage	71
Contemporary Art	73
Electronic Media.....	75
Objects.....	76
Paintings.....	80
Photographic Materials.....	83
Research & Technical Studies.....	86
Advancement of Science and Technology.....	86
Case Studies	87
Society for the Preservation of Natural History Collections	89
Specimen Spotlight	89
Digitization and Data Management in the Preservation of Natural History.....	91
Collection Theft and Security Monitoring of Collections	93
Using Natural History Collections as an Education Tool	93
Digitized Specimen Data Use.....	95
Sustainability	97
Textiles	98
Wooden Artifacts	99
Joint Session: Book & Paper + Photographic Materials	101
Joint Session: Contemporary Art + Electronic Media.....	103
Transforming Ownership Into a Network of Care	103
Joint Session: Objects + SPNHC	105
Joint Session: Research & Technical Studies + Imaging Working Group	106
Case Studies and Applications.....	107
Joint Session: Research & Technical Studies + SPNHC.....	108
Poster Sessions.....	110
Architecture – Session 1.....	110
Book, Paper, Photo Care, and Research Poster – Session 2	110
Textile Posters – Session 3.....	113
Objects Posters – Session 4	114
Paintings Posters – Session 5.....	116
Objects Posters – Session 6	117
ECPN Posters	119

General Sessions: Opening

Opening General Session

Who Is a Conservator? What Is Conservation? Evolving Our Identities and Practice to Thrive in an Inclusive World / Joelle Wickens – Assistant Professor of Preventive Conservation¹, Natalya Swanson – Mellon Fellow in Objects Conservation²

¹Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA ²Brooklyn Museum, Brooklyn, NY, USA

There are fundamental contradictions in the way we, as conservators, define ourselves, and our practice. On the AIC's website and in the organization's formal documents, we describe conservation as "all those actions taken toward the long-term preservation of cultural heritage". We define ourselves as professionals with "extensive training and special expertise" who "save cultural heritage physically".

Putting a breakable object in a box, storing a watercolor painting in the dark, and securing cabinet doors in an earthquake zone, promote long-term preservation, but none of these actions take extensive training or specialized expertise. If conservation indeed "encompass[es] all those activities taken toward the long-term preservation of cultural heritage", we cannot claim that "extensive training and special expertise" is required. Our profession cannot encompass "all actions" taken toward the long-term preservation of cultural heritage and also be reserved for experts that have specialized knowledge. We cannot write about and act on the practice of preserving the artist's intent and limit ourselves to saving physical cultural heritage. As we expand our practices of caring for objects holistically, we must redefine our role to include preserving the intangible aspects of cultural heritage as well.

There are two clear pathways to rectifying these contradictions. We can narrow the definition of conservation practice to include only highly specialized actions to preserve physical property performed by those with extensive training. Or, we can fix these contradictions by significantly broadening our definition of what it takes to become a conservator and what conservation practice entails; we can see a conservator as anyone who takes actions toward the long-term preservation of cultural heritage, regardless of the form the heritage takes.

This paper will explore these contradictions and argue that to be relevant in the coming decades we must broaden our vision of who we are, what we do, and what we preserve. We will demonstrate how increased exclusivity inherently contradicts creating a culture of care, as it writes people out of the preservation of their own heritage. We will argue that to avoid professional extinction we must create an inclusive culture where preservation practice is a dynamic system that is created by and for all communities and cultures. We will set a stage where together we can find alternatives to siloing ourselves into exclusive categories, organizational structures, and foundational definitions.

Are You Biased? I Am. / Anisha Gupta – Assistant Conservator for Archival Materials¹

¹AIC Equity & Inclusion Committee

In conservation, we value the scientific method and respect a diverse world of shared cultural heritage. We frequently collaborate with others, are highly educated, and often consider ourselves to make "neutral" decisions. But as humans, it is impossible for us to put aside our biases, which have become a natural and implicit way of evaluating a person or a situation, significantly impacting our decision-making. Implicit biases are subconscious beliefs that may in fact be at odds with an individual's ideology and self-image. They have broad effects in our lives and the lives of others, including impact on our field. They influence who gets a job, a raise, or a promotion, which can ultimately shape the demographics of the conservation profession. Biases may also affect our treatment decisions and outcomes by influencing our sense of artistic or monetary value, how we interact with our colleagues and clients, and how we categorize objects as "fine art" versus "folk" or "ethnographic" works.

Decisions we make now regarding what we choose to preserve have profound long-term influences on the historical record that we leave for future generations. We must also think about who we choose to collaborate with and how we approach them. Fortunately, the human brain is plastic, and we can start to

acknowledge and address our implicit biases. The first step is to honestly evaluate and recognize our preconceptions, after which we can use a variety of tools to help us move towards a more inclusive, fair, and equitable field reflective of the individuals in personal and professional life. This talk will also present actionable steps that help us start to counteract implicit biases in conservation.

Conservation Unfixed: Queer Visions for Transformative Practices / Sasha Arden – Rachel and Jonathan Wilf & Andrew W. Mellon Fellow in Time-Based Media Conservation¹, Kris Cnossen – Graduate Fellow², Megan Creamer – Isabel Bader Research Fellow³

¹The Conservation Center at the Institute of Fine Arts, New York University, New York City, NY, USA ²Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA ³Queen's University Department of Art History and Art Conservation, Kingston, Canada

As a field dependent on culture and cultural heritage, conservation theory and practice have to respond to changing social, cultural, material, and artistic values over time. Our current moment places conservators in the midst of forces of change such as exponentially diversified artistic practices, shifts toward prioritizing social justice at work, in the commons, and at home, and appeals for greater reflexivity in our decision-making processes through values-based approaches.

These and other active forces encourage us to become aware of the status quo and to question our roles in upholding or redefining it. This relation to the status quo is not unlike queer subjectivity, in which one's own values and practices are often formed through reflection, questioning, and in relation to others in community. As three queer-identifying conservators, we seek to discuss how queer identity and theory might align with and inform conservation in this time of transformation. From our individual perspectives, we explore how conservators might better leverage recognition and respect in practice to improve our work environments, our connection to publics, and our treatment outcomes.

Politics, Race, and Objectification: Uncomfortable Encounters in the Conservation Lab / Sarah Barack – Head of Conservation and Senior Objects Conservator¹, Kate Tyler – Objects Conservator¹, Jessica Walthew – Objects Conservator¹

¹Cooper Hewitt Smithsonian Design Museum, New York, NY, USA

Emerging technologies, new materials, and advancing laboratory analytics all promise to transform the practice of art conservation, and have done so in the past. The care and treatment of racially charged objects evoke complicated emotions and provoke challenging discussions, leading to transformation of a different sort. Moving beyond the challenges of technical decisions to respond to the complexities of preservation in a rapidly evolving cultural context propels the field forward intellectually as it bridges the personal and the professional.

Cooper Hewitt's exhibition Jon Gray of Ghetto Gastro Selects is guest curated by the co-founder of the Bronx-based culinary collective focused on race, class, and inclusion activism. Gray's curatorial choices reinterpret the permanent collection, in a fictional, Afro-futuristic narrative, featuring several examples of Blackamoor iconography. Blackamoors are exoticized decorative figures first made in 17th century Italy to represent dark-skinned Muslim Moors from North Africa and the Middle East. The figures are often ornately dressed and shown in positions of servitude. While these depictions have a long history in European Decorative Arts collections, changing attitudes relegated these pieces to storage, and most were removed from prominent locations--an action more easily taken with moveable items meant to adorn interiors. Nevertheless, some Blackamoors remained 'hidden in plain sight' and the artist Fred Wilson brought them into the spotlight at the 2003 Venice Biennale when he placed several in a museum-like setting, adding acetylene torches and fire extinguishers to their traditional subservient poses. Likewise, many of the 34 Blackamoors in the collection of New York University's Italian villa La Pietra were part of a 2015 exhibition ReSignifications, which displayed them "in conversation" with contemporary art.

The choice to display these pieces at Cooper Hewitt necessitated conservation treatment, as many of the objects had not received recent attention.

General Sessions: Opening

While small porcelain examples were easily brought in and out of storage as needed, two oversize polychrome sculptures remained in the lab for many months as their treatment progressed. The physicality of these sculptures, their heavy presence, and the conservators' discomfort with the racist tropes expressed therein spurred multiple discussions about working on such historic pieces. Questions of finish and restoration-focused decisions magnified these concerns, pushing treatment considerations into less traversed arenas. Black Lives Matter protests re-contextualized the pieces, highlighting the power of material culture and the importance of how related dialogue is conducted. This paper explores the impact of treating symbols of inequality and injustice, reflecting on how privilege and racism have shaped the field of conservation.

A Local Approach to the Global Problems of 2020: The Washington Conservation Guild and its Responses to the Black Lives Matter Movement and COVID-19 / Jayne Holt – President¹, Rachel Greenberg – Vice President¹

¹Washington Conservation Guild, Washington, DC, USA

The Washington Conservation Guild (WCG), formed in 1967, is one of the oldest regional conservation guilds in the country. Unlike so many other regional guilds, our geographic area is relatively compact, which has enabled us to focus on in-person meetings and events around the DC area. Usually, WCG holds monthly meetings between September and May in local museums and historic landmarks, providing cultural experiences for our members as well as raising awareness of the venue, its historical significance, and often its role in the conservation world. A social hour followed by a talk from speakers in our own and related fields, both from within and outside of our membership, provide excellent networking and educational opportunities. In addition to the core program of meetings, WCG sponsors a Community Partnership Project (CPP) every year and enrichment events for interns and fellows, such as lab tours and portfolio enhancement opportunities. WCG also sponsors workshops and classes with local conservators and artists.

The year 2020 has brought about a lot of change to how WCG operates. The Covid-19 pandemic forced the WCG Board of Directors to rethink how the organization can continue to function under quarantine conditions. Questions regarding how to hold monthly meetings, what can be offered to members in place of in-person social networking and workshops, whether virtual meetings should be offered free of charge, and how to reach the widest possible audience through social media and virtual conferencing platforms have arisen. These, plus many more issues, have been discussed in the few months since the pandemic started and need to be resolved by the time our new season begins.

In addition to the transformation due to the pandemic is the rising tide of awareness for diversity, equity, accessibility, and inclusion (DEAI). WCG is actively looking into the need for a more intentional approach to increasing equity and diversity not only within the organization, but also through relationships with the surrounding cultural community. The Board of Directors is working to outline concrete actions to promote DEAI with the probable creation of new Board positions to focus on and implement the changes that will become a permanent part of WCG.

There is no aspect of WCG that will not be affected by these two important matters that have already altered the current personal and professional circumstances in which the organization exists. While many topics have already been discussed, there will surely be new information leading to changes throughout the upcoming 2020-2021 WCG season. The key is to be adaptive and flexible in upcoming events as well as in the structure of the Board of Directors. The Washington Conservation Guild hopes to share both the successes and failures met in dealing with the transformation of the organization with the wider conservation audience.

Shining Light on Labels in the Dark: Guidelines for Offensive Collections Materials / Laura Briscoe – Collections Manager¹, Mare Nazaire – Administrative Curator², J. Ryan Allen – Project Manager Biodiversity Informatics³, McKenna Coyle – Specimen Digitizer¹, Aliya Davenport – Herbarium Curator, REH⁴, Janet Mansaray – PhD Candidate⁵, Carol Ann McCormick – Herbarium Curator⁶, Michaela Schmul – Director of Collections⁷

¹New York Botanical Garden, Bronx, NY, USA ²California Botanic

Garden, Claremont, CA, USA ³University of Colorado Museum, Boulder, CO, USA ⁴Reinhardt University, Waleska, GA, USA ⁵Shirley Tucker Herbarium, Louisiana State University, Baton Rouge, LA, USA ⁶North Carolina University, Chapel Hill, NC, USA ⁷Harvard University Herbaria, Cambridge, MA, USA

For more than a decade, the herbarium community has made significant strides in the digitization of their holdings. Digitization has involved various combinations of data transcription, imaging, and georeferencing, with the intention of making the data and corresponding images publicly available. Data and images are served online by institutions' local databases, as well as Symbiota portals and larger data aggregators like iDigBio and GBIF. One challenging aspect in working with and digitizing herbarium specimens (and natural history collections in general) is the presence of offensive language in collection data. Specimen labels may include historic place names that contain racial slurs or other derogatory language. Such language may also be present in plant cultivar names and archival materials including letters and other correspondence. Some institutions have implemented standards and protocols to address offensive language, while others have not or may not be aware that the issue potentially exists within their collection. Recent civil rights movements in the United States and growing efforts to promote diversity, equality, and inclusion have brought the issue of offensive language in collection data to the forefront, with much discussion in the community. As a result, a small group of herbarium managers formed a task force to survey the herbarium community with the primary goal to develop guidelines for best practices for collecting and publishing these data.

As a community, we want to preserve the historical integrity of these data to facilitate research and avoid censorship. We also recognize the need for inclusive and safe workspaces, both for our own institutional staff as well as for users of our data. Through the efforts of our newly developed task force, our hope is to develop guidance for the natural history collections community, through providing best practice measures for digitizing and publishing these data. We hope this will assist and support the community in confronting some of these legacies of racism while creating safe, welcoming and encouraging workspaces, essential to promoting diversity in the sciences. Our presentation centers on bringing awareness to this issue and sharing the ways we can mitigate harm through the implementation of best practices.

Trailblazing Rapid Enhancement of Biodiversity Collections Data to Address the Urgent Challenge of COVID-19 / Austin Mast – Professor¹, Deborah Paul¹, Nelson Rios², Erica Krimmel¹, Robert Bruhn¹, Aja Sherman¹, Katelin Pearson¹, Trevor Dalton¹, David Shorthouse³, Nancy Simmons⁴, Pam Soltis⁵, Nathan Upham⁶

¹Florida State University, Tallahassee, TN, USA ²Yale University, New Haven, CT, USA ³Bionomia, Ottawa, Canada ⁴American Museum of Natural History, New York, NY, USA ⁵Florida Museum/ University of Florida, Gainesville, L, USA ⁶Arizona State University, Tempe, AZ, USA

Genomic evidence suggests that the causative virus of COVID-19 (SARS-CoV-2) originated in horseshoe bats (Family Rhinolophidae) and that species in this family, as well as in two closely related families, are reservoirs of several SARS-like coronaviruses. Specimens collected over the past 400 years and curated by the world's natural history collections provide an essential reference as scientists work to understand the distributions, life histories, and evolutionary relationships of these bats and their viruses. A team from Florida State University, Yale University, University of Florida, Arizona State University, the American Museum of Natural History, and the [Bionomia project](#) collaborated to quickly produce a deduplicated, standardized, vetted, and versioned data product of about 90,000 specimens of the focal bats shared from over 100 natural history collections through the [iDigBio portal](#) and [Global Biodiversity Information Facility](#). The project serves as a model for future rapid data enhancements about biodiversity specimens, having generated protocols for georeferencing collection locations and standardizing collector names, scientific names, collection dates, and linkages to additional resources. We will introduce the protocols and code written to be used for this project and to be repurposed for new rapid data enhancement campaigns, including the new functionality created for [GEOLocate's Collaborative Georeferencing platform](#) and [BIOSPEX](#). The data product is shared at Zenodo: <https://doi.org/10.5281/zenodo.3974999>.

General Sessions: Opening & Concurrent

Cultures of Extinction and Contemporary Art Conservation Research / Rebecca Gordon - Independent¹

¹University College London, London, United Kingdom

For some time in fine art conservation the term 'cultures of conservation' has been used to refer to the generative effect of the professionalisation of the discipline (Brajer 2013). This paper instead invokes Chrulew and De Vos's term 'cultures of extinction' as a new framework by which to approach the preservation and safeguarding of contemporary art. Doing so, I argue, will be a step towards a transformational introspection of a discipline's values and practices that may indeed be hampering the very objectives to which it aspires. The connection between fine art conservation and conservation biology and ecology is yet to be made, and is one that I believe to be extremely productive.

Informed by animal studies and conservation biology, with something of a feminist onto-epistemological reading, this is the beginning of a thought experiment to identify and challenge the various discourses and silences, conflicts and contexts of human and non-human agents involved in this web of conservation. It will explore art conservation as a 'counter-extinction' activity, and will question the impactful effects of accepted practices of care and 'rehabilitation' on the artworks themselves. The working examples called upon in this investigation are works of contemporary art that may be thought of as 'unruly' (Domínguez Rubio 2014) or 'recursive' (Hölling 2016). In a similar way that common conservationist practices such as trapping, sedation, and tagging – and even observation itself – can disrupt or transform the behaviour of the very animals being saved, so artworks can be unintentionally stripped of their embodied knowledge, connections and rhythms. Thus, this paper will look at transformation in both its destructive and constructive allusions.

Having unpacked the analogy with conservation of the natural world, this paper will then use the classic Darwinian charter of variation, adaption, and selection as a framework of difference for the conservation of cultural heritage, namely contemporary art. It will question the invisible narratives of 'technoscientific mastery' and intervention (Chulew and De Vos 2017) that tend to inform the performance of conservation in its widest sense, and will accept Chrulew and De Vos's call to attend to the "fragile and complex relational gift" of 'intergenerational inheritance.' How is embodied knowledge held by the work of art; how is it transferred between generations or instances or instantiations? What are the entanglements of value that must be acknowledged, and perhaps unravelled? This process seeks to decolonise our understandings and impulses of conservation in order to make new alliances and connections that hold transformative potential for the field of conservation at large.

Concurrent General Sessions

Confronting our Biases to Transform Conservation

Biases affect both our personal choices as conservators and inform larger institution-wide policies. As conservators we have been taught to make non-value-based decisions. However, our backgrounds inevitably filter into our decision-making processes. Conservators are involved in discussions regarding how/if art objects are collected, displayed, and preserved. We also make hiring decisions and are involved with community engagement. The subtle but significant problem of implicit bias in all of these areas can hinder our desire for inclusivity. Conversely, if we recognize and confront our own biases, then we can transform our practice and help make the cultural heritage field more diverse, equitable, inclusive, and accessible. The Equity & Inclusion Committee (EIC) proposes a general concurrent session with the goal of understanding and developing personal strategies to identify implicit associations in conservation, from the individual level to the institutional level. We will explore this topic through a mix of presentations, panel discussion, and open discussion. The session will include three speakers from the cultural heritage sector. Attendees will gain a deeper understanding of the implicit biases we all carry and how it influences their work, and see examples of how others have effected change.

Culturally Responsive Institutions at the Center /
Stephanie A. Johnson-Cunningham (she/her/hers)
Co-Founder and Director of Museum Hue

Transformation Begins with You: You is a Collective / Dr. Porchia Moore (she/her/hers) Department Head and Assistant Professor of Museum Studies, University of Florida

Dr. Moore will excavate what "transformation" means for our field and the field of cultural heritage in an ever-changing world. Grace Lee Boggs teaches us that true transformation can only begin with the self and yet the "self" is a special kind of collective. Dr. Moore will discuss what conservation and preservation mean in a world that is permeated with anti-blackness, glaring disparities, and the supremacy of white dominant culture. This talk will encourage cultural heritage professionals to lean into their collective power as change agents to shift appreciation for cultural heritage as information super systems in the 21st century world.

Serving Collections Better by Confronting Bias / Seema Rao (she/her/hers) Deputy Director and Chief Experience Officer, Akron Art Museum

Preserving collections is at the heart of museums. Conservators often bear the brunt of this role, both in practice and emotionally. With such enormous responsibility, also dealing with bias might feel overwhelming. However, as museums confront new challenges born of cultural change, conservators are poised to help ensure we continue to best preserve our collections by thinking about how bias impacts their work.

Creating Connections & Community During COVID

Lights! Camera! Action! Virtual Courierier - The New Normal? / Per Knutås - Head of Conservation¹, Jennifer Levy - Senior Assistant Registrar, Outgoing Loans¹

¹Museum of Fine Arts, Houston, Houston, TX, USA

As the COVID-19 pandemic relentlessly established its presence worldwide in spring 2020, the usual museum practice of lending and borrowing art was highly disrupted due to travel restrictions and mandated lockdowns. The Museum of Fine Arts, Houston, had two large exhibitions open and close during the height of the pandemic. We struggled to develop an incoming and outgoing protocol that would, as best as possible, serve in lieu of the couriers normally sent by domestic and international lenders. Our institution was not alone in this; as discussions progressed within the broader museum community, it became evident that many institutions were facing the same issue. The travel restrictions prompted by COVID-19 provided an opportunity to reevaluate the value of couriers and explore whether more cost-effective options could adequately ensure proper care of irreplaceable cultural heritage. After extensive consultations, the American Association of Museum Directors (AAMD) established a shared recommendation to forgo couriering and explore alternatives to in-person supervision of packing, transport, installations/de-installations, and the main topic of this presentation, close examination, and condition checking of artifacts on loan.

Conservation, registrars, and IT staff at the Museum of Fine Arts Houston started to explore technology as a reliable method in lieu of requiring staff to be present at all times during transport, condition checking, and installation. The authors examined several different digital devices and platforms, both as in-house test sessions and "live" with domestic and international museum colleagues. Virtual meeting platforms, social media video sharing websites, Action cameras, and industrial quality control headsets with camera attachments were tested to assess the most reliable and the highest quality output, suitable to replace part of the in-person service.

The COVID-19 pandemic has irrevocably transformed the world; people and institutions have suffered greatly. The negative financial impact of State mandated shutdowns due to COVID-19 caused a significant economic impact on our museum community. The director of the Museum of Fine Arts, Houston, and his peers at AAMD explored every avenue to save money to prevent permanent museum shutdowns and staff layoffs. Special exhibitions and loans were targeted as an avenue to save money. Change may be inevitable, but we can, as a field, use this period of reflection and re-evaluation in a productive manner to examine our policies and procedures previously taken for granted. The temporary travel ban, will become, for some institutions, a permanent recommendation, with few

General Sessions: Concurrent

exceptions recommending couriers for complex installations or where specific expertise is required. The lens of the study changed, from focusing on a temporary solution to a permanent option to replace condition assessment on site. By sharing our experience, we hope to further an ongoing dialogue on how to best pack, examine, and transport art in the times to come.

Creating Competences: Conservation Class in a Box /
Ellen J Pearlstein - Professor¹, William Shelley - Lab Manager¹
¹*UCLA, Los Angeles, CA, USA*

With Los Angeles becoming a COVID hot spot in July 2020, several innovative solutions were found for teaching conservation at the UCLA/Getty Conservation Program. Truly creating connections, an increased number of live and prerecorded lectures were planned and offered to students by colleagues from all over the world, increasing our students' exposure to valued colleagues drawn from conservation, conservation science, indigenous and non-indigenous artists, and art historians both here and abroad!

Analogous to the important theme of Creating Connections, this presentation focuses on Creating Competencies! Two paired classes about animal-sourced organic materials, one focused on materials chemistry, structure and deterioration, and the other on lab-based treatment, were planned with at-home work in mind. Each student received a box containing 115 different items that constitute a "class in a box". Items in the box included deteriorated leather artifacts previously donated to our program, as well as "vintage" feathered items borrowed or purchased on Ebay. Visual examination aids such as head loupes, USB microscopes and stands, and an ultraviolet examination flashlight were provided. Color checkers, photography scales, and photography backdrop paper were supplied for imaging. Also included were sample sets of feathers, quills and animal hairs; leather and skin from different species and tannages; and horn, bone and shell samples to illustrate properties valuable for visual characterization. Consumable samples were provided along with exercises designed for comparison and evaluation of properties. Students received artificially soiled samples to practice cleaning techniques, and samples and tools to carry out adhesive and loss compensation tests. Each student was equipped to set up a conservation space at home, with blotter paper, blue corrugated board, along with tools used for examination and treatment methods.

This presentation will focus on an evaluation of the challenges but also the considerable successes involved in operating a conservation class in a box, as a Covid solution.

Caring for Family Treasures: Providing Practical Preservation Advice during a Pandemic / Annabelle Camp
- National Endowment for the Humanities Fellow¹, Laura Mina
- Associate Conservator of Textiles¹

¹*Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA*

In March of 2020, as the Winterthur/University of Delaware Program in Art Conservation (WUDPAC) moved its semester online due to the COVID-19 pandemic, students and faculty realized that while our interactions with objects would be limited, we could and should continue public outreach. We observed that people were cleaning out closets and turning to their personal collections as a source of comfort in such unprecedented times. With that in mind, the Department of Art Conservation launched its Caring for Family Treasures series, developed to provide practical tips on ways families could care for their cherished collections while at home.

From March through August, the Department released a weekly blog post focused on one object type or collection care problem. In total, 20 illustrated posts were released via email, reaching an average of over 2000 people a week. The series was also shared via social media and newsletters and is being translated by APOYOnline. Each post was authored by a WUDPAC fellow, and topics ranged from gilded frames to pest management, quilts, and ceramics. Posts centered on practical and inexpensive solutions. Rapid turn-around times required careful planning and time for editorial and design expertise. Analytics revealed a rapid and consistent "open" rate (the percentage of recipients that opened the email).

Following the death of George Floyd, and as our Nation's attention centered on

Black Lives Matter, systemic racism, and the pressing need for social justice, we re-evaluated the relevancy of this series. In doing so, we observed the central importance of cultural heritage to foster joy and well-being and to connect communities. All objects, whether in museum or personal collections, can transcend borders. They act as windows to—and voices from—the past as we collaboratively work toward a better and more unified future. As conservators, we are committed to preserving all collections, including those that may be marginalized, hidden, or underserved, and the goal of the Family Treasures series is to put the power of preservation into everyone's hands and homes. This presentation will discuss the impetus and collaborative nature of this series, as well as how students approached providing at-home treatment recommendations and the ethical ramifications. This presentation will also consider the difficulties associated with digital outreach in a time of unprecedented challenges and social-media fatigue.

Teaching Conservation in the Time of COVID-19 /
Madeline Hagerman - Instructor in Art Conservation¹, Nina Owczarek - Assistant Professor¹

¹*University of Delaware, Newark, DE, USA*

In the spring of 2020, the COVID-19 pandemic abruptly forced universities around the world to close in the middle of the semester. After the University of Delaware (UD) closed March 11, faculty had two weeks to transition to online learning. Research activities were halted and summer programs were cut or moved online. In August, realizing that the health and safety concerns caused by the pandemic were not abating, UD decided that fall 2020 courses would primarily be delivered online. Although about 90% of the courses were taught via distance learning, UD recognized that some courses could not be effectively translated to an online platform. These courses included hands-on internships, studio courses, and some laboratory-based research projects. These types of classes were permitted to meet in person, provided that social distancing and other risk mitigating steps were in place. All courses were moved online after Thanksgiving break.

This presentation will examine how the COVID-19 pandemic impacted teaching conservation at the undergraduate level at the University of Delaware. It will first identify some of the practical features of remote teaching conservation, such as health and safety considerations and the creation of materials kits with test objects. Next, it will explore the many challenges instructors and students faced in the process, including demonstrating techniques, evaluating student treatment work, and the loss of peer learning. Finally, it will recognize some of the unforeseen benefits of moving online, such as shifting the focus to ethical discussions, especially in a senior capstone course.

IPM in the Time of COVID-19: An Unexpected Unifier and Trigger for Change / Madeline Corona - Assistant Conservator¹, Jane Bassett - Senior Conservator¹, Brian Houck - Head of Grounds & Gardens², Michael Mitchell - Lead Preparator¹, Laura Rivers - Associate Conservator¹

¹*J. Paul Getty Museum, Los Angeles, CA, USA* ²*J. Paul Getty Trust, Los Angeles, CA, USA*

Increased pest activity is just one of the many challenges experienced by the global museum community during the COVID-19 pandemic, but at the J. Paul Getty Museum an increase in webbing clothes moth numbers during this period resulted in the transformation of the IPM program, increased communication about pest issues both internally and externally, and unification of staff.

One of four constituent programs overseen by the J. Paul Getty Trust, the Getty Museum is split between two locations in the Los Angeles area: the Getty Villa in Malibu and the Getty Center in Brentwood. This paper will focus on activities at the Getty Center location - a relatively new 23-year-old construction where for many years a lack of remarkable pest activity allowed for a small, isolated IPM program primarily overseen by one conservator. In recent years, the IPM program at the Getty has undergone significant growth as we moved to a collaborative, multi-specialty, and more formally coordinated Trust-wide program that extends to the campus beyond the Museum and incorporates senior leadership.

In the spring of 2020, shortly after the Museum was closed to the public and most staff, regular IPM rounds revealed increased webbing clothes moth numbers in several galleries. As a result of the new structure of the IPM program, conservators

General Sessions: Concurrent

were able to quickly and efficiently coordinate with senior administration and allied departments to allow for special project funding and COVID gallery access in order to address the issues. A large collaborative project was undertaken to tackle deep cleaning of every affected gallery, treatment of objects, HVAC cleaning, building maintenance, and wool carpet removal in select locations in order to address the issue. The long-term shut down of museums in California offered the unique opportunity to give time for isolated gallery monitoring, rethinking of current cleaning and IPM procedures, as well as consideration of new display and seismic mount designs.

Perhaps the biggest change the recent pest activity fostered was increasing open communication about pest issues across all departments at the Museum. The energy and collaboration required to complete the summer cleaning project during the COVID lockdown brought IPM to the forefront of Museum operations – so much so that at the Administration's urging, the project was highlighted at a virtual All-Staff Meeting by two of the authors. The response to this presentation was overwhelming with an outpouring of appreciation, solidarity, and requests from departments for use of the presentation material for staff/volunteer training and K-12 teaching. In a time of extreme isolation, the "battle against the bugs" unexpectedly became a source of unity – a thread connecting collections and non-collections departments, remote and onsite staff, and colleagues across the field – as we all rallied together against a tangible common enemy.

The lasting impact of this pandemic will not be fully understood for decades to come, but our hope is that through continued open communication both internally and externally, we come out of this difficult period of history with strengthened collaborative relationships and lasting institutional change.

Put It On The Wall: Conservation Content at the Harvard Art Museums / Kate Smith – Conservator of Paintings¹

¹Harvard Art Museums, Cambridge, MA, USA

Conservation and technical art history have long been strengths of the Harvard Art Museums; the Straus Center for Conservation and Technical Studies has been studying the Harvard collection technically and scientifically for nearly a century. Our research has generally been "back of the house", typically shared with small groups given special access: seminar classes taught by the department to 15 or fewer students, single-visit tours for Harvard courses, ephemeral gallery talks for 15 or less, development donor events, specialist journals. We have glass walls, but no didactics; our excellent website content is buried 4 clicks down.

In quarantine, our communications department had an increased mandate to generate digital content at an unheard-of rate to remain relevant to our audiences. Conservation played a large role in this digital outpouring; we were at home completing research and writing reports and papers, all of which could be converted to digital programming. At the same time, Covid and its attendant isolation produced a need for community within our staff, so we also presented to each other at newly formed weekly all-staff meetings. Whenever conservation staff presented their work, there was general interest, questions from all departments, queries from leadership about how to better share this material in our galleries and more widely with our audiences.

The pandemic and the current racial justice and equity movement in our country were a perfect storm, an opportunity to consider how our profession can and should contribute to diversity, equity, access and inclusion in museum institutions. The curatorial staff were tasked with reframing our galleries and collection in light of the cracks opening up in the world around us. Covid and the quarantine provided a bit of time and space to do so. The notion of widening perspectives in museum galleries became very interesting to me, particularly as the voice of conservation and technical art history was increasing in volume with our digital footprint. It is humanizing to learn how something was made, by whom, using what materials and techniques. What if, instead of offering these perspectives to a privileged few, or only online, we put them on the wall? This kind of content opens doors for visitors that might not otherwise find themselves engaged in a museum environment. What if we remembered that we are an art museum, not just an art history museum?

This talk will describe the development of an Art + Science pathway proposal that I brought to the HAM leadership to integrate our scientific investigations into the standard offerings of the galleries.

On Display

Alternative Strategies: De-installation, Treatment, and Reproduction of a Historic Chinese Import Wallpaper for Jekyll Island Museum / Luana Maekawa – Senior Paper Conservator¹, David Joyall – Senior Collections Photographer¹

¹NEDCC, Andover, MA, USA

In 2017 NEDCC was approached by the Jekyll Island Museum in Georgia regarding a unique paper conservation project – to conserve a late 19th century Chinese import wallpaper installed in the sunroom of Mistletoe Cottage, one of the Museum's historic homes. The Museum's goal was to preserve the wallpaper and consider options for reinstalling it in the home. Due to the wallpaper's poor condition, and because only a small subset of the paper remained and was installed on the ceiling, de- and reinstallation became the project's greatest challenges.

After extensive discussions between the Museum staff and NEDCC's Paper Conservation and Imaging Labs, NEDCC developed a 3-phase plan to de-install the wallpaper, conserve a section and frame it for display, and then create reproductions for re-installation in the Cottage. This project, which involved a complex, paper-based decorative feature in an actively attended historic house museum, required a collaborative decision-making process by both Jekyll Island Museum and NEDCC staff to develop and execute the project plan effectively. The full extent of the phased plan and challenges associated with each step will be discussed in this presentation by a conservator and a collections photographer.

Aside from the wallpaper's poor condition, the fact that it was installed on the ceiling, tested positive for arsenic, and had an original decorative 19th-century bamboo framework overlaid on the wallpaper all added to the logistical challenges typically associated with the de-installation of historic wallpaper. To meet these challenges, NEDCC determined that the de-installation process necessitated the involvement of both paper conservators and a collections photographer to properly document the wallpaper in-situ and de-install it, while also identifying the portion most suitable for retention, conservation, and reproduction.

Once de-installed, the identified section was transported to NEDCC for further evaluation and treatment. The wallpaper, itself particularly complex, showcases a motif of repeating green leaves, rice panicles, and fluttering pairs of colorful birds, and consists of a paper substrate lined with an open-weave mesh, then block printed. Many pigments were flaking, faded, and discolored. Using small portions of de-accessioned wallpaper, conservators were able to perform extensive testing to identify a treatment that would yield the most aesthetically pleasing and physically stable results. The treated portion of the wallpaper was then framed for exhibition alongside the reproduction paper.

The digitization, digital restoration, and reproduction of the wallpaper for installation in the cottage began with research into an inkjet printable wallpaper substrate that could be installed by local contractors. Once a paper was selected, the conserved segment of wallpaper was digitized by NEDCC's Imaging Lab to serve as the foundation for reproduction. Extensive digital restoration was undertaken to address issues that could not be fully resolved by conservation, such as the faded and significantly discolored pigments. The color of the printed elements was then refined by comparing known historic pigment samples. Finally, prior to printing the full-scale reproductions, iterative color matching was performed by shipping samples to Jekyll Island staff for evaluation in the room in which they would be installed.

Fantastic Beasts: A Manuscript Leaf Approach for the Display of a Python Skin. A Collaborative Project between Paper and Objects Conservators / Konstantina Konstantinidou – Paper Conservator ACR¹, Cheryl Lynn – Conservator¹, Nikki Harrison – Conservator¹

¹Natural History Museum, London, United Kingdom

This paper will focus on the challenges faced during the treatment and mounting of a large python skin, almost 5m long, chosen for display as part of an upcoming Fantastic Beasts exhibition at the Natural History Museum, London. These challenges included its length and undulating surface, showcase access restrictions

General Sessions: Concurrent

and potential future touring. The adopted response is a result of collaboration between natural history object conservators and a book and paper conservator, who was inspired by the display of manuscript leaves. Through this collaboration the conservators were able to adapt techniques and materials usually reserved for paper conservation into their successful use on this natural history specimen. Furthermore, support materials had to be created to match the texture and flexibility of the specimen using conservation materials such as Tyvek® and Japanese paper. For mounting, a strapping method with magnets was devised to enable the safe installation and de-installation of the skin from its rigid honeycomb panel support in case of repeated display. Sustainability was also achieved by recycling display material from a previous exhibition. This collaboration led to an exchange of skills as the object conservators were introduced to Asian lining techniques and had the opportunity to use tools such as the Uchibake beating brush whilst the paper conservator became familiar with the family of Lascaux adhesives. This successful project was a great opportunity of collaboration between different speciality fields of conservation and an exchange of knowledge.

The Materials Selection and Specification Working Group: Paving the Path for Choosing Safe Materials for Display

/ Lisa Elkin – Chief Registrar and Director of Conservation¹, Rebecca Kaczowski – Preventive Conservator², Rachael Perkins Arenstein – Partner³, Lisa Goldberg – Owner⁴, Samantha Springer – Principal Conservator⁵

¹American Museum of Natural History, New York, NY, USA, ²Smithsonian Institution, Washington, DC, USA, ³A.M. Art Conservation, LLC, Scarsdale, NY, USA, ⁴Goldberg Preservation Services, LLC, Elmira, NY, USA, ⁵Conservator, Portland, OR, USA

Placing collections on display assumes risk to the long-term preservation of the object with the trade-off that the piece is providing insight, appreciation, or fulfillment. But we also assume that the risk should not be larger than necessary or out of line with the benefits of exhibition. Choosing safe materials for the construction of cases and mounts is one of the variables that impact the preservation of an item on display. But with limitless possibilities in exhibition design comes a confusion of how to limit unnecessary damage. How do museum professionals make smart choices on what is safe to use? Where do we find the data that informs our decision making? To what resources can we turn?

As information becomes more easily accessible than ever, conservation and preservation professionals are increasingly relying on online content for decision making. We prioritize free, accessible, and practical resources from trusted organizations. Also, we like to see information aggregated in a way that provides diagnostic tools, compelling visuals and links to suppliers and vendors (Lambert et al., 2018).

Over the past three years AIC's Materials Selection & Specification Working Group (MWG) has brought allied organizations and professionals together to identify needs and develop content that will help cultural heritage professionals choose and use materials that will not harm our collections while on display. The Working Group is crowdsourcing knowledge, conducting primary research, and developing new tools to create a portal that aids in decision making, points to available data, and vets and aggregates current information on choosing safe exhibition materials.

This presentation will provide an update on the tools and resources created by the MWG and encourage the cultural heritage community to become involved in pushing these ambitious projects forward.

Standardized Protocols for Testing Exhibition and Storage Materials Used with Works of Art: Round-Robin Results

/ Christopher A. Maines – Senior Conservation Scientist¹, Eric Breitung², Susan Heald³, Emily Kaplan³, Lisa Imamura³, Gregory D. Smith⁴, Elena Torok – Assistant Objects Conservator⁵, Julia Sybalsky – Conservator⁶

¹National Gallery of Art, Washington, DC, USA ²The Metropolitan Museum of Art, New York, NY, USA ³National Museum of the American

Indian, Suitland, MD, USA ⁴Indianapolis Museum of Art at Newfields, Indianapolis, IN, USA ⁵Dallas Museum of Art, Dallas, TX, USA ⁶American Museum of Natural History, New York, NY, USA

The Materials Working Group (MWG) was established in 2018 to meet the challenges for selecting materials for collections storage, transport, and display and to disseminate this information effectively to a wide range of stewards of cultural heritage objects. The Materials Selection & Specification subcommittee was established to “identify and refine methods for evaluating materials and improve means for their implementation and interpretation for the end user.” After extended discussions, the subcommittee selected a variety of methods to test the suitability of storage and exhibition materials for works of art: two Oddy test protocols – the Metropolitan Museum variant and the Indianapolis Museum of Art/Winterthur variant – five microchemical tests – pH, chloride, and sulfur – and two gas chromatography / mass spectrometry (GCMS) tests for volatiles – solid-phase microextraction (SPME) and direct thermal desorption (DTD).

A round-robin was conducted in 2019 on seven materials that have been tested and used by many institutions for both art and non-art applications over the years: two PVC foam boards, a corrugated archival board, a high-density book binder board, two hot-melt glues, and a silicone sealant. All materials were purchased in bulk by the National Gallery of Art, and the samples were prepared there or at the National Museum of the American Indian. All samples were shipped in polyethylene bags from the National Gallery of Art on the same date in August, 2019 via FedEx to insure a short travel time and minimal exposure to the summer heat.

A total of twelve institutions participated in the round-robin: eight US museums, three conservation university programs including one outside the US, and one US library. The testers were an equal mix of conservation scientists and conservators, and most institutions conducted more than one type of test. The results of the test protocols were mostly in agreement for all seven tested materials, which is an excellent outcome considering that the participants were performing the tests independently using their own equipment based solely on the written protocols distributed with each set of samples. None of the participants used the same test equipment/instrumentation nor received hands-on training prior to the start of the round-robin.

At the fall 2019 MWG meeting, the three **Materials Testing and Standards** focus groups spent their time discussing the round-robin results and clarifying the written protocols to improve reproducibility among laboratories. Two new protocols were added – the British Museum's Oddy test protocol, and the A-D strip test for deterioration of acetate film. The 2020 round-robin, interrupted by the COVID-19 pandemic, is expected to finish by the summer of 2021. Work in 2020 involves updating information on materials and Oddy testing protocols, and establishing interpretation protocols for GCMS datasets of volatiles.

A Memorial on Middagh Street: The Treatment and Display of a Firehouse Door Mural

/ Maureen Merrigan – Assistant Conservator¹

¹National September 11 Memorial & Museum, New York, NY, USA

The 9/11 Memorial & Museum has a collection of objects that spans an array of materials and themes. Most visible are the large-scale objects on permanent display throughout the museum. They include building remnants from the World Trade Center, emergency vehicles that responded on 9/11, and memorial items made in tribute to victims. One of the Museum's recent tribute item rotations included the installation of a double-bay garage door from a local firehouse. Navigating the installation and display of this large-scale object posed a distinct set of challenges.

In the months after 9/11 attacks, members of Brooklyn's Ladder 118 and Engine 205 worked with a local non-profit group to design a memorial mural and the group painted it onto the wooden garage door in the summer of 2002. For 15 years, the 10.5ft high x 18ft wide massive mural served as a memorial to the eight firefighters of the house who perished on 9/11 and recognized the citywide loss of the Twin Towers. In 2016, the FDNY slated the 70-year-old door to be replaced with a lightweight, metal composite door.

The Museum has a unique relationship with many of city agencies including the FDNY. When the firehouse door was decommissioned, the Museum was interested in acquiring it and ultimately, it was secured through a 99-year loan to the museum. This paper will discuss how the museum balances the interests of donors

General Sessions: Concurrent

who often have emotional attachment though no legal ownership to objects. It will also consider the challenges of working with stakeholders who may not appreciate the potential risks of the long-term exhibition of artifacts.

The treatment of the firehouse door was substantial. The 15-year-old acrylic paint was flaking badly in areas and layers of dirt and grime needed to be removed. But, the size of the object was the most complicated aspect of treating it. Upon completion of the treatment offsite, access to the museum was difficult. The galleries are 7 stories below ground. This paper will outline the custom mounting system used to secure each panel as well as detailing the design solutions used to recreate the street-level feeling of the door's origin. Additional discussion of the risks considered for display location in the gallery and the height of the installation will also be included.

The final challenge the museum team faces after the successful installation is ongoing discussions with the artists and stakeholders to secure rights for educational, online, and retail uses for the mural. The challenge of navigating intensely emotional subjects such as visiting the museum with surviving first responders or the transfer of ownership of memorial materials are outside the normal realm of operations for conservators. In considering the display of materials related to traumatic events and materials related to memorialization an additional factor of emotional ownership also needs to be considered and accounted for in all discussions.

Exhibit Case as a Compatible/Incompatible Object? /

Ellen Carlee - Conservator¹

¹*Alaska State Museum, Juneau, AK, USA*

The Alaska State Museum in Juneau, Alaska has been located on Tlingit land for more than 120 years. As part of the inaugural exhibits for the new building that opened in 2016, a clan house space was fabricated from Western Red Cedar by a team of indigenous carvers. Inside this structure built within the permanent galleries, the museum installed painted masks, shell, silver, and other items whose preservation might be threatened by offgassing from the freshly-adzed surfaces of the wood. In 2020, two newly-carved houseposts and a new large wood screen were added to the display, also adding to the load of airborne pollutants in the space. This presentation discusses the mitigation and monitoring plan for addressing the exhibition of sensitive materials, and examines the uncomfortable conservation dilemma posed by putting objects in harm's way for the purposes of larger interpretive and cultural priorities. The interior surfaces were coated with several layers of shellac, silver and shell jewelry was put inside a vitrine with pollutant scavengers, fans were installed below the decks to reduce concentrations of offgassing, and Munsell color readings were used to create a baseline for monitoring pigments containing metals as identified by portable XRF. The challenges of capacity in a rural museum with a small staff are addressed in this presentation, as well as the special responsibility to "get it right" in the homeland of a people who have been here for 10,000 years. Questions of decision-making authority and intended audience for indigenous material culture add nuance to a classic dilemma of preservation versus access. The opportunity to carve the clan house, screen, and house posts is itself a form of preservation and perpetuation of culture. The ongoing use of the clan house as a heritage space by the Native community and the authenticity of Western Red Cedar as a culturally significant material on the Northwest Coast are also factors in the discussion. Questions of ownership and ongoing use of Alaska Native collections continue to be debated within NAGPRA and self-determination frameworks. This presentation explores networks of ongoing relationships involving museum staff, artists, culture-bearers, artifacts, and materials as agents from a materiality perspective. How do conservators steeped in guidelines for best practice come to terms with an exhibit enclosure that is both compatible and incompatible with its contents?

Transformative Research and Treatment in the Care of Natural History Collections

Addressing our Colonial History in the Herbarium of the New York Botanical Garden - The Folder Project /

Nicole Tarnowsky - Assistant Director of the Herbarium¹,
Leanna McMillin - Herbarium Digitization Asset Manager¹

¹*New York Botanical Garden, Bronx, NY, USA*

The collections of the William & Lynda Steere Herbarium at the New York Botanical Garden are an important way to view biodiversity through time and space. They are also a lens through which we can view human history. Our collections are artifacts that can tell the history of colonialism in science. European scientists were sent to document different corners of the world resulting in a huge number of natural history collections made in the 18th and 19th centuries. Scientists returned to Europe with these collections, where they largely remain today. Our Herbarium acquired many of these historical collections through trade with European Herbaria, from expeditions associated with westward expansion through North America in the 19th century, and by sending our own scientists to collect in other countries from the early 20th century through today. European and American botanists of the 19th and 20th century relied heavily on the knowledge and expertise of indigenous guides, figures largely erased by a whitewashing of history.

The NY Herbarium houses approximately eight million specimens of flowering plants, gymnosperms, ferns, mosses, lichens, algae, and fungi - collected from every continent. Like many other natural history collections, we use a color scheme in our filing system for specimens from different geographic regions. Devised in the 1940's, the NY filing system used color coded specimen folders that corresponded geographic regions to racial categories created by European scientists in the 19th century. The filing maps and colored folders holding specimens were an offensive, visual reminder to all users of the herbarium of racist categorizations of different regions of the world. We have carried out a project to change this filing system, removing the offensive folders that the specimens were stored in and replacing them with color codes that are not associated with historically racist meanings.

This is one small step in addressing our colonial past. The filing system was a representation of the history of scientific thought, and the insidious ways racism has been a part of how we view and categorize the natural world. We are committed to identifying and challenging the ways white supremacy shows itself in our collections and ensuring that our herbarium is a safe and inclusive workspace for staff and visitors from all over the world.

Test and Repeat: Assessing and Caring for Hazardous Natural History Collections at the Royal Alberta Museum /

Carmen Li - Head, Conservation¹, Jocelyn Hudon - Curator of Ornithology¹, Genevieve Kulis - Natural History Conservator (project)¹, Melissa Bowerman - Assistant Curator, Geology¹, Lisa May - Conservator, Objects¹, Corey Scobie - Assistant Curator, Ornithology¹

¹*Royal Alberta Museum, Edmonton, Canada*

From May 2017 to March 2020, the Royal Alberta Museum (RAM) moved approximately 3 million objects and specimens to two new buildings: a primary building located in downtown Edmonton, Canada, and a collections care centre just outside of city limits. This presentation will focus on the preparation and move of two specific collections. The radioactive mineral collection and the life sciences collection both posed health and safety complications due to various potential hazards. Initial tests to measure the radioactivity and radon emissions of the radioactive mineral collection, conducted in-house by conservation and geology staff, informed the development of written pack and move procedures. These procedures were written and approved approximately two years before the scheduled move date of the collection; however, as we began implementation of the move procedures, it became apparent that course changes were necessary when ongoing monitoring and re-testing revealed a different picture than what the initial tests led us to believe. This monitoring strategy became a critical part of developing a comprehensive plan for not only the move of the radioactive mineral collection, but for its safe long-term storage.

Similarly, surprises were encountered with taxidermy and study skins as a result of testing. Initial portable X-ray fluorescence (pXRF) tests conducted by conservations staff revealed a collection that was more broadly contaminated than previously thought, as well as evidence of widespread cross-contamination, particularly when it came to the ornithology collection. An environmental consulting company was brought in to perform wipe tests in order to analyze and quantify the amount of arsenic in active and static dust in collections spaces, lab spaces, and in other locations such as hallways and meeting rooms. The specimen specific pXRF test results, conducted in-house, and the environmental wipe test results, conducted by an outside company, were both used in the development of pack and

General Sessions: Concurrent

move procedures, clean-up protocols, and ongoing care and handling procedures. However, a second set of wipe tests conducted by the same company and using the same methodology, yielded dramatically different results, for reasons that will be expanded upon in the presentation. This once again changed our understanding, and processes and procedures were revised as a result.

The experience at RAM highlights the importance of not only testing, but ongoing monitoring and re-testing, in order to fully control for variables that may not be immediately apparent. One set of initial test results led us to under-interpret a risk, and the other set of initial test results led us to over-interpret a risk, and in both cases, it was the commitment to on-going monitoring and re-testing, as well as open communication and collaboration between collections, conservation and curatorial departments, that allowed us to make the course changes necessary to ensure a safe and effective collections care regime.

Birds of a Feather... Community-driven Research Informing Best Practices for Cleaning Feathers /

Julia Sybalsky – Conservator¹, Renee Riedler – Object Conservator², Michaela Paulson – Project Conservator¹, Lisa Elkin – Director of Conservation¹

¹American Museum of Natural History, New York, NY, USA

²Weltmuseum Wien, Vienna, Austria

In the fall of 2018, conservators at the American Museum of Natural History (AMNH), in partnership with the Yale Institute for the Preservation of Cultural Heritage, the UCLA/Getty Master's Program in the Conservation of Archaeological and Ethnographic Materials, and the Getty Conservation Institute, began a three-year research program focused on the preservation of feathers. With funding from the Institute for Museum and Library Services, this effort will systematically evaluate the impacts of cleaning, pesticide use, and restoration of color on feathers. Outcomes will directly inform the conservation of scientific specimens, taxidermy, and cultural heritage materials, as well as fashion and fine art collections.

Through the development and implementation of an online community survey, analysis of survey responses, and subsequent open dialogue with responders, the project team has identified common priorities and challenges faced in preserving feathers and feather objects. The resulting dataset includes input from over 100 preservation professionals from countries worldwide on a broad range of topics including preferred methods, criteria for decision-making, damages observed from treatment, and challenges left unanswered.

With a focus on cleaning techniques, this talk will present the diversity of concerns and treatment solutions, as well as important areas of consensus, revealed by the survey. It will explain how the knowledge and experience captured therein was organized and interpreted in order to develop an experimental design reflecting the needs of the professional community. The resulting research program investigates a representative group of cleaning methods in order to deliver empirical guidelines for treatment and decision-making tools back into the hands of the conservation and preservation communities at large.

Rehydrate This! Challenges in preserving and treating fluid specimens / Arianna Bernucci – Senior Conservator¹, Chelsea McKibbin – Conservator¹, Efstratia Vervenioutou – Senior Conservator¹

¹Natural History Museum, London, United Kingdom

The Natural History Museum in London (UK) holds more than 60 million specimens, of which over 6.5 million are spirit specimens. These include both vertebrate and invertebrate material ranging from fish to plants to mammals. Historically specimens have been prepared and mounted by curators within their individual science departments – such methods could include sewing through specimens or storing specimens in acrylic containers. Conservators have been working closely with curators to define new standards in the conservation of wet specimens. This includes specimens on display in temporary exhibitions as well those behind the scenes, in collections spaces.

Design and curatorial requests for two recent temporary exhibitions, *Venom* and *Life in the Dark*, resulted in non-invasive, innovative methods of mounting. The newly defined mounting methods provided an impetus to continue into a more

complex collections-based project, the Burne's collection. This collection includes historic dissections of cetacean specimens stored in both historic glass and acrylic containers. In addition to using the new standards for mounting, this project aims to create a standard for both condition assessment of wet specimens and other remedial treatments.

New condition assessment standards include the use of a comprehensive check list of conservation terms to address the jarred specimens as a whole. Giving equal attention to all components of the jarred specimen bridges the gap between conservation and preparation of wet specimens. Conservators studied and observed various current and historic methods of replacing fluid and rehydrating desiccated specimens to form the optimum methodology. In addition, conservation principles were used to aesthetically recreate historic seals using conservation grade materials with respect to the historic nature of the collection.

Planning a Quantitative Risk Analysis to Determine Storage Enclosure Options for Large Vertebrate Specimens /

Melissa King – Samuel H. Kress Fellow in Preventive Conservation^{1,2,3}, Robert Waller – President and Senior Risk Analyst⁴, Catharine Hawks – Conservator¹, Rebecca Kaczowski – Preventive Conservator⁵, Evan Cooney – Conservation Technician¹

¹National Museum of Natural History, Washington, DC, USA

²Smithsonian Museum Conservation Institute, Suitland, MD, USA

³Conserv Solutions Inc., Birmingham, AL, USA ⁴Protect Heritage Corp., Ottawa, ON, Canada ⁵Smithsonian Institution, Washington, DC, USA

There are an enormous number of variables to consider when deciding upon storage enclosure options for large and vulnerable collection items—especially when factoring risk mitigation and sustainability. This is the situation the Smithsonian's National Museum of Natural History (NMNH) faced when pondering storage options for large vertebrate specimens. Most collection items in the museum's off-site storage spaces are housed in powder-coated steel storage cabinets that mitigate many preservation risks and help to passively control the humidity variations. However, some specimens are currently on open shelving largely due to their large size and consequent expense of creating enclosures. Due to the relatively vulnerable nature of oversized osteological specimens on open shelving, climate control (both temperature and relative humidity within narrow ranges) for the entire 1.3 million ft³ facility has been the primary preservation strategy. The building HVAC provides the space with four air exchanges per hour utilizing 10% outside air to maintain room-level setpoints of 72°F (+/- 2°F) and 45% (+/- 8) relative humidity. The building envelope supports minimal buffering capacity (insulation relative to thermal mass), and there is a looming risk of equipment failure given the age of the HVAC systems in the space. All these considerations pose problems in maintaining a sustainable, reliable, controlled environment. Presently, the majority of the collections are housed within enclosures, however, the collections on open shelving are vulnerable to climate ranges outside of the present set points. If a solution to create a microclimate for these objects is determined, then it may allow some leniency in mechanical control of the space, minimizing overall energy costs. Further, the enclosures could provide additional protections from other risks. However, these large specimens on open display do add visual impact value for visitors to the space and provide easy access for researchers. Through the Foundation for the American Institute of Conservation's (FAIC) Samuel H. Kress Fellowship, NMNH and the Museum Conservation Institute were afforded the opportunity for devoted research and design of a decision process. The development of this process also provided an opportunity to utilize and evaluate the efficacy of a new tool developed by the Society for Risk Analysis' Applied Risk Management Specialty Group. The tool is called the "Risk Analysis Quality Test" (RAQT) and its intention is to provide an opportunity to improve the analysis by identifying shortcomings. Applying this test to the described framework offers an opportunity to evaluate its use in a collection preservation context. As with many projects completed in 2020, this research was adjusted to be completed remotely and faced many interruptions from the ongoing public health crises. This shift in distance work priorities may be an opportunity for institutions to evaluate present risks to collections and apply this type of thinking to collection management strategies. This presentation will discuss preparation methods for implementing risk analysis techniques for complicated preservation decisions, and engage the audience in ways to consider storage options for large collection items.

General Sessions: Concurrent

The Hidden Tooth: Reversal of Preparation Work, Retreatment of Unstable Mammoth Tusks, and Significance of Conservation Records / Genevieve Kulis

- Natural History Conservator (project)¹, Susan Green - conservator¹, Chris Jass - Curator, Quaternary Palaeontology¹, Christina Barron-Ortiz - Assistant Curator, Quaternary Palaeontology¹

¹Royal Alberta Museum, Edmonton, AB, Canada

Reversing a previous treatment can be a daunting task for a conservator. This is particularly true when an object has become unstable due to a previous treatment, and no record of materials or methods used are available. Such a situation was faced at the Royal Alberta Museum, where members of the conservation department undertook a treatment/preparation reversal on pair of mammoth tusks and partial skull. The specimen was uncovered in the Edmonton area in the late 1980's and had undergone preparation and stabilization around the same time. The tusks were only recently described in the scientific literature and had previously not been on public display; however, with the opening of the Royal Alberta Museum's new downtown Edmonton location, they were selected to be part of the exhibits in the new Natural History Gallery.

The tusks displayed several areas of deep and active cracking that needed to be addressed before going on display. Preliminary inspection of the specimen revealed large areas of the tusks had been in-filled with epoxy. These areas of previous preparation work were the primary sites where the cracking and splitting of the tusks was occurring. This inspection also revealed that the specimen was covered with several different coatings and paint, which were masking the extent to which the specimen had been in-filled. It quickly became apparent that the materials and methods used on the specimen were largely responsible for its deterioration and instability. As such, a remedial treatment to remove and reverse as much of the previous work as possible was carried out.

The current display of the tusks highlights the reversal work undertaken and serves as a striking contrast to published images in the scientific literature. Published descriptions of the specimen emphasized the 'complete' nature of the tusks, their overall curved morphology, and 'natural' breakage and wear patterns. While some element of that description holds true, the lack of conservation records related to the original work on the tusks led to an over-interpretation of the completeness of the specimen and tusk wear patterns in the scientific literature. The over-interpretation did not alter the results of the paper, but does serve as a stark reminder of the significance of conservation records for on-going scientific interpretation of museum specimens.

Collaborating with Stakeholder Communities

The Implications of Basketry Kits and How-to Books for Authenticity / Bryn Barabas Potter - Curator¹, Ellen Pearlstein - Professor²

¹BBP Museum Consulting, Northridge, CA, USA ²UCLA, Los Angeles, CA, USA

The UCLA/Getty Program for Archaeological and Ethnographic Conservation has a long history of working with tribal nations in southern California, most recently with the Barona Cultural Center and Museum—part of the Kumeyaay Nation—outside of San Diego. In a recent treatment, one basket has been tentatively identified by curator Bryn Potter as having been produced from a kit dating to ca. 1903 and sold to nonnative women as part of a project referred to as the Navajo School of Indian Basketry. Barona staff and members of the Kumeyaay Nation recognized that this basket “was not theirs”. Navajo experts confirmed no connection between the “Navajo School” and the Navajo Nation. Further archival research has placed these “how to” kits, books, and sample designs in Indian Boarding Schools—ironically appropriating native weaving designs while teaching Indigenous children pan-Indian basketry as an equalizer.

All of this has led to research to materially identify such “kit” and “how-to” baskets, to distinguish them from native examples, as they have now entered both tribal and non-tribal museum collections and the marketplace with erroneous labels.

A further goal is to provide a material guide to enable collections custodians to identify such baskets, and to reveal the context in which such basketry kits and books originated and were sold. This research has also explored the interesting messiness of the fact that tribal weavers respond to and incorporate new materials all the time, and that materials alone are not an indicator of authenticity.

In joint conservation-curatorial research, the authors have evaluated and documented comparable baskets in six museums with major collections, including one Indian School museum. We have compiled characteristics of their materials, stitching methods, and colorants. We have also succeeded in linking these baskets to their makers and to known “how-to” kits and books widely disseminated in the first decade of the 20th century. The material guide is in preparation and will be widely disseminated in Indian country.

Collaborating with Indigenous Communities to Deinstall the Native North American Hall at the Field Museum /Nicole Passerotti - Program Associate for the Mellon Opportunity for Diversity in Conservation¹, Erin Murphy - Assistant Conservator, Anthropology Collections², Stephanie Hornbeck - McCarter Chief Conservator, Anthropology Collections²

¹UCLA/Getty Program in the Conservation Archaeological and Ethnographic Materials, Los Angeles, CA, USA ²The Field Museum, Chicago, IL, USA

For 70 years the Field Museum's collection of 770,000 Native North American items has been represented in a permanent 7,500 sq. ft. public exhibit. Beginning in 2018, this exhibit was carefully dismantled. This multi-phased renovation project provides an opportunity to change old attitudes while confronting and re-envisioning normal and outdated museum practices. Dismantling an old permanent exhibition that contained more than 1,500 items from across Native North America was a challenging and important step in fostering both small and large institutional changes.

A new exhibit presents a perfect opportunity to initiate or encourage museum best practices and outreach to source communities. In this case study, Field Museum conservation and collections staff reflect on the vital role played by collaborative teamwork in successfully completing a major phase of the Field's Native American exhibition revitalization project. As part of this multi-year renovation, museum staff has reached out to many stakeholders to ensure that all items are documented, handled, and stored safely and respectfully. An Advisory Committee of 12 representatives from tribes across the U.S and Canada was formed that includes scholars, artists and museum professionals. The conservation team worked closely with a sub-committee drawn from these Advisors to help guide recommendations for responsible care, display, and storage.

De-installation challenges ranged from the mundane to the unexpected. Each challenge offered opportunities to confront and re-envision outdated museum practices. For example, plans to accommodate a necessary public egress route right through the gallery space allowed us to “invite” the public to learn about our work via a viewing window and displays. The conservation team also encountered out-of-date mounts, materials, labels, and displays including 44 fully dressed mannequins, some with cultural inaccuracies.

Although the de-construction phase of this project was complicated, real progress was made updating procedures, museum outreach, and interdepartmental cooperation. The deinstallation was completed on schedule in March of 2020, and left the conservation team in good position to begin the next phase of this project. The Field Museum conservation and collections staff reflect on the vital role played by collaborative teamwork in this revitalization of the Field's Native American exhibition.

Consultation and Collaboration: Renovation of the Northwest Coast Hall at the American Museum of Natural History / Amy Tjiong - Associate Conservator¹, Judith Levinson - Director of Conservation¹, Samantha Alderson - Conservator¹, Gabrielle Tieu - Associate Conservator¹

¹American Museum of Natural History, New York, NY, USA

In 2017, the American Museum of Natural History (AMNH) announced a multi-year

General Sessions: Concurrent

project to renovate its historic Northwest Coast Hall, enriching and contextualizing exhibit interpretation and conserving the culturally significant collection. The renovation project is being co-curated by North American ethnology curator, Dr. Peter Whiteley, and Nu-uh-chah-nulth artist and cultural historian, Haa'yuuups (Ron Hamilton). An additional core advisory group of nine members representing the Nations in the hall was also engaged to work collaboratively with the curatorial, conservation, exhibition, and design teams, providing invaluable knowledge regarding their cultures. An integral part of the undertaking includes the conservation of about 900 treasures that will be displayed in the newly renovated hall.

This presentation will provide an overview of the extensive consultation and collaboration that conservators and curators undertook with Indigenous communities and individuals from the Northwest Coast, with the goal of integrating Indigenous perspectives to conservation treatments and exhibit interpretation. With generous grant support, the museum was able to hire a curatorial associate and a conservator dedicated to working together to develop meaningful interactions with our Indigenous partners and to encourage an integrated workflow within the AMNH team.

Until now, long-term consultation efforts with Indigenous stakeholders regarding conservation issues often have not been successfully sustained at AMNH and other institutions given geographic constraints and insufficient resources. This renovation project expanded our initiatives to proactively seek collaboration opportunities and establish a groundwork of relationships that would move beyond consultation to an integrated collaborative process. It is hoped this process will extend into the future, acting as a model for the renovation of other cultural halls at AMNH.

The project team hosted large convenings and intimate working visits at AMNH. We also traveled to many communities in the Pacific Northwest, meeting with elders and other community members in multiple venues. We have been privileged to visit artists, attend celebrations, and be welcomed into homes. Three Indigenous fellows, to date, were trained in collections care and conservation positions created for this renovation project. These gatherings and sustained relationships have influenced our lab protocols and served to support a nuanced and considered approach to our work.

These meaningful interactions have deepened our institutional and individual perspectives, as we work to develop an exhibit that will better serve descendant Indigenous communities, reconnecting them to their heritage and increasing access to their material culture, while also providing a rich visual and contextual experience for AMNH visitors.

Building a Conservation Partnership between Yale University Art Gallery and National Museum, Lagos during the Global Pandemic / Anne Gunnison - Senior Associate Conservator of Objects¹, Cathy Silverman - Assistant Conservator of Objects and Furniture¹, Adenike Niyi-Dare - Chief Conservator², James Green - Frances and Benjamin Benenson Foundation Assistant Curator of African Art¹, Geo Barrios¹

¹Yale University Art Gallery, New Haven, CT, USA ²National Museum Lagos, Lagos, Nigeria

This paper will describe a collaboration between the curator and conservators at the Yale University Art Gallery (YUAG) in New Haven, Connecticut, community stakeholders in Kajola, Kwara State, Nigeria and conservators at the National Museum of Nigeria in Lagos, which aims to facilitate an exchange of skills and knowledge, ultimately improving care and interpretation of Yorùbá artworks in both museum collections. It will explore the use of technology to confront the challenges of working collaboratively on objects when travel is not possible, and the implications this has for future work.

Nigerian sculptor Moshood Olusomo Bámigbòyè (ca. 1885–1975) was one of a number of carvers with workshops in northeastern Yorubaland, in present day Kwara and Ekiti States of Nigeria. He will be the subject of the exhibition Bámigbòyè: A Master Sculptor of the Yorùbá Tradition, September 9, 2022–January 8, 2023 at YUAG. Reuniting more than thirty works of sculpture attributed to his workshop, the exhibition will be the first solely dedicated to examining Bámigbòyè's work over the course of his fifty year career.

James Green, Frances and Benjamin Benenson Foundation Assistant Curator of African Art at YUAG, worked closely with the National Museum to investigate objects by Bámigbòyè in its collection. He also visited Kajola, near Odo-Owa, Kwara State, Nigeria where the artist lived and where his family are still based to learn more about the artist from members of his family and wider community. Bámigbòyè's full oriki, or oral praise poem was recited, and the town of Kajola hosted a festival called Epa which included the performance of a mask by the artist.

The planning of the exhibition has also afforded an excellent opportunity to forge a partnership between conservation departments at the two museums. Whilst elements of the project have necessarily been put on hold as a result of the Covid-19 pandemic, a workshop in wood conservation to be run by Anne Gunnison and Cathy Silverman, YUAG objects conservators, and Queen Idabor and Nike Niyi-Dare at the National Museum was able to proceed, albeit in a modified format.

With course content guided by input from National Museum staff, care was taken to adapt approaches to preventative conservation and treatment to new circumstances. Originally planned as a week-long in-situ workshop, it was necessary to consider how the workshop could continue without the ability to meet in person. Video conferencing was deemed impractical because of unreliable internet connection in Lagos. As a Whatsapp group with the conservators had been created, the decision was made to pre-record a series of short videos about wood conservation that could easily be sent via the messaging platform. Geovanni Barrios, a Yale undergraduate with an interest in expanding accessibility to art and conservation through educational videos, was hired to help plan, design, shoot and edit these videos. The successes and challenges of creating this content will also be discussed.

Conservator and Stakeholder: Lessons from Unearthing a Time Capsule underneath a Confederate Monument / Sue Donovan - Conservator for Special Collections¹

¹University of Virginia, Charlottesville, USA

A time capsule buried underneath the "At Ready" or "Johnny Reb" statue in front of the Albemarle County Courthouse came out of the ground on September 12th, 2020. The solder around the lid of the copper box had failed, and groundwater had seeped in, causing the contents to be bathed in an acidic soup for over a century. The original request to assess and stabilize the time capsule quickly turned into a salvage effort. None of my prior experience as a book and paper conservator had prepared me for the kind of damage within the box. Historically, emotionally, and physically, the contents of the time capsule were incredibly toxic. My colleague and I even had to put on respirators to keep breathing the air in the lab.

I experienced a sort of decision-making paralysis induced by the novelty of the items' condition, my desire to help my community, and my fear of doing the wrong thing. Luckily, the Special Collections curator present during the salvage efforts guided me to a different perception of the time capsule and its contents. What remained of the capsule were witnesses to what had been buried over 100 years ago. They were evidence of what happens when a copper box filled with early 20th century wood pulp-based paper is enclosed in a water-filled pit for over one hundred years. Viewing the time capsule as such, my colleague and I peeled apart pages to identify items on a list of contents, and we extracted badges, medals, and two textiles. We saved a few examples of text pages that were thin enough to dry flat and froze two other chunks of what I called "paper pie" for educational purposes. The rest of the cellulosic items could not be saved, and after documentation by the curator, my colleague, and a local photojournalist, the remains were discarded with the agreement of the representative from Albemarle County and the Special Collections curator.

After everything that the community of Charlottesville and the nation has been through, I felt that I could finally be of service in my role as a conservator when I was asked to assist with the time capsule underneath "At Ready"/Johnny Reb. I felt proud and honored that I could make the process of removing the monuments a little easier. Yet I experienced an unanticipated and acute sense of loss at not being able to save everything. I lived the reality of "Conservation is not neutral" in a way I could not have predicted, and which kept me up all night after the salvage effort.

I see the removal of the statues that provoked the violent and deadly rallies in Charlottesville in 2017 as an important path to healing and a testament to the resilience of the community and Black Americans. The benefits of removing the

Concurrent | Specialty Sessions: Architecture

remaining statues in Charlottesville and in other localities are clear to me as a community member and a conservator, and I hope to share this experience at the 2021 Annual Meeting.

Canceling Neutrality: A Call to Rewrite the AIC Code of Ethics / Anisha Gupta – Assistant Conservator for Archival Materials¹, Cathie Magee – Book conservator²

¹American Philosophical Society, Philadelphia, PA, USA ²Library of Congress, Washington, DC, USA

Conservators cannot be neutral, and our Code of Ethics (COE) must acknowledge this reality. Decolonizing museums, repatriation, and improving relationships with cultural stakeholders are related issues that conservators and museum professionals have discussed for decades to little effect. Conservators are very aware of the lack of racial diversity within conservation. Without recognizing that the implied neutral stance of our practice is inherently biased, real progress is impossible. Our embrace of neutrality is supported by the object-centered nature of the COE, but to combat inequities conservation must welcome a shift to a more human-centered one. We must become better stewards of objects by prioritizing the people and cultures that create and care for them. In order to build lasting change and acknowledge this shift in values, we propose a rewriting of our Code of Ethics to reflect that.

Invoking neutrality implies that there is a conflict between opposing groups, and as conservators we are mediating this conflict. But who are the opposing groups? Who created the conflict, and why are conservators mediating in the first place? In examining the COE of the American Institute for Conservation and the Canadian Association for Conservation of Cultural Property, we find no language expressly advocating for this position. Yet neutrality persists as a bedrock value in conservation through a widespread, unwritten understanding that that is what we are supposed to be. We are instructed to prioritize the preservation of cultural property with little or no mention of the preservation of the human culture it represents.

There are numerous real-world ramifications that result from this 'neutral' stance. Monuments dedicated to racist Americans and erected as an endorsement of white supremacy and African American oppression have long been allowed to stand. Acts of 'vandalism', another term for social condemnation of such monuments through defacement, have been continuously ameliorated by conservation professionals. The improper storage, handling, and display of American Indian artifacts, facilitated by conservators, is well-documented. Arguments around 'preservation' have been used to prevent the repatriation of stolen artifacts.

Our own field suffers repercussions from the object-centric nature of our current practice, which encourages our attitude of 'vocational awe'. Conservators put the well-being of objects in our care above our own. Further consequences are seen directly in the lack of racial diversity within the profession. Studies connect a lack of racial diversity in museums to the common practice of unpaid internships. Yet recent AIC internship guidelines explicitly allow for unpaid internships. We cannot allow our future to be so devalued.

We must take action and shape the narrative of our future before the field fails to be relevant to society and no longer fulfills its mission of preserving culture. It is quite possible that rewriting the COE will have little effect on these issues, but we are hopeful that resulting conversations will be helpful and clarifying for our profession. By examining how our current COE isolates us from our social responsibilities, we can reshape it to reflect a more complex and honest vision of our profession.

Architecture

Evaluating One-Step Cleaning Methods for Heritage Building Materials Impacted by Wildland Fire Chemicals / Kaitlyn Eldredge – Research Associate¹, Mary Striegel – Chief Material Conservation¹

¹National Center for Preservation Technology and Training, Natchitoches, LA, USA

Amid the various substances that necessitate removal from historic building exteriors, a new concern has been thrown—or more correctly, flown—into the

mix. Chemical retardants and suppressants have become increasingly important tools in the suppression of wildland fires. Over the course of an incident these chemicals can be intentionally or accidentally introduced to historic materials. Swift action to clean sensitive structures of these chemicals may be required; the question remains what is the best method to accomplish this? In this presentation the results of a preliminary experiment for removing the three classes of wildland fire chemicals from three building materials are discussed. Low-fired brick, Douglas fir, and sandstone represent a sample of precontact and historic building materials in regions where wildfire is prevalent. The intent of the experiment is to test the efficacy of the separate cleaning methods of dry abrasion with a natural brush and of rinsing with low-pressure water. Potential hazardous consequences and ways in which to improve these methods are also considered. This knowledge is foundational to preparing guidance for heritage managers on how to appropriately clean resources impacted by wildland fire chemicals.

Removal of Crude Oil from Cultural Resources / Vrinda Jariwala – Research Associate, Material Conservation¹, Elizabeth Salmon – PHD Student², Mary Striegel – Chief Material Conservation¹

¹National Center for Preservation Technology and Training, Natchitoches, LA, USA ²University of California, Los Angeles, CA, USA

As considerable amounts of crude oil circulate North America by truck, rail, and pipeline, spills are inevitable. Examples of oil contamination from terrestrial spills in the last decade include pipeline ruptures in Utah, Montana, Michigan, and Arkansas and a rail accident in Minnesota, along with myriad smaller spills from vehicle accidents and human error. During an oil spill, cultural resources such as historic buildings, structures, landscapes, and archaeological sites are among the resources at risk. This study focuses on building materials. As historic buildings are built from porous materials such as brick, stone, and timber, they are particularly vulnerable to the impact of oil. Historic building materials exposed to oil become contaminated both physically and chemically. Research over the past decade has advanced understanding of how to remove oil from such substrates.

In January 2018, the National Center for Preservation Technology and Training (NCPTT) began a two-year project funded by the U.S. Department of Interior Inland Oil Spill Preparedness Project (IOSPP) to evaluate commercially available Surface Washing Agents (SWA) and the effectiveness of various application techniques for removing crude oil from historic architectural substrates. The study exposed surrogate materials to oil and examined a variety of SWA as potential conservation treatments in a controlled laboratory setting (National Center for Preservation Technology and Training, 2019). Surface Washing Agents used in this analysis were selected from the Environmental Protection Agency's National Contingency Plan Product Schedule to be applied in situ. Two oils of varying viscosities were selected for this study to understand the differences in interaction with a range of substrates. Phase I & II established that SWA containing ethoxylated alcohols were more successful in removing the crude oils. The research continued to the third Phase in 2019 which examined surrogate substrates – concrete, yellow pine, brick, and sandstone. The materials were oiled with West Texas Intermediate or Access West Winter Blend. Half of the oil samples were weathered prior to application and half were applied fresh. The exposed samples were cleaned by eight products which include seven surface washing agents and isopropanol. September 2020, samples of concrete and timber with and without exposure to artificial weathering conditions have been treated. The data collected include changes in color, gloss character, surface roughness, aptitude for water vapor transmission, and depth in penetration of oil and SWA using FTIR. The success of the product is evaluated based on restoring the physical and chemical properties of the material.

Glazed to Perfection: Conserving the Historic Spanish Tile Fountains of Gulfport Florida's Rolyat Resort Hotel / Kelly Ciociola – Principal Conservator¹, Rosa Lowinger – Chief Conservator¹

¹RLA Conservation, Miami, FL, USA

Designed by Richard Kiehnel in Gulfport, FL, the historic 1925 Rolyat Hotel is a resort property with a lush central courtyard adorned with four glazed ceramic tiled fountains. The hotel was taken over by Stetson University in 1954 and for the past 66 years has served as the campus for the University's School of Law.

Specialty Sessions: Architecture

The fountains are characterized by their beautifully glazed tiles, said to have been brought from the Mexican town of Puebla, which is known for its handmade tile making tradition. The four pictorial panels in the central fountain were signed by Puebla artists. Over time, these tiles suffered from cracking, glaze loss, and erosion driven by chlorine and the site's intense sub-tropical sunlight. Additionally, the fountains' foundations settled unevenly, causing the basins to crack and seep water. As a result of the foundation damage, these once exquisite architectural artworks, popular gathering places for university students, could no longer hold water. The University's wish to return them to functioning fountains required addressing methods for removing the historic tiles, conserving them, and re-installing them on newly poured and plumbed basins.

RLA was contracted to provide these services by Canerday, Belfsky and Arroyo Architects, Inc. A Phase One investigation determined that the condition of the historic materials was highly compromised, in part because of previous restoration efforts that were conducted by practitioners unversed in conservation methodologies. This first phase also included thorough documentation of all of the fountains, a sounding survey, tests to determine the efficacy of removing applied coatings and lifting the tiles safely, and consolidating delaminating glaze. The results of the investigation were used to write specifications that were the basis for selection of a contractor to perform the work, with RLA providing the hands-on work on the historic tiles. Of course, the best laid plans of conservators often lead to alarming discoveries during the process of treatment and necessary adjustments in methodologies. When the work is part of a larger campus where facilities administrators are unversed in the needs of historic fabric, significant compromises are required.

This presentation will delve into the treatment processes required to safely remove the tiles on an initial test fountain treatment, and a significant shift in treatment methodology that was required mid-treatment. We will discuss how even with a phased approach to treatment, there is still often a need adjust expectations during construction to meet the needs of a project.

A Tale of Two Cemeteries—Comparing Two Cemetery Surveys Conducted at Old City Cemetery in Jacksonville, FL, and the City of Miami Cemetery in Miami, FL /

Caroline Dickensheets - Assistant Conservator¹, Kelly Ciociola - Principal Conservator¹, Morgan Granger - Architectural Conservator/Historic Preservationist²

¹RLA Conservation, Miami, FL, USA ²Environmental Services Inc., A Terracon Company, Jacksonville, FL, USA

The cemetery survey can be one of the most daunting forms of conservation assessment. Given the sheer volume of grave markers, the variety of materials, and the range of conditions present, assessing cemetery markers and monuments can be a difficult task. As a result, various survey methods have been developed and used to record site and grave marker information with the intent of using this data for historical research and physical conservation. Surveys are accepted to be critical in planning for overall conservation initiatives. However, each cemetery survey presents its own goals and challenges in collecting and analyzing information. As such, every cemetery requires a specified survey and methodology in order to be carried out effectively and produce a valuable collection of information. This presentation describes the methodologies for the survey of two Florida cemeteries carried out by RLA in 2020.

In the Spring of 2020, RLA began field work on two large scale cemetery surveys. Although both cemeteries were roughly the same size and required similar information be documented, each took a slightly different approach to collecting and organizing data. While both surveys began with systematically developed methodologies, the restrictions caused by the COVID-19 epidemic required last minute adaptations to gathering and organizing data.

The first survey took place at the City of Miami Cemetery located in downtown Miami, Florida. RLA was retained by the Dade Heritage Trust to conduct a site wide survey of the physical description and condition of over 2,700 grave markers. The purpose of the survey was to establish a baseline for treatment and maintenance by collecting data on the condition and integrity of each marker. Survey work included GIS mapping, photographing, and assessing of each grave marker through a field survey form. This survey resulted in an individual survey forms and photos for each grave marker, a detailed map illustrating each individual marker within the context of the cemetery, and a final report summarizing survey findings.

The second survey was conducted at the Old City Cemetery in Jacksonville, FL. For this survey, RLA was brought on as a subcontractor for the Jacksonville based Environmental Services, Inc. (ESI) a Terracon company. While ESI provided the mapping services for recording the location of each marker, RLA was responsible for filling out individual forms for the grave markers and plot surrounds including cost estimates for the physical conservation of each element. This survey differed from the City of Miami Cemetery with its purpose of collecting individual cost estimates for the conservation of individual elements in addition to the software used to collect the survey data.

This presentation will provide an outline of the survey process including developing an appropriate survey form, determining modes of data collection, software selection, and implementation of survey methodologies on site. It will also discuss the importance of establishing specific goals for a survey by the conservator. Finally, this presentation will address lessons learned from these two projects and make recommendations for how conservators can conduct effective and informative surveys.

The Deinstallation of the Ancient Egyptian Tomb of Akhmerutnisut (c. 2500-2350 BCE) at the Museum of Fine Arts Boston: Creatively Overcoming Unknowns and Constraints to Safely Move Large Fragile Stones /

William Remsen - President & Chief Preservation Architect¹, Ian Stewart - Owner²

¹International Preservation Associates, Inc., Gloucester, MA, USA ²New Netherland Timber Framing and Preservation LLC, Ghent, NY, USA

Creativity, caution, and competence are essential for most successful conservation projects. The Museum of Fine Arts in Boston (MFA), due to a multi-gallery remodeling, needed to deinstall the monumental Mastaba Chapel Tomb of Akhmerutnisut and move it to on-site storage. The object's carved and painted limestone slabs and blocks were excavated in Giza, Egypt, in 1913 by the Harvard/MFA Expedition, given to the MFA by the Egyptian government, shipped, and finally installed for display at the MFA in 1938.

The MFA contacted International Preservation Associates, Inc. (IPA) about this deinstallation and, after discussions and site visits, we submitted a detailed 173-page proposal with 1,585 identified tasks. IPA's team was selected for the work, which began after record documentation in October 2019 and was successfully completed ahead of schedule in January 2020. We worked closely with MFA conservators and curators at all stages.

Unusual skills, experience, and creativity were needed to overcome many technical challenges, constraints, and unknowns. There were no written or photographic records of the object's 1938 installation. The 7 large sloping stones, each 2-4 feet wide, up to 7 feet tall, 8-10" thick and weighing approximately 2,00 to 2,700 pounds, differed in size, shape, and condition. Multiple slabs had been broken, probably during the shipment from Egypt.

The slabs, tightly butted up against each other, rested against a jumble of wood supports leaning against an adjacent wall. Our workspace was the triangular space behind each sloping slab, approximately 18" wide at the base and 4"-6" wide at the top. We determined that these stones were not attached to the wall, to the floor or to each other in any way. They were held in place by solely by gravity and friction, which was somewhat terrifying. The soft nature of the limestone dictated that fractured slabs could not be lifted up from above without causing severe damage to the decorated surfaces. The MFA also prohibited any contact with the fragile decorated front surfaces. Each slab and its structural support had to fit through 4' x 8' doorways and needed to be freestanding in storage.

After considering numerous options, we designed a structural lifting system that supported individual slabs from behind and lifted from below. We utilized off-the-shelf components that we could precisely cut on site and bolt together to create custom structural cages for each slab. These cages were specifically designed to facilitate transportation, further conservation, and the object's future secure reinstallation. No new materials will be visible after reinstallation, which will be reversible.

The carved and painted ashlar blocks, while simpler to deinstall, presented their own challenges which were overcome through the use of overhead rigging and air shims.

Specialty Sessions: Architecture + Book & Paper

Many lessons were learned, including discoveries made about previously inaccessible parts of the object. These were included in our detailed after report. The innovative system we designed was cost effective, safe and fast compared to conventional options and there are numerous applications beyond moving and installing heavy or large museum objects.

Grave Goods Gone: The Lost (and Found) African American Burials of Sandy Ground / Stephanie Hoagland - Principal¹

¹Jablonski Building Conservation, Inc., New York, NY, USA

How could a community cemetery lose track of almost 500 graves of friends, family, and loved ones? Taking a quick glance across the surface of the Rossville AME Zion Church Cemetery grounds one would see only 97 modest headstones sparsely scattered across 1.6 acres of flat grassland. But looking deeper into the soil using ground penetrating radar revealed an unexpected total of 576 burials. How did this happen?

The Rossville AME Zion Church Cemetery, also known as Sandy Ground Cemetery, is regarded as one of the country's most significant African American burial grounds. It memorializes the history of Sand Ground, one of the oldest continuously inhabited free Black settlements in the United States. Located on the south shore of Staten Island, NY, its history began in 1828 when Capt. John Jackson, an African American ferryboat owner-operator, bought land there shortly after New York abolished slavery in 1827. Other freedmen soon followed, including oystermen from New Jersey, Delaware, Virginia, and Maryland, who were attracted by the area's rich oyster beds. The settlement grew and prospered through the early 20th century, but increasing pollution led to the end of oystering by 1916, and the Sandy Ground community began its gradual decline. Today the community of Sandy Ground has been enveloped on all sides by encroaching suburban development with only a few families remaining who trace their roots to the original settlers.

Jablonski Building Conservation Inc. recently completed a Cultural Landscape Report (CLR) for the cemetery which required us to educate ourselves on not only the local history, but also the evolution of the African American cemetery landscape, funerary traditions, and burial practices, including the use of grave goods and other ephemeral items to mark the location of burial.

Ground penetrating radar (GPR) exploration conducted as part of the CLR found that existing markers represented only one-fifth of the actual number of burials present. Unmarked graves may have previously been denoted using temporary, non-durable materials, such as wood, shells, rocks, or plants, or they may have been marked with temporary items such as grave goods (objects placed on the grave to protect and guide the spirit in the afterlife) which have since been lost. Historic use of grave goods in the cemetery has been documented in several publications and their presence was noted as late as 1972 when an archaeological study described many graves displaying "small deposits of broken ceramics, glass, and plastic flowers."

Many African American communities have seen the gradual loss of their unique burial practices and customs over time. Lacking that communal memory, efforts to "clean up" these cemeteries has led to the loss of such ephemeral items when volunteers, unfamiliar with historic burial practices, removed grave goods they mistook to be trash.

This paper will discuss the challenges of working on preservation/conservation projects which include objects or spaces outside of one's own experienced culture and the importance of education and understanding before making recommendation or undertaking actions which could result in the loss of irreplaceable cultural heritage.

Book & Paper

See also Joint Sessions: Book & Paper + Photographic Materials

Page 101

Re-centering the Bench / Kristen St. John - Head of Conservation Services¹, Aisha Wahab - Paper Conservator¹, Richenda Brim - Head, Preservation Department¹

¹Stanford University Libraries, Palo Alto, CA, USA

Since 2018 Stanford Libraries' Conservation Services has been involved in the Linked Conservation Data Consortium with institutions in the U.S. and the U.K. seeking to increase the visibility and accessibility of conservation documentation through the use of Linked Open Data. The project spurred an evaluation of our documentation practices, forms, and terminology. During the process of examining how we define the terms we use in our documentation, we began to discuss specific terminology and to address terms that are defined in exclusionary, Euro-centric, and/or colonialist language, such as the term "non-Western". In response to the murder of George Floyd, the international uprisings in support of black lives and the calls to end systemic racism pervading the US, we have been reflecting on how we perpetuate racism and bias in our work. Libraries and archives are assessing harmful and offensive language in descriptive practices and developing inclusive, anti-racist guidelines for cataloging and archival description. We believe conservation departments should follow suit and be a part of the discussion about whether our documentation practices are inclusive and respectful. Can we reject white-centric, Euro-centric, orientalist, colonialist practices of description? What changes are needed in our current practice? Are conservation labs already asking these questions and implementing change in their institutions and if so what changes have been made to develop anti-racist terminology and practices? During this project, these questions were posed and answers were sought through a multi-step process. We evaluated all terminology currently being used in the Stanford Libraries' Conservation Services department documentation forms in key categories of structure, media, support materials and technique. After identifying terms of concern, we researched and brainstormed alternative options. In addition, a literature and resource review was performed on inclusive, anti-racist, and anti-colonial cultural heritage terminology. Conservators in labs primarily in library and archive settings were interviewed to determine current practices and opinions. The project's findings led to an in-house report and terminology policy for future written conservation documentation at Stanford University Libraries. Evaluating our documentation language and creating more inclusive practices are tangible steps towards positive change. Our documentation is a legacy for future generations of conservators. We should ask ourselves, what kind of legacy do we want to leave behind?

Playing with Time - Budgeting Light Induced Damage to Manage Light Risk Associated with the M+ Opening Display / Christel Pesme - Senior Conservator (formerly)¹, JoFan Huang - Paper Conservator and Acting Senior Conservator², Aga Wielocha - Preventive Conservator²

¹Independent Collection Care Specialist (currently), Berlin, Germany

²M+ Museum Limited, Hong Kong

This paper will present a novel decision-making approach developed in time of Covid-19 pandemic restriction to plan rotation of light sensitive items during M+ opening display.

M+ is a new Hong Kong public museum dedicated to visual culture of the 20th and 21st centuries. It will open its doors in spring 2021. Around 1500 items – about 20% of the M+ Collection - will be presented during the museum inaugural exhibition in the newly built 17,000 m² gallery space illuminated both by artificial and daylight, half of it requiring light exposure mitigation.

Implementing rotation has a considerable impact on exhibition planning and budget, and requires strong commitment of the institution. It often affects the narrative of the exhibition and the associated interpretative tools such as wall labels and publications. Negotiating rotation of items is a challenging undertaking especially in young museums such as M+ where procedures and standards are still "in the making" while the time pressure to open the museum requires decisions to be made early-on and often at a fast pace. Negotiations on rotation seemed to have reached an impasse, especially when budget restrictions induced by Covid19 pandemic resulted in extending the duration of the inaugural exhibition while limiting capacity to rotate items.

Solution was found by stepping back and by first changing the time-frame for light risk management. Four categories of value at risk to light were defined with associated levels of protection or 'Preservation Targets (PT)'. PT corresponds to the period of managed use during which unwanted change of the item is to be avoided: Higher value at risk, the longer the PT should be and required resource allocated accordingly, as sustainability principle recommends. Light dose to be

Specialty Sessions: Book & Paper

used during PT is calculated by assessing the item's light sensitivity and can be budgeted by applying reciprocity principle: once reached, the item should be kept in the dark for the time remaining.

Enlarging and diversifying time-frame for light risk management provides the level of flexibility necessary to accommodate the circumstances of the inaugural exhibition while still mitigating induced light risk, as long as monitored cumulative light dose received stays below the one associated with the item's PT and the subsequent restrictions regarding item's future display time are accepted.

M+ executives have endorsed the proposed framework as a guiding principle for the future development of the museum's lighting policy. Subsequently, M+ databases team started adapting the Collection Management System to store data related to risk assessment and accommodate tools for monitoring cumulative light dose received at item level. Framework's effectiveness is currently tested on opening display and rotation priorities reconsidered accordingly.

The efficiency of the proposed approach relies on accurately budgeting the light dose associated with the item's PT. To ensure continuity in light risk management, it is planned to use measurements collected afterwards to correct the uncertainties, inherent to the institution's early stage of development, that have inevitably been introduced in the decision process used to mitigate light risk induced during museum's opening display.

Beyond the Manila Folder – Sharing Heritage Data /

Andrew Forsberg – Preservation Researcher¹, Fenella France – Chief, Preservation Research and Testing Division¹

¹Library of Congress, Washington, DC, USA

Developing a web-based data analysis platform to support scientific researchers' work with heterogeneous data types, and assist scientists and cultural heritage partners engage with the results. We began work on the platform to manage diverse records for the Mellon Foundation-funded project: 'Assessing the Physical Condition of the National Collection' (ANC, <https://nationalbookcollection.org/>). This project was outlined at AIC, Aug 2020, and involves comparing the physical, chemical, and optical characteristics of 500-plus 'identical' books, published between 1840 and 1940, from five large research libraries in distinct regions of the United States. We selected a representative stratified random sample of titles from their shared holdings to better identify 'at-risk' time periods and paper types for the project, and undertook visual assessments and a range of objective paper testing analyses.

This data platform already allows us to import analyses from various instruments (FORS, FTIR, SEC, Tensile testing, XRF), and researcher compiled spreadsheets for pH and spot tests (Aluminum, lignin, protein, rosin, starch). The analyses are minimally processed into data structures for storage in CouchDB (a JSON document store), along with sampling and non-scientific data for each book. The analytical data is stored as close to 'raw' as is practical. Given some of the challenges with algorithm bias, our intention was to leave our options open – to be able to closely compare the 'same' book across institutions; optionally filter then plot all the samples' data for arbitrary axes (e.g., pH, Mw, Publication Date on x, y, z axes); test combinations of multiple transformations on the data; and, in short, acknowledge from the beginning that we don't know what we don't know just yet.

This 'store raw, transform on demand' approach has been working very well for us, servicing many different data visualization, comparison, reporting, sharing, and exporting tools. Most importantly, we can quickly scaffold then refine services for new research avenues as they present themselves, without having to locate and retrieve (or worse, attempt to reconstruct) the original data.

This platform has led to a focus on the need for active data that meets the FAIR principles (Findable, Accessible, Interoperable, Reusable), and the events of the past months have shown the dire need for this approach to data. An expanded project includes a much larger array of analytical procedures and scientific instrumentation, our stores of research on sample databases (see: CLASS-D, <https://www.loc.gov/preservation/scientists/projects/class.html>), and incorporates a more thorough integration of events and the temporal dimension within the platform, including the first implementation of our Linked Open Data model for sharing scientific cultural heritage data. Our intent is to share the platform (sans data) as a community resource on GitHub prior to AIC 2021. This presentation will discuss the approaches and directions assessed, issues and challenges.

Changing Practices – Reviewing the Evolution of Treatment Approaches for the Collection of the Board of Trade and Design Registers 1839-1991 at the National Archives UK / Barbara Borghese – Senior Conservation Manager – Treatment¹

¹The National Archives, UK, London, United Kingdom

This presentation aims to share developments in the work of the Conservation Treatment Team at the National Archives (TNA) in London, UK, in relation to a collection of volumes forming The Board of Trade Representations and Registers of Design, commonly referred to as the BT Design Register. Focusing on the approach to the conservation of this very popular collection, we will be looking at how this has changed during the years, reflecting both evolving trends in conservation as well as the focus and business priorities of the Collection Care Department at TNA.

The collection contains nearly three million designs which were registered between 1839 and 1991 and is one of the National Archives' most visually captivating, with its stunning array of designs used for textiles, glasswork, metalwork, ceramics, furniture, wallpaper and other decorative arts and manufactured objects. The registers include details of each proprietor who submitted a design and a representation of it in the form of a drawing, photograph or three-dimensional sample – anything from straw hats to inflatable corsets can be found hidden among the pages of these volumes! This wealth of information contribute to making this collection a popular resource for researchers with its objects being regularly requested for access.

The collection includes very challenging objects that present the conservator with an array of problems to address including size, format, usage and context, not dissimilar to the issues found in the conservation of scrap books, photo albums and other composite volumes.

Starting in early 2000 with the work of former Head of Collection Care Nancy Bell, the role and competencies of conservators in CCD have seen a shift from a bench-based treatment-focused structure to a framework developed around the 'Conservation Practitioner-Researcher' approach. Based on a model proposed by E. Pringle (Pringle, 2019) relating to the role of research within a museum context, the conservation practitioner-researcher in TNA undertakes research-led practice integrating objects with their context and value and makes treatment decisions that considers research outputs on the same level as other more traditional decision-making markers. This talk will make apparent how following this approach, concepts traditionally utilised to describe the degree of intervention, primarily focused on quantifying a treatment decision (minimal intervention) can become inadequate. In fact, when research and practice merge to become integral to the intervention, a new lexicon needs to be adopted to better describe and justify the decision-making process. Examples of past and present interventions will be presented in this talk, to give an historical perspective of the conservation of the BT Collection, also referring to the data collected by different generations of conservators and kept in CCD's database. This wealth of material has proved invaluable to describe this shift in approaches while also reflecting on the changing roles of conservators and hopefully present a working model that can be replicated in other institutions and specifically Archives.

Tango With Cows: Balancing Access and Preservation in a Research Collection / Melissa Huddleston – Assistant Conservator¹, Rachel Rivenc – Head of Conservation and Preservation¹

¹Getty Research Institute, Los Angeles, CA, USA

Tango With Cows (1914) is widely considered a seminal example of Russian avant-garde book art. The book consists of twelve poems written and designed by Russian Futurist Vasily Kamensky in collaboration with brothers David and Vladimir Burliuk. They were part of a group of artists and poets who reimagined the book as a new art form during the years leading up to the Russian Revolution. The group developed their own descriptive terminology. For example, Kamensky referred to several of the poems in Tango With Cows as "ferroconcrete" meaning "reinforced concrete" describing design layouts that related his poetry to modern Moscow's urban infrastructure.

Tango With Cows exists in multiple copies. It was printed on pages cut out of cheap wallpaper, every opening revealing a poem opposite the colorful printed

Specialty Sessions: Book & Paper

floral pattern of the wallpaper. The words and letters are arranged pictorially using several different typesets and design compositions. The copy that was acquired by the Getty Research Institute came to the collection unbound in a stack of single sheets. The book was originally bound with a stapled stab binding.

Currently *Tango With Cows* is housed in a portfolio. The pages are individually encased in transparent Mylar sleeves intended to provide access with minimal contact. Consequently, the visual and tactile quality of the book is diminished when viewed this way. Readers often request to remove the fragile pages from the sleeves and hold them side by side emulating the book as if it were bound. Efforts to protect the book have inadvertently introduced excessive handling, making it even more vulnerable to damage.

In discussion with GRI curators, scholars of the period, and conservators from other institutions who hold copies of the book in their collections, a range of solutions were explored. Mock ups were created to visually aid discussions on the aesthetic, practical, and conceptual implications of potential decisions including several binding alternatives and a variety of creative housing solutions. On the one hand, binding the book would allow it to function as originally intended while also ensuring that the pages stay together in the proper order. It would also prevent the pages from shifting out of alignment which could cause edge bends and tears. On the other hand, rebinding is an intrusive intervention that could introduce stress to the fragile paper and erase aspects of its history.

This predicament aptly illustrates the challenging balancing act of providing access while preserving the materiality, history and function of an object.

Conservation Treatment of Atlases, Foldouts, and Guarded Structures / Katherine Kelly – Senior Book Conservator¹

¹*Library of Congress, Washington, DC, USA*

Foldouts and guarded structures appear in many book genres, including atlases, and they present distinct preservation challenges. When a page is too large for its codex, the common solution is to fold it up and allow the reader to unfold it when need arises. This can lead to weakened areas along the fold and stress from repeated unfolding action. Once folded, the foldout has a disproportionate bulk within the codex. This affects the book both at rest and in action; compensation is needed to avoid a difficult-to-store wedge-shaped book, and bulky foldouts disrupt the flow of the pages being turned. Foldouts frequently require guards to position and attach them to the binding, creating a second flex point past the gutter that must work within the constraints of the binding. This presentation will discuss the effects of foldouts, guards, attachment methods, compensation, and spine action on the structure of the book and offer practical tips on how conservation treatment can adapt to and incorporate these structures.

This presentation will also offer a survey of historical binding, restoration, and conservation techniques drawn from contemporary bindings, bookbinding manuals, and conservation treatments at the Library of Congress. Although there is a clear trend in the book conservation field away from “full treatment,” atlases, foldouts, and guarded structures can sometimes only be preserved through significant structural intervention.

An Investigation into the Stability of Thermal Copying Records in the US National Archives Produced from the 1950s to the 1970s / Henry Duan – Senior Heritage Research Scientist¹, Lisa Isbell – Senior conservator¹, Jennifer Herrmann – Senior Heritage Research Scientist¹

¹*The US National Archives and Records Administration, College Park, MD, USA*

This paper addresses outstanding questions related to the preservation and conservation of records made from thermal recording media from the 1950s to the 1970s. While there is available literature about the developmental trajectory of thermal recording media, there is little published research about safe approaches to conservation treatment of the different generations of technologies. Conservation practice would benefit from information about the residual heat sensitivities, solvent sensitivities and acidity of the media.

ThermofaxTM and associated thermal recording technology were invented during

the early 1950s, and were developed and commercialized as an office copying method and process later in the decade. Across the 1960s, newer generations of the technology arose, leading to the commercialization of more stable thermal recording media. The use of thermal recording technology for office copying lasted well into the mid-1970s, and was gradually replaced by toner-based electrostatic photocopying.

Federal agencies were among the earliest to adopt the thermal copying technology. As such, many federal government records from the late 1950s to the 1970s were produced using thermal copying media of different technological generations, and were ultimately accessioned into the National Archives. Problems with the stability of these records from early generations, such as ThermofaxTM, were noted in the 1980s. They yellowed and even turned dark-brown, so that there was diminished tonal contrast between the text and its background. In addition, for some of these records the tensile strength of their support paper decreased and the sheet became brittle. Concerns arose about the prospect of irretrievable losses, especially from records made with earlier generations of media. However, reports of in-depth research about these materials are rare. Specifically, there is a lack of understanding why some media are grow dark and brittle, resulting in image degradation, while others are aging in line with non-thermal recording media of the same era. Due to these variations in stability across different generations of technologies, it is highly uncertain during conservation treatments if heat or solvents may be used, eg., to remove adhesive tape, or to clean a contaminated record.

This presentation will provide an overview of the developmental path of thermal printing technology from the 1950s through the 1960s, discuss the image-forming chemistry based on research of historical patents, and compare it with results from instrumental analysis. We will also report on experimental results that identify which types of thermal copying media remain heat-sensitive and which are sensitive to a range of organic solvents in a simulated conservation treatment. In addition, we will report on the acidity of these media, which may help predict future storage stability and mitigate risks for museum display and conservation treatment.

Based on these findings, we will provide a risk assessment for potential losses of information on printed thermal recording media during long-term storage, their vulnerability during conservation treatments, and propose a risk-mitigation strategy for institutions holding these records.

Does Iron-Gall Ink Corrosion Benefit from Nanocellulose-Phytate Treatment? / Laura Völkel – Paper Conservator / PhD Student¹, Antje Potthast – Professor¹

¹*University of Natural Resources and Life Sciences Department of Chemistry, Division of Chemistry of Renewables, Tulln, Austria*

Iron-gall ink promotes the endogenous degradation of manuscripts by its acidic and oxidative nature. As a consequence, the mechanical damage in areas of concentrated ink applications or along mechanically stressed edges or folds results in problems during storage and handling. So far strongly degraded paper areas were mostly locally stabilized with thin Japanese papers and adhesives in single-sheet treatment. Various remoistenable tissues have proven as stabilizers.

A new and innovative material – nanocellulose – has been evaluated as stabilizer for manuscripts that have been degraded by iron gall ink. The aim of this study was to integrate the nanocellulose application¹ into a multi-stage calcium phytate/calcium hydrogen carbonate treatment² in order to combine deacidification and stabilization, thus avoiding an additional stabilization and drying step.

Different types of nano-scale celluloses such as nanofibrillated cellulose are interesting as a novel stabilizing material for paper due to their close structural relation to the paper itself. Research efforts on the application of nanocellulose is increasing also in the field of paper conservation. In a previous study we could show that severely damaged papers can be stabilized by a direct, adhesive-free application of a nanocellulose suspension which can be applied locally or by full coating. The optical and haptic impact is little compared to traditional stabilizing methods.³ Additionally, it is possible to stabilize burned papers with nanocellulose suspensions which have hydrophilic and hydrophobic areas in very close proximity similar to manuscripts with iron gall ink degradation.

In the present study two differently fibrillated nanocelluloses were applied on iron-gall ink damaged manuscripts in different treatment steps. The new network

Specialty Sessions: Book & Paper

of nanocellulose and paper were characterized before and after accelerated aging in closed vials. By means of size exclusion chromatography combined with light scattering (SEC-MALS) and carbonyl group profiling, chemical stabilization was tested within different treatment steps showing that cellulose integrity was preserved. The wafer-thin stabilizing material did not cause any migration of iron ions in the paper, as investigated by laser ablation and metal analysis (LA-ICP-MS).

In addition to the basic analytical investigations this paper will present current efforts to transfer the protocol into practice. Here the aim goes beyond classical single sheet treatments towards implementation of batch treatments. The process should offer treatment of more sheets simultaneously and eventually to break new ground in the conservation or restoration of valuable, partly handwritten documents with a higher throughput. Pros and cons of the new method are evaluated and will be discussed in detail.

1 Völkel, L.; Prohaska, T.; Potthast, A. (2020): Combining phytate treatment and nanocellulose stabilization for mitigating iron gall ink damage in historic papers. In: *Heritage Science* 8, 86 (2020). <https://doi.org/10.1186/s40494-020-00428-6>

2 Huhsmann, E.; Hähner, U.: Work standard for the treatment of 18th- and 19th-century iron gall ink documents with calcium phytate and calcium hydrogen carbonate. In: *Restaurator* 29/4, 2009, p. 274–319. <https://doi.org/10.1515/rest.2008.020>

3 Völkel, L.; Ahn, K.; Hähner, U.; Gindl-Altmutter, W.; Potthast, A.: Nano meets the sheet: Adhesive-free application of nanocellulosic suspensions in paper conservation. In: *Heritage Science* 5, 23 (2017). <https://doi.org/10.1186/s40494-017-0134-5>

A Digital Imaging Tool for Identifying Photo-active Zinc Oxide Watercolor Pigments / Vanessa Johnson – Post-doctoral researcher¹, Jane Colbourne – Senior Lecturer in Paper Conservation², Kate Nicholson – Senior Lecturer in Chemistry and Applied Sciences²

¹*Pacific Northwestern Consortium for the Science of Cultural Heritage Conservation at Portland State University* ²*Northumbria University, Newcastle Upon Tyne, United Kingdom*

Watercolors sometimes undergo severe paper discoloration and deterioration around Chinese white, a watercolor paint containing a zinc oxide pigment. Zinc oxide is known to produce peroxides on its particle surfaces; however, rates of peroxide formation vary in relation to the pigment's crystallinity and UV-induced visible fluorescence. While conservators use visible fluorescence to identify zinc oxide pigments in paintings, they cannot presently relate zinc oxide's various fluorescent colors to its photo-activity. Additionally, the subtle variations in fluorescence require a precise image capture and processing procedure to characterize. In this study, deterioration and fluorescence associated with zinc oxide were characterized in both mock-up watercolor samples and in-situ historic watercolor paints and compared. First, signs of deterioration such as surface peroxides, browning and paint cracking were identified in some study samples. Then an image processing procedure was developed for sRGB images of fluorescing pigments. Image data was compared with emission spectra and levels of degradation to determine the utility of digital photography for indicating highly photo-active zinc oxide pigments.

Results from light-aging experiments indicated a distinct difference in peroxide formation and deterioration between the two main zinc oxide production methods. The most reactive pigments were produced by the indirect method, though these same pigments are most suited for pigment use because of their brightness and working qualities. Historic pigments in this study were all produced by this method, though only about half showed signs of serious deterioration.

Fluorescence followed a similar pattern as deterioration, splitting pigments into two groups by production method. Emission spectra for peroxide-producing indirect method pigments contained a strong blue/near-UV peak associated with greater photoactivity. Spectra for one inert indirect pigment and all direct method pigments contained strong green peaks and a diminished blue peak. sRGB digital photographs of zinc oxide were obtained under illumination by a UV lamp emitting at 365 nm. Processing the green and blue color channels from these photos and obtaining average intensity values lead to a distinct grouping of pigments by the fluorescent types established by emission spectra. Historic case studies photographed using different digital cameras and lighting scenarios could

still be distinctly grouped. When green/blue intensity ratios were compared with peroxide formation, a strong negative correlation was found (-0.81). The green/blue ratio appears to be a reliable indicator of photoactivity even after periods of a century or more. Sustained low green/blue ratios indicate that photo-activity does not appreciably diminish in reactive historic pigments and no reaction end-point could be established. These results, their implementation and further refinement of the image processing procedure will be discussed.

From Prints to Paintings: The Transformation of Maria Sibylla Merian's Counterproofs / Catherine Stephens – Andrew W. Mellon Fellow in Library and Archive Conservation

¹*The Conservation Center at the Institute of Fine Arts, New York University, New York, NY, USA*

Maria Sibylla Merian (1647-1717) is famous today as a painter, a printmaker, and an early pioneer in the fields of entomology and scientific illustration. For the latter part of her life, Merian supported herself by selling her illustrated books about insect metamorphosis and her opaque watercolor paintings on parchment, which elegantly portray specimens of South American insects and plants. In 1705, Merian published her widely acclaimed folio of sixty etchings, *Metamorphosis of the Insects of Suriname*, and, at about the same time, she produced three sets of watercolor paintings that bore striking similarities to her *Metamorphosis* etchings. For three centuries, these 137+ artworks were believed to be typical opaque watercolor paintings with hand-drawn underdrawings; in fact, they are hybrids created through an extraordinary combination of printmaking and painting. Rather than laboriously copying 137 underdrawings by hand, Merian made counterproofs of her *Metamorphosis* etchings onto sheets of fine white parchment. (A counterproof is made by transferring the ink from a fresh print to another surface). Merian was quite adept at reproducing designs by hand, but a counterproof requires far less time and effort than a typical underdrawing, and traces of printmaking ink are just as readily obscured with layers of opaque watercolor. A straightforward counterproof will mirror its "parent" print exactly, yet Merian developed a technique for rearranging the imagery of her counterproofed "underdrawings" so that each composition was unique. Through my reconstructions in a printmaking studio, I have found that Merian's counterproofing method is deceptively simple, so much so that it begs the question as to whether she was the only artist employing this labor-saving technique at the time. While Merian's ingenious methods allowed her to speed up the production of her sought-after watercolor paintings, they also may have constituted art fraud, by modern definitions. In 1706, Sir Hans Sloane paid 200 Guineas to Merian for her *Metamorphosis* "originals," the hand-drawn and painted models (modelli) upon which her etchings were based. Instead of honoring their agreement to the letter, Merian sent him one modello and fifty-nine over-painted counterproofs on parchment. Sloane apparently never discovered (or admitted to) the substitution, perhaps because Merian's technique produced multiple sets of unique paintings that cleverly belied their mechanical origins. Today, microscopic examination and imaging software allow for the identification of such transformed prints. A casual observer, however, may not immediately see the difference between a painting with an authentic underdrawing, and one based on a counterproof. In this presentation, I will discuss previous scholars' research on this topic and my reenactment of Merian's workshop practices in a printmaking studio. I will also describe two non-invasive methods, one of which can be performed remotely, for the identification of over-painted counterproofs.

Transforming Artworks from 3-D to 2-D Case Study: Treating Two Sets of Monumental Ink Rubbings / Ika Yi-Hsia Hsiao – associate conservator on Chinese paintings¹

¹*Cleveland Museum of Art, Cleveland, OH, USA*

Ink rubbing in East Asian art history plays an important role in transferring images or inscriptions from an inorganic to an organic substrate and transforming artworks from a three-dimensional sculptural relief to a two-dimensional paper for a more accessible study. Rubbing is usually executed on outdoor stones or metals, and this transformation can be duplicated as needed. Although each rubbing procedure makes the same images or inscriptions, how the ink absorbed to the xuan paper and ink gradation makes each rubbing work differently. Similar to the concept of the print, rubbing is a repeated image work, so there are many duplications. Despite being duplications, the rubbings are treasured for their aesthetic value as well as their connection to their original objects.

Specialty Sessions: Book & Paper

The 5th-century sculptural reliefs of the Emperor and Empress Procession were located in Longmen Cave, China, and each relief measures in 80 by 153 inches. These sculptural relief sets are the same scales as the ink rubbings on paper that were collected in the Cleveland Museum of Art (CMA). Because there is no single sheet that can fully cover the big scaled stone and the moistened xuan paper that smoothed onto the relief has to be maintained to be appropriate damp to absorb ink, smaller sheets of thin xuan paper are brushed onto the stones' surface with adhesive; the ink was rubbed onto one sheet of paper after another with a pad; rubbed sheets were then realigned and reassembled. These two sets of monumental ink rubbing came to the CMA in 1916 and were reassembled and backed with canvases and mounted on wooden stretchers approximately in the 1930s.

However, the wooden stretcher had transferred its acidic lignin from the back through the rubbing paper, resulting in brittle and yellowing. A rubbing exhibition was planned to show these monumental rubbings; therefore, the conservation project was then executed by the author working with a senior Chinese painting conservator from Beijing Palace Museum in 2020. This paper will first introduce the techniques and materials of ink rubbing in transforming artworks from a sculptural relief to sheets of paper. Secondly, it will explore how the rubbing puzzles were put together with overlappings. There are various traditional Chinese mounting formats to display the ink rubbings due to rubbing's characteristics. Finally, the paper will talk about various rubbing formats mounted in the past leading to an appropriate format with the current project decision.

Defending the Diefenbunker's Murals: Conservation and Protection of Two Murals Displayed Three Stories Underground / Kyla Ubbink – Principle Conservator¹, Sean Campbell – Visitor Experience Manager ²

¹Ubbink Book and Paper Conservation, Ottawa, Canada ²Diefenbunker: Canada's Cold War Museum, Ottawa, Canada

Three stories below ground level, are two large mural-sized photographic images printed onto sections of heavy weight paper adhered directly to the walls of The Diefenbunker: Canada's Cold War Museum. The effects of visitors and the challenges of climate control posed by the building had begun to show their effects. As a historic site, the underground bunker houses the museum, created to curate the space and its history of operation during the wider timeline of the Cold War. A 100,000 square foot, poured concrete structure built in 1959-61, the Diefenbunker was designed to shelter Canada's top officials in the event of nuclear war. There are similar examples for regional governments still standing across the country, a network of structures built as part of Canada's continuity of government program introduced in 1958 at the height of the Cold War. This site, located outside of Canada's capital, Ottawa, near the village of Carp, is the largest of this network. It features a medical centre, cafeteria, control centers, sleeping quarters, conference rooms, a vault designed to hold Canada's gold reserve, shared washrooms with shower facilities, and activity rooms. It remained an active military base until 1994, and started operating as a museum in 1998.

Installed sometime in the 1980's, the murals were meant to give a sense of having windows onto beautiful outdoor scenery to boost the morale of those working here. One mural, which is mounted to an exterior wall, had developed bubbles, stains, and a few marker lines, as well as a doodled stick figure. Both this mural and the one adorning the cafeteria wall, suffered from abrasions, scratches, and areas of lifted and torn away paper. The two largest challenges were carrying out treatment on site, and designing Plexiglas barriers to protect the murals without physically attaching the barriers to the historic building or causing an uncontrolled micro-chamber environment.

The in-filling and in-painting was straight forward treatment work, removing the staining, doodle marks and bubbling was another matter. Several chemicals and poultices were tested on the staining and marker lines including iso propyl, ethanol, hydrogen peroxide, methyl cellulose, Laponite, and Gellan gum, with Laponite having exceptional results. Being adhered with a rubber based adhesive, much of the smaller bubbles in the mural could be smoothed down with heat. The larger bubbles, however, required adhesive injection followed by shrinking the paper back into place to avoid creasing and buckling.

Like a historic home, the rooms are interpreted as they would have appeared when in use. This meant that Plexiglas barriers to protect the murals could not physically alter the structure or be attached to the building, while still being unobtrusive, safe for visitors and reasonably priced. Many ideas were explored to meet these

challenges. In the end, very simple half-wall barriers were constructed out of three sheets of Plexiglas, bent to create 'u' shaped stands fastened to each other. The barriers were fabricated and then assembled onsite, providing protection to these newly restored windows of the past.

Conserving the Australian Characeae Collection / Katy Glen – Principal Conservator, Paper and Photographs¹, Briony Pemberton – Freelance Paper Conservator², Josephine Milne – Collection Manager³

¹Grimwade Conservation Services, The University of Melbourne, North Melbourne, Australia ²Geelong, Australia ³Royal Botanic Gardens Victoria, Melbourne, Australia

This paper concerns the conservation treatment of a significant collection of fire-damaged botanical specimens housed in the National Herbarium of Victoria (NHV) located at the Royal Botanic Gardens, Melbourne. Known as the Australian Characeae (fresh water algae, sometimes called 'stoneworts') Collection, the specimens were collected within Australia during the nineteenth century. Historic handwritten labels from the collecting botanists and annotations from later researchers accompany the specimens. Many early collections of Characeae were also sent to Europe for identification and were incorporated into herbaria notably Berlin and Kew. During the bombing of Berlin, much of this Characeae material was destroyed including 'type' specimens which are the definitive example of a species. Therefore, the collection of Australian Characeae in the NHV is of great historic and scientific significance as it contains many type specimens and for some species, possibly the only existing example.

In 1958 the Australian Characeae Collection was damaged in a fire resulting in the loss of many significant items. The surviving specimens were extremely fragile, with charred edges and fine particles of soot and loose fragments over the paper surfaces. The fragility of the Collection prevented it from being accessed both on-site and at other research locations in Australia and overseas, and inhibited any cataloguing work. Conservation intervention was required to stabilise the samples and reduce the risk of damage when handled for research purposes.

In consultation with conservators from The Grimwade Centre at The University of Melbourne the decision was made to line the specimens and labels, thereby making them stable enough to withstand handling. The intervention required by lining was justified given the over-arching need for accessibility and long-term preservation of the items. The choice of lining method needed to take into consideration the role of the specimens and their labels as both a scientific and historical resource. The traditional Japanese technique for lining was not appropriate in this case for the Characeae Collection for several reasons. These included the need for observation during treatment and the fragile nature of the charred paper. The inclusion of specimen plant material, bonded by mucilage to the paper support, was a further complicating factor.

A specific set of parameters relating to aesthetics, robustness, reversibility and the integrity of the specimens as scientific samples guided the design of the lining and drying methods. A series of mock-ups using charred paper to mimic the Characeae items allowed the testing of several lining and drying methods in order to ascertain which were the most appropriate. Experiments focused on keeping the items face-up during lining, and using the suction table to adhere the lining paper. Following the testing and review three proposed lining techniques were found to be suitable. This paper will discuss in detail the practicalities and parameters of the testing phase, as well as ethical considerations, and evaluate the overall success of the conservation treatment.

From Book to Breechblock: A Preliminary Study of the Conservation of Waterlogged Paper Fragments from Site 31CR314, Queen Anne's Revenge/La Concorde / Emily Rainwater – Conservator¹, Kimberly Kenyon – QAR Senior Conservator and Co-Principal Investigator²

¹State Archives of North Carolina, Raleigh, NC, USA ²North Carolina State Office of State Archaeology, Division of Historical Resources, Greenville, NC, USA

North Carolina state archaeological site 31CR314 bears the remains of Queen Anne's Revenge (QAR), the flagship of Edward Teach, also known as Blackbeard, who operated in the Caribbean and Atlantic during the period of history referred to

Specialty Sessions: Book & Paper

as the “Golden Age of Piracy.” Prior to its capture by pirates, the ship was La Concorde, a French vessel engaged in the transatlantic slave trade. The pirates made quick work of transforming the ship into a formidable show of force, but after only six months, Blackbeard ultimately ran the ship aground and abandoned it near Beaufort, NC in June 1718. Since its discovery, the site has produced hundreds of thousands of artifacts, including an abundance of artillery and ammunition. Concretion QAR1445.000 was recovered in 2007 and identified as containing a breechloading cannon chamber, or breechblock, upon x-ray. During cleaning, a wooden plug was removed from the mouth of the chamber, behind which a textile gasket was found. While desalinating the textile and during a routine solution change, conservators noticed a small floating fragment with a printed letter “L” clearly visible. Further investigation revealed 16 tiny paper fragments, most less than 1” square and several with legible text.

After almost 300 years on the ocean floor inside a breechblock loaded with black powder and approximately 8 months of soaking in various aqueous solutions, the fragments are incredibly fragile and display traits that are atypical for most paper objects. The QAR Conservation Lab partnered with the State Archives of North Carolina’s Conservation Lab to fully research, assess, document, and treat the paper fragments. The project has brought together two very different worlds of conservation, as well as collaborators from external institutions who assisted with multispectral imaging, scientific analysis, and much needed advice.

While cellulosic textiles such as garments and rope have been recovered from submerged sites, paper is rare, and little is published about it. To further complicate matters, standard treatments for waterlogged organics – keeping them wet until desalination and consolidation are complete – run counter to the needs of paper objects. Since the discovery of the fragments has been made public, we have received several inquiries from other conservators specializing in waterlogged material who have also found paper objects. There is a clear need for information on this topic and a broader discussion of treatment protocols amongst both the paper and maritime objects conservation communities.

BPG Wiki Discussion Session / Diane Knauf – BPG Wiki Coordinator (paper)¹, Michelle Smith – BPG Wiki Coordinator (book)²

¹BPG Wiki, Pittsburgh, PA, USA ²BPG Wiki, Oakland, CA, USA

This year’s session will focus on adding a Stain Reduction page to the [BPG Wiki](#). We will discuss what treatments and materials should be included, the factors that need to be considered when reducing stains, and the best way to organize the topic on the wiki. Attendees will be invited to provide input that will shape the development of the new page.

We will also inform the membership of ongoing plans to develop new pages on East Asian mounting formats including [scrolls](#), screens, fans, and albums, as well as our continued work on the [Bookbinding Traditions by Region or Culture](#) page. As in past years, feedback on changes to the wiki will also be welcome.

We invite conservators from all stages of their careers to attend this session and partake in the lively discussion that will add to the continued effort to build this collaborative knowledge base.

Library and Archives Conservation: Priorities of the Past, Present, and Future / Amy Lubick – Supervisory Conservator¹, Lauren Telepak – Senior Collections Conservator², Randy Silverman – Head of Preservation³, Hilary Kaplan – Training Specialist, National Faculty¹, Fletcher Durant – Director of Conservation and Preservation⁴, Kimberly Hoffman – Preservation Librarian⁵, Dong Eun Kim – Exhibits Conservator¹, Jennifer Herrmann – Senior Heritage Research Scientist¹, Michelle C. Smith – Book Conservator⁶, Consuela (Chela) Metzger – Head of Preservation and Conservation⁷

¹The National Archives and Records Administration, College Park, MD, USA ²Harvard Library, Cambridge, MA, USA ³University of Utah Marriott Library, Salt Lake City, UT, USA ⁴University of Florida Libraries, Gainesville, USA ⁵Miami University, Oxford, OH, USA ⁶Private Practice, Oakland, CA, USA ⁷UCLA Library, Los Angeles, CA, USA

To honor the formation, history, and work of both the Library Collections Conservation Discussion Group (LCCDG 1980s-2020) and the Archives Conservation Discussion Group (ACDG 1992-2020) the session will start with Randy Silverman and Hilary Kaplan sharing memorable topics, key moments, and significant issues during the early days of both discussion groups. They will tell us why it was critical for these groups to emerge and what each group sought to accomplish. Randy and Hilary will discuss the impact of these groups on the profession and the organization while considering what work remains for the new LACDG.

Shifting to focus on current priorities for libraries and archives in 2021, the rest of the session will explore what’s most important to library and archives professionals right now as we respond to world happenings and current concerns. The following four talks will explore how the critical events of today have made us reevaluate our work practices, traditional roles, and priorities as library and archives professionals. The session will conclude with questions for the speakers, follow-up discussion on the topics presented, and suggestions for the future of LACDG.

Analog to Digital to What? Reconsidering the Role of Microfilm Collections in the 21st-Century Library / Fletcher Durant

Microfilming projects once drove the growth of research library preservation programs and offered a solution to the storage of newspapers and brittle books. Today, microfilm collections take up shelving space in libraries, little used by researchers, but to serve as the basis for large-scale digitization projects such as the National Digital Newspaper Project. Preservation master microfilm resides in cool or cold storage, promised to last more than 500 years if the vendor invoices are paid. If the past of microfilm was access, and the present is digitization, is there a future for this maligned format?

Hands-on, Virtually: Shifting to Student Training Videos during a Pandemic / Kim Hoffman

At Miami University, library staff returned to campus in August of 2020, and student assistants reported to the preservation department in mid-October. Having extra hands again meant resuming paused procedures like sewing and box making. However, our usual one-on-one training methods for a new student didn’t feel sustainable during a crisis. This talk will briefly describe the process of transitioning from in-person training to pandemic-friendly training videos. Ultimately, after an up-front cost of time and effort, a training video series presents benefits and opportunities that appear poised to carry forward beyond the pandemic.

Returning Loans Safely during the COVID 19 Pandemic / Jennifer Herrmann and Dong Eun Kim

COVID19 changed many aspects of life and how work is accomplished. Travel restrictions and health concerns interrupted courier trips making virtual condition reports and deinstallations necessary. Viral transmission and attenuation, where multiple staff interacts with surfaces, influence employee safety; quarantine periods or disinfection guidelines are necessary. The National Archives used Reopening Archives, Libraries, and Museums data to keep staff and holdings safe during collaborative virtual deinstallation when returning a map annotated by Franklin Roosevelt from the Victoria & Albert and The Point Elliott Treaty between the United States and the Dwamish, Suquamish, and other indigenous peoples from the Hibulb Cultural Center. Virtual practices may influence future, more sustainable methods for museum loans.

Working Toward Anti-Racist Approaches in Library and Archives Conservation / Consuela (Chela) Metzger and Michelle C. Smith

This talk will be about the UCLA Library Preservation & Conservation Department’s efforts to build an anti-racism initiative, including the development of protocols for dealing with racist collection materials that enter our lab. By sharing our own experiences, we hope to provide a loose framework that may be of use to other institutions that are working toward an anti-racist approach to conservation. We will also discuss our thoughts on addressing inequities in the preservation selection process, as well as our responsibilities in the education and training of fellows and interns. We look forward to a rich discussion with our colleagues!

Specialty Sessions: Collection Care

Collection Care

CCN Pre-session: The Materials Selection and Specification Working Group

Paving the Path for Choosing Safe Materials for Display /

Lisa Elkin – Chief Registrar and Director of Conservation¹, Rachael Perkins Arenstein², Lisa Goldberg³, Rebecca Kaczowski – Preventive Conservator⁴, Samantha Springer⁵

¹American Museum of Natural History, New York, NY, USA ²A.M. Art Conservation, LLC, Scarsdale, NY, USA ³Goldberg Preservation Services, LLC, Elmira, NY, USA ⁴Smithsonian Institution, Washington, DC, USA ⁵Conservator, Portland, OR, USA

Placing collections on display assumes risk to the long-term preservation of the object with the trade-off that the piece is providing insight, appreciation, or fulfillment. But we also assume that the risk should not be larger than necessary or out of line with the benefits of exhibition. Choosing safe materials for the construction of cases and mounts is one of the variables that impact the preservation of an item on display. But with limitless possibilities in exhibition design comes a confusion of how to limit unnecessary damage. How do museum professionals make smart choices on what is safe to use? Where do we find the data that informs our decision making? To what resources can we turn?

As information becomes more easily accessible than ever, conservation and preservation professionals are increasingly relying on online content for decision making. We prioritize free, accessible, and practical resources from trusted organizations. Also, we like to see information aggregated in a way that provides diagnostic tools, compelling visuals and links to suppliers and vendors (Lambert et al., 2018).

Over the past three years AIC's Materials Selection & Specification Working Group (MWG) has brought allied organizations and professionals together to identify needs and develop content that will help cultural heritage professionals choose and use materials that will not harm our collections while on display. The Working Group is crowdsourcing knowledge, conducting primary research, and developing new tools to create a portal that aids in decision making, points to available data, and vets and aggregates current information on choosing safe exhibition materials.

This presentation will provide an update on the tools and resources created by the MWG and encourage the cultural heritage community to become involved in pushing these ambitious projects forward.

Hazardous Materials / Joint with Health & Safety Network

Consequences of p-Dichlorobenzene Treatments: Collection Access Restrictions, Case Decontamination Labor and Residual Health Risk / Kathryn Makos – Certified Industrial Hygienist¹, Catharine Hawks – Conservator², Kimberly Harmon – Certified Industrial Hygienist³

¹Smithsonian Institution, Washington, DC, USA ²National Museum of Natural History, Washington, DC, USA ³Smithsonian Institution, Office of Safety, Health and Environmental Management, Washington, DC, USA

Exposure control of residual vapor-phase organic chemicals, applied as pesticides within collection cases, is both difficult and complicated. Organic chemicals penetrate/absorb into wooden storage furniture and paper-based storage supplies, and adsorb on metal, glass, and other materials. Paradichlorobenzene (PDB) will also sublime and re-crystallize on collections and storage equipment, resulting in a continual vapor equilibration within a cabinet and a potential inhalation exposure upon case opening. Retention by specimen lipids or other fats and tissue also results in long-term inhalation exposure for anyone handling or studying treated items, as well as potential damage to specimen analyses. One type of collateral damage from these chemicals is a sticky residue that adheres insect carcasses and other frass onto the surfaces of storage furniture. Removing this stubborn residue from storage equipment requires intensive post-treatment labor resulting in long-term case access restrictions, and if unsuccessful, expensive cabinet replacement.

The National Museum of Natural History (NMNH) had historically applied PDB as a pesticide to its specimen cases on an as-needed basis as part of its Integrated Pest Management program. The last recorded application was to 18 Mammal specimen cases after a significant 2010 pest infestation. The Museum sought to remediate both surface residue and potential health risks, as PDB is listed by National Toxicology Program as “reasonably anticipated to be a human carcinogen”. Between 2011-2013, NMNH restricted access to these cases while collection and conservation staff, wearing personal protective equipment, conducted a variety of intensive case cleaning measures. Statistical comparison of pre- and post-cleaning source sampling revealed that the measures were effective in reducing, but not eliminating, detectable PDB residual vapor. Smithsonian Industrial Hygienists conducted inhalation air monitoring (21 samples) on staff during PDB application, post treatment curating, and cleaning of specimens and storage cases. Statistical analysis indicated that, with 95 percent confidence, the likelihood of a future exposure exceeding the ACGIH occupational exposure limit (OEL) of 10 ppm was less than 2 percent. A good indicator of health risk control is if the analysis indicates, with 95% confidence, the chance is less than 5% that future exposures might exceed the OEL. However, all the exposures were detectable levels of a potential carcinogen, with significantly high concentrations during applications. Based on this concern, the NMNH discontinued the use of PDB and implemented access control procedures.

In 2014, the European Commission Scientific Committee on Occupational Exposure Limits recommended a significantly lower OEL of 2.0 ppm. A 2018 follow-up study was conducted on staff conducting sorting/re-bagging, case visual inspections and research handling, of specimens in previously treated cases. All results were significantly below the 2.0 ppm OEL, and the statistical likelihood of a future exposure exceeding the 2.0 ppm was only 0.21%. This suggests that PDB exposures from previously treated cases and specimens were finally mitigated, and the 2011-13 case decontamination efforts, coupled with years of pre-access case ventilation procedures, were successful albeit at a significant cost of time and resources, underscoring the importance of non-toxic IPM interventions.

Arsenic and Old Feathers: A Survey of Detection, Mitigation and Treatment Approaches for Pesticide-affected Objects and Creating a Treatment Protocol at SUNY Buffalo State / Liatte Dotan – Conservation Graduate Student^{1,2}, Emily Hamilton – Assistant Professor of Objects Conservation^{1,2}, Fran Ritchie – Objects Conservator^{1,2,3}, Theresa J. Smith^{1,2}

¹Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA ²AIC, Washington, DC, USA ³Harpers Ferry Center, Harpers Ferry, WV, USA

Animal hides and skins present in taxidermy and other organic artifacts have long been known to have potentially poisonous pasts due to the presence of residual pesticides that were applied by creators, collectors, and museums. While chemicals such as arsenic and mercury compounds were commonly used to combat agents of deterioration, these integrated materials pose a serious health threat to those caring for collections as well as the environment at large. Whether by a natural disaster, institutional necessity, legal repatriation, or ethical obligation, conservators and collection managers must be equipped with standard practices to provide adequate care even for these seemingly innocent but dangerous artifacts.

An example of the need for a written protocol for pesticide-treated objects arrived at the Garman Art Conservation Department at SUNY Buffalo State in 2018. A taxidermy bird life group enclosed in a glass bell jar was brought in for treatment by a private owner. Although the mounts were in relatively good condition, the unstable support branch warranted a treatment campaign, despite their poisonous potential. Without protocols for dealing with these materials, the feasibility of treating this object was brought into question - what procedures should be enacted before the protective bell jar was removed, and how should treatment proceed if the specimens did test positive for residual pesticides?

An integrated approach for detecting and treating objects that fall beneath the title “hazardous” had not yet been employed at Buffalo State. To create the protocol, resources currently circulating in our field detailing detection, mitigation, and treatment steps for pesticide-affected objects were compiled, and existing procedures from institutions were surveyed and gathered. The resulting best practice for handling and treating pesticide-contaminated objects was followed

Specialty Sessions: Collection Care + SPNHC

during the treatment of the bird group, and this talk aims to demonstrate the need for written procedures in the conservation field at large. In the compilation of this important informational and practical tool, objects such as the bird diorama may be reinstated as viable members of museum and private collections.

When the Dust Isn't Settled: Conversations in the Removal of Hazardous Material from World Trade Center Artifacts / Lisa Conte - Head of Conservation¹, Kerith Koss Schrager - Principal Conservator²

¹National September 11 Memorial & Museum, New York, NY, USA ²The Found Object Conservation, White Plains, NY, USA

The repercussions of the terrorist attacks on September 11, 2001, continue 20 years later. We grapple with psychological and physical hazards in many forms as an extension of that tragic day, when nearly 3000 lives were lost. World Trade Center (WTC) dust, to which an estimated 400,000 people were exposed, has become one of the most resonant symbols of that day. The 9/11 survivor and recovery communities and residents of lower Manhattan continue to battle and succumb to illnesses as a result of their exposure to the dust and toxins—ranging from cancer to post-traumatic stress disorder to particular vulnerability to COVID-19.

The 9/11 Memorial & Museum holds several thousand artifacts that were recovered from the Trade Center. Approximately one-sixth of the physical collection has been confirmed or suspected to contain WTC dust, often becoming an integral part of the artifact's composition. While analysis of the dust has identified hazardous components, its patina on the objects can be a crucial part of the narratives they convey as witnesses to a profoundly tragic event. In cases such as workplace relics like floppy discs and identification cards, the dust has been preserved. On the other hand, it has been removed from objects such as responder vehicles and steel columns for health and safety concerns and the curatorial decisions related to accommodating them. There are also artworks in the collection which confront the grave materiality of the day which incorporate the hazardous matter in their compositions and others that focus on the removal of dust as symbolic acts of cleansing.

Decisions about whether to remove WTC dust can only be made with input from various stakeholders, from those tasked with the caretaking and exhibition of this sensitive collection, to survivors, and victim's family members. Information from individuals with first-hand knowledge of the object's history is crucial for relating the significance of the dust to the object's narrative value and emotional effect. In this context, curators work to create a comprehensive and educational exhibition space. Additionally, museum staff are working with these hazards, in an exposure scenario that includes high frequency and close proximity. Further, visitors to the Museum must be protected from exposure. As a result, health and safety professionals are involved to develop protocols that are carefully considered and integrated into institutional policy. However, their hierarchy of controls, which favors elimination to manage hazards, can be at odds with conservation goals when the hazardous material has curatorial value. Conservators are thus tasked with navigating the complicated preservation of these hazardous elements while balancing the safety of staff, researchers, and visitors and working to achieve all stakeholder priorities. Predictably, the manner in which these competing interests are resolved varies from institution to institution.

This presentation will examine case studies from the Museum that highlight various complex health and safety, curatorial, and ethical issues that arise when working with and interpreting hazardous materials in museum collections. From the preservation of dust to its complete removal, the various solutions establish how conservators have negotiated these concerns while adhering to critical health and safety regulations. The framework developed by the Museum may be applied to decision making and risk assessment in other collections containing hazardous materials.

Joint Sessions: Collection Care + SPNHC

Integrated Pest Management

Museum Pest Control: A Survey of Collections Care Trends / Joel Voron - Senior Integrated Pest Management

Technician¹, Suzanne Ryder - Curator², Lisa Goldberg - Principal³, Julie Unruh - Private Conservator⁴, Eric Breitung - Research Scientist⁵, Zoe Hughes - Curator of Fossil Invertebrates²

¹Colonial Williamsburg Foundation, Williamsburg, VA, USA ²Natural History Museum, London, United Kingdom ³Goldberg Preservation Services, LLC, Elmira, NY, USA ⁴Houston, TX, USA ⁵The Metropolitan Museum of Art, New York, NY, USA

The museumpests.net working group, formerly the Integrated Pest Management Working Group (IPM WG) conducted a survey in 2018 to gather information about current trends in resource allocation and operational practice in how collecting institutions monitor and eradicate pest incursions. The survey was constructed over the course of two working group meetings, as members grappled with how to ask questions that would allow respondents from institutions of all sizes to describe their collecting focus, budgets, staff allocations, preferred methods for pest treatments, and any observed changes in pest populations. Distributed worldwide, the survey collected data that was evaluated using SurveyMonkey's innate analytics and Tableau, an open access data visualization program. Use of Tableau allowed us to pose different questions about the data by exposing relationships between various data sets, but also revealed flaws because of how we constructed the question set. This team will report on some general outlines for worldwide and regional trends in museum pest control methods, budgetary and personnel parameters, and pest populations. The museumpests.net working group is an unaffiliated group of museum and collections care professionals who collaborate remotely and gather once per year to provide updated information on their website. The site includes free and accessible key information about prevention, monitoring, identification, solutions, and resources about museum pests.

Buggin Out / Heather Parks - Head of Preservation¹

¹Binghamton University, Binghamton, NY, USA

In 2019 Binghamton University initiated a Buggin Out IPM project with almost 8,500 traps being checked to determine our bug problems. We checked over 160 traps weekly throughout four buildings and used the ZPest Tracker to assist with interpreting the data. That data revealed book lice, carpet beetles and silverfish were a major issue in select areas. When we shut down in 2020, my hypothesis was that our bug number would grow due to limited human presence, darkness and traps that were left too long, encouraging predator insects. However, we ended up with 20% fewer bugs. It turns out the biggest player was mother nature in providing a drier year than 2019. I'll use data to show the trends of infestation, the roles of humidity, predator insects and the changes in library use between 2019 and 2020 to explain our findings.

Lizards in the Library: A Case Study of an Established Resident Population of Mediterranean House Geckos in Collections Storage Areas and the Potential Impact of Global Warming on Other Institutions / Alan Van Dyke - Senior Preservation Technician¹

¹Harry Ransom Center, The University of Texas at Austin, Austin, TX, USA

Integrated pest management programs in cultural institutions are typically concerned with common pests living within buildings, such as insects or rodents. The Harry Ransom Center, however, has an established population of *Hemidactylus turcicus* (Mediterranean house geckos) living within its building, including in collection storage areas. These house geckos are common in Austin, Texas, where the Center is located, and are generally considered beneficial as they are insectivores. While using insectivores to control insects in a cultural institution setting is an intriguing idea, the presence of the geckos presents its own concerns. Gecko droppings can stain collection materials as well as potentially carry salmonella, a health hazard, and dead geckos can provide a source of food for pests. It is unknown what the Ransom Center geckos feed on specifically, as that they are too small to catch normal *H. turcicus* prey, though the Center does have incidental silverfish as well as odd beetles and the very occasional carpet beetle. Specimens of *H. turcicus* in the Ransom Center are physically smaller than average (5 cm. vs 11 cm. in length). Individuals are rarely seen outside of sticky blunder traps,

Specialty Sessions: Collection Care + SPNHC

though occasionally one can hear them chirping in darkened areas of collections storage areas. Because geckos are resistant to commonly used pesticides, they are especially difficult to eradicate. *H. turcicus* is an invasive species to the Gulf of Mexico region of North America, originating in the Mediterranean. *H. turcicus* are spreading globally. Their northern range limit seems to be controlled by winter temperatures. However, with global warming, it is possible that the range of *H. turcicus* can expand into more northern parts of Europe and North America in the future (Weterings and Vetter, Current Zoology, Vol. 64, Issue 5, 1 October 2018, pp 559–573, <https://doi.org/10.1093/cz/zox052>). They can be introduced into new areas rather easily, hitching rides in boxes and containers. It is quite possible that *H. turcicus* or other species of house gecko may be accidentally introduced into collections storage areas and permanently establish populations in institutions in regions previously unaccustomed to small house reptiles.

An Odd Problem to Face: Integrated Pest Management and *Thyodrias contractus* (Odd Beetle) / Rebecca Newberry – Conservator¹

¹Science Museum of Minnesota, St. Paul, MN, USA

Thyodrias contractus, or odd beetle, is an unusual dermestid beetle. The males and females look strikingly different from each other and neither looks like any other dermestid. They do have the same tastes as dermestids, preferring the tasty proteins found in natural history collections.

The females look like larva and cannot fly. They cannot easily move from place to place. They must be introduced. The best control method for odd beetles is prevention. Standard IPM procedures of inspection, isolation, preventive treatment, and monitoring should work.

What happens, then, when a fairly robust IPM program fails to control odd beetles?

The first confirmed odd beetle in the state of Minnesota was found in a display at the Science Museum of Minnesota (SMM) in the 1980's. The infestation spread to a biology storage room, among other spaces. Regular IPM monitoring began in the early 1990's and has continued to the present. When the museum moved to a new building in 1999, the conservation department used extensive IPM methods to prevent bringing odd beetles along.

Unfortunately, there were a few hitchhikers. Every few months we find very small outbreaks of odd beetles during twice monthly IPM monitoring. They show up in unexpected places like offices and break rooms and have largely been excluded from collections due to rigorous isolation and low temperature treatments. It's a frustrating experience since it's been impossible to find an infestation source. We experimented with insect growth regulators and saw little change.

I consulted with Tom Strang in 2014 and he suggested mapping the occurrences over time to predict where and when they might show up again. Using our IPM data, we mapped all odd beetle occurrences since 1999. The patterns which emerged from the mapping help us predict when we may see an outbreak. Then we use targeted pesticide applications along the wall baseboards. While the odd beetles have not yet been eradicated from the building, we are seeing encouraging reductions in their numbers.

Collection Care Adaptations

Learning from Incidents: Artwork Interaction Reporting and Lessons / Samantha Owens – Assistant Conservator¹

¹Glenstone Museum, Potomac, USA

When the conservators at Glenstone Museum prepared for an expansion opening in 2018 that would increase visitorship by a factor of 10, the existing policies for reporting art incidents and damages were reevaluated, and a new incident reporting system was created. Now two years after implementation, the system has remained a success. Conservation is promptly apprised of any visitor interaction with artwork and all incidents are logged, with overall data examined monthly. As the museum promotes an intimate experience without barriers between visitors and the artwork, it is understood that visitor interaction with artwork will inevitably occur. With our system of data collection, patterns have emerged. For example, the rate of incidents is higher in winter months, due to visitors carrying bulky coats through the galleries. Due to COVID-19 and a desire to lessen use of lockers, we have relaxed our bag policy and now allow larger bags and backpacks

into our galleries. Our system has allowed us to understand which artworks are most impacted by bags or front-facing backpacks and enables us to advocate for change.

This incident reporting procedure was created after discussions with colleagues at other museums and then tailored to our needs. Staff members who witness visitor interaction to artwork, whether in person or on a video feed, use an online Microsoft Form to log the specific artwork and incident. This log allows the Conservation team to easily check artworks for issues ranging from fingerprints to larger damages, to look for long-term trends, and to advocate for solutions to reduce future incidents within the institution. Data is imported into Microsoft Power BI which allows for analysis of larger metrics; for example, we can look at the correlation between the number of incidents and the number of visitors on any given day.

Improvements to staffing, messaging points, and visual cues have all resulted from a careful analysis of the data collected. This detailed method of incident tracking has become a partnership between our Conservation, Visitor Experience, and Security departments that we hope could serve as a model for similar institutions.

A Slack-Filled (R)Evolution: Working Remotely Planet-Wide, Together / Genevieve E. Tocci – Senior Curatorial Technician¹, Deborah L. Paul – Biodiversity Informatics Community Liaison²

¹Harvard University Herbaria, Cambridge, MA, USA ²University of Illinois at Urbana-Champaign (UIUC), Champaign, IL, USA

People working in museums and collections normally work closely with colleagues. In March 2020, many of us were unexpectedly on our own working remotely. The sudden switch to remote museum work required finding new ways to engage and interact beyond email. Video meetings quickly became commonplace, but do not replace, replicate, or supplement many interactions staff are used to. Adding the collaboration tool Slack provides a platform that neither email nor video meetings provide. Using Slack, or other collaboration software, does not replace sitting in the lunchroom, popping into the office down the hall, or sending email, but it does provide interaction in a way that allows engagement, discussion, question answering, fast responses, and morale building. It has long-term functionality within an institution, remote or working together, and for larger group collaborations.

Organizations, working groups, and professional societies need additional ways to collaborate and to plan events. Where email sufficed in the past, once everyone is remote, the volume of email increases dramatically. Email can hinder transparency and inclusion as only those in the chain benefit while Slack allows all members to see conversations in open channels. (Note Slack does support private rooms/channels). Quick team communication to discuss tasks, problems, and questions that need more than one input allows for fast decisions and a smoother workflow.

The Society for the Preservation of Natural History Collections (SPNHC) and the Biodiversity Information Standards (TDWG) organizations both now employ Slack not only for planning their online meetings, but also for giving committees and individuals a place to gather and work both synchronously and asynchronously around the globe. Others employing Slack include paleontological, entomology, and botanical collections, and the Global Biodiversity Information Facility (GBIF). Additionally, with the recent formation and work of both the [ViralMuse Task Force](#) and the [CETAF-DiSSCo COVID19 Task Force](#), Slack provides a global communication and collaboration tool. In a recently funded NSF grant to enhance published bat-specimen records¹, the entire team works together in Slack, simplifying staying on the same page, sharing expertise, and building team camaraderie. In a similar vein the Harvard University Herbaria set up Slack to facilitate transcription projects suddenly worked on remotely. It quickly was embraced by collections staff as well as bioinformatics, libraries, and administration, creating a space to quickly get input and help with everything from challenging handwriting to technology issues.

The Slack tool serves all these purposes well. It does take time to understand how to balance what happens inside Slack, what applications can be linked, and what must still be an email. It can provide an archive of discussions for future searching. Used with thought it can bring museum staff together in a time of separation as well as improve workflows when together. It allows for collaboration within societies, organization, or across disparate individuals with common interests, goals and problems.

Specialty Sessions: Collection Care + SPNHC

Mast, Austin R., et al. (2020). Rapid Creation of a Data Product for the World's Specimens of Horseshoe Bats and Relatives, a Known Reservoir for Coronaviruses (Version 1.1) [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.3993289>

Collections Care from Home: Lessons Learned from the COVID-19 Pandemic / Genevieve Pierce – Preservation Technician¹, Alan Van Dyke – Senior Preservation Technician¹

¹*Harry Ransom Center, The University of Texas at Austin, Austin, USA*

In March of 2020, the Harry Ransom Center at the University of Texas at Austin temporarily closed its doors due to the COVID-19 pandemic. It was assumed the closure would be for three weeks before the slow realization it would be closed for much longer. As with many other institutions, the Ransom Center's emergency response plan did not address an unexpected closure, and there was little time to plan or prepare for this event. After closing, a host of issues arose which needed attention, such as gallery items in displays for longer than planned, books and objects left out for research instead of in proper storage, environmental monitoring, pest management, and equipment maintenance. This presentation delves into the Ransom Center Preservation & Conservation Division collection care response, the administrative challenges of remotely maintaining an evacuated building, and how this event will impact a future emergency response plan.

Distance Management for Collection Preservation: Is this the Future? / Lisa Elkin – Chief Registrar and Director of Conservation¹, Julia Sybalsky – Conservator¹

¹*American Museum of Natural History, New York, NY, USA*

The care of collections requires ongoing monitoring and data evaluation to validate decisions and inform actions taken to prevent damage or loss. Several agents are routinely monitored including temperature (T), relative humidity (RH), leaks (water), pests (rodents and insects), intrusion, smoke/heat, light, vibrations, and pollutants. All of these variables comprise the collection environment.

At the American Museum of Natural History (AMNH), COVID-19 has introduced novel challenges to collection management and preservation through extended closure and the resulting inaccessibility of the museum facility. Collection care staff were approved access only for critical functions – feeding live animals, checking freezers, collection walkthroughs; for reasons of health and safety, access for even these functions was quite limited.

Our AMNH team reflecting Conservation, Collection Management, IT, Facilities, and Security, began investigating commercially available, remote monitoring hardware that could be employed to improve distance management of the collection environment, and have set out to begin product research and trials. These trials support an investigation of possibilities for an integrated digital platform that supports storage/archiving, access, and analysis of data collected from a fleet of different sensors, and accommodates changing needs and priorities going forward.

As time passed, it became increasingly apparent that managing collections from a distance would be a longer-term commitment than anticipated. With decreases in staff, decreases in funding, prolonged lack of access to the facility, and the possibility that even after reopening, additional closures might lay ahead, we began to consider the future of collection preservation. What if preservation from a distance became the 'new norm'? Could it be accomplished effectively? This paper considers the hypothetical scenario of a future where remote management plays a central role in ongoing collections care.

With possible reentry upon us, we understand that reemergence of the COVID-19 virus could result in another shutdown. Beyond that, with significant reductions in staff and resources we will be expected to do more with less. Remote monitoring and distance management of preventive care has become more valuable than ever.

Twelve Months, 2500 Objects: Condition Reporting during Deinstallation of Exhibits at the Yale Peabody Museum of Natural History / Mariana Di Giacomo – Natural History Conservator¹

¹*Yale Peabody Museum of Natural History, New Haven, CT, USA*

The Yale Peabody Museum of Natural History (YPM) is undergoing a major renovation that will yield more exhibit space, classrooms, and opportunities for visitors and students to experience the museum in a new light, while providing new collection storage spaces that align with best practices in conservation and collections management. This renovation will affect every gallery of the museum, with almost all of them being deinstalled, except for the dioramas. The YPM closed two galleries in January of 2020, with the expected closure of the rest being in June of 2020. Due to the COVID-19 pandemic, the galleries had to close in March of 2020. By this point, condition reporting of the specimens and objects (over 200) in the two closed galleries, the Great Hall and the Hall of Mammalian Evolution, had occurred already, using a simple system I devised to move quickly along the galleries and do as much as possible in "field conditions". The remaining specimens and objects started to be deinstalled in July 2020, with the goal of finishing by December 2020. The condition reporting system I chose to use for deinstall consisted of using a DSLR camera with a tripod (plus a scalebar) and an iPad with an Apple Pencil. The camera and tripod were used to take high resolution images of the objects and specimens from as many angles as they allowed, given the way they were installed. Those objects that allowed rotation and movement were moved to obtain images from more angles, but if this was not possible, objects were photographed by moving the tripod. Whenever possible, once the objects were deinstalled, they were photographed from the remaining angles (if not possible, they were examined, and photographs were taken only when issues were observed). Lower resolution photographs were taken of every object with the iPad and notes were taken directly on the images using the Apple Pencil and the Photos app (markup option). Cracks, previous restorations, paint losses, and other condition issues were drawn directly on the images using the same software. This system has been efficient for quick removal of the objects from the galleries and has the advantage of not needing special software other than that provided by the manufacturer of the iPad. In addition, by using the object barcodes in the photographs, identification of every object in each photograph is straightforward and makes renaming of files much easier. Moreover, a characteristic of the work that could have been considered a disadvantage in "normal circumstances", which is the large amount of data processing after the field condition reporting, has not been problematic due to having staff working from home on some days of the week and in need of computer work. This system can be used in any institution of any size and can be tailored to the specific needs of any deinstallation team. In the case of YPM, it has proved successful and I hope to use a simplified workflow for the reinstall of the galleries.

Collection Care: Storage

Boxing with Leopold von Ranke / David Stokoe – Associate Librarian, Rare Book and Paper Conservator¹

¹*Syracuse University Libraries, Syracuse, NY, USA*

In 2016, Syracuse University decided to expedite the relocation of a large part of special collections' books to high density (HD) climate controlled off-site storage to free up space in the main library. The Leopold von Ranke (1795-1886) collection was purchased for Syracuse University in 1887 and formed the nucleus of what is now the Syracuse University Special Collections Research Center (SCRC).

Von Ranke was a German historian & historiographer. Highly influential in shaping the modern approach to history, emphasizing such things as reliance on primary sources, narrative history and international politics. He rejected the idea that each era is by definition superior to those that preceded it, as well as the idea of sweeping historical theories that attempt to encompass huge swathes of time and geography.

Apart from his personal papers, the collection comprises some 18,000 bound volumes, many heavily used over the years and varying greatly in size, condition and binding style.

Ranke was chosen for many reasons including collection size, limited and predictable usage, historic importance and existing cataloguing records. Transporting items to and from offsite storage would increase risks considerably compared to onsite risk factors. Although some items were already housed in a variety of ways, the majority had no protection at all. Housing options were assessed, costings compared, budgets reviewed and heads scratched! Mechanized individual boxing was the answer!

In September 2017 we took delivery of a Library & Archive Mini-Grand PRO box maker with digital measuring device. We hired 3 graduate students, purchased supplies, spent a week training and set to work. Prior to measuring and boxing,

Specialty Sessions: Collection Care + SPNHC

books are checked against existing catalogue records and edited where necessary. HD storage is barcoded and arranged by size so two identical barcodes were assigned for each book, one for the box the other on A/F card inside the front book board. We have a macro and barcode scanner to populate the measuring device call number field, and began measuring in sequence two shelves at a time to limit data file size.

The books are similar in size, so we chose 2 suitable box designs from the 57 offered by the Kasemake software, a British Library design in E-flute for book spines over 20mm, and portfolio style in 20 point for smaller. Measurement data is imported into the Kasemake software and sorted into descending size order to maximize boxes per sheet. The software allows quick automatic positioning, averaging 6 per sheet (60" x 40"), costing \$10 - \$15 each including materials and time but not equipment! The machine prints the call numbers, creases and cuts the perfect box. Boxes are assembled and matched to books in the conservation lab prior to relocation in HD offsite storage.

The von Ranke project is ongoing but the equipment is also used for many other housing needs in special collections and for circulating stock when necessary. The new capabilities have changed how we approach collections management, in the long term saving money and time, but above all better protecting fragile items.

Stewardship and Storage: Rehousing and Reorganizing NMAI's Textile Collection / Hannah Muchnick - Collections Care Specialist¹, Nora Frankel - Textile Conservator¹

¹*National Museum of the American Indian, Suitland, MD, USA*

Since 2015, NMAI has undertaken a major project to improve and standardize its textile storage at the Cultural Resources Center (CRC) in Suitland, MD. The CRC is not just collections storage, but a multi-purpose gathering space that is frequently visited by Native community members, researchers, and artists. This multiphase approach began with a survey and pilot program which formed the foundation of successful applications for two subsequent CCFF grants. Those grants funded the contractors and materials required for this large undertaking. The project has two major components: updating housing for all flat and rolled textiles, clothing, and related items; and reorganizing to ensure that communities' textiles are stored together. The project utilizes a standardized, modular method of Tyvek housing developed to ensure that objects are compact, handleable, and accessible by visitors. NMAI is the current steward of a number of textiles bearing cultural sensitivities and handling protocols. Accordingly, our project has worked in tandem with an interdepartmental effort at NMAI to standardize labeling and storage protocols signifying those handling responsibilities and prevent accidental access. Housing is tailored to each textile on a case-by-case basis and considers each textile's individual conservation needs. Reorganization of the Textile Storage area has better grouped objects by community, type, and size, enhancing the visitor experience while also increasing and optimizing available space to accommodate a growing collection. The wide scope of this Collections project relied on participation from multiple departments for its success, including Conservation, Registration, Repatriation and Curatorial, who all contributed expertise in planning and execution. With so many moving parts, both physical and organizational, we developed useful methods of tracking ongoing work as well as creating documentation such as instructions, guidelines, and rationales that can continue to be useful as the collection is visited, loaned, conserved, and grown.

Critical Mass: Accounting for the Size and Weight of an Oversized Album in a Time-Limited Treatment Plan / Leah Humenuck - Book Conservator¹

¹*U.S. Army Heritage and Education Center, Carlisle, PA, USA*

The treatment and storage decisions for oversized and heavy albums are challenging. They may require conservators to balance the seemingly opposed goals of practicality and preserving the binding structure depending on the condition. This presentation describes the considered approaches to the treatment, context of form, and future use of an oversized photograph album weighing over 75 pounds.

The U.S. Army Heritage and Education Center was presented with these challenges in addressing a late 19th century photograph album. This album held significance as it was a bespoke gift from the Quartermaster of Great Britain to the Quartermaster of The United States of America. Its content is regarding places and some

people in India, Afghanistan, and other surrounding areas. Due to the numerous photographs showing geography, this album was consulted for current military operations in the region and was a point of comradery for a visiting Special Forces group who served in the locations shown in the photographs.

Though stable before treatment, the album was neither able to be put on display nor was it accessible to researchers without causing further damage. The practicality of treating the album weighed the considerations of context the binding gives to future researchers versus exhibit potential and accessibility to researchers. The physical limitations of storage materials to create enclosures needed to be light but strong, in order to support the contents without unduly adding too much extra weight. Project management and planning regarding the scope of the treatment and materials was limited by a treatment timeline of two and a half months. The treatment of the album concluded successfully allowing accessibility for researchers and exhibition, opportunity of future rebinding, and providing a storage solution which was strong, light, allowed for safe handling, and gave emphasis to the importance of the original binding structure.

Plastics in Natural History Collections – a Case Study / Peter Giere - Curator¹

¹*Museum für Naturkunde Berlin, Leibniz Institute for Evolution and Biodiversity Science, Berlin, Germany*

Other than in collections of cultural and technical history where plastics can be found as a constituting material in the objects themselves, specimens in natural history collections typically are of natural origin without internal plastics. However, modern materials are used in many ways for the storage, documentation and presentation of these objects. Thus, the problems caused by decaying polymers usually are not found in the collection specimens themselves but in associated structures and storage items such as the liners of the lids sealing the jars for specimens in wet collections. These, however, usually are found in great numbers – resulting in potentially critical problems related to collection management and conservation if degrading materials fail within a short time frame. This presentation provides examples of modern materials used in natural history museums and points out potential problems and hazards due to the varied uses of plastics in conjunction with specimens in storage and on display.

Safe to Shelf? Unusual Enclosures for Challenging Materials / Susie Cobbledick - Ellerman Book and Paper Conservator¹

¹*Pet H Raven Library, Missouri Botanical Garden, Saint Louis, MO, USA*

The Peter H Raven library (Missouri Botanical Garden) is a specialized botanical/horticultural library that aspires to completeness within its self-imposed limits. In practice, this means that the collection includes important texts issued in limited numbers for a relatively small audience. Many of these texts were not professionally published or bound and are difficult to shelve due to shape, size and fragility. These materials include, for example, office-style bindings of Xeroxed sheets, spiral bindings, articles in acidic paper wrappers, ephemeral pocket guides, conference hand-outs and gimmick publications that are not rectilinear in shape. How can these materials live on the shelf without causing harm to themselves and neighboring objects? The solution is enclosures. Workers in the Library's conservation lab have designed a set of idiosyncratic enclosures to meet the preservation needs of these idiosyncratic materials. Some of these enclosures are unusual; some may even be unique. The Library's book conservator will describe these structures in detail, show images of their construction, and explain the problems that they solve. These enclosures may help solve storage problems in other natural history collections with similarly specialized and unusual collections.

An Affordable System for Converting Pallet Rack Shelving to Bin Storage for Framed Works of Art / T. Ashley McGrew - Preparator¹

¹*Cantor Arts Center - Stanford University, Palo Alto, CA, USA*

The long emphasized use of "paintings screens" in museum storage can be prohibitively expensive for museums with fewer resources and can result under-recognized disadvantages for those with larger budgets. Many of the advantages of screens - easy access and high visibility - actually put artwork at greater risks

Specialty Sessions: Collection Care | Contemporary Art

resulting from dust, water leaks and light damage. Bin storage not only mitigates those concerns to a large degree, they also just represent a much more efficient use of space in most facilities.

Commercially available bin art storage is already much less expensive and more flexible than the installation of paintings screens. The system described in this presentation represents a fraction of those already lower costs along with a significant increase in flexibility of use for the institution over time.

The presentation illustrates a step by step simple method to easily convert common pallet rack shelving using readily available inert construction materials and hardware that can be purchased in most building supply centers to create customizable, adjustable, cost-effective binning for most 2-D work in storage.

In addition the presentation shares a case study of an institution with dwindling available space and a growing collection and how the use of this method allowed in-house upgrades to storage in anticipation of large new collections acquisitions and renovated exhibitions spaces.

Storage Improvements for Tanned Mammal Skins at the Michigan State University Museum / Laura Abraczinskas - Collections Manager for Natural Science Collections¹, Barbara Lundrigan - Curator of Mammalogy and Ornithology, Associate Professor of Integrative Biology^{1,2}

¹Michigan State University Museum, East Lansing, MI, USA ²Michigan State University Department of Integrative Biology, East Lansing, MI

Established in 1857, the Michigan State University (MSU) Museum houses over 117,000 vertebrate specimens dating from 1844. In November 2019, the Museum received funding from the U.S. Institute of Museum and Library Services to improve accessibility, environmental conditions, and housing for 5,619 specimens that were stored in substandard and overcrowded conditions. These were at risk from a variety of threats, including damage or loss from physical forces, pests, disassociation, and environmental contaminants. Of particular concern were 224 tanned mammal skins that had been hanging in cabinets using an outmoded system and non-archival materials, with hangers fashioned from horizontal PVC rods and vinyl-coated electrical wire. This storage configuration accelerated damage to the tanned skins and also restricted accessibility, thus hampering use. The Museum's storage improvement project, currently underway, involves the installation of 11 new cabinets designed to house the tanned skins flat on the drawers. This will significantly enhance their protection, while also allowing staff to take better advantage of the vertical space and floor space in the collections area. Archival housing supplies include Volara Type A polyethylene foam and Tyvek to pad and support the skins. Unbuffered 100% cotton paper is being installed to line cabinet drawers. Disassociated pieces or fragments discovered during the re-housing process are bagged, labeled, tracked, numbered, and re-associated with specimens (where possible). MSU undergraduate students are assisting (currently remotely) with aspects of this re-housing project. These storage improvements support the Museum's goal to properly house and protect vertebrate specimens according to museum standards and best practices.

Contemporary Art

See also Joint Sessions: Contemporary Art + Electronic Media

Page 103

How to Cure a Headache: A Collaborative Approach to Unfreezing the Motion of Claes Oldenburg's Ice Bag / Celine Chretien - Associate Objects Conservator¹

¹Fine Arts Museums of San Francisco, San Francisco, CA, USA

Ice Bag - Scale B is a series of twenty-five kinetic artworks conceived in 1971 by Claes Oldenburg. The Fine Arts Museums of San Francisco (FAMSF) acquired number ten in this series in 1996. This playful and engaging artwork is often requested for display, but its unpredictable mechanism has proved problematic. A new request for display initiated a comprehensive condition assessment of the

artwork in 2019. In previous exhibitions since its acquisition, the artwork's movement needed frequent troubleshooting by conservators. Parts of its motion had to be disabled to mitigate the risk of collision between its two motors. Additionally, the fans that inflate the bag as it moves stopped functioning.

Within the FAMSF's encyclopedic collection, the Ice Bag exemplifies the complexities of non-traditional artworks. Since the creation of a contemporary art curatorial department in 2016, these complexities have become an increasing focus of the Museums' conservation staff. Our staff is working to improve standards and protocols for the care of a growing collection of contemporary and time-based media artworks. This includes reaching out to stakeholders, experts, other cultural institutions and vendors, as well as promoting professional development among our staff. The search to understand the Ice Bag led us to the National Gallery of Australia's conservation team. Their thorough documentation of the treatment of their Ice Bag - Scale B proved invaluable for understanding the artwork's operation. Collaboration with the fabricator of the Ice Bag series of artworks, experts in robotic artworks, and conservation colleagues allowed us to pinpoint the issues and move forward with repairs. The 2020 pandemic put the final stages of treatment on hold.

This paper describes how a collaborative approach guided decision-making and actual repairs to the Ice Bag. For a broader perspective we plan to invite these stakeholders to contribute to this paper. We hope our experience can help other museums who face challenges with kinetic or mechanical artworks and do not have the necessary expertise in house. We hope this presentation will also lead to more connections among other caretakers of artworks in this series.

I See What I See: Identification of Gas Composition of "Neon" Light Units in Artworks / Taylor Healy - Conservation Student¹

¹Conservation Center of the Institute of Fine Arts, New York University, New York, NY, USA

This research introduces a handheld spectrometer as a new tool for the identification of the gas composition in works of art with gas-discharge tube components. Gas-discharge tubes - more commonly known as "neon" lights - have been used in signage since the early 20th century, and in artworks since the mid 20th century. Modern and contemporary artists including Joseph Kosuth, Tracy Emin, Bruce Nauman, and Lucio Fontana valued this medium for the colored glow and the broad variations in colors produced by glass tubing, noble gases, and gas pressure within the tube. These artists often relied on trained fabricators to create their designs, as well as to restore and replicate components over the lifetime of the work. Condition issues such as color shifting, sputtering, and darkening have been observed as the tube and its electronic components age, and it is currently a common and accepted practice to replace these components as needed. Documentation of the intended appearance of light produced by the gas and glass composition of the gas-discharge tubes is rarely available. Collections care professionals depend on the training and knowledge of fabricators and restorers to replicate aged or non-functional components. However, it has been observed that replications might not be visually faithful to the aesthetic qualities intended by the artist. The need for non-destructive identification of the gas composition is crucial to match or reproduce colors of gas-discharge tubes in artworks, and has direct application for historical signage and architectural elements.

This paper presents a pilot project exploring the applicability of a handheld spectrometer to identify the gas fill by comparing the spectral power distribution of the tubes with characteristic noble gas peaks. This technique can also be used to quantify the chromaticity of the tubes for the purpose of documenting the color of newly fabricated artworks. Together, this data can be applied to identify condition issues as the units age, and assist fabricators for future replacements with identical materials. The ultimate goal is to develop a workflow for identifying gas compositions and quality control of replacements.

Problem D5-Solved! Removing Adhered and Imbedded Tissue Paper from the Entire Surface of an Oversized, Heavily Impasto, and Topographical Contemporary Acrylic Painting using the Modular Cleaning Program / Elise Yvonne Rousseau - Director and Principal Conservator¹

¹ACdR Conservation SF ~ Art Conservation de Rigueur, San Francisco, CA, USA

Specialty Sessions: Contemporary Art

This discussion illustrates the comprehensive treatment protocol, methods of testing, and applied techniques in the successful removal of waxy acidic tissue paper from the entire surface of an oversized Guus Kemp acrylic painting from 2010, with a heavily modeled and textured surface structure, using the Modular Cleaning Program.

At our initial on-site examination of the painting, it was immediately apparent the entire face of the painting had many layers of waxy acidic tissue paper sheets firmly adhered to the surface. This was a most unfortunate situation requiring an extensive conservation treatment protocol to recover the artwork from this misinformed, and damaging mishandling during packing and international shipping.

During our on-site assessment we tested several areas along the left side, to remove the adhered tissue. We used a range of pH adjusted H₂O with sodium hydroxide and 10% glacial acetic acid at 6000uS. We found the pigments were immediately color fast, water soluble and bleeding onto our cotton swabs. Decidedly taking a non-aqueous cleaning approach to safely remove the tissue. We would learn more about the artist Guus Kemp, (1960-2015) born in Kerkrade, Netherlands and his aesthetic techniques in our follow up research. The artist did not use binders or mixing mediums—as they appeared to be squeezed raw out of the tube, and thus water soluble.

Upon further assessment at our conservation studios, much of the tissue paper fibers had melted into the pigment layers, imbedded into the multi-dimensional surfaces and left impressions of the crinkled paper, altering the soft plasticized acrylic surfaces. Initially the tissue paper was firmly stuck into the pigment surfaces, when carefully lifted away, it was leaving behind layers of paper residues, and fibers still imbedded in the surface pigments. This made our task of removing the paper and these minute particles much more difficult.

Our cleaning approach and research was informed by the Modular Cleaning Program and Ormsby et al. Testing proceeded with a series of pH adjusted solutions of deionized H₂O and calibrated conductivity with micro-emulsions using EDTA, citric acid, MES and Ecosurf as chelators/surfactant in solution with D4/D5 cyclomethicone solution and velvisil plus gel. We worked within these variables depending on the color fastness of each pigment and applied over layers of heavy gloss mediums to achieve the removal of the paper fibers.

We use only conservation safe materials, all treatments are approached in a manner to be ethically responsible, to stabilize and preserve our cultural heritage, to be reversible and relevant for future study.

We were quite challenged to put our chemistry and conservation science expertise to the test with analytical research, our stereo arm microscope, UV/infrared light imaging and sample testing along the side edges to achieve the best outcomes and successful results utilizing the Modular Cleaning Program with this oversized topographical acrylic painting. This presentation will share with the AIC PSG, our working methods, techniques, and tricks we came up with along the way, to achieve this complicated and unusual cleaning.

Spaces that Evolve and the Artist's Intent: *Integrity* in Public Art Conservation / Ruth del Fresno-Guillem

- Art Conservator and Awareness raiser¹, Rita Amor - Art Conservator and Researcher of Contemporary and Urban Art², Annette Suleika Ortiz Miranda - Postdoctoral researcher³

¹Integral Art Services, ON, Canada ²Plowden & Smith Ltd, London, United Kingdom ³Center for Scientific Studies in the Arts, Northwestern University, Evanston, IL, USA

Integrity is neither fixed nor static - It is understood as a process of interpreting, respecting, and negotiating complexity, and at times, also contentious values¹. In Art, integrity is a reflection of the artwork's identity, the meaning and significance of the artwork for the artist and to the public. In conservation, this tends to be present as aspects as reversibility, respect, and conceptuality are taken into account during the assessment and treatment of works of art. Especially, in contemporary art, the artist's idea plays an essential role in the development of any proposal related to the artwork's preservation.

Additionally, in Public Art, the concept behind the artwork is closely linked to the factors that made the artist create the artwork in a specific moment, location, etc.

However, contemporary cities evolve by the moment, producing many works of public art lose their integrity as the environment oppresses its continuity while the spaces transform with new functions. Therefore, the artist's intent, and the integrity of the artwork, are sacrificed in order to preserve the piece in a new environment.

Focusing on the case of Keith Haring's mural interventions, our paper will aim to discuss cases where the necessity of preservation had deactivated the artwork's intent. The mural Haring painted for sick children at Necker-Enfants Malades Hospital in Paris is an example. The hospital was moved due to safety issues. Later on, the mural was restored. Despite the impressive work done by conservators, there are aspects that seem to have been disregarded: Did Haring foresee this possibility-change? Would he agree on the conservation of the artwork for a wider/new public? Does conservation sometimes deactivate integrity in favour of preservation? Would it be possible to balance both statements?

¹The definition of 'integrity' was based on the description in the Change Over Time journal website.

Adapting for the Long Term: The Realization of Robert Goyer's *Untitled, 1992* as a Lasting Installation / Samantha Owens - Assistant Conservator¹, Austin Anderson - Conservation Fellow¹

¹Glenstone Museum, Potomac, MD, USA

The realization of the long-term exhibition of Robert Goyer's *Untitled, 1992*, at Glenstone Museum was the result of years of planning and 74 meetings with the artist and his team. The mixed media, room-sized installation includes enameled sinks with running water, piles of newspaper stacks, and a 360-degree hand-painted mural of a forest, among other elements.

Prior to its installation at Glenstone, *Untitled* had been shown three times: In 1992 at the Dia Center for the Arts, New York, for 9 months; in 2007 at the Schaulager, Basel, for 5 months; and in 2014 at the Museum of Modern Art, New York, for 3 months. At Glenstone, the work is on long-term view in a gallery space designed for it. Installation of the work at Glenstone spanned three years and a range of expertise, from plumbers, electricians, muralists, theatrical lighting designers, and other contractors.

Untitled has now been installed for over two years and inherent condition issues directly linked to its long-term presentation have surfaced. Conservation challenges include expected tasks, such as managing normal operation of the running sinks, to unexpected tasks, including the development—and subsequent treatment—of blue copper staining in the sinks, and the research, testing and mitigation which occurred when enamel began spalling off the sinks. Treatment has included going back to the fabricator of the sinks to understand the underlying source of new damages and to discuss mitigation techniques.

While conservators who oversaw prior installations of *Untitled* provided helpful knowledge on short-term maintenance, collaboration between Glenstone's conservation team and external specialists proved necessary for the long-term realization and maintenance of the work. All decisions are made in concert with the artist and his studio, which is integral to presenting the work correctly and maintaining it to the proper standard. Presenting this complex installation for long-term display required extensive planning, but also flexibility when new, unanticipated problems arose, and collaboration has been essential to this process. The knowledge gained through these first years of exhibition will guide us in maintaining the work for many years to come.

Phantom Thread: Research and Preparation for the Care of a Delicate Silk and Metal Sculpture by Doris Salcedo / Megan Salas - Objects Conservator¹, Jane Gillies - Senior Conservator of Objects and Sculpture², Per Knutås - Head of Conservation²

¹Denver Museum of Nature & Science, Denver, CO, USA ²Museum of Fine Arts, Houston, TX, USA

This paper presents research and study pertaining to the installation of Doris Salcedo's (b. 1958, Colombia) *Disremembered IV* at the Museum of Fine Arts,

Specialty Sessions: Electronic Media

Houston. These investigations include materials research, conversations with the artist's studio and other conservators, and the creation and study of mockups. Due to COVID-19, the majority of this work was conducted remotely, which presented interesting challenges and new opportunities. Disremembered IV was installed at MFAH for the first time in a newly-constructed building for modern and contemporary art in the fall of 2020. The sculpture is part of the Disremembered series (2014) by Salcedo. Each piece in the series—which was inspired by Salcedo's contact with American mothers whose children were victims of gun violence and which comments on the experience of mourning—takes the form of an almost invisible open-weave shirt made of fine silk thread with thousands of metal needles sewed into it. Given the delicate nature of the piece, work began to better understand its materials and develop a plan for its care. At the heart of these investigations is the fact that the silk thread is coated with the acrylic emulsion Rhoplex AC-2235M (a butyl acrylate/methyl methacrylate copolymer). This resin was applied by the artist's studio to impart stiffness to the woven structure. Research provided no case studies in which these materials were used together in this way. Additionally, the Disremembered series has had limited exhibition history. Thus, few clues exist about how these materials will age together and respond to environmental sources of deterioration. Primary concerns include how to safely remove particulate debris and how to protect the artwork from light, dust, and visitors and still honor the artist's aesthetic requirements. Mockups were created and used to study key factors that will guide preventive care and potential interventions. Communication with the artist's studio has been an invaluable source of instructions and recommendations for storage, installation, and care. Reaching out to colleagues with experience caring for works by Salcedo helped place the sculpture in the broader context of Salcedo's works, which are characterized by deep personal meaning, expert craftsmanship, meticulous construction—and for being challenging to conserve. This project has been an opportunity to rethink conservation tools and has revealed that valuable work can be done even when going into the lab is not possible.

Electronic Media

See also Joint Sessions: Contemporary Art + Electronic Media

Page 103

Collecting in the Shadow of the State: Acquiring Performance at IMMA and Institutions of Care in the Irish Context / Brian Castriota – Art Historian and conservator^{1,2}, Claire Walsh – Assistant Curator: Collections³

¹freelance conservator ²Institute of Fine Arts, New York University, New York, NY, USA ³Irish Museum of Modern Art, Dublin, Ireland

This talk presents ideas around collecting and care in relation to a body of performance-based artworks newly acquired by the Irish Museum of Modern Art (IMMA). It focuses on *The Touching Contract*—a collaborative work by Sarah Browne and Jesse Jones that confronts the reach of statehood from the perspective of the female body. Given the social and political specificities of *The Touching Contract* and the strong desire by both artists for it to be understood as a work with a distributed and delegated authorship, we are consciously working to acquire and care for the work following the principles of the collaborative methodology and feminist ethos in which it was made. In this talk we contextualise the ongoing acquisition process for this work and the unique ethics of care it embodies in relation to IMMA as a national institution, Ireland's postcolonial context, and the highly contentious legacy of institutions of care in Ireland. As it is entering the IMMA collection in parallel to the development of our acquisition policy and processes around collecting performance, we also consider how this acquisition prompts a queering of wider entrenched museological policies, norms, and suppositions around ownership and care.

Building Preventative Conservation & Documentation into a Private Digital Art Collection / Kate Weinstein – Collections Manager & Registrar¹

¹Carl & Marilyn Thoma Art Foundation, Chicago, IL, USA

The Carl & Marilyn Thoma Foundation has a Digital & Media Art collection of 304 time-based media (TBM) artworks and counting. Of these, 148 works integrate

software or video. Drawing from the extensive resources provided by larger institutions with existing registration and preservation strategies, as well as our close relationships with TBM dealers and artists, we've adapted many policy and procedure best practices to better suit our smaller staff, quicker timelines for acquisitions, exhibitions, and loans, and entrepreneurial spirit towards collecting and preservation collaboration.

The Thoma Foundation averages 30 TBM artwork acquisitions a year. With a small staff (and without any conservators on staff), it falls upon only a few people to process each acquisition from registration, testing and inspection to installation and preservation planning (e.g. creating archival & managed copies, verifying checksums, etc.). Beyond our active acquisition program, we also proactively lend our collection to museums throughout the United States, both as individual loans and as packaged exhibitions. Many of our borrowers do not have their own time-based media collections nor their own TBM conservator to oversee the exhibition planning, installation and maintenance while on loan.

This presentation outlines the decision-making process and preventative conservation progress we've made at the Foundation for our fast-growing TBM collection as well as our experience implementing internal standards while collaborating with our network of dealers, artists, artist studios, and freelance art handlers, technicians, and conservators. Over the last four years, we've overhauled our documentation policies and procedures, staffing, databases, servers, and physical spaces for inspection. From top to bottom, we've completely reimaged our pre-acquisition, acquisition, post-acquisition, loan, exhibition, storage and shipping procedures to better document, preserve, and care for these artworks.

From processing acquisitions in a timely manner to translating our learned best practices for institutions that don't "speak" TBM, this presentation also expands on our internal learning curve and outlines not only the policies we've implemented, but also those we've discarded or have had to rethink as our planned procedures didn't meet real-world needs.

Divergent Conservation: Cultural Sector Opportunities and Challenges Relating to the Development of Time-Based Art Conservation in Australasia / Asti Sherring – Senior time-based art conservator¹

¹University of Canberra, Bruce, ACT, Australia

This paper explores the current state of awareness and understanding of time-based art (TBA) in the Australasian cultural heritage sector using data gathered from a survey of 140 participants from across a range of professions, including conservation, registration, curatorial, library and archives management, installation and exhibition management, digital preservation and audience programming. The findings indicate the viewpoints of professionals who work in the cultural heritage sector on the development of TBA as a distinct specialisation within conservation, and advance discussions of cultural, institutional and structural barriers embedded in working cultures, practices and attitudes. This paper posits that the very nature of TBA requires a reassessment of traditional institutional roles and workflows, new types of technical knowledge and the development of a supportive network of practice.

Sine Waves, Sounds and Sensations / Agathe Jarczyk – Time-Based Media Conservator^{1,2}, Sophie Bunz – Time-Based Media Conservator¹

¹Studio for Video Conservation, Bern, Switzerland ²Solomin R. Guggenheim Museum, New York, NY, USA

This talk offers insights into two different audio installations: A sound piece which cannot be heard but seen and a sound installation that should be explored from different angles. Both installations challenge conservators as they do not reveal at first sight how their technical features interact to produce very specific results. The talk will shed light upon how the technical constitution of such works can be adequately documented in order to later procure replacement devices with the correct technical characteristics. Aural and visual experience will be juxtaposed to the technical features according to the equipment's specifications.

What kind of documentation methods do conservators have at hand to establish criteria for replacement equipment and how can these criteria be conveyed to the artist and other stakeholders?

Specialty Sessions: Electronic Media | Objects

The Installation and Long-Term Preservation of Alex Da Corte's *Rubber Pencil Devil* at the Dallas Museum of Art / Elena Torok – Assistant Objects Conservator¹, Lance Lander – Manager of Gallery Technology and Innovation¹, Katie Province – Assistant Registrar for Collections and Exhibitions¹

¹*Dallas Museum of Art, Dallas, TX, USA*

In February 2020, the Dallas Museum of Art (DMA) installed Alex Da Corte's *Rubber Pencil Devil* (2018), a large-scale three-dimensional work that consists of a painted aluminum house (16 ft x 16 ft x 22 ft), over 200 fragile neon bulbs, a multi-paneled glass floor, a vinyl-covered subfloor, a wall of 15 monitors, and a nearly three-hour-long high-res digital video. As the video plays inside the house, the visitor is able to step inside, or also view from the outside while walking around the house's perimeter. In this work, Da Corte uses a range of materials and pop culture references to explore the ideas of the home and the screen.

The installation of *Rubber Pencil Devil* at the DMA lasted five weeks, and required nearly a year of planning, a large-dedicated team, multiple external contractors, and thorough involvement of the artist and his studio. The work was a centerpiece in the DMA's *For a Dreamer of Houses* exhibition, which borrowed its title from a passage in French philosopher Gaston Bachelard's *The Poetics of Space* (1958) and focused on houses, the home, and how the spaces we live in shape the ways we interact with the larger world. The exhibition opened to the public in mid-March 2020 and had to promptly close just a few days later (along with the rest of the Museum) because of the Covid-19 pandemic. By the time the DMA reopened to the public in August 2020, the concept of home had taken on new significance, which allowed for unanticipated new meaning and interpretation of the exhibition and its included works.

This presentation will discuss how the DMA prepared for the installation of *Rubber Pencil Devil*, highlighting particular challenges associated with installing such a large and complex work at a museum that has a relatively small staff and limited space options for works of this size. It will also examine how the Museum's Time-Based Media Art Working Group used critical input from the artist and his studio to plan for the work's long-term storage, care, and preservation. Finally, it will consider the work's deinstall, scheduled for July 2021, and how multiple new pandemic-related variables and procedures have shaped and altered planning.

Why Ask A 60-Year-Old to Run a Daily Marathon? The Conundrum of Documenting and Displaying Kinetic Art by Jean Tinguely / Jane Gillies – Senior Conservator of Objects and Sculpture¹, Per Knutås – Head of Conservation¹, James Craven – Conservation Imaging Specialist¹

¹*Museum of Fine Arts, Houston, TX, USA*

This paper presents the results of that research and will discuss the decision-making processes involved in determining the display, and the re-treatment that was carried out for two sculptures. *Fourrures*, from 1962 and *Radio Drawing*, WNYR No.16 from 1963.

The Museum of Fine Arts, Houston opened a 237,000-square-foot-building for 20th- and 21st-century art in November 2020. The inaugural installation includes a gallery almost exclusively dedicated to kinetic sculptures by the Swiss artist, Jean Tinguely. Preparation for the long-term display of 10 of his sculptures ranging from 1958–1964 included research into archival records from photographic images to written documentation. Previous work had been undertaken by many people including non-conservators, who frequently brought their own ideas into play. Efforts to unravel all the changes that had been made since the sculptures' creation complicated the decision-making process.

The curatorial expectations of presenting the sculptures activated as intended did not always align with the material limitations. Explorations into compromises that would honor both, led to recordings of the movements as a part of the condition assessment. *Fourrures* was substantially altered over time, primarily owing to the deterioration and damage of the fur components. Significant damage to the fur was discovered when a small blurry Polaroid and letters to the artist emerged, indicated that the largest fur had been torn in half. Other changes were made by both a local artist and Tinguely's assistant. To the extent possible, we brought back the sculpture closer to its "original state", from comparison with images taken in both the artist's studio and in a 1965 exhibition at the MFAH.

Radio Drawing, a kinetic sculpture with an analog AM radio transmission continuously moving along the radio spectrum, had also been altered, and there are no recordings of the original sound. This sculpture didn't pose material limitations, but the intended soundscape was unknown. Explorations into "live" transmission, or recorded sound led to discussions about display options, technology upgrades, curatorial expectations and sound aesthetics. The question arose as to how to produce a facsimile of the original sound using samples of sounds synchronized with the original movement and, at the same time respect the artist intent. Other complexities included potential non-operational components added by the artist, such as a light socket and a speaker.

Modern technology coupled with these analogue kinetic sculptures will allow us to honor the intent of the artist, by displaying the sculptures activated at a pre-determined set schedule. Since the sculptures both command a visual and audible confrontational space, some of the sculptures will be set on a schedule while others, too fragile to operate without supervision of a conservator, can be seen and heard activated on a display adjacent to the sculptures. This will prolong the useable lifetime of the artworks as well as respecting the authentic presentation of these sculptures.

Objects

See also Joint Sessions: Objects + SPNHC

Page 105

Horse on Parade: Conservation of a 17th Century Bamen Mask / Jane Gillies – Senior Conservator of Objects and Sculpture¹

¹*Museum of Fine Arts, Houston, TX, USA*

A rare 17th century horse mask from Japan, known as a "Bamen" mask, made during the Momoyama period, was purchased by the Museum of Fine Arts, Houston in 2018. The mask was used as ceremonial horse armor in military parades. The mask was worn on the animal's forehead above the eyes. The eyes of the horse would in fact be on the sides of the mask and the painted dragon's eyes on the mask were just decorative. These masks first appeared during the 17th century, but this Bamen is one of the earliest known. The iconography can be immediately associated with depictions of dragons common during that period. The profusion of gold is typical of the taste of the Momoyama period and the absence of large lacquered parts and decorative features gives to this Bamen a strength that cannot be seen on later examples. The lacquer surface was formed into concave cells to imitate dragon scales and wrinkled skin over the leather sections.

The mask was constructed from a variety of interesting materials with a core of papier-mâché and boiled leather, which was then covered with lacquer. The use of a mixture of paper and leather as a base for lacquer was called "harikake" and was common for other items as well, as it was at the same time light and hard. The paper used in this case and many others was painted with calligraphy and was re-cycled from students' writing practice. The gold was generally applied in powder form in a technique called "takanuri", which was also often used on armor of this period.

On arrival, the condition and appearance of the mask was found to be very poor, with extensive insect damage to the core, distortion and hardening of the leather, an inflexible lacquer surface which was now falling apart and a hard crust of tarry soot mixed with coarse particulates. Insects had eaten out the core leaving little support for the lacquer surface and the edges of the mask had largely collapsed. Previous attempts at repair had resulted in the incorrect positioning of the ears and a large unsightly fill of hard material in the middle of one eye.

This conservation treatment completely transformed the appearance of the broken-down mask. The removal of the sooty crust, consolidation and compensation of the lost core, re-formation of the distortions to the leather and removal of old repairs with minimal fill and inpainting, were some of the contributing aspects of the treatment. Notable in the treatment was the use of Japanese tissue to replace the core, which was sympathetic and reversible. Applications of water-based Agar gel were used to soften the otherwise impenetrable crust, which was user-friendly and sustainable, without the use of toxic solvents. The X-radiography performed revealed a fascinating structure of hidden iron nails, brass gromets and the puzzling and unexpected image of a series of smoke rings inside one horn.

Specialty Sessions: Objects

Tlingit Strong Suits: The Collaborative Treatment and Mounting of Tlingit Armor at the American Museum of Natural History

/ Amanda Chau – Assistant Conservator¹, Amy Tjong – Associate Conservator¹, Judith Levinson – Director of Conservation¹, Samantha Alderson – Conservator¹, Gabrielle Tieu – Associate Conservator¹, Tommy Joseph – Wood Carver and Artist^{2,3}, Jeanne Brako – Conservator/ Curator⁴, Jack Townes – Preparator⁴

¹American Museum of Natural History, New York, NY, USA ²Southeast Alaska Indian Cultural Center, Sitka, AK, USA ³Artist, Sitka, AK, USA ⁴Museum Consultants of Santa Fe, NM, USA

In 2017, the American Museum of Natural History (AMNH) began a multi-year renovation project to refurbish and re-curate its historic Northwest Coast Hall. Among the many critical components of the project are documentation and conservation of all objects in the display, reinterpretation of the exhibit, and engagement with Indigenous partners to guide themes and object choices presented in the Hall.

Among the nearly 1000 objects comprising the new display, is a collection of Tlingit armor and numerous types of weapons dating from the 19th century. During an onsite visit and several online meetings, Tlingit artist and armor expert, Tommy Joseph, shared his extensive knowledge gained from examining Tlingit armor and weapons in collections around the world, aiding conservators in understanding the significance, use, and manufacture of this type of cultural material.

The three Tlingit ‘suits of armor’ ultimately chosen for the display in the Northwest Coast Hall are a moosehide shirt covered with Chinese coins arranged in a chevron pattern; a complex tunic style garment constructed of hide, wooden elements, and sinew, called slat armor; and a sleeveless painted hide garment made to be worn underneath slat armor.

Both the coin armor and the slat armor had long been exhibited in the historic Hall. Investigation and consultation revealed incorrect positioning of the coin armor on its mount and misalignment of the slat armor elements during prior restoration. Tommy Joseph’s involvement and guidance helped to rectify these problematic issues. Further, his participation in discussions of treatment goals and review of the broader collection enriched understanding of the relationship of these armor elements with the other components of the warrior’s protective clothing. This was essential for proper construction of the mannequins to provide a respectful and accurate representation of a seldom-seen category of Northwest Coast material. Background information, conservation treatment and mannequin construction will be expanded upon in the presentation, in addition to a further description of the collaborative process.

Picking up the Pieces: Stabilization and Repair of a Mask from Papua New Guinea

/ Megan Salas – Objects Conservator¹

¹Denver Museum of Nature & Science, Denver, CO, USA

This paper presents a treatment carried out at the Denver Museum of Nature & Science as part of the author’s third-year graduate internship. The object is a mask carved from wood and decorated with applied clay-like material, shells, paint, feathers, and plant fiber. The mask is a key component of DMNS’s South Pacific diorama, which includes items from DMNS’s Anthropology collection, as well as natural specimens. The mask came into the conservation lab after a large portion of the applied clay-like material (in which shells and feathers are embedded) fell off the mask and broke into several pieces while on display. In addition to the eleven fragile fragments of clay-like material that were detached from the mask, there were other condition issues like detached feathers and shells, as well as flaking paint and mold. The largest detached fragment preserved the forehead and had a long, highly mobile crack running down its center. The first step of treatment was to figure out how to safely move this fragment from its location in a storage cabinet to the workbench and then how to support it during treatment. After testing, adhesive applied to a flexible carrier material was used to stabilize the fragment so it could be transferred to a custom-made mount and then transported to the workbench. Treatment proceeded with stabilization of the detached and partially detached elements. This involved careful study of previous photo documentation, as well as the impressions in the clay left by feathers and shells to determine which pieces went where. After all pieces were reintegrated, outstanding losses were filled. Before going back on display, adjustments were made to the display mount to reduce the risk of future detachments of applied materials.

Stained Glass: The impact of Florida’s Tropical Environment on These Pieces Indoors and the Transformative Effect of Treatment

/ Julie Flynn – Assistant Conservator¹, Yenny Cabrera Valdes – Senior Conservation Technician/ Assistant Conservator¹

¹RLA Conservation, Miami, FL, USA

Florida’s sub-tropical environment frequently presents challenges to the care of historical built heritage and works of art. Even when placed indoors, the continental United States’ southernmost state’s high heat, humidity and coastal saline conditions subject most art materials to stresses, even when placed indoors. Stained glass windows, which are an amalgam of materials that are often used as architectural elements, can be particularly sensitive to these conditions. In 2018 and 2019, two Florida historic institutions—the Deering Estate in Miami, and the Lightner Museum in St. Augustine—found themselves facing situations where historic stained glass collections exhibited condition issues that were either caused or exacerbated by climate issues. In both cases, the works had been obtained from other sources and exhibited as interior artworks.

The Charles Deering Estate’s windows, from pre-17th century Spain, were described in the estate’s 1924 inventory. They had been in storage for years prior to conservation, and lead corrosion and a weathering crust on the glass surface were thought to have been caused or exacerbated by near 90% humidity at the coastal site. Similarly, the Lightner Museum of St. Augustine Florida owns fourteen (14) stained glass windows, dating from the 19th century in Chicago, exhibited bulging, broken solders, and cracked glass that were partially caused by water and humidity damage partially from Hurricane Irma’s damage to the museum building in 2017. As some of these windows were displayed on exterior interior walls.

The conservation campaigns for these two sets of stained glass collections occurred in two widely different regions of the state, however the root cause of damage could be linked in both cases to environmental issues that are distinctly Floridian in nature. This paper will demonstrate how treatment, storage, and installation choices were made, the dramatic transformation in the windows’ appearance, and the ensuing stability, of the wood, glass, and metal elements that resulted from treatment.

The Conservation of the San Xavier Mission Bells

/ Nancy Odegaard – Conservator, Head of Preservation Division¹, Ron Harvey – Conservator², Simon Belcher – Conservation Intern¹, Gina Watkinson – Conservator and Lab Manager¹, Susie Moreno – Conservation Assistant¹, Timothy Lewis – Conservator³, Luke Addington – Conservator⁴

¹Arizona State Museum, University of Arizona, Tucson, AZ, USA

²Tuckerbrook Conservation LLC, Lincolnville, ME, USA ³Tohono Restoration, Tucson, AZ, USA ⁴Arizona State Museum, University of Arizona, Tucson, AZ, USA

This presentation addresses the condition and conservation treatment of the bells at Mission San Xavier which continue to be used by members of the Tohono O’odham tribal community. In general, we found that mission bells have often been overlooked within the scheme of historic preservation. Use of the bells at Mission San Xavier, founded in 1783, have created patterns of wear, damage, and metal surface alterations have impacted their tolling sounds. Hanging methods and repairs have also affected condition. With funding from the NEH, the project developed conservation treatments and maintenance protocols that would be compatible with bell function.

Mission bells were of critical importance throughout Spanish colonial churches. Historians have noted that tolling of bells regulated the entire day; calling the faithful to prayer, work and sleep. Franciscan authority over mission communities in the borderlands of America and Mexico has been referred to as ‘living under the bell’. Today, Mission San Xavier has three bell ringers, all members of the Tohono O’odham Nation, use rope pulls to regulate the clappers and the tolling of the bells calls the faithful of the village to religious holy days and feast days. The different tolling patterns also convey information about the age and sex of the departed for funerals.

In this project, conservation and maintenance procedures had to be compatible with these bell functions. Detailed photo documentation, elemental analysis of

Specialty Sessions: Objects

the metals, and comparative study of the hanging mechanisms was necessary. Many Mission bells have genealogies or life histories, having been cast in one place and moved numerous times across the course of their life span. Some began their life in European foundries. (The Kings of Spain typically provided colonial Missions with vestments, ornaments and a mission bell). Others were crafted on the Mission site by friars using printed instruction manuals. Sometimes these craftsmen would put their name and the date the bell was cast, or the name of the Mission where the bell would hang. Bells could be consecrated through baptism and naming, thus creating an individual identity.

Conservation treatment for these bells had to be inclusive with the community bell ringers and the church. One bell, that is not rung, was used to develop a protocol that involved extensive examination and documentation, analysis of the metal composition and corrosion, a study of the sound frequency before and after treatment, appropriate cleaning materials and techniques based on testing, and the application of a coating suitable for the hot and dry southern Arizona desert climate based on accelerated ageing studies. This information will assist in training conservators in the methods and theory as well as techniques for the conservation treatment of bells and the procedures for a maintenance program.

Living the Life of Riley: Treatment of a Wooden Display Horse / Alison Fleming – Conservator, Objects¹

¹Royal Alberta Museum, Edmonton, AB, Canada

Founded in 1901, Riley and McCormick Saddlery sold horse tack and western wear in downtown Calgary, Alberta until their brick and mortar store closed in 2016. The shop's nearly-life sized wooden horse, nicknamed "Riley", stood on the busy pedestrian avenue outside and was considered a city landmark. However, both the weather and the attentions of passersby took a toll on the horse. It also underwent several amateur restorations after having been vandalized and was repainted a number of times. When the business shut down, local media noted the loss of "the weary wooden horse out front".

When the Royal Alberta Museum acquired the horse in 2017, it was in poor condition. It tilted precariously to one side due to a broken ankle and a damaged rolling platform beneath it. Other issues included a large uneven fill around the neck where the head had been reattached after a decapitation, numerous smaller fills crudely covered with iridescent spray paint, and a mane and tail that had been reduced to wispy clumps due to repeated petting. Still, underneath the damage and glaring band-aid repairs was a relatively intact, dignified-looking animal made by a skilled and observant craftsman.

The museum, which was in the process of moving to a new location, decided to put the horse on display when it re-opened in 2018. Prior to devising a treatment proposal, there were a number of questions to consider. How intensive should the treatment be? Was there a specific period from the 115-year-old "life" of Riley that should be represented? What were the aesthetic goals? Once those points had been determined, more questions arose concerning the physical object itself. How structurally stable were the existing repairs? How could the solid wooden horse be lifted off its platform to repair the ankle? What materials would make the treatment as reversible as possible?

Given the range of possible options, it could be argued that the treatment was relatively conservative: no paint layers were removed, and the neck repair was not completely redone. That being said, given the poor condition of the carving and the treatment goal of having it look presentable for display, it could be also be argued that the treatment was quite extensive: the neck fill was pared down and inpainted, and losses on the rest of the horse were filled and inpainted using reversible media. A replica mane and tail were made using horsehair, a process that involved some basic taxidermy.

This presentation will discuss how we approached the treatment of an object that, because it was considered an advertising feature rather than a rare example of historic folk art, had been kept in decidedly un-museum-like conditions, and was altered considerably, although not fundamentally, over the course of its long working life.

Natural History 101: Considerations for Conservators / Bethany Palumbo – Head Conservator¹

¹Palumbo Conservation Services, Eastleigh, United Kingdom

Objects of natural origin, including plant and animal material, can suffer the same types of damage as man-made materials such as fading and embrittlement. However, natural history collections and materials have additional considerations that must be taken into account when assessing a potential conservation intervention. This presentation will discuss four key areas in detail:

Health and Safety

Poisons such as arsenic and mercuric chloride have been used widely historically to aid the preservation of taxidermy, while formaldehyde is still used in many fluid-preserved collections. While very effective for preservation, these chemicals present significant health risks to anyone who handles collections in which they are present.

Legal Protections

Many species are protected by local, national, and international laws, such as the Convention on International Trade in Endangered Species (CITES). These laws control not only the ownership of protected species but also how they can be used commercially such as in exhibitions and for loans. These laws may also potentially influence treatment and display decisions. While the restoration of protected species is allowed under 'permissible maintenance' it must be carried out within CITES guidelines. For example, you could not use real ivory in the restoration of ivory piano keys. A synthetic substitute must be used instead. Security is also paramount for CITES listed species when on display, with many achieving high value on the black market.

Scientific Value

Though they may improve the appearance or stability of a specimen, invasive treatments such as recolouring and consolidation may also reduce the potential use of the specimen in scientific research. Physical or chemical alterations can damage or permanently destroy scientific information like pigmentation, DNA, and parasites.

Historical Value

With the recent resurgence of taxidermy as a cultural trend, pieces prepared from esteemed taxidermists such as Rowland Ward are now selling for thousands of dollars. Having an understanding of this potential increased financial value is crucial when considering potential treatment and collection decisions.

Armed with knowledge of these additional considerations, conservators who occasionally encounter these materials will be able to make safe and ethical decisions regarding treatments, storage or display.

Materials and Meaning in the Study of a Kongo Nkisi

Nkondi: The Power of Collaboration / Kate Gabrielli – Engen Fellow¹

¹National Air and Space Museum, Smithsonian Institution, Chantilly, VA, USA

Over the course of a three-year, Mellon-funded Conservation Initiative in African Art at the Virginia Museum of Fine Arts (2016–2019), an extensive collection of objects from across the African continent was documented, studied, and treated in collaboration with allied professionals across the world, including other conservators, art historians, and scientists. A key objective was developing models of collaboration to employ in the care, exhibition, handling, and documentation of these objects.

One corpus of objects selected from among the larger collection was a trans-cultural group of power figures, including a bocio figure (Adja culture), a Community Nkishi (Songye culture), and a Nkisi nkondi (Kongo culture). The Kongo Nkisi was chosen for further investigation and materials analysis.

A compelling and iconic form of African art for the Western audience, *minkisi* (sing. *nkisi*) represented a spiritual force and a combination of ingredients through which that spirit was invoked. An empty and newly-carved statuette remained inert until it was empowered by an *nganga*, or ritual specialist, using incantations and ceremonies, thereby transforming the physical material into a spiritually active entity.

The VMFA Nkisi is materially complex and required investigation using scientific and imaging techniques, as well as collaboration with outside scientists to identify or classify the remaining power materials.

Collaboration with natural history collections, including the Afrika Museum in Tervuren and the Smithsonian Institution, was instrumental in identifying many

Specialty Sessions: Objects

of these materials, including plant, animal, and mineral components. Using these collections, the identification of octahedral magnetite crystals and Congo Gray Parrot feathers within the head-pack was essential to both conservation and curatorial research and helped to lend more subtlety to our understanding of this complex and compelling object.

Although this project attempted to identify as many material ingredients as possible, we can never presume to know the whole meaning and intent of these materials to the maker. While describing the ingredients chosen can be critical to our interpretations, we learned that we must check our drive to classify and catalogue, especially where this mirrors colonial practices of pillaging, displaying, and claiming ownership of native property and knowledge. In the case of this study, reflection on our professional practices helped to present a more sensitive and nuanced interpretation of this powerful object as well as to inspire a wider, more inclusive dialogue.

In the Market for Repairs: Early 20th Century African Objects at the Fowler Museum / Marci Burton – Andrew W. Mellon Conservation Fellow¹, Carlee Forbes – Andrew W. Mellon Curatorial Fellow¹, Erica Jones – Associate Curator of African Arts¹, Christian de Brer – Head of Conservation¹

¹*Fowler Museum at UCLA, Los Angeles, CA, USA*

In 2019, The Fowler Museum at the University of California, Los Angeles (UCLA) began a three-year research project on a subsection of the Museum's African arts collection, a gift received in 1965 from the Sir Henry Wellcome Trust. The collection consists of a wide range of over 6,000 African objects collected in the early twentieth century. Accompanying this gift was a set of cards related to the objects that contain varying degrees of information on their context of use, technology, and provenance. After conducting a collections survey, the conservation and curatorial team selected 800 objects for further study.

Investigation into the material composition of the objects led to discoveries of modifications made locally by African source communities and through the life cycle of these works as they traveled to and through the European art market. Original repairs, or repairs made in Africa, are found on a variety of objects, including carved masks and wooden sculptures. The repairs incorporate a mixture of organic, naturally sourced materials, and metal alloy fixtures. Different campaigns of European repairs and alterations are also observed and include proprietary adhesives, small and uniform metal alloy nails, and numerous instances of inpainting. Many repairs, overall, are structural and in place for preservation purposes. However, a number of original and European modifications were made to alter the object aesthetics and ready them for the commercial art market.

To better distinguish the materials and timeline of repairs and potential transformations of individual objects through material intervention, this project emphasizes a simultaneous, collaborative study between curatorial and conservation practices. Archival research, non- and minimally-invasive material analysis, and conservation treatment assessments are employed to identify African and European repair methods, including those made by auction houses and the Wellcome collection staff. Results from the study help to establish the context and provenance of the objects and offer an assessment of trends and changing attitudes of the aesthetics, repair practices and care of African objects as they moved from local to European markets.

Technical Study of an Egyptian Cast Plaster Mummy Mask in the Collection of the Harvard Art Museums / Haddon Dine – Objects Conservation Fellow¹, Julie Wertz – Beal Family Postgraduate Fellow in Conservation Science¹, Katherine Eremin – Patricia Cornwell Senior Conservation Scientist¹, Angela Chang – Assistant Director, Conservator of Objects and Sculpture and Head of Objects Lab¹

¹*Straus Center for Conservation and Technical Studies, Harvard Art Museums, Cambridge, MA, USA*

An in-depth technical examination of a Mummy Mask of a Man (1965.551) in the collection of the Harvard Art Museums is underway to learn more about its manufacture and original appearance, adding to the limited body of technical

knowledge of such objects. The three-dimensional plaster head was made in Egypt during the period of the Roman empire, and it has significant remnants of paint, as well as translucent glass over the eyes. This head is a fragment of a larger object that would have extended farther, likely including hands crossed over the chest, and it would have been placed over a mummy. Like the well-known Fayum panel paintings, the mask is a portrait of the deceased that combines Roman and Egyptian funerary practices. These masks were made during the same period as the panel paintings, although mummy masks have a much longer history in Egypt and also continued being made for longer. The Harvard mask belongs to a category of plaster mummy masks with raised heads modeled in the round, with panels extending from the neck. At least part of the head, including the face, was cast in a mold, with details such as the hair, beard, eyes, and ears added. The construction methods used for the head and assembly of the components, including insertion of the eyes, are being investigated. The study includes visual examination, multiband imaging, X-radiography, X-ray fluorescence spectroscopy (XRF), scanning electron microscopy-energy dispersive spectroscopy (SEM-EDS), Fourier transform infrared spectroscopy (FTIR), and Raman spectroscopy to characterize construction methods, pigments, binders, and other possible materials. Micro-computed tomography (micro-CT) has been conducted to examine the texture inside the closed head to provide more information about the construction. To date, the study has succeeded in identifying remnants of decoration, including a scene on the back of the neck, details about how the head was assembled, the plaster, and the paint stratigraphy and pigments, including huntite, madder, and iron-based pigments. Continuing work aims to investigate paint binders and more about the construction, as well as to explore ways of confirming or rejecting connections to masks from the same mold using photogrammetry. The paper will also question how we consider this object in an art museum setting: this mask is intimately connected with the body of a deceased person, from which the mask is now dissociated, and the mask had a necessary purpose in the belief system of the deceased. The findings of the study offer more information about workshop practices, and the work will be included in an upcoming exhibition on Egyptian mummy portraits at the Harvard Art Museums.

A Specific Object's Journey from Green Gallery to the National Mall; A Comparison of Two Donald Judd Works / Elena Bowen – Graduate Conservation Fellow¹, LaStarsha McGarity – Andrew W. Mellon Fellow in Objects Conservation²

¹*RLA Conservation, Miami, FL, USA* ²*National Gallery of Art, Washington DC, USA*

In the winter of 1963 Donald Judd introduced the world to his specific objects in his first solo show at Green Gallery in New York City. Two of the works displayed in this show have since made their way into the collections of the Hirshhorn Museum and the National Gallery of Art. Between 1963 and the present day, there is a significant lack of information about their histories. The objects were added to private collections after the Green Gallery exhibition and from there any treatments, exhibitions, and modifications are a mystery.

Over the course of five months, the Hirshhorn's 1963 Untitled was researched, analyzed, and treated in preparation for a Spring 2020 loan to MoMA for a Donald Judd retrospective. The overall goals of this project were to: (1) Create a clear timeline of the object's history including treatment, exhibitions, and additions; (2) Conduct materials research and analysis of the objects to better understand the artist's practice; (3) Bring the object's surface appearance closer to the artist's original intent; and (4) Stabilize recurring condition issues. Shortly after starting the project the Hirshhorn and National Gallery of Art conservators realized we were working simultaneously on contemporaneous Judd pieces and began a collaboration. While all research, analysis, and treatment of the Hirshhorn's Judd had to be complete by the end of January, most of the analysis of the National Gallery of Art's Judd has been delayed due to COVID-19 closure and restrictions.

At the Hirshhorn, the object's historical timeline was established by conducting internal research utilizing the object files, database, and museum library. Exhibition catalogues and memos helped to nail down specific loan dates as well as the relative time-frame of some additions to the piece. Research into Judd's working practices and materials choices was done by interviewing conservation colleagues in New York City, arranging a visit to the Judd Foundation in Marfa, TX, and scientific analysis. Non-invasive techniques included portable x-ray fluorescence (pXRF) and fiber optic reflectance spectroscopy (FORS), while invasive analytical techniques included Fourier transform infrared (FTIR) spectroscopy and

Specialty Sessions: Paintings

scanning electron microscopy with energy dispersive spectroscopy (SEM-EDS). This materials analysis, as well as comparison with other Green Gallery works at the National Gallery of Art and Judd Foundation informed the final treatment decisions for the Hirshhorn piece. Not only were recurring condition issues addressed, but paint layers and wheels added later in the object's history were reduced and removed, respectively. Comparison of the National Gallery's piece to other examples at the Judd Foundation guided aesthetic choices in treatment but raised more questions about differences in fabrication, labeling, and materials. Examination of these specific objects allows us to envision a timeline of Judd's construction process and the evolution of his aesthetic choices as well as identify condition issues that arise from Judd's media choices.

Paintings

Reframing Black Art: William H. Johnson's *Fighters for Freedom Series* / Keara Teeter – Lunder Conservation Fellow¹, Amanda Kasman – Graduate Fellow²

¹Smithsonian American Art Museum, Washington DC, USA ²Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA

Art has long been a powerful tool in the fight for civil rights. This is particularly true in art made by black artists. It is evident in prints reproduced in William Still's book *The Underground Railroad* (1886) to the photojournalism of Gordon Parks (1940s–1970s). Depictions of African Americans by African Americans have documented, commemorated, and encouraged positive social change. William H. Johnson's paintings in the *Fighters for Freedom* series reference images by Still, Parks, and other photographs from popular media as a method of “re-depicting” important historical scenes and illustrating them through a new artistic medium. Inspired by luminaries such as Frederick Douglass, Harriet Tubman, Booker T. Washington, and Mary McLeod Bethune, Johnson painted scrapbook-themed compositions of these leaders and the historic events that connected them.

Between 2018–2020, twenty-nine *Fighters for Freedom* paintings were surveyed and conserved at the Smithsonian American Art Museum in preparation for exhibition. The authors aim to share the conservation and inspiration of these artworks from two perspectives: physical and metaphorical. Interventive treatments include addressing structural problems in the solid supports (paperboard, Upson Board, Masonite, plywood), stabilizing underbound paint, remediating mold growth, and retrofitting old frames or fabricating new ones. New interpretations of Johnson's imagery informed by visual analysis research indicate that the artist was well-versed in portions of African American history that were being intellectually suppressed. Of additional merit is that Johnson's series emphasized the labor of African American women and the role of education in racial uplift.

In context with the Black Lives Matter movement, Johnson's gripping biography and artwork carry strong temporal relevance and deserve a closer look. Critical moments in Johnson's life will be investigated, such as when his racial identity helped and conversely hurt his career. Johnson's vision will be shared through SAAM's upcoming *Fighters for Freedom* traveling exhibition, providing a new perspective on a series of work that has not been collectively shown since its debut in the 1940's. Through the preservation of these artworks, William H. Johnson's concept of freedom can continue to transform future generations and elicit meaningful dialogue.

“If I Could Say It In Words, There Would Be No Reason To Paint” – E. Hopper / Gwen Manthey – Paintings Conservator¹

¹Smithsonian American Art Museum, Washington DC, USA

Edward Hopper remains one of the most prolific and recognizable 20th-century American artists. A printmaker, illustrator, draftsmen, and painter, Hopper would also complete more than 350 paintings.

Three Hopper paintings, *People in the Sun* (1960), *Cape Cod Morning* (1950), and *Ryder's House* (1933), all in the collection of the Smithsonian American Art Museum, were all treated in the last two years for multiple loan requests. Hopper kept records of his paintings and materials in detailed ledgers, now in the Whitney Archives. The 27-year gap between *Ryder's House* and *People in the Sun* reveal an evolution in Hopper's manipulation of his materials, despite self-limiting in actual material choice.

Acquired by SAAM in 1969, *People in the Sun* has stood as an icon for American Realism in the post-war era. It has been on nearly continuous display since its acquisition. In preparation for inclusion in the 2019–2020 exhibition *Edward Hopper and the Hotel at the Virginia Museum of Fine Art*, the painting was slated for its first significant treatment, which would involve removal of Hopper's original varnish.

Curiously, despite a plethora of exhibition catalogs, scholarly articles, and other publications relating to Hopper's training, response to his artistic instructors, and impact on post-modern realism, there is little in the way of technical writing on the artworks themselves. Built from primary research materials (Smithsonian Archives of American Art, Whitney Museum of American Art Archives), and interviews with Hopper scholars and conservators, this paper hopes to share technical advice for those who are and will be entrusted with the care of his paintings.

Training the Next Generation: A Conserving Canvas Collaboration Between The Ringling and ArtCare Conservation / Megan Salazar-Walsh – Associate

Conservator¹, Barbara A. Ramsay – Chief Conservator², Rustin Levenson – Founder³, Oliver Watkiss – Senior Conservator³

¹North Carolina Museum of Art, Raleigh, NC, USA ²The John and Mable Museum of Art, Sarasota, FL, USA ³ArtCare Conservation, Miami, FL

In the summer of 2019, The John & Mable Ringling Museum of Art was awarded a grant from the Getty Foundation, through its Conserving Canvas initiative, intended to provide training opportunities in the structural treatment of canvas paintings for mid-career museum painting conservators. The project focused on conservation of The Ringling's painting *Emperor Justinian*, by the 19th century French artist Jean-Joseph Benjamin-Constant. The monumental work on canvas (c. 13' x 22') was in poor condition, rolled in storage, and off-view for many decades. This initiative was developed as a collaboration between The Ringling and ArtCare Conservation, with the latter's Miami studio serving as the main work site for the treatment.

The project was preceded by an examination of the painting by conservators from The Ringling and ArtCare. Upon awarding of the grant and before treatment commenced, a group of senior painting conservators gathered for an experts meeting. Together, they assessed the condition of the painting and discussed various options for treatment.

Seven early- and mid-career painting conservators from the USA, Canada, and Colombia were invited to participate as trainees in this project. Over the next six months, these conservators completed multiple training residencies. The trainees collaborated on the structural treatment of the massive *Emperor Justinian*, including hand-lining using BEVA 371b. In addition, they lined seven other paintings on canvas. This provided them with experience in a broader range of structural problems, and the opportunity to experiment with variations on traditional glue-paste lining. The project culminated in an intensive one-day training workshop in which four additional participants—including an eighth trainee and faculty from three graduate conservation programs—joined the project team.

The trainees had staggered residency schedules throughout the project, so an online platform was used to facilitate communication among the team members. Project participants collaborated in a Slack workspace where they could document details of treatment activities and share their experiences. It quickly became the virtual hub of our small community, allowing those who were not physically present to experience every step of the ongoing treatments. This approach helped us build a welcoming and inclusive learning environment.

This presentation will focus on the development of this project as a model of successful collaboration between a museum and a private conservation firm. We will explore the trainee experience, describing how the project evolved to provide expanded learning opportunities in the structural conservation of canvas paintings and the unexpected lessons learned along the way. Experimentation, collaboration, and friendship were central to the success of this project.

She Persisted: The Evolving Painting Practice of Alma Woodsey Thomas / Sydney Nikolaus – Durational Paintings Conservator¹, Gwen Manthey – Paintings Conservator², Amber Kerr – Chief of Conservation and Senior Paintings Conservator², Melissa Ho – Curator of Twentieth-Century Art²

Specialty Sessions: Paintings

¹*Yale University Art Gallery, New Haven, CT, USA* ²*Smithsonian American Art Museum, Washington, DC, USA*

A vital figure in the Washington, DC, art community for decades, Alma Thomas (1891-1978) achieved national recognition as a major abstract painter when she retired from her 38-year career as an art teacher. In 1972, she was the first African American woman to have a solo exhibition at the Whitney Museum of Art in New York.

From August through December 2019, the Smithsonian American Art Museum (SAAM) conducted a comparative technical study of Alma Thomas's colorful abstractions, painted from the early 1950s to her death in 1978. This research offers an intimate understanding of Thomas's evolving practice and her continuing ability to paint with great vitality despite the effects of advanced age and ill health. Throughout Thomas's painting career, there were numerous shifts in her materials and techniques, corresponding to the ebb and flow of her creative process. In the early 1960s, as the artist was entering her seventies, Thomas switched her paint medium from oil to acrylic emulsion to pursue a bolder, brighter style of abstract painting. Her methods continued to evolve over the following decade and a half, as she experimented with composition, pattern and hue, but also, it seems, in response to her ongoing struggle with chronic arthritis. Our analysis thus illuminates the work from two sides. How did Thomas achieve her signature visual effects, while adapting her painting process to accommodate her declining mobility and physical strength?

With the generous support of the Friends of Alma Thomas, conservators at SAAM examined more than 40 of Thomas's paintings for this technical study. In addition to SAAM's twenty-nine holdings, created between 1958 and 1976, this study has included works held by the Baltimore Museum of Art, the Hirshhorn Museum and Sculpture Garden, the National Gallery of Art, the National Museum of Women in the Arts, and The Phillips Collection. These selections complement the chronological scope represented in SAAM's collection and were included based on comparable painting materials, subject matter, and accessibility within the timeframe of the project. Technical examinations, diagnostic multispectral imaging, and X-ray fluorescence (XRF) were performed to better understand Thomas's working methods and to determine how she used her materials, prepared her canvases, planned her compositions, and applied her paint to the surface. To supplement this analysis, archival research was performed at the Archives of American Art and technical observations were shared among conservators, curators, and historians.

Forgotten Histories: The Treatment of Kumi Sugai's 'Fuyu' / Ruby Awburn - Painting Conservation Fellow¹

¹*Straus Center for Conservation and Technical Studies, Harvard Art Museums, Cambridge, MA, USA*

Fuyu (1960), by Kumi Sugai, has been severely affected by interlayer cleavage, flaking and curling paint throughout its lifespan at the Harvard Art Museums, and evidently well before the painting was acquired. Scientific analysis, including cross-section analysis, SEM-EDX, FTIR and py-GCMS demonstrated a high concentration of crystalline and non-crystalline zinc soaps, accumulating at the ground-paint interface. Analytical research informing treatment decision-making and quantitative monitoring methods were carried out in order to stabilize the artwork. Fuyu, has never been displayed at the museum or treated for its chronic condition problem until now. Archival research regarding the painting's acquisition history and exhibition trends at the Harvard Art Museums were also investigated to explore the historic neglect of the painting, both physical and art historical. This paper will discuss the holistic nature of the treatment and decision-making processes which led to the reimagining and revival of a previously forgotten painting.

Paintings Transport by Sea: A Special Case Study for Vibration Risk Analysis / William Wei - Senior conservation scientist¹, Hans Waalewijn - Senior collection manager¹

¹*Cultural Heritage Agency of the Netherlands, Amsterdam, The Netherlands*

Internationally well-known works of art on loan are transported under the strictest of conditions to reduce the risk of damage to an absolute minimum. When conducting risk analysis for such works, the "value" of the work plays a major role in determining if and how it is to be transported. Ideally, collection managers would like to provide the same level of protection to all objects under their care.

However, this is beyond the reach of many smaller museums struggling to attract more visitors, and institutions such as the Dutch National Collection (RCE) tasked with providing public access to their collections. This then requires more flexibility when considering the risks for a given loan request, and can result in interesting situations.

One such situation came up for the RCE with a request for a painting of the southwestern Dutch port of Zierikzee by the 17th century Amsterdam painter, Hendrick van Anthonissen. The request was made by the StadsHuismuseum (City Hall Museum) in Zierikzee. At the time, the painting was hanging in the admiralty building on the Dutch Naval Base in Den Helder in the northwestern corner of the country. In order to create publicity for the museum and the navy, a request was made to the RCE to allow the transport of the painting using the minehunter, Zr.Ms. Zierikzee.

After careful analysis of the risks and benefits of such a trip, permission was granted. The painting was wrapped in plastic sheet and placed in a standard wooden "flex"-transport crate with Ethafoam padding by an internationally renowned art transport firm. The crate was transported the short distance to the ship by a museum standard art truck, and was manually on- and eventually off-loaded. On board, it travelled in a chamber protected from the elements but with no climate control. The water journey lasted two days, (10 hours on open sea, 36 hours on inland waterways). The painting was accompanied during the entire journey by the authors. The trip also provided an unusual opportunity to monitor vibrations and shock during the transport of a painting by sea using a sensor affixed to the rear of the frame of the painting, and one on the top of the crate.

The painting arrived in the same excellent condition it had left Den Helder in; no damage to the painting or frame was found. This must, however, absolutely not be interpreted as a license to make such actions a routine part of museum loan policy. On the contrary, the results of vibration monitoring (also by Bäschlin, et al.) and live observation of the transport process confirm the suspicions of many museum professionals that most mechanical loads which could cause damage during transport occur during moments of loading/ unloading of an object. For objects which are considered important, couriers and/or monitoring equipment with an action plan are still indispensable. On the other hand, this case shows that some flexibility is possible in dealing with transport climate, vibrations and shock when considering all risks involved in a loan.

Titian's Rape of Europa: Conservation, Restoration and Observations on the Artist's Technique (Part II)

/ Gianfranco Pocobene - Chief Paintings and Research Conservator¹, Jessica Chloros - Objects Conservator¹, Aaron Shugar - Andrew W. Mellon Professor², Richard Newman - Head of Scientific Research³, Courtney Books - Assistant Paintings Conservator⁴, Corrine Long - Assistant Conservator⁵

¹*Isabella Stewart Gardner Museum, Boston, MA, USA* ²*Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA* ³*Museum of Fine Arts, Boston, Boston, MA, USA* ⁴*Saint Louis Art Museum, Saint Louis, MO, USA* ⁵*Gianfranco Pocobene Studio, Malden, MA, USA*

Titian's Rape of Europa, arguably the Isabella Stewart Gardner Museum's most iconic painting, underwent technical research (described in Part 1), structural work, cleaning and restoration in 2018-19. Previous to the present conservation campaign, just one documented surface cleaning is recorded in the conservation archives. Remarkably, the painting also retained a late 18th century lining stretched over a softwood strainer. In preparation for the rigors of trans-Atlantic travel, a structural treatment was performed to stabilize the canvas support. Although Titian's painterly effects are well preserved, deterioration and darkening of smalt and associated over cleaning compromised portions of the picture. The varnish layers also exhibited considerable degradation and yellowing.

Delamination of the old glue paste lining along the edges of the original canvas support and buckling of the canvas at the top left corner along with overall slackness suggested that structural intervention would be necessary. Removal of the lining and relining was given some consideration, but ultimately, it became evident that the lining was sound and that it should be preserved. The old softwood strainer, however, was severely compromised exhibiting bowing of cross-members, weak corner joints and wood worm damage. These problems precluded its

Specialty Sessions: Paintings

possible reuse so a new, modified stretcher system incorporating light weight, solid panel inserts and loose lining fabric was utilized to support the painting. The structural treatment demonstrated the desirability of extending the life of old, glue paste linings and the efficacy of solid supports for oversized paintings.

The opportunity to study the picture and its cleaning revealed fascinating aspects of Titian's late period technique; most notably his use of vibrant pigments applied in a loose yet exceptionally thin manner. Though smalt pigment was available to Titian throughout his entire career, he did not begin using it until the late 1540s. In *Rape of Europa*, smalt is present in much of the sky; both as an under-layer for ultramarine passages and as a final presentation layer. Deterioration of the smalt to a blackened color, along with aggressive cleanings down to the canvas raised questions about the degree to which cleaning would make these problems more evident. A clearer understanding of the extent and deterioration of the smalt containing passages revealed through macro-XRF, SEM analysis and careful examination of the paint surface informed the extent of retouching required to balance the remarkably well-preserved passages with areas of damage all the while respecting the picture's age.

Distinctions between colore and disegno were ardently debated in the Italian Renaissance with Titian's work exemplifying the Venetian style of painting. Characterized by the use of rich colors applied in a diffuse, painterly manner; brush strokes are often readily evident over the surface of the *Rape of Europa*. In this picture Titian strikingly employs all of these effects, but even more surprising, underdrawing along with the selective enhancement of contours with dark lines of paint play a more prominent role in the final composition than previously imagined.

Redefining Seeing- Toni LaSelle's Studio Practice and Working Methodologies / Corina Rogge – Andrew W. Mellon Research Scientist^{1,2}, Per Knutås – Head of Conservation¹

¹Museum of Fine Arts, Houston, Houston, TX, USA ²The Menil Collection, Houston, TX, USA

Dorothy Antoinette (Toni) LaSelle (1901-2002), an artist, art historian, and teacher, had an impressive career spanning six decades. A polymath undergraduate, her interest in art solidified during her senior year and she obtained a master's degree in art history from the University of Chicago with a thesis on New Guinea masks. To support herself she accepted a teaching position at Texas Woman's University in Denton, TX in 1928 where she remained for the next 44 years. Well aware of the innovations in art happening elsewhere, she sought to expose her students to the avant-garde and invited renowned thinkers and artists to lecture, who then also informed her own studio practices. She studied with László Moholy-Nagy and Hans Hoffman, and the summers spent with the latter at his School of Fine Arts in Provincetown were particularly critical in the evolution of her own abstract style. Although she renounced representative art, she was remained influenced by her environment, describing her working practice as "waiting in the presence of nature so all the energies could clear up and they could become a painting," presumably a pleasurable experience at the Provincetown beachfront. Her extensive career and success were localized to Texas, and she, as many groundbreaking female artists, has been denied a place in the art historical canon. Although her art pushed the boundaries of abstraction, she was overlooked and marginalized, and noted: "Women, are not credited with innovations."

Two paintings in the collection of The Museum of Fine Arts, Houston, *Study for Puritan* (1947), and *Puritan* (1947-1950), made during her early career offer a rare opportunity to parse the evolution of her artistic vision. The canvas painting is about twice the size of the sketch on canvas board and at first glance may seem nearly identical in composition; circles, triangles, and rectilinear forms in black, grey, and shades of green interact on a white foreground/background. However, the painting exhibits more condition issues, and macro-area XRF mapping, FTIR and Raman spectroscopy reveal significant differences in materials, with refinements and alterations on both the sketch, which is to be expected, as well as the painting. The sketch once had regions of vermillion, which LaSelle chose to over-paint with gray, and in the painting a cadmium orange not present in the sketch was added. The greens of the sketch are primarily viridian, with some phthalocyanine green while on the final painting LaSelle used viridian on only one area. The paint application on the sketch is mainly thin and smooth, but on the painting she allowed her brushstrokes and revisions to show, the thick impasto enhancing the tension of shapes and color. Despite the preparatory sketch, the painting was not quickly or easily realized and shows LaSelle wrestling to balance the 'push' and

'pull' of her abstract forms. She once insisted she was a "a painter who tried to teach," and if we know how to ask her paintings can indeed tell us about her and the struggles she faced and the innovations she achieved.

Untangling Truth, Authenticity, and Lies in Metaphysical Paintings by Giorgio de Chirico / Corina Rogge – Andrew W. Mellon Research Scientist^{1,2}, Desirae Dijkema – Assistant Paintings Conservator², Katrina Rush – Paintings Conservator³

¹Museum of Fine Arts, Houston, Houston, TX, USA ²The Menil Collection, Houston, TX, USA ³The Art Institute of Chicago, Chicago, IL, USA

"Et quid amabo nisi quod aenigma est?" (What shall I love if not the enigma?) was the question that Giorgio de Chirico (1888-1978), the Italian artist best known for his metaphysical paintings of hauntingly empty piazzas and blank-faced mannequins, inscribed on a 1911 self-portrait. He painted enigmatic compositions, and his working method has engendered complex mysteries that are still being investigated. One of the complex and thorniest issues surrounding de Chirico's paintings being his creation of the so-called 'verifalsi': Works that he intentionally made in an earlier style and deliberately backdated; the phrase derives from the Italian words vero and falso (true/authentic and fake). Distinguishing between de Chirico's accurately dated works, his backdated works, and the paintings created by the many forgers who have sought to capitalize on his fame has presented difficulties and challenges for decades.

The Menil Collection in Houston, Texas, has strong holdings by surrealist painters, including de Chirico. Stylistic inconsistencies, provenance, and anecdotal histories raised the question of whether two of the Menil's de Chirico paintings, *Melancholia* and *Hector and Andromache*, are verifalsi. Dated to 1916 and 1918 respectively, a mid-1940s creation date seemed more likely. In order to resolve this enigma, a complete technical study of the two works was undertaken, which revealed the presence of PY4, a yellow arylide monoazo pigment, which was patented in 1909 but not available until around 1928. The presence of this species confirms these works as verifalsi and establishes a terminus post quem that may be used to identify and help date other backdated works. PY4, which was readily detected by Fourier transform infrared spectroscopy of microsamples, was present in green paints that also contained cadmium yellow and Prussian blue. Unlike other arylide pigments, PY1 and PY3, PY4 is not a common pigment, although it was used for a time in Winsor Yellow paints; however, the co-detection of PY4 and cadmium sulfide suggests that it could be present as a toner added to more expensive cadmium paints. Given that PY4 is not a common pigment, analysis of more de Chirico works may help establish a date range of paintings within which PY4 is present, which could define when different verifalsi were created and so help to clarify de Chirico's confusing oeuvre. It may also be able to help discriminate authentic de Chirico works from those made by forgers. Because of their value and scarcity, many individuals (including Oscar Dominguez, Max Ernst and perhaps Remedios Varo) created copies or forgeries of de Chirico's metaphysical period paintings, and it seems unlikely that a forger would accidentally use PY4 in their works. De Chirico described painting as a "weaving together, an intermingling, a skillful superimposition of colours". By picking apart the colors he used in *Melancholia* and *Hector and Andromache* we have revealed a tell-tale thread, the presence of PY4, which may help deconvolute de Chirico's authentically dated works, his verifalsi, and the works of other forgers.

Lady in Blue: Mitigation of Blanching Through Varnish Application on A 16th Century Portrait / Rachel Childers – Postgraduate Paintings Fellow^{1,2}, Fiona Beckett – Assistant Professor of Paintings Conservation², Patrick Ravines – Director and Associate Professor of Conservation²

¹Williamstown Art Conservation Center, Williamstown, MA, USA ²Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA

Keywords: painting, Madonna, infrared, ultraviolet, imaging, radiography, Confocal Microscopy, FTIR, XRF, blanching, varnish, solvent, treatment

Portrait of a Lady is a 16th century portrait of a sitter presumed to be the Madonna figure. Like many paintings its age, it has suffered immensely in its past and

Specialty Sessions: Photographic Materials

survived numerous invasive treatment campaigns. Most notably, the harsh cleanings it endured left behind a severely blanched paint film that disfigured the painting. While blanching is common enough to encounter in paintings conservation, the painting's severe example of historical blanching presented a unique opportunity for a more in-depth study and materials testing. A full technical analysis was executed to understand the artist's technique and identify materials; however, the primary goal was to determine a suitable treatment protocol to mitigate the blanched paint layer and reintegrate the composition. The analytical techniques employed were ultraviolet and infrared imaging, x-radiography, confocal microscopy, Fourier transform infrared spectroscopy, x-ray fluorescence spectroscopy, and cross-sectional analysis. Several varnishes currently used in conservation (Paraloid B72, Laropal A-81, Regalrez 1094, dammar) were directly applied to the blanched surface and evaluated. Solvent treatments, including historically used dimethylformamide and benzyl alcohol, were also tested, though to a lesser extent. Confocal microscopy was used to quantify the surface texture of the blanching both before and after the varnish and solvent applications. Based on the results, a treatment protocol using varnishes was established, and the painting showed significant improvement to the blanched surface. While more research is required to fully understand treatment options for blanching, the painting allowed for a practical approach to testing on an historical surface due to the severity of the blanching. Additional findings during the analysis include the discovery of painted canvas inserts and indications of the original colors of the painting.

Photographic Materials

See also Joint Sessions: Book & Paper + Photographic Materials

Page 101

Disinfection of Photographic Materials with Ethanol Vapours: Preliminary Evaluation of the Effects on Chromogenic Prints / Chloé Lucas - Owner and Principal Photograph Conservator¹, Greg Hill - retired Senior Conservator of Archival and Photographic Records², Nancy E. Binnie - Senior Conservation Scientist³

¹Chloé Lucas Conservation, Ottawa, Canada ²previously Canadian Conservation Institute, Ottawa, Canada ³Canadian Conservation Institute, Ottawa, Canada

The biodeterioration of photographic collections by fungi is a recurring problem that can result in the loss of part or all of the photographic image by the hydrolysis of the paper and colloid substrate. Most photographs serve as a substrate for fungal growth because they are composed of proteinaceous and hygroscopic materials, such as gelatin, albumen and cellulose. Fungi induced damages can be minimized with a strict control of the storage environment to mitigate fungal growth; however, mould remediation treatment is still often necessary.

Lucas et al. (Restorator, vol. 38, issue 3, 2017) demonstrated that exposing photographs to the vapour of a 70:30 (v/v) mixture of absolute ethanol and demineralised water for two hours inactivates five of the most common fungal species found in photographic collections. Although the disinfection method has shown to successfully disinfect fungi on photographs, its effect on their chemical stability remains unknown. It is necessary to evaluate the effects of the vapour treatment on photographs prior to implementing this method on photographic collections.

The goal of this project is to evaluate the effects of the disinfection treatment on photographic techniques most common in collections, in particular archival collections which are often impacted by fungal development. Archival photographs are composed of a wide variety of materials. This study was limited to determining the effect of the disinfection treatment on chromogenic prints, which are very common in both fine art and archival collections and known to be particularly sensitive to solvents.

The tests were undertaken on historic chromogenic print samples from the 1940s, 1950s, 1960s, 1970s, 1980s and 2000s, on various types of primary supports, brands and provenance. The effects of the treatment on the samples were evaluated by taking colourimetric measurement before and after treatment.

The measurements showed a colour change on some of the treated samples after treatment. The importance of the colour change varies based on the sample's date of production and condition prior to treatment. Samples from the 1980s and 2000s were the most affected by the treatment, both in percentage of affected samples and in the importance of the colour change, some samples showed colour changes visible to the naked eye. Samples from earlier decades were less affected by the treatment both in the percentage of affected samples and in the importance of the colour change.

Mass-treatment of E.S. Curtis' *The North American Indian* Photogravures / Richard Stenman - Photograph Conservator¹, Sara Bone - Associate Conservator²

¹The Better Image, Milford, NJ, USA ²The Morgan Library & Museum, New York, NY, USA

Early 20th century photographer Edward S. Curtis traveled North America documenting Native Americans and their traditions. During his career Curtis took over 40,000 photographic images of 80 tribes. He also made wax cylinder recordings and made use of motion picture film. His project titled *The North American Indian*, with field-funding partially provided by J.P. Morgan, ultimately produced 20 portfolios of large format photogravures and 20 quarto text volumes with illustrations. The work was published serially between 1907 and 1930. At the time of the final volume, about 280 sets had been sold.

The Better Image was asked to conserve a complete set of 20 portfolios of the large-format photogravures, containing a total of 722 gravures executed on thin, gampi paper. Each portfolio contained a frontispiece delineating the contents and brief description of the gravures, with roughly 35 mounted and matted photogravures housed in individual paper folders. In three of the earlier portfolios, each gravure was signed by Curtis using iron gall or fountain pen ink.

The condition of the prints differed vastly between folios, and sometimes within folios. Common problems included overall discoloration, localized mottling, creases, wrinkling, tears, and planar distortions. Despite some prints being in comparatively good condition, the scope of the project was to uniformly treat every print, so that the entire set would age cohesively.

Several challenges arose that required testing and ingenuity to overcome. These included safely releasing the tissue gravures, immersing them, uniformly drying and flattening the prints, mounts and mats, stabilizing the inks of the signed photogravures before immersion treatment, choosing appropriate adhesives, and reducing static for polyester interleaving during final reassembly. Considerations were undertaken to reuse drying and processing materials to reduce waste and expenses.

Initial treatment consisted of separating the mats and prints from their mounts, and separately bathing the mats, mounts, and photogravures. Lastly, the components were reassembled and rehoused. This was a large undertaking. 722 photogravures quickly tripled with the three separated component elements to 2,166 objects to handle and treat. For the number of objects being treated, a mass production approach was needed. Each phase of treatment required a specific configuration of lab space and sets of materials that were standardized in size.

Methods for testing and assessing the choices of materials are described. A description of the methodology for processing the works, standardized procedures, drying, flattening and reassembly, are also discussed in this paper.

Scanning Micro-XRF for Historical Photography / Nigel Kelly - Senior Market Application Scientist¹, Roald Tagle - Senior Application Scientist micro-XRF², Falk Reinhardt - Application Scientist², Ullrich Waldschlaeger - Director System Engineering², Michele Gironda - Market Segment Manager - Art & Conservation³

¹Bruker Nano Analytics, Denver, CO, USA ²Bruker Nano Analytics, Berlin, Germany ³Bruker Nano Analytics, Milan, Italy

The advent of photography revolutionized the way the world around us is recorded. From historic events to the mundane day-to-day, early photographs provide remarkable insights into life of the 19th and early 20th centuries. However, many have commonly degraded with the passing of time. The extent of this degradation depends on several factors, such as the manufacturing technique, exposure of the

Specialty Sessions: Photographic Materials

photographs to the elements, and storage techniques, all leading to discoloration and blurring of the original images. Despite this change to the visible image, key components of the photographic information are not lost, including silver and/or other metal salts used to capture the original image.

One approach to cataloguing and developing strategies for preservation of historic photographs is to conduct non-destructive X-ray based analysis. For example, spatially resolved XRF analysis (micro-XRF mapping), offers not only the possibility to classify and describe the photographic techniques used but also recover the lost images using element distribution scans. However, typical configurations of scanning micro-XRF instruments limits the possible outputs of analysis. Impediments to effective analysis derive from the thin nature of the silver-bearing layer within the photograph making detection of Ag-K lines difficult and requiring the Ag-L lines to be measured. Measurement in air is problematic due to overlap between the Ag-L and Ar-L lines (Ar makes up ~1% of air), and while analysis of some elements is improved when conducted under vacuum, this is not possible for all photographic materials due to desiccation and further damage of these fragile artifacts. Further, in a standard instrument (Rh X-ray tube) element sensitivity is limited by Rh-L energies from the source being below the absorption edge of Ag and Pd.

To address these issues, a new instrument design is required that improves sensitivity to low concentrations of Ag and other key elements. Promising results have been produced from experiments conducted using W- and Cr X-ray tubes equipped with polycapillary lenses to achieve similarly small (20 µm) spot sizes. The characteristic X-rays emitted under the W and Cr sources are more effective for the excitation of Ag and Pd-L lines, and so better suited to imaging historic photographs. To improve mapping capabilities, the system is configured with two large surface area SDD detectors that increase sensitivity, and analyses will be run under a nitrogen atmosphere limiting line overlaps between Ar-L and Ag-L while not causing desiccation and other damage to the fragile photographs. This design further improves detection and mapping of low element concentrations.

Photography Beyond Two Dimensions – Exhibition and Re-Valuation of Materiality / Catarina Pereira – Researcher¹, Ilda Zabumba – Conservator²

¹*School of Arts, CITAR, Universidade Católica Portuguesa, Porto, Portugal* ²*Portuguese Center for Photography, Porto, Portugal*

When photography turned digital, it was clear that the photographic image belonged to the bidimensional world. But the photographic object is preserved in three dimensions, and what is preserved in archives does not fit in the two dimensions of a screen.

Negatives, stereographs, and albums are the focus of this research. It explores the exhibition of such objects, not as support for images, but valued for their materiality and specific significance in photography history.

Common preservation practices have included converting negatives into positives, presenting stereographs as single images, and albums' disbinding. This results in a significant devaluation of the object's materiality and, ultimately, the experience of it. These objects hold stories in themselves beyond the image. They relate to the practice of photography, the photographer, particular uses, and visual culture.

Even with light-tables, negatives are rarely exhibited, as the image with inverted values is not readily understood. But as an object, the negative is also a testimony of a practice. They often bear markings that are not represented in the print, like annotations or retouchings. And the images often show more than the print as they are uncropped. Stereographs were a part of a cultural and social experience but demanded an intimate relationship with the photographic object. The image to be fully appreciated needs to be observed with the aid of special equipment. And replicating this experience in an exhibition context is challenging. Leaving a stereoscope available is not enough.

This intimacy with photography is also present in albums. They are image catalogs, and each image has value in itself, but there is also a relation and intentionality in the arrangement and order. They were put together to tell a story. Albums have titles, annotations, and other decorations, pages, and covers that were to be experienced as a whole.

Conservation practices and exhibitions often clash. Here, it is argued a need for reevaluating the original uses of the photographic object in an exhibition environment. And how exhibitions promote the preservation of collections.

International Collaboration, and the Potential of Virtual Condition Surveys – The Conservation Assessment of a Collection of Linnaeus Tripe Photographs at the University of Yangon Central Library, Myanmar / Tess Hamilton – Graduate Student¹, Natasha Kung – Graduate Student¹, Felice Robles – Graduate Student¹

¹*The Conservation Center at the Institute of Fine Arts, New York University, New York, NY, USA*

In early 2020, librarians Ni Ni Naing and Dr. Hlaing Hlaing Gyi reached out to Bertrand Lavédrine, former director of the Centre de recherches sur la conservation des collections, to discuss how to improve the long-term preservation of a collection of photographs housed in the University of Yangon's Central Library in Yangon, Myanmar. The library found in its collection eighty salted paper prints by the colonial photographer Linnaeus Tripe on the artist's original mounts. Upon discovering this historically significant collection, the University library was advised to contact Nora Kennedy, of the Department of Photograph Conservation at The Metropolitan Museum of Art, to collaborate in devising the best means of digitizing, conserving, and housing the photographs with a generous grant from UNESCO Memory of the World Committee for the Asia-Pacific Region. A condition survey of the collection was proposed to determine the current condition issues and best recommendations to ensure the preservation of the collection.

Due to the COVID-19 pandemic restricting travel and collection access, a virtual collection survey was designed and conducted by Felice Robles, Natasha Kung, and Tess Hamilton, three photograph conservation students at the Conservation Center of the Institute of Fine Arts, New York University. In collaboration with the library, we used scans, photographs, climate data, and art historical information to assess the condition of the collection and its past and current storage environment.

This talk will explore the unique challenges and limitations of designing and completing a virtual condition survey across institutions, countries, and languages, as well as the advantages that virtual work provides by creating an ideal platform to share information, resources and expertise among many different people. Working hands-on with cultural heritage is central to our profession, but virtual collaborations of this sort give conservators a new opportunity to connect with collections and communities beyond the limited scope of our institutions, and allow us to expand our own perspectives while extending our expertise to institutions without local access to conservation resources. Collaborating with our colleagues at the University of Myanmar's Central Library on the conservation of Linnaeus Tripe's photographs allowed us to think deeply about the colonial trappings of the conservation profession, and how they can be challenged. Through methods like virtual collaboration, we can begin to move towards a more equitable, sustainable, and global approach to the preservation of cultural heritage.

The Transformation and Printing of Claude Marie Ferrier's Albumen on Glass Negatives by Robert Jefferson Bingham / Nicholas Burnett – CEO/Head Conservator¹

¹*Museum Conservation Services Ltd., Cambridge, United Kingdom*

The 1851 Great Exhibition, the first ever World's Fair, was staged in the Crystal Palace in Hyde Park in London. Prince Albert conceived the idea of producing a set of deluxe, photographically illustrated presentation copies of the Reports by the Juries (the juries awarded medals to the best exhibits). The 140 presentation copies were sent to the heads of state of countries that exhibited and to people who had played a significant part in organising the exhibition. Each set was illustrated with 154 salted paper prints, requiring more than 20,000 photographs. Never had such a large quantity of photographs been produced for a single purpose (Nicholas Henneman struggled to print 7,000 smaller images for the Art Union in 1846).

Robert Jefferson Bingham (1825-1870), author of the 4th and subsequent editions of 'Photogenic Manipulation', won the contract for printing the photographs from the glass negatives. Unfortunately for him it was at a fixed price and with a limited timescale. To carry out the work, Bingham set up a workshop in the town of Versailles near Paris in France. The glass negatives were sent to him in December 1851. In February 1853 the first completed copies of the Reports were distributed. Six months later he returned the negatives.

Bingham was familiar with manipulating paper negatives to improve the final print. However, glass negatives were a new and largely unknown quantity, particularly

Specialty Sessions: Photographic Materials

in the UK. Indeed, Ferrier and Martens were invited from France to photograph the exhibition specifically due to their expertise with glass negatives (with today's perspective it is easy to underestimate how radical the change from paper to glass was). Photography for the Reports started in the declining light of September 1851 with access from 6 to 9 am only. The calico sunshades in the building had become dirty by September resulting in long exposures and underexposed negatives. Bingham had to work out how to bring out the best from Ferrier's negatives (Martens returned to France after a short time). Bingham employed a variety of techniques, both physical and chemical, some borrowed from paper negatives, others completely new.

The paper shows what can be learned of Bingham's working methods, based on an examination of 67 surviving negatives, seven physical copies of the finished Reports along with six digital sets. The underexposed negatives often included distracting extraneous details. Bingham set out to remedy the defects and in the process transformed the negatives into complex three dimensional objects. The alterations Bingham made have left traces. A stratigraphic approach to the negatives discloses the sequence of events; the techniques Bingham tried and rejected.

Bingham was aware of what a tremendous showcase for his work the Reports would be. The stratigraphy of the negatives reveals how his earlier interventions were time consuming and done with great care whereas the later the interventions were less time consuming, presumably the result of time pressure. Eventually Bingham ran out of time as well as suitable light for printing and had to use prints he had earlier rejected.

The Treatment and Preservation of the Emily Howland Photograph Album / Jennifer Evers – Book Conservator¹, Alisha Chipman – Senior Photograph Conservator¹

¹*Library of Congress, Washington, DC, USA*

The Emily Howland photograph album was a joint purchase between the Library of Congress and the Smithsonian National Museum of African American History and Culture. The album is an ornate Civil war era carte-de-visite (CdV) album that was gifted to Howland in 1864 while she was teaching at a freedmen's camp and school in Virginia. Howland was a Quaker, educator, abolitionist, suffragist, philanthropist and a lifelong activist. Her album contains photographs of family, friends, and colleagues, as well as images of notable abolitionists, politicians, teachers, and celebrities of the era. Of particular interest is the CdV located on the final page of the album - a previously unrecorded portrait of Harriet Tubman.

This presentation will discuss the history, manufacture, and cultural significance of the album, as well as the work undertaken during its examination, documentation, research, analysis, treatment, and housing. Because the object is jointly owned, strategies for its digitization, cataloguing, exhibition and long-term preservation have been uniquely collaborative. The excitement surrounding the newly discovered portrait of Tubman resulted in the album and its treatment receiving tremendous publicity and widespread interest leading to many opportunities for discussion and outreach.

Rare Findings – Pannotypes in the Design Registers of the Board of Trade Collection at The National Archives / Ioannis Vasallos – Conservator of Photographs and Paper/ Archives¹, Lucia Pereira Pardo – Senior Conservation Scientist¹

¹*The National Archives, London, United Kingdom*

The Design Registers, part of the Board of Trade collection, is one of the most visually captivating collections at The National Archives, UK. They contain representations of almost three million British patterns, designs and trademarks from 1839 to 1991 which are registered with a reference number and contain information about the date of deposit, the name and the address of the proprietor. A wide range of different materials have been used to record the representations, including prints, photographs, drawings, sketches, and material samples such as textiles, beadwork or metalwork. The representations are adhered to the support pages of large bound volumes, which are classified according to the type of the design including textiles, glasswork, metalwork, earthenware, furniture, wallpaper and other decorative arts and manufactured objects.

A new and innovative medium in the 1840s, photography gradually found use in many applications other than portraiture and landscapes. The Design Registers are a representative example of an early practical application of photography to illustrate products' designs for copyright protection. Almost every volume has a large number of photographs, in a wide variety of techniques and formats, ranging from salted paper prints, to albumen prints, daguerreotypes, tintypes, and silver gelatine prints. The chronological sequence of the volumes reflects the evolution of the photographic medium and processes, and portray the efforts to make photography a small, thin and convenient medium to carry around and attach to albums and scrapbooks.

The pannotypes present in a few volumes of the Design Registers are a rare find. This photographic process was introduced by the firm Wülf & Co in 1853 and is made on a textile support. According to historical sources, it had a favourable reception because it was less fragile than photographs on glass (such as ambrotypes) and was manufactured with cheap materials (Kleffel, 1861, p.89). However, the process was quickly abandoned as paper-based photographs became the norm, and that medium allowed for easier image reproduction. Nowadays, the few pannotypes found in photographic collections are often in poor condition. The discovery of pannotypes in the Design Registers volumes was immediately embraced as a unique opportunity to study the process and its variables, understand their characteristic deterioration and examine their use in the context of the volumes.

This talk will explore the use of the pannotypes in the context of the volumes and describe the conservation and preservation challenges they present in relation to them. The choice to dedicate resources to research will be explained, and the analytical techniques that were employed, as well as their results so far, will be described and evaluated. The outcomes with reference to the treatment approach will be outlined, and how the results shed more light on the layered structure of pannotypes.

Intervention Criteria of Two Photographic Albums / Pablo Ruiz – Conservator¹

¹*Centro Andaluz de la Fotografía, Almería, Spain*

In order to address all the interventions on two albums belonging to the Museo Casa de los Tiro, Granada (Spain), two main guidelines were defined before carrying out the restoration.

- A- Which is the historical-cultural unit that brings the heritage value to these sets of photographs; the album or the photographs.
- B- What for will be needed the sets of photographs or albums after intervention.

These questions were not as simple to answer as they may appear. First, the two albums were created time after the photographs. In addition, the state of conservation of the photographs were compromised by the subsequent assembly in the form of albums.

However, precisely, this assembly allowed the photographs to reach us, preserving them from dispersion and maintaining the sense of group of images with which they were created.

The first album tells the story of the first photographed expedition to the Veleta and Mulhacen, the highest mountains in Spain. The idea of the first known photographed expedition is what gives value to this set of photographs. The second is a work of systematic documentation of the state of conservation in which the buildings of the Alhambra were in the second half of the 19th century. Possibly, there was an original album, but it was lost. In the 70's a new album was created with added textual information that expanded the visual information of the photographs. Although the original album is missing, the sense of album, as a cultural unit, has been considered essential to face the restoration.

Based on these ideas, those responsible for the museum's collections proposed that restoration should be made in order to make the two albums fully practicable for both study and exhibition. Once these points were made, the possibilities of intervention were evaluated according to the state of conservation of albums and photographs.

The first album showed great structural problems. Actually, it is like a kind of dummy for later publication in photomechanical form, which was never done. This means that it was made in a very handmade way and has come to us with

Specialty Sessions: Photographic Materials | RATS

great physical problems. With the second album, the main problem was that the glassine paper interlayer was adhered to most of the photographs, all of them being albumen prints. In both cases, the demand for careful restoration work clashed with a very small budget. This circumstance guided all the work done on the two albums. The main consequence was to carry out the minimum intervention needed to match the expected objectives.

The results have been fully satisfactory, as shown in the intervention reports (some images are attached). The two albums can be used again, and the photographs are in better conditions and accessible.

In conclusion, I believe that extending the information on these two cases, comparing one with the other, indicating the arguments that have led to the different decisions and promoting a debate on them, can make a good contribution to the objectives of this meeting.

A Sticky Situation: The Preservation of Self-Adhesive Photograph Albums / Amber Kehoe – Photograph Conservator^{1,2}

¹Harry Ransom Center, The University of Texas at Austin, Austin, TX, USA ²Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA

There was a time when every family had one. By now, every collecting institution has probably acquired one. I'm referring to the puffy-covered, sticky-paged, plasticity beast: the magnetic or self-adhesive photograph album. The word "magnetic" was likely adopted as a metaphor for the releasable bond between the adhesive lines and the transparent cover sheet. From a practical viewpoint, this type of album became popular because the peel-and-stick pages allowed compilers to freely mount and reposition scraps and prints without applying corners, hinges, or adhesives. This advantage distinguished it from other commercially available album structures.

What made these albums unpopular among preservation professionals in the 1980s was how readily and visibly they deteriorated. From discoloration and darkening to sticking and staining, it became evident that these structures did not meet the quality standards of preservation materials and consequently were largely disdained by the community. After decades of preemptive disbinding and discarding, I argue that we strive to recognize the remaining examples of self-adhesive photograph albums as material culture worth valuing and preserving for future generations. But how?

In order to confidently make preservation guidelines for self-adhesive albums, the materiality and degradation of historic samples need to be studied and identified. There have been no scientific studies published on self-adhesive albums to date. Unfortunately, they are composite structures manufactured with highly processed materials and proprietary formulations. In addition, the patent literature is incomplete and suggests that there are a variety of covers, bindings, and leaf constructions used in self-adhesive albums.

In 2018, this seemingly unsolvable problem from the past inspired me to pursue two guided research projects on the topic as a graduate fellow in the Winterthur/University of Delaware Program in Art Conservation. The results of my technical examination using invasive and non-invasive analytical techniques on three historic albums showed that the leaves were composed of laminated, bleached hardwood paperboards, rubber-based adhesives, and either isotactic polypropylene or plasticized poly(vinyl chloride) cover sheets. The study was useful to those particular albums, but the sample size was not representative of self-adhesive albums in general. The analyses performed did not provide enough information to draw strong conclusions about deterioration pathways.

These methodological limitations, coupled with more questions than answers, pushed me to study preservation decision-making and create a more practical resource for others—a decision tree. Decision trees are useful for simplifying large and complex problems that do not present a straightforward answer. A preservation decision tree is a living document that can be refined and used many times over the course of an object's lifetime. In this presentation, I advocate for the preservation of self-adhesive albums through a collaborative decision tree that examines the ethical and practical challenges of preserving ephemeral albums in special collections.

Material Characterization and Decision Making in the Conservation of IICT's Photographic Album / Joana Sobral – Graduate in Conservation and Restoration¹, Élia Roldão – Invited Assistant Professor¹, Maria Conceição Casanova – Assistant Professor¹, Catarina Mateus – Curator and Conservator of Photography collections²

¹Department of Conservation and Restoration, Faculty of Sciences and Technology, NOVA University of Lisbon, Caparica, Portugal ²National Museum of Natural History and Science of Lisbon, Lisbon, Portugal

The scientific collections of Tropical Research Institute – Instituto de Investigação Científica Tropical/Lisbon University (IICT/UL), are an outcome from Portuguese Scientific Missions carried out between late 19th century and during 20th century, in Portuguese former colonies. Aiming to reach a new and sustained knowledge concerning these territories, scientific studies crossing cartography, geography, biology, anthropology and other scientific disciplines were performed through decades. In the context of Geographic Missions, photography was used as a tool to illustrate the scientific work being developed, as well as landscapes and the everyday life in the field. Through time, for research access, photographic albums were made. IICT's collections comprise varied types of albums that possess essential information liable to contribute to the technical history of photography in Portugal and overseas colonies, as well as for the knowledge of the scientific equipment's and working methods used. For this reason, it is essential to conserve and preserve these albums and collect information about their materiality. Taking this in consideration, this paper presents a methodology for the material characterization and conservation treatment of the photographic album produced in the context of the Geographic Mission carried out in Moçambique between 1932 and 1973. Moreover, this methodology is a contribution to the future study of the remaining albums existent in IICT's photographic collections. This research aims to contribute to the construction of a broader knowledge concerning the scientific practice in different disciplines as well as the use of photography as a resource for the build-up scientific and cultural knowledge.

Research & Technical Studies

See also Joint Sessions: Research & Technical Studies + SPNHC

Page 108

See also Joint Sessions: Research & Technical Studies + Imaging

Page 106

Advancement of Science and Technology

Cultural Heritage Meets Biotechnology: Nature-Science Collaborations in the Symbiocene / Theanne Schiros –

assistant professor of science¹, Helen Lu – Percy K. and Vida L.W. Hudson Professor of Biomedical Engineering (BME)², Delfina Farias¹, Christian Joseph², Susanne Goetz¹, Romare Antrobus², Anne Marika Verploegh Chassé¹, Shanece Esdaille², Yueh-Ting (Candice) Chui², Gwen (Karen) Sanchirico¹

¹ SUNY Fashion Institute of Technology, New York, NY, USA, ² Columbia University in the City of New York, NY, USA

With anthropogenic activity putting Earth on course for a still avoidable mass extinction, and a global pandemic exposing vulnerabilities and systemic racism and injustices that have shaped our institutions, we seek to transform our mind-set and practices to create more inclusive, critical and equitable world. This talk will explore opportunities for intersectional sustainability that combines cultural heritage with the frontiers of biotechnology to create a more equitable systems for safe, inclusive, development, through the lens of a circular materials economy. Can scientists and entrepreneurs collaborate with nature to utilize materials,

Specialty Sessions: Research & Technical Studies

energy and shared knowledge to build a resilient new normal- the Symbiocene- in which cultural diversity, biodiversity and a social justice foundation are valued and protected? Inspired by the complexity of nature and its robust regenerative potential, we harness microbial biosynthesis and adapt ancient textile techniques for the sustainable development of regenerative, high performance biotextiles. The work highlights how biofabrication and green chemistry processing, together with indigenous science and historically important textile dyes and arts, can strategically address the most damaging impacts of a linear economy, as encapsulated by the fashion industry.

How Modern Mass Spectrometry Is Reshaping What We Can Learn about Paintings, Objects and Cultural Heritage

/ Caroline Tokarski - Prof¹

¹University of Bordeaux, CNRS, Bordeaux, France

For 20 years now, modern bio-mass spectrometry has been changing the analytical landscape of art, archaeology and cultural heritage. Alongside the technical improvements, the continuous emergence of new applications always allows improved structural elucidation of ancient components and interacting biomolecules, found in artworks and heritage objects.

Over this period, besides the effort made on sample preparation procedures, the substantial progress of mass analyzers in resolution/mass accuracy and sensitivity combined with increased capacity of fragmentation modes, have sustainably established “omics” techniques. Furthermore, these developments have confirmed mass spectrometry as a key stone to describing compounds, as varied in structure as in their complexities, that are ancient lipids, sugars and proteins. From a few micrograms of precious sample from an object, and taking advantage of the computational power of new bioinformatics solutions, it is now possible to obtain protein/ tissue identity sequences and to discriminate biological species on a single amino acid basis.

In addition to this improved investigative process, enhancing knowledge of artworks and preservation approaches, we are now confronting, in heritage mass spectrometry, an even more complex issue of chemical decoding of biomolecular networks, their fine characterization, the study of cross-linking mechanisms, as well as the understanding of their modifications and interactions.

This presentation will illustrate how protein chemical signatures inform about ancient material manufacturing processes and conservation practices, and the impact of these procedures on protein structures.

In this context, the presentation will describe our latest developments in top-down and hydrogen deuterium exchange mass spectrometry to address complex questions of molecular interaction in networks in unaged and aged forms. Protein conformational changes and pigment interactions occurring during paint formulation, drying and ageing will be discussed. Analytical evidence of protein crosslinkings in historic artworks will be presented and discussed (e.g. tempera, painted leather). Other examples will also demonstrate the whole mass spectrometry capabilities in elucidating restoration procedures, based on specific chemical signature monitoring; e.g. the study of Coptic manuscripts will reveal the chemistry behind a treatment performed at the Vatican-Library. Another example will show how our most recent analytical procedures for trace level analysis based on miniaturized analytical workflow have provided insight into Thomas Gainsborough's working methods. Finally, High Resolution MALDI Imaging to decode biomolecular organization of the paint layer will also be presented. Intact material, by-products and organic-inorganic interaction examples will help to reveal evident aptitudes of this promising technique in the heritage field.

Of Light and Darkness: The Use of Microfadometry in Loan Decisions

/ Emilie Cloos - Conservator, loans & exhibitions¹

¹The National Archives, UK, London, United Kingdom

The museum professional knows very well of the dichotomy when it comes to light: we need it to show our collections but it is, in turn, one of the main agents of deterioration. Light is our ally and our enemy – how can we find a happy balance between displaying our collections and preserving them for the generations to come?

A few years ago, the Collection Care department at The National Archives UK acquired a Microfademeter, a scientific instrument that helps predict how certain media will react to light in the gallery environment. This talk will highlight why and

how the loans team uses the technique and what its advantages and downfalls have been. When most of The National Archives' collection items fall into the 'vulnerable' and 'high' light sensitivity categories, what has microfading taught us and how is it being used alongside our lighting policy?

On the one hand, the technique allows for better light sensitivity categorisation, provides empirical data to support and justify decision-making and increases material knowledge of our collection. On the other, we are faced with issues of reciprocity and reproducibility, issues with the reference standards (blue wools), as well as data interpretation and translation into real-life display solutions.

Through illustrative examples, from colourful propaganda posters to Titanic telegrams, we will discuss the ethical and technical challenges of using this instrument, as well as the steep learning curve faced by the non-scientist users.

Diving Deeper into the Origins and Intent of Organic Materials in Cultural Heritage by Combining DNA and Mass Spectrometry

/ Julie Arslanoglu - Research Scientist¹, Christopher Mason - Associate Professor²

¹The Metropolitan Museum of Art, New York, NY, USA ²Weill Cornell Medicine, New York, NY, USA

In the early history of organic materials analysis in cultural heritage, the class of the material (oil, wax resin, protein, etc.) was the benchmark. As more advanced mass spectrometric techniques were incorporated into cultural heritage analysis, more precise assignment of specific types of materials could be distinguished (linseed oil v. poppy seed oil, beeswax v. Carbowax, egg white v. collagen, etc.). However, complex mixtures, reactions between organic material mixtures and pigments, as well as organic materials that are not in our libraries (non-European materials) can cause inaccurate identification of materials and even missing entirely some significant information. One way to address these hurdles is to expand our approach so that we are probing all aspects of organic matter (oil from seeds, proteins from tissues, gums from plants): their molecular building blocks (proteins, lipids, polysaccharides) as well as their instructions (DNA, genomics, and DNA damage rates). Mass spectrometry (LCMS, MALDI) of the molecular building blocks can be described as “-omics” and allows us to distinguish between structures that are too similar or too complex to investigate using GCMS approaches. However, DNA takes into another arena that has been little explored or correlated to MS in cultural heritage. DNA provide a unique access point into the specific species source and can often link material to a geographic area. Yet there is so much more DNA information in an art sample than just the materials used to make the artwork. There are masses of “meta data” from the DNA of microorganisms deriving from not only the moment in time when the artwork was created, but also its exposure throughout its lifetime. However, all of this information needs to be put into context: the mere presence of something does not necessarily mean that it is significant. The key is the integration and interpretation and of all of this information and for that, a team with specialists in bioinformatics, historical botany and biology, human populations, material use in cultural heritage, as well as technical experts are required. The Met is collaborating with Weill Cornell Medicine and The University of Bordeaux to embark on a combined DNA and “multi-omics” approach (genome, epigenome, proteome, lipidome, microbiome) to investigate two unresolved questions: (1) the identification of Chia oil in Mexican colonial artworks and (2) distinguishing author attribution between paintings by Hokusai and his daughter, Katsushika Ōi. Here we will present the process and decisions about each of the research paths as well as a discussion of the critical role of metadata that is often discarded in our quest for a fast, accurate “answer”.

Case Studies

The Development and Application of Instrumental Methods for the Identification of Materials and Processes Used in the Manufacture of Orotone Photographs

/ Ivanny Jacome Ottati - Chemistry PhD Student¹, Claire Kenny - Associate Conservator, Paper and Photographs², Tami Lasseter Clare - Associate Professor of Chemistry¹

¹Portland State University, Portland, OR, USA ²University of Washington, Seattle, WA, USA

Specialty Sessions: Research & Technical Studies

Distinguished by their characteristic brilliancy, orotones (also called Curt-tones, goldtones, or Doretotypes) were popular from the late 19th century through the 1940s. Orotone photographs are positive images on glass with a gold-colored metallic coating or backed with a reflective material. The coating consisted of a metallic powder dispersed in a liquid carrier, and it was applied to the emulsion after development. Contemporary sources describe the use of a “banana liquid or oil” in the manufacture of the metallic coating. Although the materials and process used in the production of orotones have been previously documented, there is limited published scientific research on the subject. Extant technical studies on 20th century orotones, published by Siegfried Rempel in 1986 and Richard Stenman in 2011, are somewhat limited in scope but lay an appropriate foundation for broader study. This study focused on expanding the work of Rempel and Stenman by using different instrumental techniques to analyze a wider scope of photographs. Twelve orotones, four hand-colored orotones, and two silvertones produced by 10 known artists and 2 unknown artists were analyzed. This sample set included orotones by Edward S. Curtis, who along with his brother Asahel Curtis and other American Pacific Northwest photographers, was a notable practitioner of the process. The photographs, dating from the early-mid 20th century, were from the University of Washington Libraries’ collection, and one of the orotones was from the Portland Art Museum.

X-ray Fluorescence (XRF) spectroscopy, Fourier Transform-Infrared (FT-IR) spectroscopy, Raman spectroscopy, Scanning Electron Microscopy in tandem with Energy Dispersive X-ray Spectroscopy (SEM/EDS), and Pyrolysis coupled to Gas Chromatography Mass Spectrometry (Py-GC/MS) were used to identify the materials and pigments used in the production of these photographic types. The analysis revealed that copper and zinc alloys were used in the backing of all the orotones; no gold was identified. Collodion was detected in an orotone sample with a proteinaceous emulsion, indicating that it was a component of the banana liquid. The proteinaceous emulsion in one of the orotones was identified as gelatin. Vermilion and Prussian Blue pigments were used in hand-colored orotones, and aluminum was identified as the metallic pigment in the backing of silvertones. Ongoing research aims to identify other components of the banana liquid by Py-GC/MS, including the use of amyl acetate and other materials for the purpose of understanding occasionally observed embrittlement and delamination condition issues. These results and continued research will increase the body of knowledge on orotones and silvertones and aid in the long-term preservation of these historical photographs.

A Low-Cost, Open Source Micro-Fading Tester: Construction, Characterization, and Use / JP Brown – Regenstein Conservator for Pacific Anthropology¹, Jacob Thomas – Independent Conservation Scientist²

¹The Field Museum, Chicago, IL, USA ²Independent Conservation Scientist, Göteborg, Sweden

Micro-fade testing provides a semi-quantitative method of predicting the fading rate of light-fugitive colored materials due to light exposure (Whitmore, Pan, and Bailey 1999) -- essentially, an Oddy test for museum lighting. However, the equipment is expensive for most conservation laboratory budgets (USD 25-35k), and there is no modern standard open-source software for acquisition and analysis of the results. The currently available free software (Getty Spectral Viewer v.2) is unsatisfactory in that it does not provide real-time data acquisition which makes it hard to monitor the test for excessive damage, and because it does not provide color shift analysis in terms of CIEDE2000.

In this paper we present a complete retro-reflective MFT instrument due to Thomas that can be built from standard ThorLabs optical components in an afternoon, and is hardware agnostic in its choice of light source and spectrometer. The system uses a revision of Getty Spectral Viewer which provides real-time color shift monitoring as CIEDE2000 during data acquisition which is due to Brown (in conjunction with Vincent L Beltran at the Getty Conservation Institute). The purchase cost of the complete system is ca. USD 8k including a spectrometer, light source, equipment for characterizing the MFT spot, focusing rails, and specialist tools for the assembly.

The main advantages of the system are low build cost and simple data acquisition and analysis. The principal disadvantage is manual focussing, which is similar to most of the more expensive builds except the Instytut Fotonowy system (Fotonowy 2020) and the instrument assembled by Prof. Haida Liang at Nottingham

University (Liang et al. 2011). The most controversial design decision is probably the use of a variable power LED light source (delivering 2.85 mW as tuned) in place of the more usual xenon lamp.

We discuss the effect of our design decisions in both hardware and software, what we learned while refining the build, and present an analysis of the repeatability of measurements on different substrates using an example instrument which was recently built at the Field Museum. In particular, we compare the use of the instrument on smooth graphic substrates to its use on rougher social history surfaces, and provide an appreciation of the effects of the LED light source compared to a xenon source.

Bibliography

Liang, Hadia, Rebecca Lange, Andrei Lucian, P Hyndes, Joyce Townsend, Stephen Hackney. 2011. Development of portable microfading spectrometers for measurement of light sensitivity of materials. In ICOM-CC 16th Triennial Conference Preprints, ed. J. Bridgland,

Instytut Fotonowy, 2020. <https://www.fotonowy.pl/products/micro-fading-tester/?lang=en>. Accessed September 27, 2020.

Whitmore, Paul, Xun Pan, and Catherine Baillie. 1999. Predicting the fading of objects: identification of fugitive colorants through direct non-destructive lightfastness measurements. *Journal of the American Institute of Conservation* 38: 395–409.

Principals on Paper: Using FTIR Spectroscopy and Chemometrics for Non-Invasive Media Analysis / Julie Wertz – Beal Family Postgraduate Fellow in Conservation Science¹, Leonie Müller – Craigen W. Bowen Paper Conservation Fellow¹, Arthur McClelland – Principal Scientist², Penley Knipe – Philip and Lynn Straus Senior Conservator of Works of Art on Paper¹

¹Straus Center for Conservation and Technical Studies, Harvard Art Museums, Cambridge, MA, USA ²Center for Nanoscale Systems, Harvard University, Cambridge, MA, USA

The identification of media in paper-based artworks is often challenging due to the minimal amounts of material present and the potential impact of sampling on most objects. X-ray fluorescence spectroscopy (XRF) is a valuable non-invasive tool to identify many pigments, but it does not reliably detect elements lighter than aluminum, and cannot be used for carbon-based (organic) materials like gums, resins, glues, inks, and lake pigments. Raman spectroscopy has some non-invasive applications in this context, but infrared spectroscopy consistently provides more detailed spectra for these materials due to their structure and how it interacts with the instruments. Fourier transform infrared (FTIR) instruments come in a variety of configurations, some of which can be used for non-invasive analysis of artworks. Instrument interfaces, like attenuated total reflectance (ATR), diffuse reflectance, or specular reflectance, will influence the data collected and require corresponding reference spectra for interpretation.

FTIR spectra show the total response of all materials present. This means mixed materials, a highly likely occurrence, can be difficult to fully characterize due to potential overlapping peaks and minor components being overwhelmed in the mixture. Slight variations in spectra, which may have significance, can be overlooked by the human eye while major differences can be distracting without saying much. Chemometrics, the application of statistical methods to chemical data, is a way to analyze spectra using algorithmic processing of known and unknown samples.

In this paper, the application of chemometric techniques like principal component analysis (PCA) is explored using FTIR spectral collected from a set of prepared references. These references include a wide varieties of blank papers and inks, such as including iron gall, bistre, and lampblack, that are prepared in-house. We present the samples analysed, the resulting statistical modeling, and what potential benefits and limitations identified during this investigation. The aim of this work is to determine to what extent it is possible to extract more information about media from works of art that cannot be sampled by using non-invasive analysis.

This work was performed in part at the Center for Nanoscale Systems at Harvard University, a member of the National Nanotechnology Coordinated Infrastructure Network, NSF award no. 1541959.

Specialty Sessions: RATS | SPNHC

Elucidation of Natural Organic Red Colorants on Paper via Microsampling and Surface Enhanced Raman Spectroscopy / Lyndsay Kissell - PhD Candidate-Chemistry¹, Trine Quady - Undergraduate Research Assistant¹, Samantha Springer - Principal Conservator², Jeannie Kenmotsu - Japan Foundation Associate Curator of Japanese Art & Interim Head of Asian Art³, Tami Lasseter Clare - Associate Professor of Chemistry¹

¹Portland State University, Portland, OR, USA ²Art Solutions Lab, LLC, Portland, OR, USA ³Portland Art Museum, Portland, OR, USA

Definitive chemical analysis of natural colorants is an ongoing challenge for a variety of objects the amount of colorant is small and has frequently undergone chemical changes as a result of environmental exposure. In Japanese nishiki-e (brocade) prints of the 18th century, natural colorants were used to produce heavily bound, thinly printed inks on fine papers. This important historical period of mass produced, profusely colored and elaborately produced prints marks a decisive shift in the visual and material qualities of Japanese printmaking. Of particular interest in this study is the wide range of pink, red, and orange colors that appears in these works. Historically available organic red colorants are Safflower, Sappan, or Madder inks. Recent studies have suggested the contemporaneous usage of those three and the mixing of colorants to produce a variety of hues.

In this work, a microsampling tool was developed to collect colorant particulate, on the order of 5-10 µm in size, from the surface of prints. This microsampling tool utilizes a small hydrogel surface in contact with the print for one minute to mechanically collect colorant without using harsh solvents nor unnecessarily extended sampling times. By applying silver nanoparticles onto the small samples retained on the hydrogel, a plasmon resonance effect is induced and the Surface Enhanced Raman spectroscopy (SERS) can be performed.

Advantages of SERS over other analytical techniques include extreme sensitivity to analyte molecules, suppression of interfering molecular fluorescence, and unique chemical fingerprints resultant from the molecular structure. Additionally, through extensive analysis of laboratory-produced standards, including accelerated aging techniques, spectral (and in turn molecular) changes may be identified. Successful identification of organic red colorants, after fading or color shifting due to exposure, is demonstrated. This method is also shown to elucidate mixtures of red colorants. This methodology has been applied to works attributed to Suzuki Harunobu in the collection of the Portland Art Museum to better understand the use of individual colorants and colorant mixtures in mid-18th c. Japanese printmaking.

Society for the Preservation of Natural History Collections

See also Concurrent General Sessions: Transformative Research and Treatment in the Care of Natural History Collections

Page 56

See also Joint Sessions: Collection Care + SPNHC

Page 69

See also Joint Sessions: Objects + SPNHC

Page 105

See also Joint Sessions: Research & Technical Studies + SPNHC

Page 108

Specimen Spotlight

A Chance Encounter with a Coloring Book / Amy Pool - Curatorial Assistant¹

¹*Pet H Raven Library, Missouri Botanical Garden, Saint Louis, USA*

In the spring of 2017, I had a chance encounter with an unusual book. As a plant taxonomist at the Missouri Botanical Garden most books I consult are taxonomic in nature. But on this day, I was wearing my Science Outreach hat and was investigating for an upcoming exhibit of 19th century colorists, those individuals whose profession it was to hand color black and white lithographs. I never did learn much about the unsung colorists. Instead, I stumbled upon what is believed to be the world's oldest coloring book. My specimen spotlight object is *The Florist*, a book published in the 1760s specifically for the entertainment of coloring by adults. In addition to describing the book I will mention some of the ways we were able to use its "rediscovery" to promote the Missouri Botanical Garden's research collections and programs.

A-Maizing Paper / Susie Cobbledick - Ellerman Book and Paper Conservator¹

¹*Peter H Raven Library, Saint Louis, USA*

All books have artifactual as well as textual value. As a book conservator, I am always pointing this out; but some books lend themselves to supporting this point better than others. William Cobbett's *A Treatise on Cobbett's Corn* (1828) is an excellent case in point. Cobbett was primarily a political journalist, but he also wrote several books about English rural life, gardening and agriculture. He grew a variety of corn (ie maize) in his own garden that performed well in the British climate, and he wrote this treatise to promote its many potential uses, including the possibility of using its husks as a papermaking fiber. Such a proposal needs to be understood in the contexts of the early 19th century. The demand for paper at this time skyrocketed with growing populations and literacy rates, and the traditional source of paper-making fiber, post-consumer rags, could not meet the needs of the market. Scientists and entrepreneurs sought other more copious and reliable sources of cellulose, so Cobbett was not alone in proposing a new source of paper fiber. In support of his proposal, Cobbett had paper made using his husks and incorporated some of it into his book. The title page and the table of contents are printed on this paper.

Hole-in-the-Water: Historic preservation, diving history, and the Creature from the Black Lagoon / Amy Jones Abbe - Conservator¹

¹*Jones Abbe Art Conservation LLC, Athens, USA*

This is the story of the "Hole-in-the-Water," a custom steel, wood, glass and rubber variation on a diving bell that serves as the unlikely connection between the development of deep-sea diving technologies, science fiction film production history, and grassroots historic preservation efforts in Florida.

The Hole-in-the-Water "was just that: a glass and steel-lined cylindrical depression down from the surface of the water, designed for professional sub-surface motion picture work. Open to the atmosphere at the surface, it was covered with a light trap so as to avoid undesirable reflections on the windows within" (as described in documentation provided to the Friends of Wakulla Springs by the Wisconsin Historical Society's Early Diving Research Team).

It was one of at least two such objects used for underwater scenes for the earliest Tarzan movies and the *Creature from the Black Lagoon* filmed at Wakulla Springs, a remarkable natural resource and archaeological site in north-central Florida. It was designed by Max E. Nohl, a noted underwater diving pioneer from Milwaukee, Wisconsin, who set a world record for diving in 1937 and who is co-credited with inventing technologies that furthered the possibilities and popularity of deep-sea diving.

Decades after its use in filming, the Hole-in-the-Water was discarded in the woods that are now part of Wakulla Springs State Park, along with a dozen or so items of steel industrial and farm equipment that may have been used in the construction of the historic Lodge at Wakulla Springs and earlier buildings nearby related to the area's early use in industrial turpentine production.

Specialty Sessions: SPNHC

Recognized as objects of historic value by Florida State Parks, which owns them, and the Friends of Wakulla Springs, a non-profit group devoted to the rehabilitation and preservation of Wakulla Springs natural and cultural resources, the objects have been moved to a sheltered location, received preservation interventions made possible with state grants, fund-raising, and volunteers, and are displayed with interpretive signage explaining their role in the development and use of the site for more than a century.

Gold, Deforestation, and the Demise of a Wet Evergreen Forest in Nicaragua / Amy Pool - Curatorial Assistant¹

¹*Pet H Raven Library, Missouri Botanical Garden, Saint Louis, USA*

My specimen spotlight is the Missouri Botanical Garden herbarium specimen that my colleague W.D. Stevens and I selected as the neotype of the name *Vitis javalensis*. Neotypes are very important specimens chosen to define a name when the original material used to describe the name no longer exists. This specimen not only clarifies the use of this name which had been puzzling botanists for 130 years but also played a role in helping us document the transformation of the landscape near the gold mines of Javalí, Nicaragua from wet evergreen forest in the mid-nineteenth century to a region characterized today by patches of dry forest clinging to rocky slopes amidst a scrubby savanna. This transformation began with the deforestation associated with the gold mines, which date back to the 1800s, and was later accelerated by cattle ranching.

The Deep Sea Comes to the MCZ / Jennifer Trimble - Curatorial Assistant¹

¹*Museum of Comparative Zoology, Cambridge, USA*

The Departments of Invertebrate Zoology (IZ) and Malacology (Mala) at Harvard University's Museum of Comparative Zoology (MCZ) house specimens that are both fluid and dry preserved across many Phyla. The museum's collections are constantly growing to facilitate research, education and outreach. To this end, the MCZ has partnered with the Ocean Exploration Science Team (OET) and has become one of the main repositories of specimens from their yearly trips aboard Exploration Vessel (E/V) Nautilus, whose mission includes ocean exploration, innovation, and education. This large influx of specimens has provided the opportunity for the departments of Malacology and Invertebrate Zoology to examine our specimen acquisition protocols, and workflows with fresh eyes. The MCZ participated in an assessment in 2017 with researchers from the Center for Coastal and Environmental Health and Biomolecular Research. The goals for the 2017 assessment were aimed at increasing efficiency and clarity of the data and identifications obtained aboard E/V Nautilus. They focused on the following areas for improvement: specimen preservation protocols, clarity of station numbers' suffixes, documentation of related specimens, and the association of media in-situ for cataloged specimens. The department has implemented the recommendations and is pleased with the results. Since 2013, IZ/Mala has accessioned over 2500 new specimen lots from the OET. The department has improved upon various aspects of specimen data including: vague specimen identifications, data-entry errors, efficiency of data entry into our museum-wide database, efficiency of communication with scientists both during and after each expedition, specimen preservation, and data collection formats. This collaboration is directly correlated with an increase in loans, related research by scientists studying deep sea invertebrates, visitors, media available to data aggregators such as Global Biodiversity Information Facility (GBIF), and student involvement with related specimen lots. As our collections grow, and the technology available to scientists expands and changes, the MCZ will continue to adapt to the best of its ability to accession, preserve and represent its holdings in the most efficient manner possible. The MCZ and OET have mutually benefited from this project and will continue to adapt future protocols to fit the ever-changing needs of both organizations.

Frozen in Time: Documenting the Spread of Potato Blight in New England on Tomatoes / Michaela Schull - Director of Collections¹

¹*Harvard University Herbaria, Cambridge, USA*

The early story of the potato blight, *Phytophthora infestans* (Mont.) de Bary, ties into the human history and issues that are still occupying us today: What do we

do when important food resources are devastated and how do we prevent this from happening? *Phytophthora infestans* demonstrates the effect of a globally distributed plant pathogen. This highlighted specimen from the Farlow Herbarium, collected by Roland Thaxter in Maine, documents the appearance of the disease and its spread throughout New England.

Fossil Cephalopod Species Known from a Single Specimen / Paul Mayer - Fossil Invertebrate Collections manager¹

¹*The Field Museum, Chicago, IL, USA*

Field Museum Fossil Invertebrate specimen PE 24538 is the holotype and only known specimens of *Paleocadmus herdinae*. It is an impression of a radula from a Pennsylvanian (307 million year old) cephalopod from the Mazon Creek area southwest of Chicago. A radula is a thin, hard structure with sharp hooks in a mollusk's mouth which it uses to rip apart food or scrap algae from rocks.

Paleocadmus herdinae is known only from this single fossil; no shell or other body parts have ever been recovered. The rarity of this specimen is astonishing—one theory is that it was regurgitated by a scavenger or predator.

The specimen is mounted on a scanning electron microscope (SEM) and was coated with a thin layer of gold and a layer of carbon to help with the imaging process. The bright colors you see are interference colors formed from different thicknesses of the carbon layer. The silvery greenish areas are 45-40 nanometers thick, blue areas are 30-25 nanometers thick, the red areas are 20nm thick, and in some areas you can see the underlying gold coating. (a million nanometers equal one millimeter).

Tunneling for the Future Reveals an Ancient Burrow (Thalassinoides) / Patricia Coorrough Burke - Curator of Geological Collections¹

¹*Milwaukee Public Museum, Milwaukee, USA*

In 1993, the Milwaukee Metropolitan Sewerage District (MMSD) completed a series of water storage tunnels and drop shafts. This project was the cornerstone of Milwaukee's multi-billion dollar water pollution abatement program which involved 19.4 miles of deep tunnels dug 300 feet underground to help reduce sewer overflows into Lake Michigan. In a cooperative project with Milwaukee Public Museum geologists, rock excavated from known depths in the shafts were set aside for museum collection. Samples were taken as bulk rock from labeled rock piles.

The bulk samples from the Silurian (Wenlockian) Racine Formation, were taken to the museum for processing into thin sections, polished slabs, and etched from dolostone. Large samples were etched with dilute HCl, dissolving the dolostone matrix. Etched material from samples 30477 and 30478 exposed the silicified boxwork of the ichnogenus *Thalassinoides*, a common type of large, branching burrow system in marine sediments. MPM specimen 28438 has an articulated calymenid within a *Thalassinoides* burrow. The specimen is a 3-D record of bioturbation on the Silurian carbonate shelf.

Initiating the Red Wolf Repository at Arkansas State University: Combining Old Techniques to Spark a New Conservation Program and Natural History Collection / Kari Harris - Instructor of Biology/ Club Coordinator College of Sciences and Mathematics¹, Tracy Klotz¹, Kyle Gustafson¹, Tom Risch¹

¹*Arkansas State University, State University, USA*

In 2008, Arkansas State University (A-State) adopted the "Red Wolf" as its new mascot. Once native to Arkansas, the species has been extirpated from the state since the early 20th century. After the mascot change, the Endangered Wolf Center began working with A-State biology faculty to create education and conservation programs centered around red wolves. This led to a campus program, Red Wolves for Red Wolves (RW4RW), modeled somewhat after the Missouri "Tigers for Tigers" program. However, unlike "Tigers for Tigers" the A-State program works with a species endemic to its immediate community.

Specialty Sessions: SPNHC

A-State is now working with the Red Wolf Species Survival Plan and the United States Fish & Wildlife Service to actively conserve and research red wolves, with the intention of revitalizing their populations and eventually re-introducing them to their native range in Arkansas. This has led to the creation of the Arkansas State University Red Wolf Repository Program, a natural history collection comprised of specimens obtained from red wolves in captivity in zoos and breeding facilities. This new collection includes tissue, skin, and skeletons from red wolves that pass away and yearly blood samples from all living red wolves in captivity.

There are certainly other universities with conservation programs for their mascots, and other endangered species programs that work to conserve species native to North America. Most notable for A-State is the University of New Mexico's conservation efforts with Mexican Wolves as our repository efforts are largely modeled after their successful program. However, A-State is somewhat unique in that we have chosen an endemic endangered species as our mascot and we are actively pursuing conservation of that species within our home state. We are also the primary repository of specimens and data for that species, when previously most carcasses of these endangered wolves were incinerated instead of kept as specimens.

This and other natural history collections efforts on our campus have sparked a new wave of collections-based research for A-State. When the Red Wolf mascot was named, the state of natural history collections on our campus was in decay. In the past decade, we have seen our campus go from considering disposing of its collections to using them as a primary research mechanism. Our historic collections now have new spaces and equipment, and we are actively pursuing new types of collections and research, such as this red wolf program. At a time when many natural history collections are struggling, and many universities are still deciding whether to keep their collections or not, A-State is striving to set a precedent that renewed interest in university-based natural history collections is obtainable.

Promoting Exhibit Access and Safety: A Collaborative Approach to Collections Care / Samantha Snell – Collections Management Specialist¹, Cali Martin – Collections Management Specialist², Jeff Hirsch – Principal³

¹Smithsonian Institution, Washington, DC, USA ²Smithsonian National Museum of the American Indian, Washington, DC, USA ³Hirsch Culture Works LLC, Washington, DC, USA

The Promoting Exhibit Access and Safety (PEAS) Working Group advocates for a balanced approach to the presentation of collection material on exhibition that acknowledges and integrates public access, preventive conservation, and security. The group seeks out and reviews new methodologies that aim to protect exhibits and enhance safety for visitors, provides interdisciplinary expertise and recommendations to organizations and individuals, support the testing of new and novel methodologies, and promotes and advocates for the implementation of proven strategies within the field. This presentation will focus on the benefits of collaborating across disciplines (collections managers, conservators, architects, security staff, facilities managers, risk managers, and visitor services staff) and share strategies that have been proven effective to positively influence how visitors interact with collections and exhibits.

Digitization and Data Management in the Preservation of Natural History

Workflow for Digitizing Ordovician Fossil Invertebrates via Batch Image Uploads / Catherine Wiegand – Lauer Collections Assistant¹

¹The Field Museum, Chicago, IL, USA

The Field Museum's collection of fossil invertebrates contains more than two million specimens, but only 15% is digitized and accessible to people outside the museum. A 3-year IMLS grant aims to transition paper catalogue records to digital records for the Ordovician Period of the collection. Workflow development has been key to the successes of this project over its first two years; with more than a dozen summer interns and volunteers entering specimen label data and photographing thousands of fossil specimens, a comprehensive workflow is required to maintain data quality. The workflow we developed ensures no specimens are missed, mistakes are found and corrected, and time lost changing camera set-ups is minimized.

Workflow steps are: 1) Enter all specimens from a cart into KE EMu, including cataloguing any uncatalogued specimens 2) Photograph all specimen labels as JPGs 3) Photograph all fossils as RAW files 4) Crop label images and check for errors 5) Convert fossil images to DNGs 6) Use batch upload CSV to upload fossil and label images to KE EMu 7) Attach images to corresponding catalogue records and correct any errors found

Images are named using a standard formula, which contains the specimen's catalog number and any additional morphological or identification data. This means images can be easily linked to catalog records in KE EMu and assists with error checking procedures. Images are batch-uploaded to the multimedia module of KE EMu using CSV files. Using the multimedia IRNs created from these uploads, a second CSV file is created and uploaded to the catalog module which attaches the multimedia records to their corresponding catalog record. In the process of linking images to catalogue records, there are additional opportunities to catch errors. KE EMu generates an error log of images that failed to link during the batch input; the most common errors are format errors in the batch upload, specimens not entered into the catalog, and typos in the specimen's catalog number. Additionally, each batch of specimens are from the same geologic period and taxonomic group, making it easy to spot any inconsistencies or missing data.

Batch uploads of images saves time and guarantees that all images have the same information available. Using this workflow, over 41,600 images have been captured and uploaded and more than 12,000 catalog records have been created. This workflow is transferable to other large scale KE EMu digitization projects with minor adaptations based on a collections specific needs.

Bringing the Past into the Present: Digitizing Specimen Inventory and Micro-CT Scans for Upload to Open Access Platforms / Jordan Zajac¹, Lyndell Bade – Natural History Collection Manager¹

¹Colby College, Waterville, ME, USA

Natural History Collections are important resources for teaching and research. In an era of rapid extinction, habitat loss, and climate change, access to historical specimens for global change research is of crucial importance. As such, the incorporation of new techniques and technologies is vital for the continued maintenance and preservation of these historical specimens, as well as for newly collected specimens which may become threatened by the ever-advancing issue of climate change. Of particular importance is to deepen the understanding of these specimens without damaging or destroying them, and to make this information relevant and available to curators and researchers external to the institutions in which these specimens and their respective data are housed. Thus, the Colby College Biology Natural History Museum has begun the process of producing a collections management system through which an inventory of all specimens within the wet collection can be completed, after which the inventory data will be cleaned, curated, and published to iDigBio, an National Science Foundation publishing house for natural history collections around the world. In addition to the aforementioned inventory data, imaging of these specimens will be conducted in accordance to the protocols developed by the Friday Harbor Laboratories at the University of Washington for the #ScanAllFish micro-CT imaging project. Images of fish in the wet collection produced by the team will be analyzed and uploaded to the NSF oVert (openVertebrate) and #ScanAllFish wiki, which are open source platforms for sharing scans of vertebrates and all fish species, respectively. These scans provide very high-quality resolution images for studies of anatomy, morphology, and systematics without damaging soft tissues and destroying historically important specimens. Once scan images are uploaded to the open source platform, they are available for anyone interested in ecomorphology, comparative anatomy, and historical ecology studies. However, the team will also conduct micro-CT imaging on all other specimens within the wet collections, including a wide selection of amphibians and reptiles, which will be uploaded to oVert as well. This poster will present all data and images acquired prior to the conference, which occurs mid-project.

BugFlow: A Community-Driven Repository for Entomology Digitization Resources / Tommy McElrath – Insect Collections Manager¹, Craig Brabrant², Gissela De la Cadena³, Melissa Callahan⁴, Caitlin Chapman⁵, Nicole Fisher⁶,

Specialty Sessions: SPNHC

Jennifer Girón⁷, Chris Grinter⁸, Rachel L. Hawkins Sipe⁹, Pamela Horsley¹⁰, Erica Krimmel⁵, M. Andrew Johnston¹¹, Sangmi Lee¹¹, Crystal A. Maier⁹, Rachel K. Osborn¹², Deborah L. Paul – Biodiversity Informatics Community Liaison¹, Marianna Simoes¹³, Erika Tucker¹⁴, Maureen Turcatel¹⁵, Matthew Yoder¹, Jennifer Zaspel¹⁶

¹Illinois Natural History Survey, Champaign, IL, USA ²University of Wisconsin-Madison, Madison, WI, USA ³Instituto Nacional de Biodiversidad, Quito, Ecuador ⁴Auburn University Museum of Natural History, Auburn University, AL, USA ⁵iDigBio, Gainesville, FL, USA ⁶CSIRO, Canberra, Australia ⁷Purdue University, West Lafayette, IN, USA ⁸California Academy of Sciences, San Francisco, CA, USA ⁹Museum of Comparative Zoology, Cambridge, MA, USA ¹⁰San Diego Museum of Natural History, San Diego, CA, USA ¹¹Arizona State University Biocollections, Tempe, AZ, USA ¹²Michigan State University Department of Integrative Biology, East Lansing, MI, USA ¹³Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany ¹⁴University of Michigan, Ann Arbor, MI, USA ¹⁵The Field Museum, Chicago, IL, USA ¹⁶Milwaukee Public Museum, Milwaukee, WI, USA

After 10 years of entomological collections digitization, we plan to update entomology digitization workflow modules previously created by iDigBio and publish them via a versionable resource using GitHub. We are calling this new resource “BugFlow”. In addition to updating and adding to the previously created modules, we plan to capture the methods and practices used and incorporate new versioning and metadata practices for workflows developed using these modules. The repository will also serve as a central clearinghouse for digitization workflow examples. To support wider adoption and ease-of-use, the group will also endeavor to produce versions in multiple languages. BugFlow will improve the sustainability of digitization efforts, and reduce duplication of effort in the development of new workflows. A side project associated with the SPNHC Best Practices committee will incorporate references to curatorial best practices used during entomological digitization. We encourage participation in the initiative from contributors globally, and those who would like to be involved should contact the presenters.

Stop Digitizing YOUR Collection: Notes from iDigBio's Southern Rocky Mountain Thematic Collections Network to Help Strategize Digitization across Consortia and Regional Projects / Ryan Allen – Biodiversity Informatics Manager¹

¹University of Colorado Museum of Natural History Herbarium, Boulder, CO, USA

While digitization efforts have created a vast amount of biodiversity data, a large proportion of the world's data are still “locked up” in the herbaria and natural history collections of the world. Narrowing our focus to herbaria, we have ~390 million specimens housed between ~3,100 collections (Index Herbariorum October 2020). At this same time, GBIF lists ~84 million databased specimens for Plantae, Fungi and Algae. Clearly data herbarium data exists outside of GBIF in a digital format, but the available data suggests that roughly one in four herbarium specimens have been digitized and made publicly available. Of the records online, many only provide an image and minimal data capture such as barcode/GUID and taxonomy and in most cases some form of geography. Many specimen records do not represent complete transcriptions, and a larger portion lack georeferences. NSF's ADBC program produced ~62 million digitized specimens in its first 8 years (\$100 million over 10 years), so a much larger investment would be needed to complete the remaining data in herbaria alone. Conveyor systems have opened up a faster means of rapidly imaging herbarium specimens, but these efficiencies in imaging are creating a larger and larger backlog of digital specimens without the time and funding to transcribe and georeference specimens. Collectively we have made tremendous strides towards imaging, transcribing, and georeferencing our collections. We are at a good point to stop and evaluate the data already generated by other collections, examine what data can be reused, and what data housed in our collections might benefit other collections actively digitizing. Aggregators such as GBIF and SEINet provide an opportunity to move data between collections using the DarwinCore standard linking records up using

collector and collector numbers. Digitization work is often completed in a vacuum, one specimen and one collection at a time often repeating work transcribing and georeferencing specimens that have duplicates housed in other collections. Taking the time to step back and evaluate how collections came to your herbarium and working on partnerships to collectively complete digitization will be the key to speeding up the data entry and georeferencing processes. Strategizing what and how we digitize may be the most important way to make meaningful progress towards completing our digital collections.

Ch-ch-ch-ch-CHANGES: Turn and Face the Strange, Amounts of Ecological Data Hidden in Natural Resource Surveys / Karen Alofs¹, Andrea Thomer², Hernan Lopez-Fernandez³, Randy Singer^{3*}, Justin Schell⁴, Kevin Wehrly⁵

¹University of Michigan School for Environment and Sustainability, ²University of Michigan School of Information, ³University of Michigan Ecology and Evolutionary Biology and Museum of Zoology, ⁴University of Michigan Library, Shapiro Design Lab, ⁵Institute for Fisheries Research and Michigan Department of Natural Resources, MI, USA

Time may change us, but we can trace time through the detailed data collected and stored at state-run Departments of Natural Resources and other similar agencies. These immense sources of, until recently, unexplored and undocumented data were used for reporting purposes and then archived. Through a grant provided by the University of Michigan Institute for Data Science (MIDAS) our interdisciplinary team of researchers is developing methods to integrate and analyze varied and patchy ecological data to make new insights into impacts of recent environmental change on biodiversity. More than a century's worth of ecological data from the Michigan Department of Natural Resources (DNR) Fisheries Division and the University of Michigan Museum of Zoology have been digitized from thousands of individual 5" x 7" observation cards. Using the crowdsourcing platform Zooniverse, we engage broad public communities to assist with the initial classification of, before utilizing statistical modeling and other data science approaches to investigate the effects of habitat and climate changes on inland lake fish communities across Michigan. Such efforts can be mirrored in the future to uncover vast amounts of dark data that can be useful for the collections community and beyond.

Arctos: The Community Model for Museum Biorepositories / Mariel Campbell – Senior Collection Manager¹, Carla Cicero², Andrew Doll³, Kyndall Hildebrandt⁴, Teresa Mayfield-Meyer⁵

¹Museum of Southwestern Biology, University of New Mexico, Albuquerque, NM, USA ²Museum of Vertebrate Zoology, University of California, Berkeley, Berkeley, CA, USA ³Denver Museum of Nature & Science, Denver, CO, USA ⁴University of Alaska Museum of the North, Fairbanks, AK, USA ⁵The Arctos Consortium, Albuquerque, NM, USA

Arctos (www.arctosdb.org) is a web-based, community-driven, research-grade data collection management system and data portal that manages and serves over 3 million museum records for over 200 natural history, cultural, and earth sciences collections, including world-class biorepositories archiving genomic resources. Arctos initiated the holistic or extended specimen concept that facilitates the integration of specimen records, observations, tissues, endo- and ectoparasites, microbiomes, environmental samples, field notes and other documents, and media (e.g., images, audio recordings, and video) into research and policy. Specimen records and their associated data are managed and integrated with agents (people, organizations), geospatial information (collecting events, coordinates), transactions (loans, accessions, permits), object tracking (barcodes, RFID tags), and usage (publications, projects, citations) in a continuously updated, web accessible platform which is readily linked with external resources and data aggregators including GBIF, VertNet, iDigBio, GloBI, GenBank, and GGBN. Arctos member institutions share data vocabulary and standards, curate and improve the quality of data (e.g., agents and taxonomy), and actively guide future development. We focus on natural history biorepositories in Arctos and on how specimen usage and attribution are shared and tracked given the specific challenges of linking derivative genomic and molecular data across multiple platforms.

Specialty Sessions: SPNHC

Appreciating the Little Things in Life: Molecular Technologies Driving New Methodologies in Specimen Preservation and Management / James Macklin – research Scientist in Botany and Biodiversity Informatics¹, Matthew Ryan – Curator, Genetic Resource Collection²

¹*Agriculture & Agri-Food Canada in Ottawa, Canada*, ²*CABI, Egham, UK*

The advent of the genomic age and the technologies that drive it have made an enormous impact on biological research. One of these major impacts has been the ability to identify and study microorganisms both as individual species and in their associated communities. These organisms occupy an incredibly diverse set of habitats and substrates such as water, soil, air, and in association with living systems (plants, animals, fungi, etc.). These microbiomes are now being sampled at an unprecedented rate and there is an urgent need to preserve the environments in which these organisms live to support future study. Natural history collections have been preserving non-living baseline physical evidence for centuries: the specimen. Similarly, botanical gardens, zoos, and aquaria, and more recently germplasm and culture collections have preserved living specimens. One solution to preserving these microbiomes is biobanking using various cryotechnologies, which has become a necessity to preserve important genetic material for later use. However, other solutions to long-term preservation are also required to maintain these microorganisms in matrix. This reality has begun to put pressure on collection-based institutions to store and manage these new sample/specimen types and their associated data. In this symposium we will discuss the challenges these new preservation methodologies present and potential solutions.

Collection Theft and Security Monitoring of Collections

Security and Collection Theft / Paul Mayer – Fossil Invertebrate Collections Manager¹

¹*The Field Museum, Chicago, IL, USA*

Something has been stolen – what now? This was raised as a question in response to the plenary talk and discussions by Kirk Wallace Johnson, author of *The Feather Thief: Beauty, Obsession, and the Natural History Heist of the Century* at last year's SPNHC Meeting in Chicago. This symposium will give collection managers a chance to share their experiences about collection theft. It will also give security and information technology staff an opportunity to share their ideas and experiences on preventive actions, communication networks, education, and other resources that are already available. Later at this meeting the Security and Collection Theft Committee will meet with the goal to develop best practice policies that can be used to help prevent theft and employed if a theft does occur. Topics that are of interest include:

Preventative Actions

1. Education: Engaging the communities who may be at higher risk and educating them as to the importance and scientific value of the collections
2. Heightened Security: Balancing between acceptable levels of security and either alienating the community or discouraging use of the collections
3. Risk assessment: Identifying higher risk objects and higher risk visitors

Communication Channels and Monitoring

1. Using listservs and social media to alert the community of thefts
2. The use of automated alerts
3. Monitoring Social media
4. Train people in the amateur community to identify items as stolen
5. Digitization and cataloging to help identify what has gone missing from collections
6. Regular collection audits
7. How to handle the return of stolen material

Turning Lemons into Lemonade: Managing Security and Risk at the Yale Peabody Museum of Natural History / Russell D. White – Director of Collections & Research¹, Richard E. Boardman¹

¹*Yale Peabody Museum of Natural History, New Haven, CT, USA*

In 2005 the Beinecke Rare Book & Manuscript library discovered a theft of a historic map that propelled Yale University to evaluate the policies and procedures of the University's collections holding institutions. With the help of a consultant, Lowers & Associates, the University evaluated the security practices of 20 institutions holding art work, natural history, musical instruments, library materials and archives. Some of these institutions are public facilities with galleries while others are research collections with little or no public interaction. However, most of these institutions participate in teaching and learning experiences with Yale students and scholars. Over two years Lowers toured these facilities and discussed with appropriate staff practices and concerns and it was acknowledged that two groups of institutions, the administrative homes (e.g., the President's home) and the Peabody Museum of Natural History, fell below acceptable standards for institutions holding cultural and scientific collections. Lowers had identified 96 action items and upgrades at the Peabody that the University and Peabody needed to address across five broad areas (administration, access, facilities, electronic surveillance and monitoring) to secure the Peabody from intruders and safeguard the collections.

To meet the challenges of the Lowers Report, the Peabody worked closely with the Yale offices of Risk Management, Security, Auditors, Provost's Office and Lowers & Associates to address these upgrades in a time-sensitive and fiscally responsible manner. Over the next six years the Peabody incrementally made improvements in our administrative and curatorial practices, facilities, access, electronic surveillance, and monitoring of our collections and galleries.

Virtual Security of Museum Collections / Breda Zimkus – Assistant Director of Collections Operations

Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA

The coronavirus pandemic forced many natural history museums to close their doors to the public. Many museums found that posting videos on their websites and offering virtual tours of their galleries and exhibits was a way that they could continue to share their collections with the public. Some institutions have similarly opened up collection storage areas that are not normally available for public viewing. The Harvard Museum of Natural History (HMNH) and the Museum of Comparative Zoology (MCZ) both have recently had their spaces scanned to create 3D models in Matterport. The HMNH has made their virtual tour available on their website so that members of the public can take self-guided journeys through the galleries. As a collection closed the public, the MCZ must carefully consider all information shared on its website, including images of collection spaces, maps, and information provided on specimen records. There are currently no plans to publish the MCZ models as a result of concerns associated with collection security, including making information about the location of valuable specimens or their associated data openly available. However, these scans are a valuable resource that will allow MCZ departments to give guided virtual tours to select groups of visitors. There may also be ways to use the scans to create virtual snapshots of select areas to share online in the future.

Using Natural History Collections as an Education Tool

Using Natural History Collections to Communicate Social Issues: The Hand Lens / Nicole Tarnowsky – Assistant Director of the Herbarium¹, Laura Briscoe – Collections Manager¹

¹*New York Botanical Garden, Bronx, NY, USA*

Science communication centering on natural history collections has become increasingly important to connecting various public audiences with the natural world. We are in the middle of a biodiversity crisis as the world changes faster than ever due to climate change and anthropogenic stresses, and fewer taxonomists to name species before they are risked with extinction. Natural history collections serve as an engaging tool connecting the public to the world they live in. This was felt even more keenly when everyone's world became dependent on connecting remotely in the wake of COVID-19. As institutions like the New York Botanical Garden pivoted to share the beauty and joy of plants with a completely digital

Specialty Sessions: SPNHC

audience, the herbarium contributed with specimen-related content. The Hand Lens, a public outreach extension of the New York Botanical Garden's C.V. Starr Virtual Herbarium, was launched in April 2019 to tell collections-based stories for the non-scientific audience. With the talent and creativity of herbarium staff, we were able to present specimen-based activities for children to do at home, articles about collecting while on socially-distanced road trips, and spring wildflowers in real time, to help people feel more connected to plants and each other during isolation. Our content has been further enriched as we were able to collaborate with our NYBG colleagues in the LuEsther T. Mertz Library, utilizing their collections hosted in the Biodiversity Heritage Library. The scope of our storytelling also shifted in response to Black Lives Matter protests, as a way to contextualize diversity through the lens of plants. With a heightened call for inclusion and diversity in the sciences, storytelling through specimens allows us an avenue to center indigenous knowledge and the experiences of marginalized groups of people through the lens of plants. This presentation highlights some of the topical content produced in 2020 for The Hand Lens to show the power of using natural history collections to represent our institutions, the sciences, and also the human element of social issues today.

Building Bridges Between Classrooms and Collections at California Botanic Garden: A Pilot Study / Mare Nazaire - Administrative Curator¹

¹California Botanic Garden, Claremont, CA, USA

California Botanic Garden (CalBG) serves the diverse needs of the communities within the Greater Los Angeles Metropolitan area and the Inland Empire in Southern California. Educating youth about the value of plants, California's biodiversity, and natural history collections is a critical component of CalBG's mission. The Garden's five collections (Library, Archives, Herbarium, Living Collection, and Seed Collection) are integral to CalBG's education and internship programs. Collection resources are used routinely in undergraduate courses, education programs, and tours.

Because of the COVID-19 pandemic, CalBG closed to the public, to students, and to the research community in mid-March 2020. For reasons of safety and adhering to California's state and county mandates, the pandemic dramatically shifted the way that our organization connects with our community, and notably, how our collections connect with our community when access to collections is severely restricted.

Most higher education institutions in California closed their campuses in March in response to the COVID-19 pandemic, with students and faculty abruptly transitioning to online instruction. To determine the educational needs of our community in the context of the pandemic, we surveyed biology faculty from 15 institutions in Southern California. To address their needs, we developed a pilot study to create digital access to CalBG's collections through virtual tours and to develop online educational modules to engage students in learning about California native plants through our collections. Our aim was twofold: 1) to provide access of CalBG's collections and online plant science resources to students during a public health emergency when collections cannot be accessed; and 2) to encourage greater diversity in professions related to plant sciences and natural history collections through educational and experiential learning.

This presentation highlights the challenges of providing access to collections during a pandemic, the inception and development of CalBG's online resources to connect undergraduate students to collections, and the results and success of our pilot study.

Student-Focused, Career-Driven, Exploration in Natural History Museums through Experiential Education and Mentorship / Adania Flemming - PhD Student^{1,2,3}, Dave Blackburn - Associate Curator of Herpetology^{1,2,3}

¹Florida Museum/ University of Florida, Gainesville, FL, USA ²iDigBio, Gainesville, FL, USA ³Department of Biology, Gainesville, FL, USA

The scientific collections and public spaces of natural history museums include tens of millions of physical specimens, exhibits, a staff of educators and researchers. Undergraduate students have unique opportunities working with staff in museums. The students require practical experiences to better understand their academic fields and career trajectories, while collection personnel need assistance curating

specimens. This can be accomplished through mentorship, training, and experience with research in a course I developed and taught at the University of Florida titled an Introduction to Natural History Museums. I taught this course in the Spring of 2018 (20 undergraduate students), 2019 (33 undergraduate students), and 2020 (12 undergraduate students and 3 undergraduate mentors who previously took the course). Over this time, the structure of the course changed from once to twice per week to incorporate the typical science course with a lecture and lab design as well as allowed students to fully engage in research in collections. The curation experience was the first step in the research process for students and inspired literature reviews from which their initial questions emerged. The lab provided a hands-on experience during which students were paired with a mentor based on research interest for the duration of the course. This experience was later refined to allow students to fully develop hypothesis-based research projects that were presented during a poster session at the end of the course. The lectures complimented the students' projects by introducing topics such as the nature of research, the distinction between predictions and hypotheses, the nature of science, efforts to make collections more accessible through digitization, and reading of relevant scientific literature. In panels with graduate students and museum professionals (curators, collection managers, museum educators), students learned and discussed career paths in science. In 2019 and 2020, students completed a pre- and post-survey to gauge their understanding of science and their career trajectory before and after taking the course. The results of the survey, and follow-up interviews, and other reflective assignments provide insights into the impact of this experiential course. The preliminary findings illustrate how natural history museums and hands-on experiences in collections serve as a gateway for students to careers in biodiversity careers. The model of this course should be considered across university-based museums to fully engage undergraduates in STEM, and can help retain students from underrepresented groups in natural history studies.

"We Found the Passenger Pigeon?!": Hands on Student-Involvement in Preservation and Curation of a Neglected and Historic Natural History Collection at a Small Undergraduate Institution / Lyndell Bade - Natural History Collection Manager¹

¹Colby College, Waterville, ME, USA

The Biology Natural History Collection at Colby College was founded as a Natural Philosophy Museum before the Biology Department even existed, and was integral in the creation of the Department. Over the subsequent decades, which included moving campuses and buildings and within buildings, the "Museum" now consists of a few display cases and the main part of the Natural History Collection is in storage and used for exhibits, research, and teaching. As a consequence of those moves, we no longer have accession information, metadata, or an inventory. Various professors and teaching staff made efforts to preserve the NHC, especially over the last 30 years, but the Collection has still suffered from extended periods of neglect. Many of our specimens are historical and of research and ecological importance. For example, we have a passenger pigeon collected from Waterville, Maine in 1870. In fact, we thought the passenger pigeon was "lost" until only recently when recognized by a local ornithologist while walking past one of the storage cabinets! We have spent the past few years doing basic preservation and management work: cleaning, identifying, and creating an inventory of our museum and teaching collection specimens. While we do not yet have a complete inventory of all specimens nor a searchable unified database, we are starting afresh and bringing 21st century approaches and best-practices to this historic and neglected collection. My approach is to combine our long-term goals with authentic research experiences tailored for each student while we also work on the day-to-day operations of inventory and preservation. There are many exciting opportunities in research (life history, development, morphology, parasitology, microbiome), imaging, preservation, art, museum studies, and data science, allowing for meaningful interdisciplinary collaborations between the sciences, arts, and humanities. I allow our students the intellectual freedom to find those interests and passions: from conservation work of the entomology collection, caring for historical taxidermy, identifying and collecting fish, acquiring high resolution micro-CT scan images of specimens--the potential opportunities for students are vast. This approach to inclusion of undergraduate student research in a Natural History Collection, although not unique, reflects the community involvement, local environment, and global engagement of Colby College as well as our engaged, active, and diverse student body. This presentation will highlight the progress we have made on the NHC via student involvement and student research on the collection.

Specialty Sessions: SPNHC

Digitized Specimen Data Use

Finding the Lost Herbaria in Arkansas / Diana

Soteropoulos – Botanist and Arkansas Herbarium Digitization Coordinator¹

¹Arkansas Natural Heritage Commission, Little Rock, AR, USA

Arkansas is a relatively small state in the U.S. Mid-South, but it is rich in botanical biodiversity and includes high levels of endemism in the Interior Highlands region. A decade ago, none of the important information housed in Arkansas herbaria through 200 years of plant collection history was publicly available online. Since then, over 200,000 specimen images and skeletal record data have been added to the Southeast Regional Network of Expertise in Collections (SERNEC) portal, with the eight known Arkansas herbarium collections contributing specimens. In the past year, as the Arkansas Herbarium Digitization Coordinator, I created a network hub for Arkansas's herbaria based at the Arkansas Natural Heritage Commission (ANHC). Through this process, I found six additional Arkansas herbarium collections. While small, these collections include underrepresented institutions in digitized natural history collection portals: three federal collections (Hot Springs National Park herbarium – HOSP, Ouachita National Forest herbarium – OUF, Buffalo National River), two community college collections (Arkansas State University-Beebe and Northwest Arkansas Community College), and a small public university (Southern Arkansas University). All collections, big and small, offer unique biodiversity records, and the growth of Arkansas's herbarium visibility depends on digitizing each herbarium specimen.

The Fishes of Texas Project's Impact on both Conservation Science and Management and a Fish Collection / Dean A. Hendrickson – Curator of Ichthyology¹, Adam E. Cohen – Collection Manager, Ichthyology¹, Melissa J. Casarez – Assistant Collection Manager, Ichthyology¹, Gary P. Garrett – Research Scientist¹, Timothy W. Birdsong – Habitat Conservation Branch Chief – Inland Fisheries Division², Sarah Robertson – Aquatic Biologist², Stephen Curtis – Aquatic Biologist², Kevin B. Mayes², Megan Bean – Conservation Ecologist³

¹University of Texas at Austin, Austin, TX, USA ²Texas Parks and Wildlife Department, Austin, TX, USA ³Texas Parks and Wildlife Department, Mountain Home, TX, USA

Started in the 1990s as an un-funded book project that was re-envisioned in the early 2000s as a digital, interactive, continually-updated and evolving online information resource, since 2006 the Fishes of Texas (FoTX) Project has had > \$2 million of federal State Wildlife Grant funding through the Texas Parks and Wildlife Department (TPWD). Its mission is to compile and subject freshwater fish occurrence data to rigorous normalization, error detection, and extensive validation/correction and make them available to, and facilitate utilization by, researchers, natural resource managers, and the public. Initial efforts focused largely on simple data digitization and compilation, then georeferencing, and development of an interactive website (<http://www.fishesoftexas.org>). Initially developed with exclusively specimen-vouchered data, the project recently expanded to include citizen science and angler-based observations and non-vouchered agency datasets vastly increasing the number of records, although many are not verifiable with specimens. Our data are now published not only in our website, but also a selected subset of fields is published (as a DwC Archive) to GBIF and iDigBio.

The project's comprehensive data aggregation, digitization, normalization, and accessibility enabled significant advances in detection and awareness of statewide faunal trends and implementation of diverse management advances. Examples include improved field guides and documentation of species' ranges, expansions, contractions, shifting community composition, bioassessments and improved biodiversity conservation, species conservation assessments, and documentation of new and long-term expansion of early invasive species. Ninety percent of presentations on related topics at this year's statewide fisheries meeting utilized FoTX products.

The now long-term, consistent funding has greatly benefited our Fish Collection

(University of Texas' (UT) TNHCi - <https://www.gbif.org/dataset/6080b6cc-1c24-41ff-ad7f-0ebe7b56f311>). Part of the funding is for statewide bioblitzes that generate new specimens, and collection growth skyrocketed, nearly doubling the size of the collection in the last decade. Bioblitz planning utilizes tools in our website that summarize and facilitate exploration of geographic and temporal histories of sampling and detection of under-sampled areas. TPWD also funds a full-time Assistant Collection Manager position to focus on bioblitzes, but also supporting general collection management and supply purchases, and assist in supervision of student help and volunteers. Another grant-funded position provides a higher-level liaison between the collection and TPWD staff. That spawned the statewide Texas Native Fish Conservation Areas program that coordinates funding and actions by diverse stakeholders for conservation at a watershed scale. Both externally funded positions participate in diverse research and outreach endeavors. Our website was developed in large part by UT's science database group in the Texas Advanced Computing Center (TACC) - a collaboration that blossomed into long-term technical support for collection database management and data publication that has since extended to support all collections in our Biodiversity Center. At the time of submission, serious discussions of a 10-year agreement between TPWD and UT for continued support of FoTX and the Fish Collection are ongoing.

Bringing the Extended Specimen into Adaptive Management: Collections informing Conservation. / Anna

Monfils – Professor and Herbarium Director¹, Rachel Hackett – Conservation Associate, Botanist², Michael Belitz – PhD Graduate Student³, Blake Cahill – PhD Candidate¹, Michael Monfils – Science Coordinator and a Senior Conservation Scientist², Dave Cuthrell – Conservation Scientist², Sara Hansen – PhD Graduate Student¹, Sarah Warner – Environmental Contaminants Biologist⁴, Sarah LeSage – Aquatic Invasive Species Program Coordinator, Water Resource Division⁵

¹Central Michigan University, Mount Pleasant, MI, USA ²Michigan Natural Features Inventory, Lansing, MI, USA ³University of Florida, Gainesville, L, USA ⁴U.S. Fish and Wildlife Service, Madison, WI, USA ⁵EGLE – Water Resources Division, Lansing, MI, USA

Adaptive Management (AM) is a structured and iterative approach to making conservation decisions. Natural history collections can play a critical role in the development of AM strategies for invasive species, conservation of threatened and endangered species, and assessment of environmental impacts. We will present on our experience building collaborations and developing AM strategies for the conservation of the federally listed butterfly, Poweshiek skipperling; and the effective management of the Great Lakes aquatic invasive plant, European frog-bit. We engaged with partners from the US Fish and Wildlife Service, the Department of Natural Resources (MI, MN, WI, IN), Michigan Natural Features Inventory (a Natural Heritage Program), Michigan Department of Environment, Great Lakes, and Energy, and researchers from US and Canadian Zoos. In both collaborative projects, collections provided critical and verifiable occurrence records representing the target species over time, space, and scale. Working with our collaborators we were able to extend the collections data using a combination of observation-based occurrence records (and field images), associated species records, environmental data, and land cover data. We developed a collaborative workflow designed to integrate data across taxa, field sites, collaborators and stakeholders and created standardized methods to facilitate more efficient field data preparation, data cleaning, and post-curation practices. The extended specimen data contributed to our understanding of species ranges, critical habitat, and biodiversity changes over time. We were able to fill critical information gaps, inform on-going research efforts, assist in the development of a pesticide risk assessment, contribute critical distribution data to a USFWS species recovery plan, and inform best-management practices. By building collaborations among partners in state and federal agencies, non-profits, and museums and living collections, we were able to extend the specimen-based data with legacy and ongoing observation-based data and enhance our ability to manage and conserve biodiversity.

Student-led Entomology Collection Digitization and Protocol Development for TCN / Monique Raymond –

assistant curator¹, Holly Hoag – student assistant curator¹, Jenna O'del – lead digitizer^{1,2}, Julia Hobbie – digitizer¹, Isaac

Specialty Sessions: SPNHC

Bergfalk – digitizer¹, Sophia Zaslow – digitizer¹, Nathan Stearns – digitizer¹, Istvan Miko – collections manager¹

¹University of New Hampshire, Durham, NH, USA ²University of Rhode Island, Kingston, RI, USA

The taxonomically important holdings of the 130-year-old Don Chandler Entomological Collection (UNHC) have been largely inaccessible to researchers and the general public resulting from largely analog functioning. In 2019, the UNHC became part of the NSF-funded Terrestrial Parasite Tracker Grant, drawing on its strengths in certain Diptera, and its Phthiraptera and Acari specimens. To progress this project, the UNHC has employed undergraduates, including new and past UNH alumni, to digitize parasitic specimens and generate high-resolution images. Students are crucial in developing workflows, including cell phone staged specimen imaging, Macropod high-resolution imaging system, flatbed scanner slide imaging, and the application and testing of biodiversity software TaxonWorks. TaxonWorks allows remote access to the UNHC, and will encourage dispersion of information. This work has provided a unique opportunity for students. Undergraduate research opportunities in the biological sciences rarely allow exploration of software testing and protocol development. These protocols and their associated workflows are challenged for their remote efficiency during the coronavirus pandemic. Ultimately, digitization protocols have been developed and will be applied in a recent NSF grant awarded to the UNHC to digitize New England Lepidoptera specimens into the Lepidoptera of North America Thematic Collection Network (LepNet TCN).

Use of Digitized Natural History Collections Data to Inform Conservation Management Decisions for RTE Plant Species in South Carolina / Herrick Brown – Curator¹

¹A.C. Moore Herbarium (USCH), University of South Carolina, Columbia, SC, USA

The A.C. Moore Herbarium (USCH) at the University of South Carolina has maintained a longstanding, close-working relationship with the South Carolina Department of Natural Resources Heritage Trust Program. Serving as the principle repository for all plant voucher specimens collected through Heritage Trust survey efforts, USCH has prioritized digitization for all specimens of Rare, Threatened, and Endangered species held in its collection. Mobilization of these data has facilitated access for Heritage Program personnel who have reviewed and annotated relevant specimens. This partnership has resulted in improved data quality through positive identifications with updated taxonomy and georeferencing of verbatim localities and the addition of geographic coordinate values. In addition, Heritage Program staff have leveraged increased access to specimen data at other herbaria in the Southeastern United States through the SERNEC data portal (www.serneportal.org). We will present a focused case study involving the use of herbarium specimens of Venus Flytrap (*Dionaea muscipula*) to inform the State of South Carolina's position regarding the status of the species in the state. This action followed a 2016 petition to the United States Fish and Wildlife Service to consider the species as Endangered under the 1973 Endangered Species Act. Alternative query methods were possible with the use of tools available in the SERNEC data portal. These various approaches to data mining enabled Heritage Program personnel to characterize historical habitat conditions based on specimens collected in the 1940s and to begin understanding possible causes for extirpation of local populations. Armed with this knowledge, Heritage Personnel have increased efforts to re-locate Flytrap populations considered most at risk in South Carolina and initiated additional management strategies to improve habitat conditions.

Lessons in Data Collection, Management, and Dissemination across Multiple Biodiversity Projects /

Rachel Hackett – Conservation Associate, Botanist¹, Michael Monfils – Michigan Natural Features Inventory, Michigan State University¹, Anna K Monfils – Central Michigan University²

¹Michigan Natural Features Inventory, Michigan State University, Ann Arbor, MI, USA ²Central Michigan University, Ann Arbor, MI, USA

A next step in enhancing biodiversity collections is the building the infrastructure and incorporating new extended specimen data, information, and measurements into datasets. Buy-in from the research community to develop datasets abiding

by FAIR data principles will expand the capabilities and questions that could be answered by biodiversity data. In many field-based ecological projects, the adoption and integration of FAIR data principals is not at the forefront of project planning or resource allocation. The burden of such datasets is usually placed on the data curator post-data collection. Since few resources are allocated for data curation, we must develop best practices that can be adopted when designing the field collection protocols to reduce the burden and develop flexible and dynamic tools to organize data post-collection. We will share best practices and lessons learned over the course of several large-scale projects when collecting observational and specimen data to integrate into multi-layer, multi-dimensional relational datasets modeling Darwin Core terms and classes. We also call for other developments that will ease creation of biodiversity datasets to enable effective, long-term scientific data stewardship for field-based projects.

Extending Herbarium Specimen Data Beyond the Ivory Walls – A Case Study from the Consortium of Pacific Northwest Herbaria Online Database / David Giblin – Collections Manager¹, Ben Legler – Collections Manager²

¹University of Washington Herbarium, Burke Museum, Seattle, WA, USA

²University of Idaho Stillinger Herbarium, Moscow, ID, USA

The Consortium of Pacific Northwest Herbaria (CPNWH) online database was launched in 2010 and now hosts over 3 million specimen records and 1.4 million specimen images from 42 herbaria throughout the region. The specimen data support a range of plant conservation, floristics, invasive species, and public outreach projects. Natural heritage programs in Alaska, British Columbia, Idaho, Montana, and Washington rely on CPNWH data for taxonomic, nomenclatural, and distribution data. Ongoing multi-institution flora projects in Alaska and British Columbia consult CPNWH data to generate baseline species checklists and range information. National Park Service and U.S. Forest Service botanists in Washington use CPNWH data to locate rare plant populations on their lands and to locate local native species populations for seed collecting as part of habitat restoration projects. The Washington Native Plant Society uses CPNWH distribution data, nomenclature, and taxonomy as the basis for its online Plant Lists database, which contains over 700 species checklists from locations around the state contributed by its members over 40 years. Smartphone wildflower app developers use CPNWH data for their distribution maps. In this talk we cover how we make these data available, how we build partnerships, use specific examples to demonstrate the impacts of non-academic use of data, and identify additional areas that we think the data can be used in the future.

Mining the Digital Treasure Trove: The Value of Digitized Herbarium Specimens to State Natural Heritage Programs, and Recommendations for Enhancing the Value of Future Collections / Theo Witsell¹

¹Arkansas Natural Heritage Commission, Little Rock, AR, USA

State Natural Heritage Programs (NHPs) generate, gather, curate, and provide data on the occurrence and status of species and natural communities of conservation concern (rare species and communities). These data come from a variety of sources (agency scientists, academic researchers, amateur naturalists, scientific literature, museum specimens, etc.), and are used for a variety of purposes including environmental review, conservation planning, and research. Natural history collections have always been important sources of information for NHPs, but the increasing availability of digitized natural history specimens in recent years has revolutionized the data landscape and the resources available to NHPs.

Using real world examples, we will highlight some of the ways the Arkansas Natural Heritage Program uses digitized herbarium specimens, accessed primarily through the Southeast Regional Network of Expertise and Collections (SERNEC) portal (serneportal.org). Examples include documenting the historical occurrence of rare species not previously known to occur in the state (e.g. *Berberis canadensis*, *Phragmites australis* subsp. *americanus*, and *Rumex maritimus* var. *fueginus*, all from the late 1800s), first state records of rare species from state natural areas (e.g. *Dichanthelium spretum* and *Paspalidium geminatum*), and many new occurrences of species of state conservation concern. We have also used certain habitat-specific indicator species to find previously unknown occurrences of rare communities.

Specialty Sessions: SPNHC | Sustainability

Also, in hopes of increasing the utility of digitized specimens, we will highlight the importance of including detailed data on specimen labels including 1) precise locality data (ideally GPS coordinates), 2) population attributes (number of genets/ramets, areal extent or area occupied, vigor, and reproductive status), 3) habitat information, 4) associated species, and 5) threats. We encourage collectors to include these data on specimen labels for rare or uncommon species, as it greatly enhances a specimen's value for conservation. Similarly, while consideration should be given to masking locality data from specimens of species at true risk from over-collecting (e.g. some orchids, medicinal plants, carnivorous plants, etc.), a common sense approach should be used when selecting species to mask so that data for as many species as possible are freely available.

How Digitized Herbarium Specimens Contribute to Biodiversity Inventory and Conservation Planning in a Rapidly Developing Region of Northwest Arkansas /

Theo Witsell - Ecologist/Chief of Research¹

¹Arkansas Natural Heritage Commission, Little Rock, AR, USA

State Natural Heritage Programs (NHPs) generate, gather, curate, and provide data on the occurrence and status of species and natural communities of conservation concern (rare species and communities). These data come from a variety of sources (agency scientists, academic researchers, amateur naturalists, scientific literature, museum specimens, etc.), and are used for a variety of purposes including environmental review, conservation planning, and research. Natural history collections have always been important sources of information for NHPs, but the increasing availability of digitized natural history specimens in recent years has revolutionized the data landscape and the resources available to NHPs.

In 2018 the Arkansas Natural Heritage Commission (ANHC) began its first-ever County Natural Heritage Inventories (CNHIs) in Benton and Washington Counties. These counties, located in the northwestern corner of the state, are among the most rapidly developing regions of the country and represent one of the highest priority areas for conservation in Arkansas. They are also among the most biologically diverse counties in the state, in part due to the historical abundance of several types of high-biodiversity grassland ecosystems. Benton County, for example, supports the highest number of plant species of state conservation concern of any county in Arkansas.

The goal of these CNHIs is to identify, based on the best available data and science, the most critical areas for biodiversity conservation and prioritize these sites for conservation investment and management action. This presentation will describe the CNHI process and highlight the role of digitized herbarium specimens in fulfilling three key objectives of the CNHIs: 1) compiling annotated lists of the vascular flora of each county, 2) mapping occurrences of species of state conservation concern (rare plants), and 3) informing the description and mapping of natural communities in the counties. These resources will be used to prioritize the acquisition of new conservation lands, guide recreational and other development on existing conservation lands, and make decisions on where to best implement ecological restoration and management activities.

Sustainability

Evaluating the Effects of COVID-19 Changes in Mechanical System Operation on Collections Environments /

Kelly Krish - Preventive Conservation Specialist¹

¹Image Permanence Institute, Rochester, NY, USA

The onset of the COVID-19 global pandemic forced many institutions to implement changes in the operation of their mechanical system(s) as a result of reduced occupancy, to save money, or to slow the spread of the virus. These changes, from complete system shutdowns during lengthy closure periods to using increased amounts of outside air during humid summer months, had often not been previously tested. Depending on the specific situation, these actions can have significant impact on the short-term quality of a preservation environment but can also inform the long-term planning and future of sustainability within cultural heritage.

The Image Permanence Institute (IPI) set out to: 1) evaluate the effects of these changes with respect to their impact on preservation, and 2) to share with the field

how to best use this information to enact long-term changes that improve both preservation and sustainability.

An online survey collected data about topics including: pre-existing emergency plans for mechanical system adjustments, decision-making processes pertaining to mechanical system operation, institutional concerns associated with changes made, and the observed changes/impact to collections environments during closures. Evaluating this data provided insight into what a similar incident may mean to other institutions and how to avoid negative consequences when making emergency operational changes. Planning for emergency operations includes identifying the key factors for success, laying out appropriate guidelines, and testing strategies in advance to understand their impact.

Six institutions that responded to the survey were selected for a more in-depth analysis, particularly those experiencing challenges related to the implementation of strategies during modified operations due to COVID-19. The data can be used in long-term planning to assess the quality of their building envelope, capacity of their mechanical system(s), and effectiveness of their mitigation strategies. Operating mechanical systems to strict museum standards can result in high energy costs and, consequentially, a larger carbon footprint; seeing how collection spaces responded to these changes indicates which strategies can become a permanent part of operations, leading to lower energy costs and a reduced carbon footprint. Alternatively, if strategies, even with modifications, are not appropriate at a specific institution, they will be prepared and able to prioritize capital spending to make the most significant changes for preservation and energy-savings.

While human health has always been, and will remain, the overriding factor to determine mechanical system operations, the current safety guidelines, IPI's previous experiences in implementation, and the results of the survey and in-depth analysis, all build towards a better understanding of our indoor spaces and how we can best operate to ensure a sustainable future for our collections and our environment.

The Migration of Coconuts; The Historic Uses of Coconut Shell Across Cultures and its Presence in Museum Collections /

Elena Bowen - Graduate Conservation Fellow¹

¹RLA Conservation, Miami, FL, USA

A scene from one of my favorite movies, 1975's *Monty Python and the Holy Grail*, leads to a humorous discussion between King Arthur and a castle guard about what type of swallow could carry a coconut from tropical climates to the temperate zone of Great Britain. While coconuts may not have been transported across the continents by swallows, as suggested in this scene, coconut shell has found its way into the material culture of societies across nearly every continent. From carved ornate goblets thought to have curative powers to utilitarian tools such as spoons and water containers, coconut shell is a raw material with endless possibilities that at one point in history even inspired a coconut cult. One of the unique and useful qualities of coconuts, is that every part of the coconut is useful. The inner milk and meat are nutritious components that can be consumed raw or cooked, the shell and husk are used as an efficient biofuel, and the fibers harvested from the coconut husk can be used to create rope and textiles. These are merely examples of the many uses for coconut worldwide.

My fascination with coconuts stems from a graduate curriculum treatment of a Puerto Rican vejigante mask. I was familiar with this object from my childhood travels to Puerto Rico but couldn't connect that nostalgic familiarity to my scientific knowledge of materials. It was then that I decided to focus my thesis research on coconut shell usage, aging, and treatment. This poster will focus on the results of a preliminary survey of the Fowler Museum at UCLA collection, the subsequent Google Forms survey sent out to colleagues across the globe, and research into coconut as a cultural phenomenon.

Sustainability Committee Ask and Expert Q&A: Zero Waste /

Angela Moore

Textiles

Re-examining surfactant choices in textile conservation

/ Callie Jerman - Graduate Student¹, Sara Reiter - Senior Conservator², Sarah Foskett - Course convenor¹

¹Center for Textile Conservation and Technical Art History - University of Glasgow, Glasgow, United Kingdom ²Philadelphia Museum of Art, Philadelphia, PA, USA

As part of the internship process required of the University of Glasgow Textile Conservation program, the author partnered with conservators at the Philadelphia Museum of Art to examine the current use of surfactants for wet cleaning. The prevalent use of Orvus® WA Paste was highlighted as a particular concern. This led to an inter-disciplinary examination of the literature available on surfactants that are appropriate for use in textile conservation, including evidence of issues with anionic surfactant adsorption on protein fibers. Reducing the use of anionic surfactants requires the identification of suitable replacements-- a challenging proposition given the range of options available and a lack of information about many of them. Cultural heritage institutions are also increasingly aware of the potential environmental effects of their chemical use, which adds a new dimension to surfactant selection.

Here we encourage conservators to question their established practices and re-examine the literature available about surfactant properties. The chemical classes of surfactants that are commercially available are explained in terms of their properties, current use in conservation, and environmental effects, to aid in understanding of the breadth of the options available. The Philadelphia Museum of Art is presented as a case study of surfactant suitability for a specific institution and collection. Finally, we hope to draw attention to the gaps in our understanding of the surfactants available to textile conservators and the complexities involved in studying such dynamic and interactive materials.

"How Does My Stitch Work?" - An Attempt to Evaluate Stitching Methods in Tapestry Conservation / Eva Catic - Textile Conservator¹

¹Center for Textile Conservation and Technical Art History - University of Glasgow, Glasgow, United Kingdom

Securing fragile areas is one of the most time-consuming and important aspects of conserving a tapestry for future generations. However, little research has been done to compare the most popular stitching methods and analyze their behavior. The presentation based on the author's master's thesis, carried out at the Center for Textile Conservation, University of Glasgow, raises the question of how to assess and evaluate stitches that international conservators use for tapestries. A questionnaire and literature review were undertaken to identify methods executed by conservators within Western conservation practice. The questionnaire carried out in four different languages (German, English, French, Italian) showed a connection between the preferred stitching methods and materials with traditional behavior and the geographical area.

Artificially damaged test samples were treated with the two most common methods - brick couching (tabby stitch) and laid couching. The samples were subjected to a fixed load testing for seven days. Deformation processes could be recognized and analyzed with a digital image correlation program (DIC). (see Figure 1)

Figure 1: Vertical strain of test samples showing via DIC (Digital Image Correlation) at hour 26. Red meaning high strain, blue means a negative strain.

The presentation illuminates the following questions:

A: Which stitching methods are currently the most common ones, and what are the main reasons for conservators to use them?

B: What can we learn in comparing and analyzing the stitching methods, and is there a possibility to enhance our understanding by using scientific measurements such as an image correlation program (DIC)?

C: What are the differences between methods, and how is it possible to analyze patterns in behavior?

The tests showed differences in the behavior of the stitching methods. However,

also similarities despite their variation in execution and materials. Other recordings such as measurements of extension and recovery, amount of material used, and time needed for stitches supported this observation and helped to understand certain behaviors better.

This study provided initial data and concluded that DIC is a useful tool, but further research is needed. The research was carried out in conjunction with a project to investigate the behavior of tapestries at the Centre for Textile Conservation, University of Glasgow, led by Professor Frances Lennard.

Testing Urease and Protease Enzymes for Use with Cellulosic Textiles / Zoey Hasselbring¹

¹Fashion Institute of Technology, New York, NY, USA

While soiling from food, fats, dust, and metals are common in textile collections, the problem of pet urine is unusual, troublesome, and odiferous. Feline urine creates discoloration, brittleness, and a pungent odor that lingers as the object ages. Enzymes offer a targeted solution to break down specific components of staining and are used widely in commercial pet cleaners and laundry products. This suggests the useful application of enzymes for addressing pet staining could be applied to textile conservation with additional research.

Although starch targeting (alpha-amylase) enzymes are well known to textile conservators, many of the enzymes used by our colleagues in paper and objects conservation to target proteins (proteases), lignin (ligase), or the cell walls of mold (chitinase) are unfamiliar to us. The use of protease enzymes has been widely used by paper conservation. However, there has been little research on the application of protease enzymes in textile conservation.

This paper explores the potential application of protease and urease enzymes for use with textiles with urine staining. It discusses relevant research publications in paper and objects conservation, that were used to shape the experimental set up. It will then examine the efficacy and long-term safety of Trypsin IX, Savinase, and Urease III on cellulosic textiles.

Little Friends, Big Problems: Treatment and Analysis of the Garments on the Libbey Doll Collection / Marissa Stevenson - Kress Fellow, Multi-Media Textile Conservation¹

¹Toledo Museum of Art, Toledo, OH, USA

Lovingly revered and often inquired about, the Libbey Dolls have been a part of the Toledo Museum of Art (TMA) collection almost from its inception. Created in 1915, the 78-figure collection personify characters from works of art and fashion publications by famous French artists like Gustave Moreau, Nicolas Lancret and Philibert-Louis Debucourt, depicting the evolution of French fashion from 493 A.D to 1915. The 24" tall figures are dressed in the minutest detail by prominent Parisian couturier of the late 19th and early 20th century, Jacques Doucet (1853-1929). The elaborate ensembles exhibit the same high degree of detail, finesse and conservation issues as Doucet's full-scale garments. Since the acquisition of the collection by the TMA, the Libbey Dolls have been a visitor favorite and a nostalgic touchstone in the history of the museum. As beloved objects, the collection remained on view from 1917 until 1970's when the impacts of environmental conditions became more apparent as the field of conservation developed. Being objects that were subjected to long-term display, the dolls were exposed to adverse effects from light, early wooden case work design, mounts, handling, and fluctuating environmental conditions common in early to mid 20th century museums.

As three-dimensional objects embellished with fragile, multifarious materials, the Libbey Dolls pose a complex conservation challenge to treatment. The figures have wax and plaster heads, arms and legs with a soft torso stuffed with hay and raw cotton. The dolls are dressed in fine linen, silk, cotton, wool fibers and satin, velvet, brocade, and painted fabric remnants from the House of Doucet. The ensembles are embellished with feathers, glass beads, early plastics like cellulose nitrate, trims, metal threads, sequins, leather, fur, paper and paint. The textile components have significant signs of degradation including color fading, brittleness, acidic staining and shattered silk. The dolls have been upright on their stands for most of their existence, as a result the stuffing of the torso has settled causing the removal of the garments unachievable in some cases, adding an obstacle to treatment.

Specialty Sessions: Wooden Artifacts

This paper will examine the stabilization and treatment of the garments and accessories as well as question and address the complexities of conservation treatment of garments on composite, three-dimensional objects. Given that the adverse environmental conditions and duration of exposure is known, further analytical testing will be conducted to identify the silk weighting agents and degradation markers to quantify and interpret how these conditions have affected the aging of the silk fabrics. Since the collection is large, a select number of dolls with the most serious condition issues have been selected to serve as conservation case studies for the remaining collection.

Wooden Artifacts

Exhibit Case as a Compatible/Incompatible Object? - Part 2 for Wooden Artifacts / Ellen Carrlee - Conservator¹

¹*Alaska State Museum, Juneau, AK, USA*

The Alaska State Museum in Juneau, Alaska, has been located on Tlingit land for more than 120 years. As part of the inaugural exhibits for the new building that opened in 2016, a clan house space was fabricated from Western Red Cedar by a team of indigenous carvers. Inside this structure built within the permanent galleries, the museum installed painted masks, shell, silver, and other items whose preservation might be threatened by offgassing from the freshly-adzed surfaces of the wood. In 2020, two newly-carved houseposts and a new large wood screen were added to the display, also adding to the load of airborne pollutants in the space. This presentation discusses the mitigation and monitoring plan for addressing the exhibition of sensitive materials, and examines the uncomfortable conservation dilemma posed by putting objects in harm's way for the purposes of larger interpretive and cultural priorities. The interior surfaces were coated with several layers of shellac, silver and shell jewelry was put inside a vitrine with pollutant scavengers, fans were installed below the decks to reduce concentrations of offgassing, and Munsell color readings were used to create a baseline for monitoring pigments containing metals as identified by portable XRF. The challenges of capacity in a rural museum with a small staff are addressed in this presentation, as well as the special responsibility to "get it right" in the homeland of a people who have been here for 10,000 years. Questions of decision-making authority and intended audience for indigenous material culture add nuance to a classic dilemma of preservation versus access. The opportunity to carve the clan house, screen, and house posts is itself a form of preservation and perpetuation of culture. The ongoing use of the clan house as a heritage space by the Native community and the authenticity of Western Red Cedar as a culturally significant material on the Northwest Coast are also factors in the discussion. Questions of ownership and ongoing use of Alaska Native collections continue to be debated within NAGPRA and self-determination frameworks. This presentation explores networks of ongoing relationships involving museum staff, artists, culture-bearers, artifacts, and materials as agents from a materiality perspective. How do conservators steeped in guidelines for best practice come to terms with an exhibit enclosure that is both compatible and incompatible with its contents?

String Theory: the Comparative Treatments of Two Musical Instruments / Emily Brzezinski - Graduate Fellow¹, Sarah Towers - Graduate Fellow¹

¹*Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA*

This talk explores often-overlooked facets of our work: the decisions driven by a conservator's training and personal preference, as well as cultural bias which can be compounded by historical collection practices of the institutions or collections which we help preserve. We compare the treatment methodologies for two wooden stringed musical instruments, demonstrating the significant impact the conservator's personal bias can have on an object. The two interventive treatments were performed in different labs as part of the graduate curriculum at the Winterthur/University of Delaware Program in Art Conservation. The first, an Indian sarangi of unknown maker and date, was treated in the objects lab; the second, an 1833 Norwegian Hardanger fiddle made by John Eriksen Heland, was treated in the wooden artifacts lab. Both instruments were in poor condition, with extensive structural damage, separated or missing elements, tangled or lost strings, and damage to surface decorations. Therefore, both

instruments required similar treatments and the same ethical considerations around playability and aesthetics. Despite this, the treatments took very different approaches to loss compensation. The abundant research material available for a European musical instrument provided extensive historical context on the maker and original appearance of the Hardanger fiddle, while the sarangi had an unknown provenance and minimal information to inform its original appearance, exacerbated by historical colonial collection practices. Additionally, the goals of the instruments' permanent collections guided treatment priorities, reinforcing divergent methods between the two. Finally, the conservation specialties - objects and wooden artifacts - brought their own conventions regarding techniques, materials, and approaches that were driven by the personal skills and preferences of each conservator. The combination of all these factors resulted in the wooden artifacts lab taking a more restorative approach on the Hardanger fiddle that utilized like materials and more visually integrated loss compensation, while the objects lab employed less visual integration and modern, highly distinguishable materials on the Indian sarangi. Either approach would have been valid for either object, and these case studies exemplify how the historical cultural bias in the fine arts world still affects our treatment choices and options. Ultimately the conservator's preferences were the deciding factors in the treatment and we propose that individual training, priorities, and cultural bias have a profound influence on the objects in our care.

Treating an Oil-Gilt J.M.W. Turner Picture Frame / Ines Bravo - Frames Conservator¹ and Freelance Objects Conservator¹

¹*Tate, London, United Kingdom*

This paper presents the treatment of an oil-gilt J. M. W. Turner (1755-1851) frame in Tate's collection and the practice-based research designed in consultation with the Tate Conservation Science department to support the development and optimisation of a successful cleaning methodology for this gilded surface.

Previous restorations undertaken on this frame created the need to treat the object, and also added a number of challenges and ethical considerations to the treatment. The 3-dimensional ornate nature of this object posed additional challenges to the cleaning strategy as removing gel residues from topographically complex gilded surfaces without disturbing the gilding can be particularly problematic. A comparative evaluation of a range of cleaning systems was therefore designed to assess the efficacy of the removal of soiling and bronze overpaint from this complex oil-gilt frame.

Undertaking this in-depth treatment required addressing and treating losses to the composition ornament and to the gilded surface. This stage of the treatment needed consideration in how best to visually reintegrate areas of loss and raised ethical questions of if and how to tackle former, distracting restorations.

Each step of the treatment was guided by ethical considerations, not just regarding the best course of action, but also in selecting the most appropriate conservation materials to employ in order to better preserve the object. Such considerations led to weighing up pros and cons of traditional vs non-traditional conservation materials and techniques. As a result, this project became an excellent opportunity to explore and select non-traditional and synthetic conservation-grade materials to undertake the conservation treatment of a traditional gilded object.

Demonstration of Gilding Methods, Materials, and Techniques / Behrooz Salimnejad¹

¹*Philadelphia Museum of Art, Philadelphia, PA, USA*

While gilded surfaces are frequently found in collections worldwide, the workload and rotation of objects through a lab may mean that generalist conservators may not always have the familiarity or the confidence with the process of gilding.

Behrooz Salimnejad, the Senior Conservator of Furniture and Woodwork at the Philadelphia Museum of Art, has been gilding for over 50 years and will be demonstrating tips, techniques, and materials both traditional and what he has developed to make the process easier. Salimnejad will demonstrate how to process substrates for gilding, make gesso, bole, and methods of applying them on different surfaces including over highly carved forms to minimize the loss of detail. Lastly, he will discuss different methods of cutting and refining gesso and applying and manipulating gold leaf that significantly improve the ease of working.

Specialty Sessions: Wooden Artifacts

Assessing the Interaction of Commonly Used Wood Adhesives and Fillers in Conservation for Hardwood and Softwood, and Their Behavior in Monsoon Condition

/ Cindy Lau – Objects Conservator¹, Noriko Hayakawa – Conservation scientist, Head of Restoration Materials ², Reo Kurashima – Researcher²

¹*Heritage Conservation Centre, Singapore, Singapore* ²*Independent Administrative Institution National Institutes for Cultural Heritage Tokyo National Research Institute for Cultural Properties, Tokyo, Japan*

The selection of adhesives and gap fills for wood conservation has always been complex and challenging, especially in outdoor conditions due to hygroscopic characteristics of wood, material nature of the adhesives and gap fills, interaction between the conservation materials and wood tissues, and their response to external environments. Therefore, this study aims to assess and compare the characteristic and performance of the commonly used adhesives and gap fills in wood conservation, and their behaviour in storage and simulated outdoor monsoon aging conditions with respect to hardwood (Teak) and softwood (Pine) through simple analytical methods. The overall results revealed that the different species of wood would have significant influence and unexpected ramification on the adhesive penetration, bond strength, and gap fills performance of commonly used adhesives and gap fills. Conversely, under the effect of high fluctuating relative humidity of the outdoor monsoon condition, Jade R adhesive shown the best performance for softwood (Pine) but not for hardwood (Teak), and none of the tested gap fills appeared to be suitable with the formation of different degree of defects on the gap fills. The result will impact the future experiment or testing methodology of adhesives and fillers for different species of wooden objects in conservation.

The Efficient Methods of Studying Previous Interventions, Materials, and Techniques Used in Tutankhamun's Painted Wooden Bed / Mohamed Moustafa – Conservator, wood lab¹, Gilan Sultan – Head of wood lab¹, Ahmed Abdrabou – Conservator¹, Samar Fawzy – Conservator¹, Hassan Mohamed – Manager assistant of storage department¹, Hussein Kamal – General director of conservation affairs¹

¹*Grand Egyptian Museum – Conservation Center, Giza, Egypt*

The bed studied here dates back to the new kingdom, 18th dynasty, King Tutankhamun (1337-1347 B.C). Six daily beds were found in the tomb of Tutankhamen, two in the antechamber, while the others in the annex. This paper describes for the first time one of the white painted beds, which was found in a bad condition at the north end of the chamber, the foot panel broken off and dismantled from bedstead, also damage of cord webbing in several places were recorded. After receiving this bed it was clear to see major previous conservation materials covered original surface, previous adhesive materials, insect remains, flaking off a white painted layer, and red layer was noticed under the white layer in several places. Here we will shed light on materials of manufacturing, previous conservation interventions, and conservation processes. Non-destructive techniques of visual assessment, optical Microscopy (OM), x-ray diffraction (XRD), x-ray fluorescence (XRF), and Fourier Transform Infrared Spectroscopy (FTIR) in a combination with TP technical photography were used in this study to elucidate the components of the bed, deterioration aspects and identify the previous conservation materials. Non destructive technique was used for the first time in the Tutankhamun collection to identify the wooden species which revealed to the presence of Tamarisk .sp., besides, identification of insects species included in this study. Technical photography revealed in the areas of previous conservation materials, especially on the cord webbing, that could not be able to identify by naked eyes. After examination of the vegetable fibers, it was clear to know that the cord webbing made of linen, while previous conservation interventions were from cotton covered with red painted layer, but with the same technique. A combination between all analyses mentioned above were applied to know the ethics of reconnecting the footboard with the bed frame and identify the white painted layer as huntite. In addition, the authors succeeded to find the missing part of the tomb remains related to the bed frame, and applied all needed investigations, and analyses to prove its original place with the original white color without any consolidation materials

and reconnected this part for the first time from the tomb discovery. Besides, the previous conservation fillers were analyzed to know more information regarding the previous conservation materials and methods.

A Gothic Revival: Treatment of a 19th-century Red Goatskin Leather Tufted Sofa / Gert Van gerven¹

¹*Private Practice, Amsterdam, The Netherlands*

Beginning in 2015, over 300 objects in the early American furniture collection at the Philadelphia Museum of Art (PMA) were surveyed for publication in the catalogue "American Furniture 1650-1840, Highlights from the Philadelphia Museum of Art". Over 100 objects in this selection were treated, many of which needed new upholstery. One of the more challenging treatments involved the reupholstery of a Philadelphia Gothic sofa in leather using a removable and minimally intrusive system. This Gothic sofa was acquired by the PMA in 2006 through a dealer, who had realized part way through deupholstering that the sofa contained some original material. The tulip poplar wood sofa is painted in a faux oak wood graining and retains its original underupholstery on the arms and back. During the treatment we found several remnants of the original leather and even a small strip of the original trim. Based on technical research and material analysis we rediscovered what materials were originally used, which proved helpful for reconstructing the original shape, show cover, and finishing elements.

The large surface area of the back and seat of the sofa required the use of more than one hide. Consultation with specialists in the field led us to the conclusion that during this period the leather would have likely been skived and glued rather than stitched. Skiving tools were customized to prepare the leather for the new show cover and a number of adhesives were tested for joining. The leather needed to be applied following the exact shape of the underupholstery but could not be attached to it. The leather was molded to retain its shape and sit like a skin on top of the original upholstery. Tacking strips were made from carbon fiber using molds and vacuum techniques to create a perfect fit with the original underupholstery. This minimal approach reduced the amount of staples needed for attachment. The sofa was originally upholstered with a floating tuft. The tufts were finished with buttons based on a period sofa at Bayou Bend Collection and Garden. The reproduction trim was woven and glued to the new leather showcover.

The most disturbing of the missing carved elements were completed. The faux grain painted surface was cleaned and losses were inpainted. This project contained an interesting mix of material analysis, technical challenges for carrying out the treatment, and creative problem solving. The specific skills from multiple conservators in the lab were combined to come to a maximum result.

Joint Session: Book & Paper + Photographic Materials

Photograph Albums; Cross-disciplinary Decisions for These Most Delicate Bound Volumes / Georgia Southworth
– Associate Conservator, Photograph Conservation Department¹

¹*The Metropolitan Museum of Art, New York, NY, USA*

In caring for The Metropolitan Museum of Art's photographic collections, the Department of Photograph Conservation engages in preservation, research, education, advocacy, and of course, conservation treatment. Photographs are held throughout The Met's collection in numerous formats. Each format - and more accurately, each individual work of art - presents a unique set of preservation concerns that determines its accessibility for research and/or exhibition. A great number of photographs in The Met's collections are housed in photograph albums, and their needs often must be addressed not just by a photograph conservator, but by a book conservator, as well. With the goal of minimal treatment intervention into these integral objects, this cross-disciplinary communication and care is essential for the proper preservation of photographically illustrated volumes.

Museums, libraries, and archives collect bound volumes for numerous reasons; certainly for the content within their pages, but also for the beauty of their bindings, their rarity, prominence in an archival collection, or the aura imbued in them through authorship or provenance. With photograph albums and photographically illustrated books, the images that enliven the pages serve most often as the reason for acquisition, and the conservator's understanding of the methods of attachment and the chemical sensitivities of the photographs is essential. Also, the bound volume is a dynamic object. It 'functions' through a series of actions that allow the book to open and close smoothly; with photograph albums, these actions are regularly quite different from those in traditionally bound books. The health of this mechanical action is critical, and if compromised, access to the artworks within is compromised as well.

Volumes containing photographs also present their own set of preservation issues, housing needs, and exhibition concerns. Hewing to the underlying theme of the ethical considerations involved in each object's treatment, this talk will review a number of album structures and their common degradation patterns. Aware that institutions of all sizes, with varying levels of resources, house photograph albums in their collections, the author will discuss guidelines for preservation, treatment, and storage that incorporate the further environmental and physical concerns heightened by these volumes' photographic contents.

Revisiting and Reconsidering Disbound Albums /
Anne Marigza – Conservator¹

¹*United States Holocaust Memorial Museum, Washington, DC, USA*

In 2003, the United States Holocaust Memorial Museum received by donation four family photograph albums that had been removed from the residence of Heinrich Himmler, the second most powerful man in the Third Reich. Two of the albums were compiled by Himmler's daughter, Gudrun, or "Püppi" ("Dolly") as she was nicknamed, and contain photographs of young Gudrun and her parents, as well as photographs of her father taken by official photographers, with notations in Gudrun's schoolgirl script. The two albums compiled by Gudrun were bound with cord, and it was decided by artifact and photography curators at the Museum that these albums should be disbound for ease of photography and exhibition of individual pages. Additionally, these albums were accompanied by many loose photographs, which were believed to have fallen out of the albums.

Treatment involved documenting the albums as intact volumes and the locations of photographs still attached on each page, then removing the cords and storing them and the cover boards separately, as well as surface cleaning of the pages and the photographs in situ. Two historians from the Museum worked with the conservator to determine the proper location of some of the loose photographs, and these were placed and documented.

Part of the rationale for disbinding was that individual pages could be displayed on exhibit. Instead of stressing the pages and exposing the entire volume to risk,

only one or two pages at a time would be needed, showing only the photographs applicable to the exhibition theme; and, exhibit preparation would be simple, with the pages mounted flat. However, exhibition curators since that time have shown a preference for displaying intact albums rather than pages, and these two albums have been rejected for use in exhibits in part because they are unbound.

With this preference in mind, consideration was recently given to rebinding these albums, more than fifteen years after they were disbound. Advances in the processes for photographing volumes since that time mean that the albums would not necessarily need to be disbound for future imaging projects. No record of damage to the string holes or heavy creasing at the shoulders of pages or cover boards at the time of disbinding was found in the documentation available remotely in electronic format, so it was proposed that the volumes could possibly sustain restraining, with the treatment being done upon returning to onsite work.

The albums and their associated curatorial and conservation documentation were examined during a short-term return to the laboratory. While a final decision has not yet been made, the assessment of their current condition and an investigation into the feasibility of rebinding the albums revealed compelling reasons for them to remain unbound.

This talk will present the case for rebinding the albums as well as the case for leaving the albums in their unbound state. The albums have been altered once by treatment, by disbinding and the reattachment of photographs, and rebinding may impose still more alteration. Rebinding can be seen as a new treatment, or as the culmination of a treatment that involves disbinding as an intermediate step. The question is, ultimately, whether the albums should be returned to their original bound form or whether the treatment reached its functional termination at disbinding and reformatting.

Japanese Tourist Albums in the Collection of the Art Institute Chicago: their complex interpretation and material deterioration / Nayla Maaruf¹

¹*The Art Institute of Chicago, Chicago, IL, USA*

The Art Institute's Photography and Media collection holds two 19th century Japanese photographic tourist albums with hand-colored albumen photographs and Chinese paintings on pith paper. I plan to discuss the material aspects of the albums and their conservation difficulties.

The albums are both Orihon style (accordion binding) with wooden lacquer boards of the same size. The lacquer on the boards of both albums is cracking and delaminating. Both albums have broken bindings, the pages are warped and acidic. The photographs in both albums are fading, yellowing, and exhibiting micro-cracking. The first album consists of photographs and small paintings on pith paper. The binding has been mended with two types of sticky tape, obscuring the artefacts of the original binding structure and plastic interleaving that has been adhered around the paintings. The second album consists of only photographs and has an almost fully detached binding. The warping of the pages indicates that the current order of the pages of the album might be incorrect. The sequence of the photographs is important for the interpretation and provenance research of the albums. In many cases the order of images reflects the order of the journey of the traveler purchasing the albums.

The process of formulating and executing treatment are ongoing at this time. In the following weeks there will be collaboration with the object conservators to address the needs of the lacquer boards, and with the paper conservators to establish the approach for the conservation of the Chinese paintings on pith paper. The composite nature of these albums requires collaboration between different fields. The following elements need to be addressed: (1) the binding and the sticky tapes used to reattach the pages, (2) the lacquered boards, (3) the paintings on pith paper and their plastic interleaving, (4) the photographs. All these elements will determine the final treatment decisions and the long-term storage needs of the albums.

The proposed presentation will discuss the complex nature of the albums and the final decisions made for treatment and preservation in collaboration with object and paper conservation. Decisions will be made concerning the possibility of re-binding the albums as they are currently in an disbound state. Considerations that will define the final decisions will involve the needs of the photographs, the lacquer, the fragile pith paper inside the albums, and the effects on the interpretation of the albums as historic artefacts.

Joint Session: Book & Paper + Photographic Materials

Camera Work: One Size Treatment Does Not Fit All /

Sophie Barbisan – Assistant Paper Conservator¹

¹*Saint Louis Art Museum, Saint Louis, MO, USA*

Camera Work, published by Alfred Stieglitz from 1903 to 1917, is considered to be the most historically important photography magazine. This independent journal was created solely to promote the art of photography and featured important artists from the Photo-Secession. Therefore, Camera Work is commonly found among museum's collections across the United States. Even though it is considered a magazine, it shares much in common with scrapbooks and photo albums. Like scrapbooks, the photographs held within Camera Work are not printed on the page but were tipped in by Stieglitz himself. Although several publications have studied the photographic techniques used by Stieglitz, Camera Work poses unaddressed collection maintenance issues. Despite their importance, these magazines are often in poor condition due to the inherent vice of the materials used in their construction. For example, on a majority of copies, the Art Nouveau cover designed by Edward Steichen, has deteriorated. Made of a thick wove grey paper, its brittleness compromises the long-term preservation of the magazine. The sewing is generally weak, while the adhesive used to put the manuscripts together has crystalized and lost its strength. The photographs tipped within the journal are often detached and the folds of the folios are weak.

The Saint Louis Art Museum owns the entire run of Camera Work. Currently their fragile condition makes providing access to them in the Print Study Room for staff and researchers impossible. Since the Saint Louis Art Museum is a public institution, its strategic planning mandates accessibility. Therefore, availability of Camera Work for the Print Study Room is strongly desired. Moreover, two issues have been selected to be part of the exhibition Architectural Photography from the Collection, 1850-2000, which will take place in July 2021 at the Saint Louis Art Museum. Aesthetic repairs will therefore be required before display.

This talk will first review the way Camera Work has been treated and housed at other institutions, and how the type of institution (Museum, Library or Archives) may have dictated the treatment approach. This is not the author's first encounter with Camera Work. An initial survey of the magazine was performed in 2015 at the Harvard Art Museums. The methodology developed in that survey will serve as the foundation for assessing the condition and producing treatment proposals for the Saint Louis Art Museum's collection. This presentation will walk through the treatment decision making for balancing the aesthetic concerns and accessibility to the objects, while preserving the items structure and the photographs within. Examining these objects provides the opportunity to reevaluate housing for the entire collection. Designing appropriate housing is critical for the long-term preservation of the magazine and detailed recommendations will be provided. This talk will elaborate on how the culture and values of an institution can have a strong influence on treatment decision-making.

Lord Fitzwilliam's Print Albums as Evidence / Harry

Metcalfe – Paper Conservator¹, Elenor Ling – Curator¹

¹*Fitzwilliam Museum, Cambridge, United Kingdom*

The Fitzwilliam Museum houses one of the world's most important print collections, second only in the United Kingdom to that at the British Museum. At its core is one of its great treasures, the 198 print albums compiled by the museum's founder, Richard, 7th Viscount Fitzwilliam (1745-1816). Containing approximately 40,000 prints collected over 50 years, the albums are an extremely rare survival of an eighteenth-century print collection, which even in its day, was considered remarkable.

Fitzwilliam occasionally acquired fully assembled albums, but most of the prints in the collection were purchased singly or in groups. We know that Fitzwilliam arranged the prints into a specific desired order, and had them pasted by their edges onto one side of plain drawing paper. He paid great attention to the decorative effect of the finished sheets. Neatness, symmetry and elegance are characteristic qualities across all his albums. Fitzwilliam kept the sheets in unbound portfolios before sending them to a binder with specific instructions as to how he wanted them bound.

Fitzwilliam assembled his collection during a particularly interesting period in the history of print appreciation: the introduction of the oeuvre catalogue and the work of the Viennese scholar, Adam Bartsch (1757-1821). Fitzwilliam's choice to arrange his albums by printmaker rather than image designer predates the publication of the Bartsch's *Le Peintre Graveur* (1803-21), but its influence on the collector is clearly evident.

There is frustratingly little documentation to indicate how Fitzwilliam went about acquiring his prints, but the albums themselves provide a rich source of information; not only of Fitzwilliam's tastes and preoccupations as a gentleman amateur print collector, but of the subsequent changing status of these objects within the Museum's collection. The use, display and conservation of these objects has always been challenging and the albums show clear evidence of past struggles, which in themselves are very revealing.

Some of the albums were dismantled later in the nineteenth century and individual prints have periodically been temporarily removed for display, but very fortunately, the collection has remained substantially intact. This paper will discuss the challenges associated with such a collection and the factors that influence the current approach taken by the Fitzwilliam Museum regarding the use of these objects. Plans for the future conservation and study of the albums will also be discussed.

This paper will draw from evidence found in the albums which are much greater than a sum of their parts; information that would certainly have been lost had they suffered the fate of so many other collections of print albums.

The Jessie Fuller Scrapbook: Balancing Access and Context in the Treatment of an Important Black Sorority Scrapbook from 1949 with a Unique but Damaging Structure / Sue Donovan – Conservator for Special Collections¹, Krystal Appiah – Instruction and Outreach Librarian for Special Collections¹

¹*University of Virginia, Charlottesville, VA, USA*

The Jessie Fuller scrapbook was created between 1946-1949 by a young woman attending Hampton University, then Hampton Institute, a historically black university in Hampton, Virginia. The scrapbook includes memorabilia, photographs, and notes from classmates and fellow members of the Phyllis Wheatly Literary Society. The scrapbook has a wooden lower board with a bracket-shaped wooden spine piece nailed to the left side of the board. Blue, pink, and tan colored pages are attached together and held onto the wooden board via iron screws that pass through the lower board and are secured with square iron nuts. A reinforced and decorated first page fills the role of an upper board. The first few dozen pages are heavy with memorabilia of Fuller's rich social life at Hampton, attached with deteriorating pressure sensitive tape. The rest of the scrapbook is filled with loose memorabilia, and the thick pages exert a large amount of pressure on the pseudo-screwpost binding, causing damage and restricting the opening.

Scrapbooks in archival repositories have often been ignored in teaching and research due to their fragility as well as to the lack of cohesion in their content. In recent years, however, scholars such as Ellen Gruber Garvey and Jesse Erickson have argued that the editing, cutting, and reformatting aspects of scrapbooking can provide insight into ways that marginalized people documented their lives. The collections at the Small Special Collections Library largely reflect their location at an institution that educated wealthy white men for most of its history. The library has few materials by or about African Americans that are not related to the violence of slavery or Jim Crow. In presenting the joyful life of a Black college student, the Fuller scrapbook is one of the few items that presents an alternative to those traumatic histories.

As such, Instruction and Outreach Librarian Krystal Appiah uses it frequently in classes about African American history. However, its research potential spans disciplines, allowing Krystal to incorporate this artifact of Black life into classes ranging from women's history and photography to the history of education and material studies. Although fascinated by the content, novice student researchers have often been reluctant to handle the Fuller scrapbook due to features inherent to its materiality such as failing adhesives, hard-to-turn sheets of construction paper, mixed media, and loose slips of paper.

In deciding how to approach treatment for the scrapbook, we centered our discussions around how to facilitate access while maintaining the context of Fuller's album. While at first it seemed that the original structure couldn't be maintained without perpetuating damage, brainstorming and reflection, thanks to the pandemic, provided a path forward that would preserve the original vision and the full impact of Fuller's lived experience. The conservation treatment will allow students to handle the scrapbook and explore its multi-faceted layers more closely without harm. Thanks to this stabilization, it is being used this semester in a women's studies class about college women, filling a gap in women's education that is not well represented in the library's collection.

Joint Session: Contemporary Art + Electronic Media

Transforming Ownership Into a Network of Care

In Search of Sustainable Care for Digital Art: Establishing Networks, Enhancing Collaboration and Shifting From Ownership To Commons / Annet Dekker – Assistant Professor Archival and Information Studies¹, Aga Wielocha – Conservator, Preventive², Marina Valle Noronha – PhD Candidate³

¹University of Amsterdam, Amsterdam, The Netherlands ²M Plus Museum Limited, Hong Kong ³Aalto University, Helsinki, Finland

Several solutions to preserve digital art are emerging and while some of them work well, in most cases changes to the content and information happen as most hardware and software follow the economic model of planned-obsolence. Consequently, endless migration, emulation, virtualisation, and documentation tools and projects are being set up to prolong the functioning of digital art. Burdened by this continuous technical change, several artists decided to delete their projects. For instance, in 2011 Slovenian net artist pioneer Igor Stromajer ritually deleted a number of his classical net art works that were produced between 1996 and 2007: they didn't look the same anymore because settings had changed and the web had been updated. While Stromajer prefers deletion to aesthetic loss, in other cases users start to take care of decaying artworks. In such cases networks are formed in which tasks and responsibilities are distributed and shared. Here the challenge of preservation shifts from the object to maintaining a network that supports the project. In this panel we will present several new perspectives on the sustainability of caring for and perpetuating digital art that search for more transparency, collaboration and less exclusivity and control by focusing on: inter-institutional preservation (Aga Wielocha); the potential of networks of care (Annet Dekker); dissolving orphan collections in the commons (Marina Valle Noronha). Combined, these approaches lead towards a greater understanding of the networked conservation concerns of a diverse range of artworks.

Wielocha proposes building an artwork's archive as a method for establishing inter-institutional networks supporting continuity of variable art forms including digital art. She suggests that putting in focus collaboration and knowledge exchange requires shifting the understanding of institutional collecting from gathering objects to investing in interactions. Dekker will expand on the outcomes of a first pilot study of networks of care, which explores the preservation efforts of the artwork Brandon by Shu Lea Cheang. Moving from the notion of collective ownership (of parts of) an artwork, the focus of this presentation will be on the needs and actions for establishing and sustaining a network of care. It will address questions like, what are the different elements of a network of care, and who would be involved when initiating such a network? What are benefits (or challenges) for the study of these artworks when they are preserved through a 'network of care'? And what could be the role of an established institution, or preservation professionals, to persist and evolve such a network over time? Finally, Valle Noronha speculates on modes of usage within collections management that bring an expanded notion of accessibility for the visitors, objects and collections by exploring how orphan collection items can function through the commons.

New Art and New Ways of Institutional Collecting: From Possession to Partnership / Aga Wielocha – Conservator, Preventive¹

¹M+ Museum, Hong Kong

Most professional definitions describe the conservation and preservation of collections as one of the main duties of a museum, or one axis of a museum's activities (Desvallées & Mairesse, 2010). Conventionally, the musealisation of an artwork, its inclusion in a museum's collection, is related to the transfer of ownership and control to an institution. However, recent studies of the preservation of contemporary art forms including digital and net-based art stress the importance of the involvement of external stakeholders, especially artists, in the preservation

effort. The gap between the two competing notions of exclusiveness and collaboration calls for new approaches to institutional collecting and related professional processes and practices.

In 2016, M+, in Hong Kong, acquired the entire body of work, past and future, of Seoul-based internet art duo YOUNG-HAE CHANG HEAVY INDUSTRIES (YHCHI). The initial batch of works included more than 450 animations created in the now-obsolete format of Adobe Flash. The collectible consists of videos that YHCHI share on their website accompanied by drafts and preparatory work, artworks that were previously presented as installations, and public performance lectures. Works produced after the submission of the first batch are delivered to M+ every six months, for as long as the artists make new work and present their projects.

M+'s decision to acquire a still-expanding oeuvre by living artists questions the traditional concepts of ownership and control over what can be collected. What does it mean to own something that is broadly accessible within the public domain of the internet? How is it possible to preserve and care for art that has not yet been created?

This paper addresses these challenges by examining the notion of guardianship as introduced in contemporary museum ethics by Janet Marstine and the potential of this notion for facilitating the preservation of inherently changeable art forms. Guardianship privileges forms of shared responsibility and shared ownership, in which museums and creators work together towards securing the continuity of the collectible. Current museological discourses point to guardianship as a means to respect the dynamic, experiential, and contingent nature of a collectable heritage and to offer a new framework for sharing rights and responsibilities (Marstine, 2011). By shifting the role of a museum from owner to facilitator, guardianship puts in focus the establishment of long-term partnerships between institutions and creators or source communities, as well as the quality of these relationships.

By analysing how the unique relationship between M+ and YHCHI unfolds and how it contributes to the preservation of artists' legacy, this paper will ponder over potential ways of applying the notion of guardianship as a framework for collecting contemporary art forms.

How to Lose Control and Learn to like It (the Story of Planetary) / Jessica Walthew – Conservator¹, Ben Fino-Radin – Founder and Lead Conservator²

¹Cooper Hewitt Smithsonian Design Museum, New York, NY, USA ²Small Data Industries, Brooklyn, NY, USA

In 2014 Planetary, a music visualization app by Bloom Studios (created in 2012) was the first iOS application acquired by the Smithsonian. Its pathbreaking trajectory began at its acquisition, which was unusual in that it was led not by curators but by the museum's Digital and Emerging Media department. The museum negotiated an innovative arrangement with the designers, who were already starkly aware of the longevity and preservation concerns embedded in their use of emergent technologies (the then-novel iOS/iPad platform). The designers agreed that it would be in the interest of preservation for the museum to not only acquire and document the project's source code, but also to release the full source code on Github to encourage users anywhere to riff on or remix the code, or to volunteer to keep the app up to date as programming conventions changed. Knowing the designers could not agree to solve future obsolescence challenges, lead designer Tom Carden nonetheless offered to review changes to the code as they might arise. Nearly immediately, issues began to pop up: updates to Apple's operating system meant that newer devices failed to run the app properly. Fast forward to 2016, when the now four-year-old app faced serious conservation issues: the operating system on which it ran was now 7 versions out of date, and some of its code was facing deprecation. The museum's digital consultants Small Data Industries estimated it would require hundreds of hours of programming work to reengineer the outdated components, an investment the museum could not make. Things looked dire. It was not until the global pandemic in 2020 that a programmer in Sydney emailed out of the blue to say he had "remastered" Planetary and released a working version on the App store. This paper charts the story of Planetary's revival or resurrection in its remastered form and describes how the museum's conservation norms had to evolve to accommodate outside expertise. This work resulted in a decentering of the museum as locus of preservation, and a dissolution of the museum's control over the work.

Joint Session: Contemporary Art + Electronic Media

Trust and Oral Tradition as a Proposed Strategy for the Conservation of Performance Art: Indigenous Approach and Inclusivity / Ruth del Fresno-Guillem - Integral Art Services, Art Conservator and Awareness raiser, Freelance ¹

¹Ruth del Fresno Integral Art Services, Richmond Hill, Canada

The proposed talk is based on work-in-progress research on the Conservation of Performance Art. In this research, one goal is to understand oral tradition and cultural transmission, studying contemporary Indigenous artists and their link to the Indigenous tradition. Performance Art is an art manifestation non based in objects and involves humans, space and time. Some strategies developed for its conservation are based on documentation, but there are all kinds of Performances, and each would need different strategies. Although the conservation community is opening its arms to inclusive approaches, it is based on colonialism and western foundations. In this research, the focus is to study, analyze, and evaluate conservation strategies for performance-based artworks and learn what can be added to the already exciting research and how we can make it inclusive. The study is interested in learning from other cultures, specifically from Canadian Indigenous artists and art professionals. How can we be, as contemporary art conservators, more open-minded and inclusive? The idea is to open the conversation and include their point of view, understanding what Oral Transmission can add to the conservation of Performance Art.

Using the example of Tino Sehgal and his non-documentation-based transmission, this research is interested in deep diving in the possibilities that Trust could offer to conservation. Can we create a conservation strategy and protocols based on Trust? If yes, how would the art community embrace a non-material strategy? Integration of other cultural approaches, inclusivity and flexibility are the base of this research. Study the concept of Trust from the perspective of Indigenous culture and also evaluate how Trust could be (or not) included in the biography of artworks, including the economic transactional system.

Murals and the Matter of Cultural Heritage / Lorraine Lezama Lazard - Managing Partner¹

¹Studio Conservancy, Boston, MA, USA

Large-scale public murals have emerged as particularly important signifiers of contemporary political culture. Their ephemerality however suggests that their messaging has vanishingly small windows for sustained cultural impact since their physical presence and durability are contingent upon multiple factors: ownership of the property on which the murals are constructed and a web of municipal and state laws which govern sizing, and often, content and for formally-sanctioned murals, the length of display time as well as location.

This project seeks to identify and excavate politically-themed, recently created murals and explore the socio-historical and political contexts in which they were created. It also seeks to determine and document which of these murals should be slated for cultural heritage designation and protection and to formulate specific legal strategies for achieving this goal.

SFMOMA Policy on Reprinting: New Challenges and Opportunities / Roberta Piantavigna - Photography Conservator¹

¹San Francisco Museum of Modern Art, San Francisco, CA, USA

As one of the first American institutions collecting color photography, SFMOMA has long been concerned with the proper handling of this material, specifically chromogenic prints and RC papers, which are inherently prone to deterioration. Over the last two decades, curators and conservators at SFMOMA have worked in tandem with several artists to reprint photographs of the collection deemed unexhibitable due to changes in their appearance. As more and more artists have approached the museum to discuss the possibility of reprinting their work, in 2014, SFMOMA embarked on a Mellon-funded research project to investigate the matter in-depth, with the objective of developing a policy to help guide the decision-making process in the future.

Designed to have a holistic and collaborative approach, the SFMOMA research project brought together curators, conservators, and collection experts, incorporating the artists' voice into the study and taking into account the viewpoints of

colleagues from other institutions, printmakers, producers, art historians, and the market. All the experiences and perspectives were summed and shared at the SFMOMA Symposium on Reprinting held in May 2019. SFMOMA team is currently working towards three goals: implementing a museum-wide policy on reprinting; reviewing and studying all SFMOMA reprinting projects, addressing the existing terminology issues associated with reprinting by proposing a common vocabulary list to share with the conservation community.

The research project has provided us with a deep understanding of the challenges, implications, and opportunities that the practice of reprinting can offer to museums and artists' legacies. Working on a museum-wide policy for reprinting that ensures transparency and the participation of all necessary stakeholders in the decision-making process has certainly offered a unique opportunity to define its steps and actions while recognizing and valuing museum staff's different areas of expertise. The process hasn't been devoid of challenges. As cultural institutions face a dramatic financial and ethical crisis, conservators are pushed to analyze and review their practices and re-frame them through the lens of their museum's diversity action frameworks. The challenges and solutions adopted to make SFMOMA museum policy on reprinting a more neutral "preservation tool" will be presented.

Developing a Community of Practice between M+ and AGNSW for the Preservation of Two Editions of a Complex Time-Based Media Installation Artwork, Yin Xiuzhen's Beijing Opera (2000, 2001) / Asti Sherring

- Senior time-based art conservator ¹, Rebecca Barnott-Clement - Junior time-based art conservator¹, Alessandra Guarascio - Installation Art Conservator², Marta Garcia-Celma - Photographic materials and contemporary art ²

¹Art Gallery of New South Wales, Sydney, Australia ²M Plus Museum Limited, Hong Kong

Contemporary art conservation literature emphasizes the importance of collaboration, communication, and negotiation to ensure the long-term display and preservation of time-based media installation artworks. In practice, however, it can be a challenge for conservation professionals to openly share knowledge and personal insights gathered between artist, curator and conservator beyond long-lasting institutional parameters.

This stark reality sits in conflict with the very notion of learning. However, as demonstrated though the concepts of a 'community of practice', learning is embedded within social practice and community engagement and as such is a fundamental process by which we learn.

This presentation applies a 'community of practice' theoretical framework to analyze a collaborative exhibition and preservation approach undertaken by conservators at M+ Museum, Hong Kong, and The Art Gallery of New South Wales, Sydney on the time-based media installation artwork Beijing Opera (2000, 2001) by contemporary Chinese artist Yin Xiuzhen.

Through this case study, the authors explore the conservator's role in collaboratively establishing the identity of an artwork, sharing knowledge gained through documentation, including artist questionnaires and iteration history reports, and working together to manage the variability and changeability of the artwork for the purposes of long-term preservation and faithful display. This presentation argues that the preservation of time-based media installation artworks can be better achieved when conservators apply a community of practice approach which reflects the fundamentally social nature of learning and embraces the opportunities afforded by seeking collective answers to complex questions together.

Joint Session: Objects + SPNHC

Lascaux and Its Application in the Restoration of Taxidermy and Entomology Collections / Bethany Palumbo – Head Conservator¹

¹*Palumbo Conservation Services, Eastleigh, United Kingdom*

Materials historically used in the restoration of natural history collections have not always demonstrated good reversibility or long-term chemical stability. However, with the increasing influence of the wider field of art and artifact conservation, there is currently a movement among professionals who work with natural history collections to embrace materials that are consistent with its standards.

One such product is 'Lascaux 498-20X', an acrylic adhesive that is commonly used in textile and painting conservation. The aim of this paper is to supplement our knowledge of these existing usages with a selection of recent case studies describing the use of Lascaux on taxidermy and entomology collections. These examples demonstrate the use of Lascaux 498-20X as an adhesive, a consolidant, and a loss compensation material. Applied with Japanese tissue, either in multiple layers or mixed into a paste, it provides a strong yet flexible base for a variety of applications. It can be used in repairing torn or broken skin, and rebuilding areas of loss as a fill material. If mixed with pigments, Lascaux provides a realistic fleshy appearance in the restoration of fish fins and tissue. Diverse in its applications and easily removed with acetone or toluene if required, Lascaux shows much promise as a standard adhesive in the conservation of natural history collections.

Off the Wall: The Study and Repair of a Shattered Taxidermy Mouflon Shoulder Mount / Nicole Feldman – Graduate Intern¹, Fran Ritchie – Objects Conservator², Julia Sybalsky – Conservator³

¹*The Conservation Center at the Institute of Fine Arts, New York University, New York, NY, USA* ²*Harpers Ferry Center, Harpers Ferry, WV, USA* ³*American Museum of Natural History, New York, NY, USA*

After falling from the wall, this shattered Mouflon shoulder mount was believed to be beyond repair. The hardware securing it had failed, rendering it into approximately 50 major fragments and dozens of smaller ones. Some were irretrievable. The majority of its left side was in pieces, both ears and the left horn were fully detached, and there were large tears in the skin on the right and dorsal sides. The mount remained in this state for several years; though a successful repair seemed nearly impossible, this ancestor of the domestic sheep is on the endangered species list, so it was not discarded.

The mount was selected for study during a semester-long course on the conservation of natural science materials at New York University's Conservation Program. The damaged condition of the mount provided a rare opportunity to observe the internal construction of its manikin. Devising a treatment plan for this composite object of skin, fur, bone, horn, resin, plaster, clay, and glass was a complex endeavor. Nevertheless, using common conservation adhesives (Paraloid B-72, Lascaux 498HV), large sections of the brittle skin fragments, manikin materials, bone, and horn could be reattached simultaneously with delicate balancing. Loss compensation was executed using pigmented resin (BEVA 371) flocked with hairs from commercial scraps of deer, skunk, javelina and goat. Original and restored areas were integrated by toning with stable colorants (QoR paints, Faber-Castell Pitt Artists Pens). With effort and the aid of well-established conservation materials, this severely damaged mount, initially assumed to be unsalvageable, was restored to its previous glory so that it may continue to provide aesthetic and scientific value.

Conservation of 18th Century Bound Herbaria: Three Visions of Ethical Treatment / Magdalena Grenda-Kurmanow – teaching and research assistant, and paper conservator¹

¹*Academy of Fine Arts in Warsaw, Faculty of Conservation and*

Restoration of Works of Art, Warszawa, Poland

This paper presents objectives and realization of conservation treatment of three 18th century bound herbaria from Polish collections: the herbarium of Izabela Czartoryska, 1746 (National Museum in Cracow), the herbarium of Johann Friedrich Zeidler, 1732 (Library of the University of Life Sciences in Lublin), and a herbarium by Matthias Boretius and/or Andreas Helwing, 1725-45 (Herbarium of the University of Warsaw). All three items count among the oldest surviving herbaria in Poland.

Although they were created in the same time period, herbaria present different styles and techniques. Their poor condition before treatment prevented any research and safe handling. As valuable historical documents, they also required careful treatment planning, regarding their scientific, historical, and possible exhibition values.

Ethical considerations included the strategy for detached and loose plants, choosing the right adhesive to re-attach specimens, and adjusting paper conservation procedures to the delicate and deteriorated structure of herbaria. In the cases of Zeidler's and Boretius/Helwing's herbaria, most of the treatment was executed without disassembling the blocks.

In herbaria of Czartoryska and Zeidler recognizable fragments of specimens were attached to the pages where they were mounted previously, and the rest of plant remains were put in the envelopes. The envelopes were not attached to the pages but were put in transparent enclosures. The adhesives used to mount the plants and repair the paper were chosen, basing on the test of adhesives concerning the safety for DNA material.

In the case of Boretius/Helwing's herbarium, loose plant specimens were spread throughout the tightly sewn block and most of them were deformed and broken. The decision made with the curator was to remove the specimens, mount them on the new sheets, and treat the album separately to keep it empty as the archival record.

Another challenges were treatment of iron gall ink corrosion and consolidation of paint layer on some specimens in Zeidler's herbarium.

These conservation treatments were a part of the project „Heritage preservation and ethnobotany. Analysis of the influence of conservation treatment on genetic material of historic herbaria“ (project no. 2014/13/N/HS2/03118) funded by the National Science Centre in Poland.

Joint Session: Research & Technical Studies + Imaging Working Group

Building Reliable and Reusable Complex Digital Representations: The Digital Lab Notebook / Carla Schroer – Founder & Director¹, Mark Mudge – Founder & President¹

¹*Cultural Heritage Imaging, San Francisco, CA, USA*

How do we capture, process, and archive digital cultural heritage data in a way that is scientific, transparent, and reusable by others, both today and in the future? How do we enable broad participation in the documentation of heritage especially for indigenous and first nations peoples? How do we separate the quality and authenticity of digital representations from the authority of who created them?

This paper will begin to answer these questions. We will explore the Digital Lab Notebook (DLN), a new set of open source software tools for the near-automatic recording and archiving of computational photography-based digital representations and their contextual and process metadata. These computational photography techniques include Reflectance Transformation Imaging (RTI), 3D Photogrammetry, Multispectral Imaging (MSI) and sets of documentary photographs.

The DLN software, currently funded by a grant from the National Endowment for the Humanities (NEH), is under development, with an expected 1.0 release in the first quarter of 2021. We will demonstrate the software, discuss its goals and future directions, and share our experience using these tools in professional training sessions. Additionally, we will share our experience working with local communities in Albania and Nigeria, the Tlingit community in Southeast Alaska, the Unangax community of the Aleutian Islands, and Maori weavers in New Zealand. The common thread running through these projects is the deep desire for local and indigenous peoples to take back the narrative of their own heritage.

Photography based imaging approaches along with tools such as the DLN can help make this a reality. The DLN serves the same function as a written scientist's lab notebook. It permits a digital representation to be qualitatively evaluated for reliability and fitness for purpose by others. This provides the opportunity for informed reuse of cultural heritage digital documentation. The DLN enables the documentary work of local cultural communities to stand toe-to-toe with the work of authoritative institutions. The quality of each community's work can speak for itself.

The talk will also explore the necessity for transparent evaluation of scientific digital representations. The goal is to establish the conditions under which a "real-world" artifact can be digitally represented as a "digital surrogate", which can reliably serve as a digital stand-in usable for subsequent scientific or scholarly examinations. The DLN dramatically simplifies the process of scientific imaging. It also manages the creation of archival Submission Information Packages (SIPs), built in conformance with international standards (the CIDOC/CRM). The DLN's Archiver tool prepares image data, built digital representations and their scientific metadata for intake into long-term preservation environments. This simplification of scientific imaging and the dissemination of computational photography to indigenous and other local cultural communities enable people around the world to tell their own stories. Broadening participation in the creation of cultural heritage documentation can both widen the perspectives and enrich the world's understanding of how people before us have lived a human life.

The Discovery of Community Stakeholders through the Technical Imaging Analysis of Georgia O'Keeffe's "Pelvis Series, Red with Yellow", 1946, Oil on Canvas, 36" X 48" / Dale Kronkright – Head of Conservation¹

¹*The Georgia O'Keeffe Museum, Santa Fe, NM, USA*

Today, much of the documentation, analyses and characterization of the tangible evidence of fabrication, repair and re-use of heritage sites and materials is done using technical imaging. Multi-spectral imaging, x-radiography, 3D surface imaging and modeling, SEM/EDS, and scanning XRF are all examples of imaging

techniques that are now part of an array of data gathering techniques used to detect, characterize and monitor the tangible characteristics of heritage materials.

Typically, prior to setting out on a course of treatment, conservators and conservation scientists analyze materials, structures, evidence of previous alterations and deterioration products, as well as archives and historic documentation to determine how a particular work was intended to look and function when first fabricated. Conservation practice has evolved further to reflect a holistic approach to the understanding of the cultural contexts and changing uses of heritage materials over time. It is increasingly common to characterize the tangible evidence of use, repair, re-use, ritual care and even disposal. In this way, conservators have a more complete understanding of changing intentions, uses, preferences, and values reflected in each fragment of evidence of alteration. Conservators now understand that any given course of treatment that removes, replaces or obscures some existing condition of a work emphasizes the evidence certain values while removing or disguising the evidence of others. Imaging documentation helps preserve the understanding of all the evidence of uses, damage, repair and fabrication, including those that might be removed or obscured as a result of contemporary conservation interventions.

Conservation has been less intentional about identifying and documenting what a heritage object or site does, culturally for contemporary stakeholders. Stakeholders are individuals, groups and even organizations whose self-identity, personal or social agency and well-being are linked to the object or site. It is uncommon for conservators to investigate what a heritage object means and does for its contemporary stakeholders, beyond the exhibition and programmatic intentions of an owner, museum or heritage agency. While this type of preservation research is gaining traction in the preservation of archaeological and Indigenous material culture, its application to contemporary art is far more rare.

This presentation illustrates how the technical characterization of materials used by the American modern artist Georgia O'Keeffe in 1946 in the canvas painting "Pelvis Series, Red with Yellow" (36" x 48", Georgia O'Keeffe Museum L.1997.3.4) helped the Museum discover and begin new dialogues with previously unrecognized stakeholders. In this abstraction of the void in an animal pelvis bone, high-key orange, red and yellow, pigments were characterized which connect the work to Veterans of World War II, Los Alamos National Lab, the Santa Fe War Relocation Internment Camp for Japanese Americans, and descendants of workers in New Mexico's uranium, coal, lead, zinc and barium mines. The discovery of possible stakeholders, as a result of technical analysis allows the descendent populations of all these groups claim a meaningful connection to painting and to the museum.

Virtual Reality: A Versatile Tool for Historic Preservation / Yeneneh Terefe – Graduate Assistant¹

¹*University of Florida, Gainesville, FL, USA*

Historic preservation's goal is to transfer the past to future generations by accurately documenting all the changes that occurred throughout the years. Digital technology provides accurate documentation of existing conditions and allows preservationists to accurately transfer information for future use.

Preserving the past is not simple for various reasons such as sea-level rise, natural disasters, war, and competing interests with more financial incentives like development projects. Accurate documentation and more specifically digital documentation gives preservationist a blueprint of a historic site which could be used to rebuild sites like the Bamiyan Buddha in Afghanistan and Palmyra in Syria, help in restoration projects in Notre-Dame of Paris, and serve as sea-level rise prediction model in Miami. Virtual reality offers an immersive form of digital documentation that allows users to experience the site in first-person perspective. Such perspective could potentially be used as an advocacy tool to galvanize and energize concerned stakeholders in the preservation of a historic site. Another benefit of VR is the ability to experience a historic site from the comfort of our house, especially due to COVID-19.

The goal of this research project is to create a VR application (app) that could be used as an advocacy tool in historic preservation (HP). Historic Old Mount Carmel Church in Gainesville, Florida was captured using a 360-degree camera and imported into Unity game-engine to create a VR app. The app was installed in Oculus Quest head mounted display (HMD). The future goal of this project is to determine whether VR could be used as an advocacy tool.

Case Studies and Applications

Recapturing Ancient Identities: Challenges and Discoveries from the Multispectral Imaging of Roman Egyptian Stelae at the Kelsey Museum / Caroline Roberts – Conservator¹, Suzanne Davis – Associate Curator and Head of Conservation¹

¹Kelsey Museum of Archaeology, University of Michigan, Ann Arbor, MI

This paper discusses the initial outcomes of a project to document the polychromy of a group of limestone funerary stelae from the Roman Egyptian city of Terenouthis. In 1935, the University of Michigan excavated the necropolis at the site. The ancient cemetery, dating from roughly the 2nd to the 4th centuries CE, had hundreds of small pyramid and barrel vaulted tombs. Each included a carved and painted limestone funerary stela, or grave marker, with a depiction of the deceased, and many of the tombs also had plastered and painted forecourts. When the excavation concluded, 194 stelae and some of the painted plaster were brought to the University's Kelsey Museum of Archaeology as part of an agreement with the Egyptian government. Although the salt-laden objects have deteriorated since their excavation, many retain some their original pigment.

The stelae and their painted tombs present an opportunity to reconstruct ancient paint schemes and color use in Roman Egypt, a unique period of cultural exchange in antiquity. Using multispectral imaging (MSI), conservators at the Kelsey have started to document and characterize pigments found on the stelae. Thus far, rose madder, Egyptian blue, and green earth (celadonite) have been identified. These pigments point to connections between Terenouthis—a small provincial city in the Nile Delta—and a broad network of trade that spanned the Roman Empire.

Our paper also discusses challenges we have encountered in studying in the stelae's remaining color. These include deteriorated and disrupted surfaces; damage from historic, aggressive conservation treatments that included repeated cleanings and coating applications; and, more recently, problems with collections access and image capture due to COVID-19. Confronted with an uncertain research timeline, we developed a condensed MSI protocol to map color and gather data for subsequent analysis.

While conducting MSI, we also made an unexpected discovery: painted images and inscriptions only visible in ultraviolet-induced visible luminescence (UVL) images. These newly revealed images include Anubis figures, fringed shrouds, and inscriptions written in Greek on seemingly blank registers below the individuals' carved portraits. The images are not mentioned in previous publications on the stelae; however, black and white photographs taken shortly after the stelae's excavations suggest they may have been visible at the time of the objects' discovery nearly ninety years ago.

Our initial pigment data, coupled with these re-discovered decorative elements, are creating new insights about the lives and choices of ancient people, using legacy excavated materials. This imaging project has also produced compelling new visual information from the collection, a valuable tool in our Museum's efforts to reach students and scholars remotely. From archival photographs to newly captured digital data, this research reminds us of the power of images to preserve and reconnect us with the past.

Practical LED-based Multispectral Imaging of Cultural Heritage Materials / Olivia Kuzio – Graduate Research Assistant¹, Susan Farnand – Assistant Professor¹

¹Rochester Institute of Technology, Rochester, NY, USA

Multispectral imaging (MSI) is a powerful tool for documenting cultural heritage materials. In the context of this research, MSI refers to the capture of 6 to 10 images within select wavebands spanning the visible spectrum and spaced at relatively regular intervals. Coupled with computational image processing techniques, this capture strategy enables the estimation of a reflectance spectrum at every pixel of the image. In part, a reflectance spectrum describes both the color and material nature of an object. An image-sized collection of the spectral reflectance across the surface of an object provides dense information about the object's physical characteristics and their spatial variation. Furthermore, spectral estimation also enables improved color reproduction. These characteristics of MSI render it a more comprehensive technique than conventional RGB imaging.

While commercial systems have been developed to take MSI from a lab-based analysis to a studio-friendly capture technique, these systems may prove prohibitively expensive for exploring MSI. Furthermore, when the advantages of routinely using MSI are not clearly articulated, it is less likely that the curious will invest in costly systems for independent experimentation with the technique. In recognizing these barriers which currently limit the accessibility of MSI, this research demonstrates a lower-cost MSI system alternative that is still studio-friendly and affords high spectral and color performance. The system incorporates multichannel, narrow-waveband LED lights, and otherwise requires only equipment already found in most imaging studios. We have developed capture and processing strategies practical for the studio environment, and we will present these workflows along with the color reproduction and spectral accuracy they afford. We aim to emphasize the utility of MSI for color-critical imaging of cultural heritage materials and to demonstrate an accessible, needs-based strategy with which it can be implemented.

Optical 3D Scanning System to Enable 3D Viewing, Sharing and Printing of Artworks / Yi Yang – Assistant Professor¹, Xingyu Zhou – Graduate Assistant², Darlene In – Student¹, Xingchang Xiong – Student¹, Kunze Yang – Student¹, Xing Chen – Student³, Heather McCune Bruhn – Assistant Teaching Professor³, Xuan Liu – Associate Professor²

¹Penn State Abington, Abington, PA, USA ²New Jersey Institute of Technology, Newark, NJ, USA ³Penn State Univ., State College, PA, USA

Optical coherence tomography (OCT) is a non-invasive imaging method that can be used to study the surface features and subsurface structures of delicate cultural heritage objects. However, one of the limiting factors that is preventing OCT for broader applications in art conservation is the system's small field-of-view (FOV) (Song, Xu, and Wang 2016). This limits the OCT system's ability to cover a mesoscale or macroscopic region of interest (ROI), such as a painting.

We present a hybrid scanning platform combined with effective algorithm to achieve macroscopic OCT (macro-OCT) imaging. With this new system, we present a proof of concept spectral 3D reconstruction of objects such as an impressionist style painting. We first acquire enface images from each OCT scan and digitally stitch these images together to form a large image of the painting. This enables the system to achieve high resolution OCT imaging with increased FOV to generate high definition 3D surface model. We then demonstrates the potential applications of the OCT data by rendering 3D volumetric data into standard virtual reality (VR), augmented reality (AR), and 3D printing formats. Using the 3D data acquired by the marco-OCT system, the team converted it into standard 3D files which can be used for online viewing, VR and AR. The team demonstrated these concepts through viewing the model from a webpage and a cellphone using AR. Finally, the team 3D printed a 1:1 sample 3D model.

This type of digital copy could serve as a backup method to capture the best possible details of art works to hedge against the worst-case scenario, such as war, terrorism, natural disaster, heist, and other catastrophes. The 3D surface model of paintings also can be used in classes to enhance art viewing experiences, especially for online courses. Collaborators will be able to rotate, zoom in and out to view details of art works such as brushstrokes and learn about various painting styles. 3D printed painting samples can be used to assist visually impaired users to experience various painting techniques, such as Van Gogh's brushstrokes and Pointillism demonstrated by Seurat's works. Furthermore, surface model of ancient coins or metallic objects can be 3D printed to give visually impaired visitors touch experience. Finally, the OCT provides a minimally invasive method to generate the cross-sectional information of paintings, which can be used for art conservation work.

Reference:

Song, Shaozhen, Jingjiang Xu, and Ruikang K Wang. 2016. "Long-Range and Wide Field of View Optical Coherence Tomography for in Vivo 3D Imaging of Large Volume Object Based on Akinetic Programmable Swept Source." *Biomed. Opt. Express* 7 (11): 4734–48. <https://doi.org/10.1364/BOE.7.004734>.

Titian's Rape of Europa: Artist's Pigments and Changes Revealed through Macro-XRF Mapping (Part I) /

Gianfranco Pocobene – Chief Paintings and Research Conservator¹, Jessica Chloros – Objects Conservator¹, Aaron Shugar – Andrew W. Mellon Professor^{2,3}, Bruce Kaiser –

Joint Session: Research & Technical Studies + SPNHC

Scientist⁴, Richard Newman – Head of Scientific Research⁵,
Courtney Books – Assistant Paintings Conservator⁶

¹Isabella Stewart Gardner Museum, Boston, MA, USA ²State University of New York College at Buffalo, Buffalo, NY, USA ³Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA ⁴South Jordan, UT, USA ⁵Museum of Fine Arts, Boston, MA, USA ⁶Saint Louis Art Museum, Saint Louis, MO, USA

Titian's Rape of Europa (1562, 180 x 205 cm), is one of six pictures the artist painted for King Philip II of Spain between 1551 and 1562. The paintings are large-scale mythological scenes inspired by Ovid's epic poem "Metamorphoses." Titian called the paintings "Poesie" as he considered them to be visual manifestations of poetry. Over the centuries, the works were dispersed throughout Europe and America; Rape of Europa entered the Gardner Museum collection in 1896. The painting, along with its companion paintings from the commission will be reunited for the first time since 1704 for a major travelling exhibition (London, Edinburgh, Madrid and Boston, March 2020 – May 2021). The exhibition prompted both an in-depth technical study and extensive treatment of the painting (the latter is discussed in Part II).

Rape of Europa was the last painting executed by Titian for the Poesie commission and the technical study provided the opportunity to gather valuable information about the artist's painting techniques from his late period. A full complement of imaging and analytical techniques was employed for the investigation. High resolution imaging was carried out in visible, ultra-violet (UV) and infra-red wavelengths and x-radiographs taken in 1979 were digitized and stitched together, allowing for a detailed examination of the painting's structure and condition.

The extent to which certain pigments were used by Titian and their change over time called for elemental analysis of the entire painting using macro-X-ray fluorescence mapping (MA-XRF). Without access to a large-scale, expensive scanning system the scale of the painting created logistical problems implementing accurate scanning of the surface. A novel approach was devised to analyze the elemental composition of pigments. The painting was hung on a French cleat system that allowed it to be moved smoothly left to right for scanning each horizontal row. A Bruker 5i handheld XRF unit was then attached to a DeWitt 400E gantry to scan the entire surface gridded into forty sections. As each row was completed, the painting was shifted to the next cleat on the wall to scan the next row. This set up ensured proper alignment and registration throughout the process. The MA-XRF analysis produced over 250,000 spectra that were then stitched together to create 18 separate elemental maps. The maps provided details of alterations made to the composition by the artist and confirmed extensive salt degradation, particularly in the right half of the sky.

The MA-XRF maps also enabled strategic targeting of sampling for cross-sectional analysis, with multiple questions often answered with one sample, thereby reducing the number of samples taken. The samples were also submitted for elemental analysis by scanning electron microscopy with electron dispersive spectroscopy (SEM-EDS) using a JEOL JSM-6460LV scanning electron microscope with an Oxford Instruments X-Max^N energy-dispersive X-ray spectrometer. The results of the technical study not only produced rich information about Titian's paint materials but also informed the approach taken with cleaning and restoration.

Joint Session: Research & Technical Studies + SPNHC

Comparing Accelerated Weathering and Degradation of Consolidants Used to Stabilize Paper Shale Fossils /
Catherine Cooper – Research Scientist¹, Conni O'Connor – Museum Technician²

¹National Center for Preservation Technology and Training, Natchitoches, LA, USA ²Florissant Fossil Beds National Monument, Florissant, MO, USA

Florissant Fossil Beds National Monument (FLFO) houses an important collection of fossils that are known and studied world-wide. The collections include paper shale specimens that are particularly fragile due to their lamellar structure and composition. Condition assessments of paper shale fossils in the FLFO collections

indicate that they are in danger of delamination, flaking, cracking, and breaking, which can cause loss of material and decrease accessibility to the samples to prevent further damage. The fossils are contained in individual layers within these lamellar structures, so loss of a single layer can mean loss of that fossil entirely. Various consolidants have been used to stabilize these samples in the past, but studies on their effects on the samples have been limited.

In this study, we compare how five different consolidants applied to paper shale fossils from Florissant Fossil Beds National Monument age when exposed to accelerated weathering. The consolidants chosen were two name-brand versions of ethyl-cyanoacrylate (Aron Alpha 241F and PaleoBond 40), a medical grade butyl-octyl cyanoacrylate blend (GluStitch GluSeal), and two types of Butvar in ethanol (B76 and B98). Due to the unique nature of these specimens, any change in the surface can be considered a failure. Therefore, failures ranked from most severe to least are: failure of consolidant bonds, flaking and loss of material, change in gloss of sample, change in color of sample.

Each consolidant was used to treat five samples, and there were five untreated samples prepared as controls, for a total of thirty samples used in this experiment. The samples were exposed to a total of 800 hours of accelerated weathering in a QUV weatherometer following ASTM D904. After each weathering cycle of 200 hours, color, gloss, surface roughness, and FTIR data were collected.

Preliminary results indicate that the two Butvars cause the least overall change in appearance when compared to the control samples. All of the consolidants maintained adhesive bonds, but a few samples exhibited signs of impending delamination.

Reconstructing Asia's Ancient Ivory Trade: PCR and NGS DNA Analysis of Elephant Tusk Sections from the Field Museum's Java Sea Shipwreck Collection / Lisa Niziolek – Director of Government Affairs and Sponsored Programs

¹Stephanie Hornbeck – McCarter Chief Conservator, Anthropology Collections¹, Claire Scott², Gary Feinman – MacArthur Curator of Anthropology¹, Cynthia Wagner², Felix Grewe – Director of the Phylogenomics Initiative of the Grainger Bioinformatics Center¹

¹The Field Museum, Chicago, IL, USA ²University of Maryland, Baltimore County, Baltimore, MD, USA

In 1999, the Field Museum acquired 7,500 items, mostly Chinese ceramics, from an excavated trading vessel that sank in the Java Sea in Indonesia in the 12th century. Researchers use cargos and vessel remains, including the Field's 800-year-old Java Sea Shipwreck (JSW) collection, to investigate ancient large-scale socioeconomic networks that linked societies from Japan to the African continent. Although durable materials such as ceramics are most frequently found at submerged wreck sites, merchants also traded precious natural products, such as resins and elephant tusks. Resins were used in incense, sealants, and adhesives, and elephant ivory was used in China in traditional medicine and the decorative arts.

The JSW cargo included sections of elephant tusks, which, based on historical accounts, could have originated from several countries in Asia and Africa. Although researchers originally thought the shipwreck's ivory originated from Southeast Asian elephants, ivory transshipped via the Middle East from African elephants was thought to be of higher quality. The larger tusks of African elephants with their extensive dentine regions have been historically prized by ivory-carvers. Pinpointing the origin (or origins) of the tusks from the JSW is enabling us to more accurately trace the ship's route, assess the value of its cargo in historical context, and examine the early history of ivory trade in the framework of maritime trade.

A total of 16 elephant tusk sections were recovered at the JSW site; 12 are in the Field Museum's Anthropology collection. The tusk segments are in raw form; they were not worked or carved into objects. They have extensive structural damage, with heavily abraded exterior surfaces and numerous complete breaks, deep cracks, and worm holes. Although we could confirm from diagnostic features that the material was elephant ivory, it is impossible to determine through visual inspection the elephant species they might have come from. Small amounts of cellular material can be extracted from tusks, which allows DNA to be isolated and molecularly analyzed in order to differentiate among the three known species of elephant. Further, DNA analysis provides crucial information for reconstructing

ancient ivory trade routes.

In collaboration with University of Maryland, Baltimore County, our team initially isolated DNA from tusks from the JSW collection for a Polymerase Chain Reaction (PCR) of a short mitochondrial marker region, which helped us determine whether the tusk pieces were from Asian or African elephants. Next, with the Field Museum's Grainger Bioinformatics Center, we aimed to assemble and annotate regions of the mitochondrial genome of the ivory by next-generation sequencing (NGS). Complete mitochondrial genome assemblies would allow us to clearly distinguish the Asian from the African elephant by 847 SNPs (single-nucleotide polymorphisms) and learn additional information about the elephants whose tusks we analyzed.

Through this collaborative research project, we determined which method was most effective for working with this highly degraded material. This allowed for identification of the origin of several of the ivory sections and, consequently, more accurate reconstructions of the trade networks to which the JSW was a contributor.

Put the Lime in the Coconut: An Investigation of the Mechanical and Aging Properties of Coconut Shell and Recommendations for Compatible Conservation Materials / Elena Bowen – Graduate Conservation Fellow¹

¹*RLA Conservation, Miami, FL, USA*

Coconut shell is a material that has been used in cultural heritage across the continents and has been linked with human migration and colonization for thousands of years. Though ubiquitous, as a material coconut shell lacks the extensive conservation research done on similar cellulosic materials such as wood. Coconut shell objects are housed and displayed in museums across the globe, without knowledge of the effects of humidity, temperature, or lighting and no information about coconut shell morphology for identification and responsiveness to conservation treatment. This study attempts to address all of these gaps by conducting aging, humidity, and adhesive tests on coconut shell samples as well as examination of coconut shell cross-sections under magnification. The ultimate goal of this work is to provide suggestions for best practices for coconut shell objects in museum collections and inspire future research into coconut shell as a material.

Thin sectioning of a coconut bowl was done in two directions following the procedures used for wood sampling and imaged under magnification. A literature search and analysis of the samples using portable Fourier-transform infrared (FTIR) spectroscopy provided the basis for compositional comparison of coconut shell and wood. As has been shown with the extensive research done on wood, the microstructure of a material can help to predict its behavior when exposed to non-ideal conditions. With wood, the directionality of its cell structure indicates that it responds anisotropically to environmental changes. This allows us to predict the direction of cracking. There is no such information about coconut shell. By comparing the microstructure and composition of coconut shell with that of wood, I hope to reveal more information about its aging characteristics and responsiveness to environmental factors. For environmental testing, coconut shell samples were subjected to fluctuating humidity conditions, light chamber aging, and Oddy testing. The final round of testing consisted of broken coconut shell slivers adhered with either Paraloid B-72 or Jade R and subjected to stress testing.

From this research, I hope to begin to show how coconut shell objects can be cared for in museum collections and where future research might fill in the gaps to better understand and care for this material. Environmental guidelines for the display and storage of coconut shell including humidity and temperature guidelines, appropriate light levels, and storage guidelines based on interactions with specific materials have been developed from test results. From my investigations, I will propose ways to monitor and identify light fading and propose future areas of study. From adhesive testing and surveying of institutions around the globe, I will also provide recommendations for compatible adhesives and treatment methods.

Mineral Transformations on Pyrite: Microscopic to Macroscopic Perspectives / Chris Tacker – Research Curator in Geology¹

¹*North Carolina Museum of Natural Sciences, Raleigh, NC, USA*

"Pyrite disease" is usually approached as a problem in oxygenated water of variable pH, but in collections, it is a problem of abundant oxygen and variable humidity. This talk reviews the current scientific literature to create a cohesive

view of the chemical reactions. This microscopic view provides a context in which to examine macroscopic ways to thwart the reactions.

The pyrite surface (Fe^{2+}S_2) is rapidly attacked by electron acceptors (oxygen and water) to oxidize iron atoms, and the electrons, water and/or oxidants rearrange to oxidize the sulfur next. Pyrite is a semiconductor, so mobile electrons on the surface and in the crystalline body of the pyrite move to sustain these reactions, dependent on the conductivity of the pyrite. Eventually melanterite ($\text{Fe}^{2+}\text{SO}_4 \cdot 7\text{H}_2\text{O}$) forms, grows and continues to scavenge water, transferring part of it to the pyrite surface and creating a damp micro-environment. Once melanterite forms, a positive feedback loop is possible: water diffuses to the pyrite surface, and oxidation of Fe^{2+} in melanterite to Fe^{3+} produces another electron acceptor for further oxidation. Deliquescence of melanterite in its own puddle produces acidity, greatly boosted by small amounts of Fe^{3+} . Acidity begins to be generated in the high ionic strength liquid through oxidation and dissolution of the Fe^{3+} sulfate minerals.

The scientific literature provides some surprises. Grain size dependence of the reaction is a result of the large surface area with rapid surficial electron transport, the "proximity effect." Oxygen and water attack the pyrite surface in seconds to minutes, and the surface develops its own film of water. The efflorescent minerals also develop a film of water, apparently a feature common to iron sulfate minerals. This film of water is highly resistant to removal at lower humidity, so oxidation reactions proceed under low-humidity storage, bolstered by oxygen availability. Efflorescent mineral products depend on the previous efflorescent minerals, suggesting that the process is controlled by kinetics, not equilibrium.

In this context, control of "pyrite disease" requires control of electron mobility, which is unlikely once the reactions have begun. Stopping oxidation/hydration requires removal of surficial water, and storage under anoxic, dry conditions.

These results apply to the system Fe-H-S-O in humid air. Reaction between pyrite and clay minerals short-circuits the reactions described above. Instead of melanterite, deliquescent halotrichite ($\text{Fe}^{2+}\text{Al}_2(\text{SO}_4)_4 \cdot 22\text{H}_2\text{O}$), and alkali-bearing jarosite, form in addition to the regular suite of iron sulfate minerals. The clay serves as a source/sink for the cations as well as electrons and water. Preliminary results for controlled humidity experiments between pyrite and reference clays will be presented.

Long term storage requires a degree of prediction. The reactivity of pyrite is determined by conductivity of electrons, so a database of pyrite conductivity is highly desirable. Long term storage is then dependent upon low-oxygen environments as well as low-to-no humidity environments.

Early Plastics, Taxidermy, and Conservation at the Field Museum / Daniel Kaping – Assistant Conservator¹

¹*The Field Museum, Chicago, IL, USA*

The deterioration of early plastics is a challenge for conservators and taxidermists alike, especially when considering the care of aged semi-synthetic models. This study explores pathways for the immediate and future care of degraded cellulose nitrate and cellulose acetate natural history models created by Leon Walters, with a primary goal of extending their function as educational tools. The significance of these models to the history of taxidermy is also recognized, contextualized through a short overview of innovations at the Field Museum of Natural History. A brief look at the production history of cellulose ester plastics, their chemistry, and their stability issues is likewise included in order to better understand the breakdown of these materials over the last century. A discussion of methods to retain structural integrity follows, showcasing recent triage stabilization treatments of mammalian and herpetological models. Lastly, future display improvements are considered with an eye towards affordability and sustainability.

Poster Sessions

Architecture – Session 1

Dealing with Death and Digital Assets: Crowdsourced Transcription of a Cemetery's Pre-existing Digital Surrogates During a Pandemic / Thom Burns – Curatorial Consultant¹, Elizabeth Mauer Casner – Collections Management Consultant¹

¹Mount Auburn Cemetery, Cambridge, MA, USA

What digital assets do individuals and institutions already have, and how can they be leveraged to create access and expand audiences? This paper examines a crowdsourcing project at Mount Auburn Cemetery that raises technical and philosophical implications of sharing digital assets relating to death. The lessons learned from the case study shows how carefully challenging preconceived barriers can significantly expand access and impact even with limited staff and budget.

Established in 1831, Mount Auburn is the first rural cemetery and designed landscape open to the public in North America. The cultural landscape includes memorials carved by some of America's finest sculptors and today remains an active place of burial. The Cemetery's unique Historical Collections & Archives houses burial records, business papers, correspondence with families, maps, photographs, and artworks. With the onset of the COVID-19 pandemic the authors of this paper conceived and implemented a crowdsourcing transcription project, Transcribing Mount Auburn, that utilizes pre-existing digital images taken over fifteen years. The project helped secure the authors' roles while working remotely and created an opportunity to expand the size and diversity of the Historical Collection's volunteers and users. In April, the project received a National Endowment for the Humanities CARES grant. The project is an online, freely accessible transcription program and searchable database hosted by From the Page. While crowdsourced transcription is not innovative by itself, utilizing existing digital assets to meet the needs of a new initiative and leverage crowdsourcing to expand the demographics of the audience, is a novel application. A diverse and expansive public was far more interested than expected in transcribing records relating to death.

This paper is divided into three parts. First, it lays out the case study of Transcribing Mount Auburn in which pre-existing digital assets were used to create remote work opportunities and provide the public with new access to cultural material. The second section will focus on the philosophical considerations that arise when digitally publishing historical materials relating to death. At the same time, this paper will challenge the conservation and preservation sector's inhibitions about sharing data and advocating for universal access to digital assets. The third section will extrapolate the lessons learned in the case study to show how other institutions can leverage digital assets in a similarly unique way. Utilizing digital assets created during preservation and conservation can provide interim access for staff and the public while simulating interdisciplinary investigations and reaching new audiences. Photographs from a collection survey could supplement missing images on an institution's digital collections database. Scientific data that would be shared by request could be published online, thus removing barriers. The paper demonstrates how the pandemic served as a catalyst for the authors to break through conceived barriers to provide access and, in turn, expand the reach and demographics of their audience.

Preserving Heritage Preservation: A Website and Database for Exploring the Organization's History / Madeline Hagerman – Instructor in Art Conservation¹, Rebecca A. Rushfield – Conservation Consultant²

¹Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA ²Self-employed, New York City, NY, USA

For over forty years, Heritage Preservation, originally called the National Conservation Advisory Council when it was founded in 1973, worked towards preserving the nation's heritage through programs, publications, and outreach. Notable Heritage Preservation-sponsored programs include: the Conservation Survey/

Assessment Program, or CAP (1988); Save Outdoor Sculpture!, or SOS! (1989); and the Alliance for Response (2003). Heritage Preservation also published seminal learning tools and documents, from the Emergency Response and Salvage Wheel (1997) available in multiple languages to the Heritage Health Index (2004 and 2014). Several of those programs, including CAP and the Alliance for Response were taken over by the American Institute for Conservation in 2015 when the organization was dissolved.

Knowing that the rise and demise of the Heritage Preservation offered many lessons for the field of cultural heritage preservation, the last Board members planned to commission a history of the organization and have the University of Delaware oversee the project. As research was conducted, it became clear that a linear history of the organization could not adequately capture the multiple aspects of the organization. Rather, a website which would also serve as an archive and a library of the organization's publications would be the best way to approach the subject.

In the summer of 2019, the website, heritagepreservation.info went live. It contains an array of material from data about the organization's finances to personal essays written by key players in the organization's history. It is an evolving site with room to grow. Anyone who had a connection to the organization--employee, board member, volunteer, funder, recipient of its services--is invited to contribute their photographs, documents, and memories to the website.

Book, Paper, Photo Care, and Research Poster – Session 2

Collection Care Solutions for Plastics in Library and Archival Collections—An Update / Jessica Pace – Preventive Conservator¹, Chantal Stein – Samuel H. Kress Conservation Fellow¹

¹NYU Libraries, New York, NY, USA

Safe storage and handling of plastic objects present a pressing and often overlooked problem in many archival collections. Plastics age and become unstable, yet need to remain accessible for researchers and must be stored in institutions with space constraints. This poster presents an update to a long-term project to study and rehouse vulnerable plastic objects in the David Wojnarowicz Papers at NYU Libraries. The collection is frequently used for teaching, research, and exhibition, and contains a large variety of inadequately housed plastic objects dating from the 1960s-1990s. The poster presented in 2019 discussed the analysis of a representative sample of approximately 10% of plastic objects in the collection. This poster will provide an update that focuses on the work conducted during a subsequent project, funded by the Samuel H. Kress Foundation and administered by the Foundation for Advancement in Conservation, to identify, label, rehouse, and monitor plastics in the long term. The project aims to survey all of the plastic objects in the collection, and identify problematic vulnerable plastics for rehousing and long-term monitoring. Fourier Transform Infrared Spectroscopy (FTIR) and micro chemical spot testing will be conducted as necessary for identification, though emphasis will be placed on no- and low-tech solutions that can be implemented in many libraries and archives. Each analytical method will be evaluated for efficacy, efficiency, and precision in order to eventually develop a more nuanced approach to identification. Building on the previous work, designs for housing will be developed to create models that are scalable, reproducible, and easy to handle. The overarching aims of the project are to extend the lifespan of the plastics in the collection, and create models for identification, safe housing, and deterioration monitoring that can be readily applied to collections in other cultural heritage institutions.

Aluminum Foil as a Cathodic Protector to Prevent Silver Mirroring on Silver Based Photographic Materials / Mohamed Hendy – Photograph Conservator¹, Rasha Shaheen – Conservation manager¹

¹Ministry of State for Tourism and Antiquities, Cairo, Egypt

Silver mirroring is one of the major problems we face in our collections, since no way to prevent such deterioration yet, a New method has been developed using Aluminum foil as Cathodic Protector to prevent silver mirroring on silver based

Poster Sessions

photographic materials. The Best in this method is that its cheap, available and effective so it will save a lot of money for archives and collectors, the deterioration will be explained in detail, also SEM with EDX samples beside the explaining the new idea.

Balancing Tertiary Institutions' Expansion Drive with Conservation Needs of Their Libraries: The Case of the Book Binding Unit in the Library of the Midlands State University in Zimbabwe / Davison Chiwara - Lecturer¹

¹Midlands State University, Gweru, Zimbabwe

The Book Binding Unit at the Midlands State University's library faces an uphill task of conserving books in the midst of the university's expansion drive. The university is one of the biggest institutions of higher learning in Zimbabwe with an approximate enrolment of 23 000 students up to date. The university has adopted the multi campus system, with campuses located in different cities and towns across Zimbabwe, namely Gweru, Harare, Mutare and Zvishavane. The Book Binding Unit which is based in the City of Gweru, is responsible for conserving all the books from all of the university's campuses across the country. With only one qualified paper conservator and a few members of staff, the Unit is overwhelmed with a difficult task of working with huge volumes of books in need of repair. Without a purpose built conservation laboratory and adequate storage facilities to service such a big institution, the Unit ran out of storage space at the university's [1]Telone campus and relocated to [2]Hellenics library which is also owned by the university. Still the storage facilities at Hellenics are failing to cope with the ever increasing number of books in need of repair. The limited number of staff in this Unit is overwhelmed with conservation work. In light of this, students doing courses in Conservation of Archives and Records and Archives Management from the department of Archaeology, Cultural Heritage and Museum Studies were roped in, as a way of equipping them with practical conservation skills through hands on activities, as well as easing work pressure on the staff in the Unit. Although this noble idea has helped in ensuring efficiency in work operations in the Unit, it is still failing to cope with the demands of the conservation work for books due to lack of resources. The library is the heart for the functioning of the Midlands State University. Therefore, there is need for the university to prioritise resourcing of this vital conservation Unit in its expansion drive so that it matches the multi-campus status that the university has attained. This Unit is key in supporting scholarship at the university through the conservation of books used by students.

Tidelines: Too Hot To Handle? Thermal Observations of the Wet-Dry Interface / Grace Walters - Paper Conservation Fellow¹, Theresa J. Smith¹, Juan Juan Chen - Associate Professor¹

¹Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA

This project observed the formation of tidelines in a sheet of paper using a thermal camera. A series of observations captured in the medium wave infrared region (3-5 μm) reveal that tideline formation is thermally dynamic. Several organic solvents common to paper conservation, as well as deionized water adjusted to varying pHs, were introduced dropwise to Whatman filter paper in a controlled environment. Each test was documented from drop introduction to complete evaporation using a FLIR A6751sc MWIR camera equipped with an Indium Antimonide (InSb) sensor at a rate of 30 frames per second (fps) and analyzed with FLIR ResearchIR software. The extracted temperature information was used to create false color videos which highlighted the temperature differences across the testing area. The expected decrease in temperature associated with evaporative cooling was observed at the center of the testing area consistently across all aqueous and non-aqueous solvents. All solvents with an aqueous component showed a clear and significant increase in temperature along the wet-dry interface, with recorded discrepancies of up to 8 degrees Fahrenheit between the treated and untreated areas of the sheet. While the cause of these reactions is still unknown, both the method and the content of these observations reveal that more is occurring at the wet-dry interface than previously understood.

Between Originality and Functionality: Conservation Challenges of Two Photographic Albums Belonging to the Saturnino Herrán Foundation / Ariadna Rodriguez - Conservator¹

¹National Institute of Anthropology and History, Mexico City, Mexico

The Saturnino Herrán Cultural Foundation in Mexico has the mission of preserving and promoting the documentary archive of Saturnino Herrán. In 2019 Saturnino Herrán Gudiño (President of the Foundation and grandson of the painter) sought advice to preserve his documentary collection. The collection is conformed of objects, documents and photographs that belonged to the painter.

The object of study of this work are two small photographic albums belonging to this collection, whose manufacturing technique is heterogeneous and without a conventional binding system that allows the consultation of the photographs inside. This situation is contrasting to the evidence that was Saturnino Herrán who carried out the binding work.

In accordance with the above, in this work will be presented, the case of study of both albums. Its assessment values and the problems that its conservation presents respect to its current function.

Examination of the Effects of Various Water Emergency Scenarios on Inkjet Prints Past to Present / Daniel Burge - Senior Research Scientist¹

¹Image Permanence Institute, Rochester, NY, USA

Over the last three decades, large numbers of inkjet-printed photographs, fine art prints, mixed-media works, artist books, etc. have been acquired by museums and other cultural heritage collections. Institutional personnel are typically not well informed on the nature of these materials nor trained how to properly care for them, including how to prevent or respond to damage caused by flood or other water emergencies. Many inkjet prints are considerably more sensitive to water damage than traditional photographs and prints, and some inkjet print types can also significantly harm adjacent materials during water disasters. Existing research has already demonstrated that inkjet prints, when wetted, can be prone to high levels of dye bleed, dissolution of paper coatings, cracking or delamination of surface layers, increased sensitivity to abrasion and scratch, blocking, ferrotyping, etc. While preliminary work has been done to rank the relative sensitivities of these materials, a full understanding of how the materials will behave during different water damage scenarios, from small spills to prolonged full immersion, has yet to be performed. This project was initiated to fill that knowledge gap and provide collection care personnel with the information and tools they need: first, to minimize risk of damage; second, to respond most efficiently during the event; and third, to retrieve and stabilize exposed materials following such unfortunate events. Experiments included total print immersion, edge-only and small droplet wetting, variations in immersion times from initial wetting to seven days, dimensional changes both wet and dried, dirty and salt water exposures, rinsing and excess water removal by blotting or wiping, colorant transfer, stacked prints both in direct contact and interleaved, and time to air-dry at various relative humidity. As inkjet is not a homogenous group of materials but rather a matrix of possible colorant, ink receiver coatings, and substrates combinations, each with unique sensitivities to water, a sample set that represented these variations and simulated inkjet print types from its origin to today was created for the study. A large number of measurements and assessments were made on the print samples to thoroughly document their changes and sensitivities. Quantitative devices, including spectrophotometer, gloss meter, paper caliper, and image analysis hardware and software, were used to measure various attributes of image quality such as color, gloss, line quality, dimension, optical brighteners, scratch, abrasion, and cracking. Visual assessment was used to evaluate blocking, coating dissolution or delamination, and colorant transfer. Finally, a set of best practices was drafted that includes precautionary tips, guidelines for response prioritization, recommendations for staging and rinsing, as well as suggestions for handling during salvage and air drying of the damaged materials. This information is now available for free on the existing IPI Digital Print Preservation Portal website. This work is especially important given the likelihood of increasing number and severity of rain and flood events expected due to climate crisis.

Poster Sessions

Preservation of a 15th Century Spanish Antiphony / Christopher Saclolo¹

¹*University of Central Florida, Orlando, L, USA*

This poster will describe the process of recreating a book “sled” with modifications to accommodate the specific needs of the University of Central Florida Library’s Special Collections & University Archives’ Spanish Antiphony.

The University of Central Florida Libraries’ Special Collections & University Archives began implementing basic book conservation procedures to care for rare books and manuscript collections. While not fully lab equipped, the conservation efforts have been proactive to stabilize the condition of the collection by performing basic techniques such as rehousing and creating custom enclosures.

In 2011, a large Spanish antiphony was generously donated by a resident outside the university community. The antiphony was identified with dates from around 1520-1560. The size of the antiphony is 16 by 22 inches, with wooden covers and metal bosses. The antiphony contains 364 pages of vellum and is 4 inches thick. After many years in the department’s archive space, Special Collections & University Archives continues to preserve this large antiphony. Because of its size and weight, the Spanish Antiphony had been challenging to store.

During the Covid-19 pandemic, new housing for the Spanish Antiphony became one of the highest priorities for the department. The condition of the antiphony is relatively stable with the binding intact, except for the leather spine gradually deteriorating. My requirement for the antiphony is for minimal handling and to not be fully enclosed while being able to be moved easily from a shelf by the request of our archivist. The research was being investigated for new storing methods of large books. I asked the AIC Book & Paper community for suggestions to re-house the Spanish Antiphony. Several conservators reached out to my inquiry with suggestions such as custom clamshells with cradles and book cozies. Based on the University of Chicago Library’s design and build of a minimalist “sled” housing, we will adapt the “sled” design for our Spanish Antiphony.

From this project, photographic documentation with detailed written description will be shown to gain knowledge on the methodology of recreating the “sled”. Specific modifications to the sled base will also be investigated to accommodate the metal bosses on the Spanish Antiphony. This poster will also provide insight on the trial and error that will occur for any conservator considering recreating this housing.

28 Feet Long! 1910 Railroad Elevation Map Conserved and Digitized / Terrance D'Ambrosio - Director of Imaging Services¹, Luana Maekawa - Senior Paper Conservator¹

¹*NEDCC, Andover, MA, USA*

NEDCC recently conserved, digitized and created a facsimile print of a 28-foot long, 1910 elevation and grade map of the Portland, Gray, and Lewiston, Maine Railroad for the Seashore Trolley Museum in Kennebunkport, Maine. The museum had recently acquired the rolled map, but with its outer layers in such a fragile and damaged state, they decided to leave it rolled and have its condition assessed by professional conservators. In the Spring of 2018, the map was brought to NEDCC. The map presented a unique challenge for the Center’s conservators and imaging staff that was accomplished with coordinated team effort, a spacious lab, specialized imaging equipment, and NEDCC’s extensive experience with very oversized objects.

To carry out the examination, four 4’ x 8’ lab tables were arranged to accommodate the map. When rolled the map had been partially flattened, resulting in regular, almost pleated planar distortions that made precise measurement difficult. An approximate measurement determined that it was 19 5/8” x 28 1/2” in one continuous sheet of paper. The map was manuscript in black and red pen inks and graphite pencil. The support was off-white, wove graph paper. The outermost layers of the map were most damaged, with large losses and major breaks. The bottom edge of the map was generally tattered. There were also water stains, numerous mold stains of various colors, and some skinning or small losses. There was also surface dirt and embedded mud. Testing revealed that none of the media were sensitive to water or a mixture of water and alcohol.

After surface cleaning, the map was rerolled onto polyester film and washed by immersion in a water/alcohol bath. A series of melamine-surfaced Masonite boards

had been lined up on the tables and woven polyester fabric was then adhered to the boards with wheat starch paste, followed by Japanese paper adhered to the fabric also with paste. The washed map was rolled out onto the pasted paper. This “Dacron lining” method also served to keep the map flat while drying. The map was allowed to dry for a week, then separated from the polyester fabric and trimmed.

Following conservation, the map was digitized on NEDCC’s oversize materials workstation, a custom-designed 4’x8’ vacuum table on rails, allowing for movement along both X- and Y-axes, allowing objects to be imaged at high resolutions overlapping segments without excess handling. However, when imaging very long materials, such as the railroad map, NEDCC is able to rely on the map’s rolled storage format, as well as multiple photographers, to carefully digitize those overlapping sections. The map was digitized in a ‘take-up reel’ manner, unrolling, imaging, then re-rolling; unrolling, imaging, re-rolling, etc. At 300 pixels-per-inch, the final file measured 6,200x103,500 pixels.

NEDCC also created a one-to-one color-matched archival print facsimile, with losses filled digitally to minimize visual distractions, for handling and display. The print was generated on an Epson 9900 using their pigment-based inkset and the company’s UltraSmooth Fine Art Paper and was a single, continuous reproduction of the original.

A Delicate Balance: Preparing a Parchment Fragment for Posterity / Maren Rozumalski - Gladys Brooks Conservation Fellow-University of Notre Dame, Hesburgh Libraries¹

¹*University of Notre Dame, Hesburgh Libraries, South Bend, IN, USA*

Developing treatment plans for delicate research materials is a balancing act between the desires of the curator/researchers, the long-term future use of the item, and what is best for the materiality of the item. Conservators at these institutions need to merge these components together in such a way that the curator targeted goals are met without compromising the item’s safety and stability. Never a straightforward task, it is particularly complex when working with delicate materials such as deteriorated parchment.

This poster illustrates the journey of FRAG.II.14 as it moves through the treatment process—including curator requests, examination, treatment planning, treatment carried out, and housing. FRAG.II.14 is a 12th century Greek parchment manuscript fragment written in iron gall ink with red pigment embellishments, which is due to be extensively researched. The researcher requires access to the written text as well as codicological aspects, such as evidence of the ruling system and various measurements.

The curatorial goals for FRAG.II.14 were flattening, “gunk” removal, and stabilization. The stiff, horny appearance of the fragment, along with obvious water damage and mold staining, meant further examination needed to take place before Conservation could agree to such possibly interventive treatments. Microscopic examination of the collagen fibers revealed flaking and gelatinizing of the parchment.

The examination led to three key areas of focus:

1. Locally humidify the areas where the parchment is overlapping itself, rather than humidifying the entire fragment and risking further gelatinization of the collagen fibers.
2. Utilize UV photography to reveal the text obscured by staining, rather than attempting to remove the stains mechanically. It is not worth the risk to the damaged substrate to introduce organic solvents for cleaning if there are other viable options available. The staining is also part of the fragment’s history, and it is not the role of conservators to alter that story.
3. Housing to support the piece and give researchers/classes access to both sides without touching the actual parchment.

Poster Sessions

Reproduction of an 18th Century Paper Mould and Deckle / Emily Mercer - Graduate Fellow¹, Pamela Young - Senior Paper Conservator², Chris Swan - Senior Conservator², Peter Stinely - Journeyman Printer and Supervisor of The Printing Office²

¹Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA ²Colonial Williamsburg Foundation, Williamsburg, VA, USA

The Colonial Williamsburg Foundation (CWF) utilizes prints to educate audiences on a variety of topics from the 18th century. A set of William Hogarth prints from the Rake's Progress series were sent to the paper lab for treatment in preparation for loan. The examination and research into the manufacture of the prints, prior to treatment, prompted an investigation into 18th century papermaking methods and materials. To further this investigation the author reproduced a wooden paper mould and deckle using resources across CWF. The mould was reproduced following instructions in Joseph de LaLande's historic papermaking book *The Art of Papermaking*, found at the John D. Rockefeller Jr. Library. Journeyman Printer and Supervisor of The Printing Office, Peter Stinely in the department of Historic Trades, provided materials and craft information regarding paper in Colonial America. Christopher Swan, Senior Furniture Conservator, provided additional materials and assisted in developing the wood working skills necessary to create the mould and deckle in the conservation woodshop. Senior Paper Conservator, Pamela Young, was consulted for advice in the papermaking process. The mould provides visitors to the paper conservation lab with a visual of the iconic vertical and horizontal brass wires that impart the pattern on the historic laid papers Hogarth used during his printing process. Furthermore, the project prompts additional research into paper shrinkage during the drying stage following the initial formation of the sheet and how it affects historic standard paper sizes. This project expanded the authors understanding of the craft of mould making and how it directly relates to the papermaking process.

Leather Selection and Use: The Impact of Conservators' Choices / Holly Herro - Senior Conservator¹, William Minter - Senior Book Conservator², Katherine Wagner - Senior Book Conservator³, Kristi Wright - Principal⁴

¹National Library of Medicine, Bethesda, MD, USA ²Penn State Univ., State College, PA, USA ³Smithsonian Institution, Washington, DC, USA ⁴Wright Conservation & Framing, LLC, Front Royal, VA, USA

The Leather Discussion Group was formed in 2016 by a few book conservators to acquire a better understanding of leather and the leather dyes traditionally used in conservation. The initial goals were to determine the best products available to meet the needs of conservation, to make those needs more apparent to leather manufacturers, and to identify effective methods to evaluate a skin's quality and longevity.

Leatherworkers face many choices regarding leather selection and use and there is little guidance regarding the ways these choices and subsequent actions could affect leather's longevity. The primary focus of the poster will be on leather added to the object during repair, such as when a book is re-backed, rather than consolidation or treatment of deteriorated leather.

Historically, leather was a stable, reliable repair material for many generations. However, leather production, including tanning practices, animal husbandry, and available tannins, dyes, and fatliquors have all changed since the Industrial Revolution. Conservation techniques are regularly reevaluated and leather use is no exception. Some historic and modern leather treatments differ significantly, and naturally aged samples indicate some treatments may affect the leather's longevity more than others.

Specialist tanners and leather experts are willing to work with conservators to achieve ideal leather qualities. Projects focusing on leather quality and longevity started in the early twentieth century and continue to the present day. If an ideal leather is produced, what are the requirements for book repair? Are the CRAFT Project BE-S2-3432 specifications ideal? Which qualities factor into production and selection for conservators?

The Leather Discussion Group is investigating what is being done in other parts of

the world and collaborating with European conservators. The goal is to compare both modern and historic practices in Europe and the United States and the group welcomes further international input to the conversation to determine a holistic interpretation of leather use, treatment, and selection.

What can we learn from each other? The Leather Discussion Group is interested in facilitating a cross disciplinary dialogue and welcomes input from all leather users. To guide the conversation, the group created a survey which is available on the AIC wiki's [Leather Research](#) page.

Textile Posters – Session 3

Beyond Stain Reduction: A Collaborative Solution for Reducing the Appearance of a Stubborn Stain / Katherine Sahmel - Conservator of Textiles¹, Laura Mina - Associate Conservator of Textiles¹

¹Winterthur Museum, Garden, and Library, Winterthur, DE, USA

An 18th printed handkerchief showing Gen. George Washington on horseback featured prominently in the exhibition: *Hamilton & Burr: Who Wrote Their Stories?*, which opened at Winterthur Museum on the 200th anniversary of the Hamilton/Burr duel. The red-on-white handkerchief from the museum's collection has been attributed, although inconclusively, to John Hewson, one of three known textile printers in the Philadelphia area in the mid to late 1700's. The handkerchief is in good structural condition; however, a large, dark-gray stain is present in an unprinted area to the viewer's left of Washington's figure. Past treatments on the stain produced minimal success, and a stitched muslin patch was used to mask the area. Although the muslin patch covered the stain, the patch itself sat slightly proud of the surface, causing distraction by visually disrupting the handkerchief's texture and weave structure. In anticipation of the exhibition, we revisited the stain with a series of locally applied agarose poultices containing the chelator DTPA, as well as the enzymes lyticase and chitinase. The poultices reduced the gray coloration only minimally; therefore masking again became a necessary option for reducing the appearance of the stain. A collaboration with the library lab at Winterthur helped to formulate a treatment plan using Japanese tissue and silk crepe fabric with a water-based adhesive. The sheer tissue and silk fabric both could be custom toned, and are also thin and semi-transparent, allowing for some of the surface texture to show through. A water-based adhesive would ensure close and smooth contact between the surface of the handkerchief and the masking material. Japanese tissue and sheer silk were adhered in combination to the stained area, placing small pieces of toned tissue over the darkest stains, and larger patches using the dyed silk crepe fabric on the stained areas overall. Both the tissue and silk were adhered with a 1:1 methyl cellulose/wheat starch paste adhesive, which could be water reactivated and remains readily reversible. This treatment approach successfully reduced the appearance of the stain, while still allowing the texture and appearance of the underlying weave structure to show through.

An Atypical Approach for a Typical Problem: Loss Compensation for a 19th Century Quilt / Jacquelyn Peterson-Grace - Assistant Textile Conservator¹

¹Colonial Williamsburg Foundation, Williamsburg, VA, USA

The poor condition of a circa 1850 pieced and appliqued quilt in the collection of the Abby Aldrich Rockefeller Folk Art Museum at The Colonial Williamsburg Foundation necessitated an unconventional approach to loss compensation. The quilt, likely made near Shippensburg, Pennsylvania, features a pieced eight-pointed Star of Bethlehem in the center. This predominant design feature is composed of hundreds of diamond-shaped pieces of roller-printed cotton in various colors with small motif prints. Appliqued rosette shapes in a printed green cotton are scattered around the star. The quilt top is bordered by appliqued repeating swags in green printed cotton. The dynamic design, skillful piecing, and artful hand stitching made this quilt an ideal candidate for display in the museum's introductory gallery.

The pink cotton used in the center of the star and in the concentric rows of diamond pieces that form the star points was badly degraded, likely due to chemical deterioration. Every location in which this fabric was used exhibited some degree of degradation, from small losses that exposed the white fill material below to

Poster Sessions

almost entire losses in the fabric, which exposed the white backing fabric of the quilt. The green fabric used in the appliqued sections of the quilt exhibited similar chemical degradation, with damage concentrated in the black areas of the printed design. Losses in the green fabric exposed the white fabric below, resulting in visually distracting disruptions to the printed design.

Treatment goals centered on stabilization of the degraded printed cotton, but loss compensation was required to reintegrate the degraded fabrics and reinstate the visually engaging design. Treating each loss in the hundreds of actively splitting pink cotton diamond pieces was infeasible and would not have provided the structural stability required for safe display and handling. The losses were treated with stitched overlays of pink Stabiltex, an open weave polyester fabric, that was heat-cut to shape using a template. The pink Stabiltex overlays provide stability to the degraded cotton and reinstated the overall pink tone of the diamonds.

The larger losses in the degraded green fabric necessitated a different approach. The larger printed design had resulted in dropout of only the black elements, while the rest of the cotton fabric remained relatively stable. These losses were treated individually with inserts of medium-weight Japanese paper, toned with acrylic paints. Painted paper was selected over custom-dyed silk or cotton because the paper could be easily inserted between the ground fabric of the quilt face and the green appliqued cotton without fraying or causing additional stress and splitting of the compromised object. The paper blended well with the surrounding cotton and proved to be more straightforward to manipulate. Toned paper pieces were inserted below the damaged fabric and secured with stitches around the perimeter of each loss, which served to anchor the loss compensation and stabilize the original fabric in areas of damage.

The two separate approaches to loss compensation resulted in visual reintegration of the design and rendered the quilt stable and exhibit-ready.

Objects Posters – Session 4

The Use of Additive Manufacturing Technology for the Aesthetic Restoration of Ceramic and Glass Artefacts: The Research So Far / Erato Kartaki – PhD researcher¹, Graeme Earl – Professor of Digital Humanities & Vice Dean – External Relations¹

¹King's College London, London, United Kingdom

Aesthetic restoration treatment is typically the last stage of the conservation process applied to an artefact. Where an artefact is incomplete or damaged, the goal of aesthetic restoration is to improve the legibility of the object's form, whilst respecting its authenticity and history. Traditional aesthetic treatments include re-modelling missing parts with either moulding or casting methods, and re-assembly. Any reconstruction must be reversible and readily identifiable, using materials with known ageing properties and no negative effects on the historic artefact. For ceramic objects, materials such as potters' clay, plasticine and plaster of Paris have been used. However, these methods can be time-consuming, and if the object is too fragile, can be inappropriate. The end result of aesthetic restoration depends, on a great extent, upon the skills of the conservators.

Technological advances, such as additive manufacturing technology can complement traditional aesthetic restoration to produce results that may be more objective, particularly in terms of repeatability. They may also provide new solutions in restoration and reassembly of missing parts, improving and advancing the aesthetic restoration treatments overall.

This research is applying, testing and evaluating additive manufacturing technologies and their suitability for aesthetic restoration of ceramic and glass artefacts by recreating missing parts and, where possible, reassembling them. Additionally, the additive manufacturing materials employed will be tested and evaluated, taking into consideration all those factors required of traditional fill materials (reversibility and re-treatability, strength, density, durability, shrinkage, thermal expansion, and long-lasting performance). As the research continues, the processes will be evaluated regarding their aesthetic outcomes, the time and the cost involved and other implications for object conservation.

This paper presents the progress of this research so far: the ceramic and glass artefacts chosen from the Greek-Roman, Chinese and Islamic collections of the British Museum to be used as a case study; the use of photogrammetry for

capturing the objects; the different approaches used for their digital restoration, depending on the available data from each object; and the methodology used for testing and evaluating the additive manufacturing materials.

A Minimally Invasive Treatment on an Églomisé Looking Glass / Caroline Shaver – Marshall Steele Pre-Program Intern¹, Chris Swan – Senior Conservator¹

¹Colonial Williamsburg Foundation, Williamsburg, VA, USA

Verre églomisé, also known as reverse glass painting, is the process of layering and applying paint and gilding on the reverse side of glass. Objects made with this technique are challenging for conservators to treat. Part of the challenge is that only the rear-most layers can be accessed for treatment, but the layers against the glass are what are seen from the front. Consequently, one must be able to see the front and the rear of the object simultaneously for treatment.

This poster demonstrates how conservators in the Wooden Artifacts lab at the Colonial Williamsburg Foundation prepared a Neoclassical five-paneled églomisé looking glass for exhibit using a minimally invasive approach. Missing and flaking gilding and paint in the main panel required consolidation and infilling in order to unify the image seen from the front. A custom mount, mirror and live feed through a camera were implemented to see the front and rear concurrently. To infill the losses the black painted design was digitally reconstructed in Adobe Photoshop and printed onto Mylar, which was then gilded and painted from behind. The Mylar insert was carefully aligned and passively installed against the rear side of the glass to visually compensate for the missing design. This new addition is easily reversible as the Mylar inserts can simply be removed if needed. The minimally invasive treatment of this églomisé looking glass utilized modern technology and traditional techniques to successfully restore the visual impact of the design.

Markings of the Turning Point: Preserving the Last Surviving Example of Invasion Stripes on a World War II Bomber / Karen Wilcox – Engen Conservation Fellow, Smithsonian Institution, National Air and Space Museum¹, Lauren Horelick – Objects Conservator¹

¹National Air and Space Museum, Smithsonian Institution, Chantilly, VA, USA

This poster describes a research project at the National Air and Space Museum (NASM) to characterize and preserve fragile paint remains on Flak-Bait – a World War Two-era Martin B-26 Marauder. The study focused on degraded black and white stripes, which were painted on the wings and fuselage prior to the D-Day invasion of Normandy. These are likely the only surviving example of 'Invasion Stripes', painted on Allied planes to prevent friendly fire. Analytical methods included X-Ray Fluorescence Spectroscopy (pXRF), Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), Raman Spectroscopy (Raman), and Liquid Chromatography with Mass Spectrometry and Proteomics (LC-MS). However, even with these methods the composition remains elusive, particularly the binder. This poster discusses the problems of characterizing the complex and heavily weathered surfaces of an aircraft which survived over 200 missions during its service life. The paint is unstable and conservation methods are being evaluated as part of a larger project to preserve the exceptional originality of this rare survivor.

Shifu: The Ancient Craft of Handmade Paper Thread and Its Application in the Treatment of a Hupa Indian Basketry Hat / Christine Manwiller – Graduate Student¹, Jonathan Thornton – Retired Faculty¹

¹Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA

A deep understanding of materials and the necessary handskills to manipulate them is vital to make conservation treatments. This project shows how the ancient Japanese craft of shifu was investigated and applied in the conservation treatment of a Hupa Indian basketry hat.

Shifu is a traditional Japanese textile made from handmade Japanese paper. Its

Poster Sessions

aesthetic can be altered by using different papers and making slight changes in the making process. The use of Japanese paper is seen across every conservation specialty, and shifu shows another way this paper can be altered and processed for use in treatments. By understanding and mastering the process of making kami-ito or paper thread used to weave shifu, large amounts of strong and even thread can be produced while maintaining the aesthetic of a handmade product. This aesthetic results in a sympathetic restoration.

The treatment of this Hupa Indian basketry hat required structural repairs and several small fills for aesthetic restoration. Kami-ito proved to be strong enough to complete the repairs without disturbing the fragile bast fibers of the object. Knowledge obtained through the investigation of the shifu making process informed decisions regarding the processing method and the fiber type of paper used. Gampi paper was used to achieve a compatible crispness and sheen to that of the fibers in the basketry hat. The kami-ito was used for both warp and weft, and its strength and flexibility enabled the fills to be woven in the same manner as the original object. This treatment shows one use of kami-ito, but the versatility of the material suggests other potential uses in the field of art conservation.

Application Methods of a Black Resin Layer on the Funerary Equipment from the New Kingdom to the Ptolemaic Era of Egypt / Abdelmoniem M. Abdelmoniem – Assistant Lecturer and Researcher¹, Naglaa Mahmoud – professor¹, Wael S. Mohamed – Professor²

¹Conservation Department, Faculty of Archaeology, Fayoum University, Fayoum, Egypt ²Polymer Department, National Research Centre, Dokki, Giza, Egypt

The present study focuses on the different application methods of black resin layers to cover the funerary furniture in ancient Egypt from the New Kingdom to the Ptolemaic era according to the wealth and social class of the deceased person. The ancient Egyptians had the language of color. For instance, the use of dark tones of color was a sign of sorrow. That is, black represented the death and hereafter for the ancient Egyptians. It was used for religious purposes.

Black resin was one of the most important archeological materials that revealed many facts, historical information, and secrets about the materials used by the Pharaohs, suggesting the extent of their progress. Identifying the application methods of a black resin layer on funerary equipment is very important to understand the ancient civilization, materials, and production methods, reflecting the state of art and life in the age of the Pharaohs.

There are many methods of applying the black resin layer on funerary equipment, including the direct application on wood and painting on the black resin, as well as the direct application on wood. Sometimes, the artist tended to making a ground layer, applying the black resin, and painting on. Moreover, other methods were adopted, such as making a ground layer, applying the black resin, then using golden papers to implement the required decorations; making a ground layer, sculpting the required parts, then applying the black resin on the artefact; making a ground layer on wood, applying the black resin, and defining the eye area only. Additionally, a layer of black resin was applied on some artefacts after coloring.

In some artefacts, a broad ground layer was made topped by pigment and the black resin was poured on them. In other cases, a broad ground layer was made, followed by a painting layer from outside and inside, and a black resin layer was applied.

The tools used in applying black resin: Soft bristle brushes were used in the application of the black resin. The ancient Egyptians used brushing or casting for the application of the black resin that was applied while being hot. If it was very hot, it would not show any signs of the tool used.

The ancient Egyptian prepared black resin by slow heating to make sure that all components of the black resin dissolve. It shall be considered that black resin dries fast. To apply it on funeral furniture, the ancient Egyptian used black resin while being heated or hot.

Methods of applying black resin

1. Casting: The black resin was put in the container on which the black resin was to be applied. The excess was emptied from the other direction within seconds due to the fast and sudden cooling of the black resin.

2. The brush: A soft-bristled brush was used to apply the black resin in order not to leave any trace on the model.

Restoration of a Victorian Bird Display: A Case Study / Gretchen Anderson – Conservator¹

¹Carnegie Museum of Natural History, Pittsburgh, PA, USA

The Carnegie Museum of Natural History recently acquired an antique bird display in a case through donation. It is a typical Victorian style display, with an array of small humming birds, song birds, a grouse and a duck. The birds sit on and around a fanciful fake tree and landscape. The tree sits on an imagined landscape. These birds have no relationship to each other – they are mostly North and South American, with one wild canary from Africa thrown in for good measure. However, they are pretty, with bright, iridescent colors. The entire display is encased in a cabinet with glass on the top and three sides with a wooden backing board.

The display sat in the same spot in a vacation home since 1874, not far from Pittsburgh. Sun streamed through a window onto the taxidermied birds for much of that time. The backing board had warped and cracked over time, causing one of the glass panes to break. Soot, air pollution and dermestids got in, causing rampant damage. The birds and landscape were filthy, the grouse and duck were chewed on (they are laced with arsenic, so this did not go too far, but the damage was done). Two birds, a scarlet tanager and a cock-on-the-rock, showed significant light damage.

The owners donated it to the museum, along with funds to restore it. Our director was eager to have it in his office. So, Conservation got to work. Anderson and her interns did most of the treatment in the public view, talking to patrons, school groups and interested staff. Specimens were tested for poison, cleaned and recolored. One bird got a pair of new (and more accurate) legs. Plants were cleaned, repaired and generally spruced up. A local artist was hired to paint a new background on a more stable board. This poster will follow the display case from its arrival at the museum in sad condition through full restoration. Challenges, collaborations and treatment decisions will be discussed.

Aqueous Cleaning of *The Surveying of Washington DC* by Benjamin Banneker / LaStarsha McGarity – Andrew W. Mellon Fellow in Objects Conservation¹, Rebecca Ploeger – Associate Professor², Juan Juan Chen – Associate Professor², Jonathan Thornton – Retired Faculty²

¹National Gallery of Art, Washington, DC, USA ²Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA

Composite objects present a multitude of obstacles which often necessitate drawing experience from all specialties to tackle each of their component materials individually and as a whole. *The Surveying of Washington, DC* by Benjamin Banneker, a diorama in the collection of the Legacy Museum at Tuskegee University, is a composite object that incorporates metal, wood, canvas, electrical components, light bulbs, plaster, and watercolor paints on all exposed surfaces within the scene. The need to clean matte watercolors on a porous substrate is not a complication isolated to objects conservation, and the standard treatment techniques incorporate expertise from many specialties and from the experience of colleagues. *The Surveying of Washington, DC* by Benjamin Banneker presented an opportunity to explore alternatives in reducing surface dirt and grime on a watercolor surface.

A water event, likely a burst pipe in art storage, deposited a disfiguring layer of dirt, dust, grime, and foreign material into the painted scene. Dry surface cleaning with cosmetic sponges, the “standard” technique used on the other dioramas in the series, was not feasible during the treatment time frame, prompting testing of wet cleaning methods that would not damage the soluble watercolor layers or penetrate too deeply into the porous plaster layers below. Materials and techniques to be tested were chosen with an awareness of material costs, material availability, and potential health and safety concerns. Testing revealed a method relying on a hydrophobic, slow evaporating solvent as a barrier layer between the watercolor layer and the minimal amount of deionized water applied by rolled cotton swab necessary for cleaning to be the best approach. This shift away from the standard technique reduced the time needed to remove the grime layer from a matter of weeks to a matter of days without compromising the safety of the watercolor layers.

Poster Sessions

Approaches to Collaborative Conservation at the Field Museum During the Age of Covid-19 / Erin Murphy – Assistant Conservator, Anthropology Collections¹, Stephanie Black – Assistant Conservator, Anthropology Collections¹

¹*The Field Museum, Chicago, IL, USA*

The Field Museum is currently involved in a multi-year project to renovate its permanent Hall of Native North America. The hall is over 70 years old and reflects problematic attitudes towards the procurement and display of Native American cultures and items. Both the deinstallation and reinstallation phases of the project provide opportunities to challenge these attitudes while confronting and re-envisioning normal and outdated museum practices. The deinstallation phase was just finishing when the Covid-19 pandemic hit. While the pandemic has presented unanticipated hurdles that have impacted the project, it has also provided new opportunities to further refine and develop our community outreach practices.

From the beginning, a core aim of this project was to collaborate across departments and with community members. The closing of the museum during the pandemic brought unanticipated and unusual challenges for the project. The timeline was already set for the opening of the new exhibit, making it necessary to continue outreach to the wide range of stakeholders in imaginative ways within the restrictions implemented by State and Local Governments. Previously rigid department schedules were remade to accommodate the collaborator's schedule, essentially bringing the museum to the communities. Interdisciplinary virtual visits with multiple staff participation is proving to be easier than anticipated and are often on a more frequent schedule than possible in person. It is also possible to include many more virtual participants in video conferences than could be squeezed into the available space in an actual meeting.

The development and installation of a new exhibit usually presents museum personnel with the opportunity to rethink their methods and practices. With this project we are trying to deconstruct some of the Field Museums methods and practices, while inviting input from communities. We did not anticipate that a pandemic would present us with positive opportunities to develop better practice guidelines. So far however, Covid-19 social distancing restrictions and remote work guidelines have stimulated the development of a variety of unexpectedly positive practices.

Paintings Posters – Session 5

Cleaning of Matte White Polyvinyl Acetate Paint with Nanorestore® Gels / Anne Schmid – Andrew W. Mellon Fellow in Painting Conservation¹

¹*The Menil Collection, Houston, TX, USA*

Unvarnished paintings can pose an extraordinary challenge for surface cleaning if potentially water-sensitive materials are involved, such as polyvinyl acetate emulsion paint. A small-scale pair of paintings at the Menil Collection in Houston, Texas, by Walter De Maria entitled “A Walk to Sign B” “B Walk to Sign A”, 1961, fall into this category. The works consist of matte white paint layers on canvas with black plastic applications. Improper handling before the Menil's acquisition of the paintings, and a long period of storage in the artist's studio, including a flooding event, led to a disfiguring soiling layer, darkened fingerprints, scuff marks and foxing-like spots.

The paintings entered the collection as part of a large acquisition of early works by the artist. Careful consideration was given to the desired level of cleaning to ensure the paintings were neither distractingly soiled when exhibited on their own nor overly pristine when exhibited within the larger group. Dry cleaning with a soft brush was employed to remove loose surface dust, but other dry methods had little effect on the more ingrained soiling or overall discoloration and resulted in burnishing. Hence, a series of 26 tests on the paintings were conducted that explored aqueous cleaning methods and the relevant variables of pH, conductivity, chelation and surfactants, along with delivery systems using absorbent tissues, rigid agarose gels and the novel Nanorestore® Gels.

The Nanorestore® Gels, in particular the “Peggy” type, revealed an excellent ability of conforming to the surface without the need to add weights, and showed high water-retention paired with high absorption capacity. Given their short history in conservation and scarce literature available, first-hand information was gathered

from the manufacturers, CSGI in Florence, and conservators experienced with those gels at Tate and LACMA. Once their efficacy and risks were better understood through this research, custom-sized Peggy 5 gel sheets were ordered that matched the dimensions of the paintings – a decision that minimized the possibility of a grid pattern or tidelines. The sheets were modified by cutting small windows for the plastic applications and loaded with both cleaning and rinsing solutions. The cleaning gel sheets were placed on the paintings without additional weights, and removed after 30 minutes showing visible discoloration from absorbed grime. Subsequently, the surface was “rinsed” with another set of gel sheets, which were left in place for 15 minutes. The treatment was repeated a second time with the same gels, which can be rinsed by soaking in deionized water and reused up to 5 times, even after several months' storage.

The Peggy 5 gels achieved a clear brightening of the white paintings and noticeable reduction of dark fingerprints, while maintaining the paint's velvety surface quality.

Data Visualization for Understanding Widespread Efflorescence Formation on a Collection of Oil Paintings by Edwin Austin Abbey / Katherine Peters – Pre-Program Intern¹, Kelsey Wingel – Assistant Conservator of Paintings¹

¹*Yale University Art Gallery, New Haven, CT, USA*

This poster describes the findings of a data-driven investigation of a large collection of efflorescing oil paintings by the American artist Edwin Austin Abbey (1852-1911) in the collection of the Yale University Art Gallery (YUAG). Comprising over 3,000 artistic works that came directly from Abbey's studio in London, the Edwin Austin Abbey Memorial Collection contains 609 paintings, many of which are preparatory oil studies for easel paintings or mural commissions. Largely untouched and stored for over 60 years in uncontrolled environmental conditions, many of the paintings display surface efflorescence, some of which has been identified in recent publications as either lead soaps or zinc soaps. Because Abbey's paintings have rarely been treated, this collection provides a valuable opportunity to broadly explore the possible factors involved in efflorescence formation on a substantial dataset of late 19th and 20th century paintings.

As part of a larger study aimed at understanding the efflorescence observed on the Abbey Collection, this research project employed data visualization to gain further insight about the efflorescence on Abbey's 609 paintings. The preliminary round of analysis used a data set derived from a condition survey and rehousing project funded by the Institute of Museum and Library Services (IMLS) in the late 1990's. The questions that this investigation sought to explore were 1) How many paintings in the collection display efflorescence and how severe is its appearance? 2) Is the presence or severity of the efflorescence related to the commission or date of creation? 3) Is the presence or severity of the efflorescence related to past storage conditions and locations? 4) Is the presence or severity of the efflorescence related to the materials used to create the work, such as the support type and ground color, or the colourman supplier? This investigation yielded valuable information about the overall scope of the efflorescence on the Abbey collection, and allowed for an exploration of the influences of environmental conditions and painting materials on the ageing and degradation of Abbey's works.

Migration of Colors: Digital Consolidation and Mapping of Material Art History / Thiago Piwowarczyk – CEO / Principal Investigator¹

¹*New York Art Forensics, Brooklyn, NY, USA*

Attributing authorship to a given artist, a movement, or people, has very often depended on the precise knowledge about terminal dates and location of use of artistic materials. Efforts to associate such information to each object are frequently hindered by inefficient data access and generalizing approximations. The present work is an effort to consolidate and curate such data through automated methods. Deep learning adaptive algorithms and a social interactive system, were devised to mine the cumulative body of information generated by different authors and research groups. By using artificial intelligence and a self-sustainable rating system, the objective of this study is to facilitate the use of already existing knowledge into a searchable database and optimized visualization maps.

Poster Sessions

Objects Posters – Session 6

Objects of Power: Protocols Developed in Partnership with Northwest Coast Native Communities / Amy Tjiong – Associate Conservator¹, Michaela Paulson – Project Conservator¹

¹American Museum of Natural History, New York, NY, USA

The American Museum of Natural History (AMNH) is currently undertaking a multi-year project to renovate its historic Northwest Coast Hall, co-curated by North American ethnology curator, Dr Peter Whiteley, and Nuu-chah-nulth artist and cultural historian, Haa'yuups (Ron Hamilton). The museum has also engaged a ten-member core advisory group representing the nations featured in the Hall to work collaboratively with the curatorial, conservation, exhibition, and design teams. An integral part of the undertaking includes the conservation of about 900 items that will be on display in the newly renovated Hall. Through extensive consultation and collaboration efforts, the conservation lab received feedback that underscored the need to develop protocols specifically for the treatment, handling, display, and transport of objects of power during the renovation process.

The project team worked together to determine which, if any objects of power would be included in the new exhibition. Some were removed from display and placed in storage with strict prohibitions on future handling and access, while others were deemed inappropriate for display but remained in storage with no restrictions. In the end, a selection of belongings from a few nations associated with traditional doctors, often referred to as shamans, were chosen by the curators and cultural advisors for display.

While it is impossible and, in some cases, undesirable to treat all objects of power in the same way; creating an overarching set of protocols allowed conservators to respect the traditions of our advisors while providing the most beneficial treatments for the recontextualization and display of these powerful items. This poster will focus on the conversations and interactions that were vital in development of these protocols and will highlight examples of newly adopted practices, such as specialized staff training, posting of warning signage, and covering of objects when not undergoing active treatment. It will also feature selections from the newly written guidelines and present the views and responses of some of those involved in their development.

Restructuring the LSU Herbaria after Doubling in Size / Jennifer Kluse – Herbarium Collections Manager¹, Laura Lagomarsino – Assistant Professor, Herbarium Director¹, Christina Mozzicato – Herbarium Technician¹, Genevieve Mount – PhD Student, programmer¹

¹Louisiana State University, Baton Rouge, LA, USA

The Shirley C. Tucker Herbarium at Louisiana State University (LSU) is a well-established natural history collection comprising ca. 400k plant, lichen, and fungal specimens, with particularly strong representation in the flora of the Gulf South broadly and southern Louisiana specifically. It is the largest and most active herbarium in the state, houses Louisiana's only searchable comprehensive online database, and boasts 655 type specimens. The majority of the LSU's growth in the last five years— which has climbed from 185k in 2015 to ca. 400k currently— has come from the accrual of state herbaria divested from their institutions. These number seven in total, notably including Tulane University (120k). LSU also partnered with the Botanical Research Institute of Texas to repatriate 60k (or 13%) of University of Louisiana-Monroe's 470k collection. Including all recently acquired collections, LSU has a comprehensive collection of the flora of Louisiana, including representation of geographical areas that were not well-represented in the original collection, especially of northern and western Louisiana. In this poster, we will present recent milestones in integrating these herbaria, including structuring our digitization pipeline, developing a workflow to accession new collections into our digital and physical collections, and integrating the multiple collections into a single infrastructure.

Identifying 3D Printed Manufacture Techniques / Stephanie Guidera – Graduate Fellow¹, Aaron Shugar – Andrew W. Mellon Professor¹, Jennifer McGlinchey Sexton – Paper and Photograph Conservator¹

¹Garman Art Conservation Department at SUNY Buffalo State College, Buffalo, NY, USA

Artists and designers are using 3D printing techniques to create objects and prototypes. As technology advances, the materials used and printing techniques are constantly changing. Museums are faced with the task of preserving these, in many cases, unstable objects. Understanding the technique of printing is an important factor when determining how to store and conserve the object. Using non-destructive and small sampling techniques, four different printing methods were tested for characteristics that may allow method of manufacture identification. Samples built by fused-deposition modeling (FDM), stereolithography (SLA), selective laser sintering (SLS), and drop-on-demand (Polyjet) were analyzed with scanning electron microscopy (SEM), x-ray fluorescence (XRF), x-radiography (X-ray), and multi-modal imaging.

Out with the Old and in with the New? A Preliminary Assessment of Storage Conditions in the Yale Babylonian Collection / Aliza Taft – Conservation Fellow¹

¹Yale Peabody Museum of Natural History, New Haven, CT, USA

Proper storage of cuneiform tablets has long been a controversy amongst curators and conservators of such collections. Cuneiform tablets were rarely fired in antiquity, but many were fired post-excavation so that they could be desalinated (Reade 2016). Soluble salts are observed in both fired and unfired tablets. For this reason, it is crucial for collections to maintain a stable environment. However, the Yale Babylonian Collection, which was founded in 1911 and holds over 40,000 objects (Lassen 2019), is at present not fully climate controlled. The five interconnected collection rooms are heated by steam radiators in the winter, and dehumidified by LG window air conditioners in the summer. These units are run inconsistently, and only during working hours. A HOBO data logger in the tablet room has recorded a minimum of 13% RH and a maximum of 75% RH since being installed in 2016, and fluctuations of over 20% RH over 24 hours. These values are well beyond the accepted safe zone for materials with soluble salt problems (Charola 2000; Buys and Oakley 1993). The drawers and cabinets in which the objects are stored, and potentially the boxes, are therefore the primary line of defense for the collection. But are the original wooden drawers still used by many tablet collections, including Yale, superior to powder-coated steel cabinetry in terms of buffering changes in temperature and humidity?

The Yale Babylonian Collection currently has sixteen original (pre-1930) wooden shelving units and six new Delta Designs steel cabinets. The tablets themselves are stored in cardboard boxes with glass and plastic lids. In order to determine the buffering capacity of the boxes and cabinets, six HOBO MX1101 data loggers have been placed in the tablet rooms: two will determine ambient conditions, two will be placed inside wooden drawers, and two will record inside Delta cabinets. In each type of shelving system, one logger will be in the drawer, and one will be inside a tablet box.

The loggers are still in place, but preliminary results suggest the wooden cabinets may help to maintain a more stable environment than the metal cabinets. If these results hold when additional data is collected, they will carry significant weight when deciding whether to update the storage system of the Yale Babylonian Collection.

Buys, S. and Oakley, V. 1993. *Conservation and Restoration of Ceramics*. Oxford: Butterworth-Heinemann.

Charola, A.E. 2000. Salts in the deterioration of porous materials: an overview. *JAIC*, 39.3.

Lassen, A.W. 2019. The Yale Babylonian Collection. In: Lassen, A.W., Frahm, E., and Wagensonner, K. (eds). *Ancient Mesopotamia Speaks*. New Haven: Yale Peabody Museum of Natural History.

Reade, J.E. 2016. The manufacture, evaluation, and conservation of clay tablets inscribed in cuneiform: traditional problems and solutions. *Iraq*, 79.

Preventive Conservation at University of Sao Paulo: Challenges for Collections Storage / Ina Hergert – paper conservator¹, Juliana Saft – architecture professor², Flávia Andréa Machado Urzua¹, Lisely Salles de Carvalho Pinto²

¹ Museu Paulista of the University of Sao Paulo, Sao Paulo, Brazil, ²

Poster Sessions

Faculty of Architecture and Urbanism, University of São Paulo, São Paulo, Brazil

The University of São Paulo (USP) houses collections of the most importance for Brazilian culture, history and science, with over than 36 million items in several supports and nature, that are generated, acquired and maintained by the various units on USP's four campuses. Items need to be collected, preserved and disseminated both as primary sources for studies and as result of researches. The conservation of original sources is a premise of university collections.

A situation often faced by collectors is concerned to space, oftenly inadequate and insufficient. To illustrate this diagnosis, two cases are presented below.

The first one is the library of the School of Architecture and Urbanism (FAU USP), that currently houses over 237.000 itens, including original architecture designs, representing important periods of brazilian architectural development. The collection has grown exponentially without proper spaces planning, gradually occupying part of the school's basement, thus favoring the deterioration of materials. Today, it faces the concern is to get more adequate physical space to receive new and important collections.

The second case is the Paulista Museum (MP USP), whose mission is to preserve, research and exhibit its collection of over 450,000 items in several supports, focusing on Brazilian History and Material Culture. It is headquartered in two cities and distributed in more than 11 properties that are owned, in lending or rented.

Much of this collection was housed in a historic building from the 19th century, which needed to be closed in 2013 for emergency renovation and was distributed in five rented properties, partially adapted to receive them.

The suiting of new storage areas requires detailed planning of space, accomodation and packing, as well as knowledge of each item, its materials and dimensions for proper preservation. Unplanned storage of collections can be very harmful and increase the risk to their integrity. When this process fails, the items get in poor condition, even with the active presence of a conservator.

The absence of a holistic view for sustainable preservation results in inefficient and ineffective management of the available human and financial resources, increasing the risks of collections loss. There is a need for greater awareness that the resulting effects from the delay in identifying risks and proposing solutions can cause irreversible and irreparable damage.

Therefore it is urgent to review the policies of preservation, management and storage areas, as well as the planning for new buildings construction, suitable for conservation. This new approach depends on education and team work at the university: it is necessary to encourage greater appreciation of the collections whose meaning depends on its preservation in its originality and integrity. Managers must also be made aware of the damage and costs associated with incorrect storage.

Since 2018, as an initiative to achieve this goal, professionals who deal with the USP collections started a network in order to identify and solve common difficulties through meetings and training in preventive conservation, elaboration of surveys and discussion of common protocols.

Evaluation of Two-Part Barrier Systems to Prevent Siloxane Staining on Porous Archaeological Surfaces /

Kasey Hamilton^{1,2}

¹*Japanese Institute for Anatolian Archaeology, Kaman, Turkey* ²*UCLA/Getty Program in the Conservation Archaeological and Ethnographic Materials, Los Angeles, CA, USA*

Impression materials are commonly used in the study of cultural heritage objects to create negative imprints of carved surfaces. At Kaman-Kalehöyük, impressions of cylinder seals or ceramic bullae may be taken in order to give to researchers for study, to take out of Turkey, or to be displayed alongside original artifacts in the Kaman-Kalehöyük Archaeological Museum. Polymer clays and silicone rubber molds are two common examples of impression materials. Polymer clays such as Sculpey are often preferred in archaeological field labs due to their ease of use, however they fail to capture the high levels of surface detail that silicone rubbers can.

Silicone rubbers are prevalent in conservation labs outside of the archaeological setting. Conservators may utilize silicone rubber to create molds of components to be cast for restoration. Silicone rubbers may even be used in order to produce

entire replicas of objects in order to be sold in museum gift shops or sent on traveling exhibitions in instances where the original may not be permitted to travel. They have also been used to take impressions of carved surfaces in order to better understand surface topography or tool marks.

Within the past 20 years, conservators have observed that silicone rubbers can deposit oily residues on surfaces where the material was applied. These oils are commonly referred to in literature as silicone oils or siloxane residues. The non-polar residues are tenacious and difficult to remove from porous surfaces such as unglazed ceramic or stone, as the silicone oils penetrate the surface, becoming trapped within the material's pores. This leads to localized staining and alters the surface chemistry of the material, imparting hydrophobic properties.

To avoid deposition of siloxane residues, a barrier layer is required. Conservators commonly apply dilute acrylic adhesive barriers (such as B48N or B72) in an attempt to prevent staining from silicone rubbers. However, the barrier layer itself is often difficult to fully remove from porous substrates, leading to an overall darkening or staining of the surface. This research, conducted during the 2019 Kaman-Kalehöyük field season aims to develop an improved barrier method which prevents siloxane deposition, is reversible, and does not obscure surface detail when the impression is taken.

Through this research, the author evaluates two-part barrier systems modeled after those discussed by Brückle et al (1999). The two-part system involves application of molten volatile binding media (traditionally cyclododecane) followed by a water-based adhesive layer (such as gum arabic or methylcellulose). The hydrophilic adhesive layer forms an effective barrier to the silicone oils, while the volatile binding media (VBM) occupying the pores of the material prevents the adhesive layer from being absorbed. After mold-making, the adhesive layer is reversed with water and the VBM sublimates. L-menthol was tested in addition to cyclododecane and was found to be easier to work with and produced better results. All two-part systems tested were evaluated for ease of application, detail capture, reversibility, and prevention of staining. Of the materials tested, menthol and gum arabic were found to be most successful.

Tough Love for Magnesium / Daniel Ravizza - Conservator¹, Abigail Rodriguez - Graduate Student²

¹*Smithsonian National Air and Space Museum, Washington, DC, USA*

²*Winterthur/University of Delaware Program in Art Conservation, Newark, DE, USA*

This case study focuses on the treatment of a meteorological satellite from the collection of the Smithsonian, National Air and Space Museum (NASM) that contained heavily corroded magnesium components. Magnesium has a unique advantage as a structural material as it is both lightweight and strong. For these reasons, it has been used extensively in aerospace applications. Its disadvantage is that it is reactive and susceptible to corrosion, particularly in humid environments and when in contact with dissimilar metals. To deter corrosion on magnesium, a conversion coating is typically applied. The conversion coating process changes the surface of the metal into a more stable compound that passivates the surface. Since the 1920's, chromates have been used to create conversion coatings on magnesium alloys. Unfortunately, many of these chemicals contain carcinogenic hexavalent chromium. With health and safety in mind, chromate-free industrial products were explored to improve the treatment methodologies for magnesium artifacts at NASM. Ultimately, a two-step chemical process from Sanchem Inc. was selected for treatment.

The two Sanchem products are environmentally friendly and safe alternatives to toxic chromates. First, Sanchem 560RTU, a mild acid cleaner was used and proved effective in removing corrosion. The acid cleaner was mild enough not to disturb the original conversion coating, thereby preserving as much of the original artifact as possible. Following that, SafeGard CC-13062Mg RTU, a transparent colorless conversion coating was applied, providing renewed corrosion protection. The resulting treatment stabilized the magnesium components of the satellite while preserving what remained of the original conversion coating.

I'm Rubber and You're Glue: Preliminary Investigations into Compatible Adhesives for Elastomeric Materials

/ Marci Burton - Andrew W. Mellon Conservation Fellow¹,

Poster Sessions

Lauren Horelick – Objects Conservator², Malcolm Collum – Engen Conservation Chair and Chief Conservator², Tim Gooding – Museum Specialist³

¹Fowler Museum at UCLA, Los Angeles, CA, USA ²National Air and Space Museum, Smithsonian Institution, Chantilly, VA, USA ³National Museum of Natural History, Washington, DC, USA

The Smithsonian, National Air and Space Museum (NASM) collections include objects made entirely from rubber, or composite objects with elastomeric materials. A departmental survey found that NASM conservators use a range of adhesives to stabilize rubber artifacts, specifically. This study focuses on a selection of adhesives and evaluates their efficacy for stabilization. Each adhesive was assessed with digital microscopy, Scanning Electron Microscopy – Energy Dispersive Spectroscopy, and tensile strength testing to determine bonding cohesion, flexibility, surface penetration and coating properties. The results of the study are aimed to guide treatments of rubber objects with structural tears, deformations and lack of cohesion. While published studies on elastomeric degradation are available, few provide answers for conservation treatments. The current lack of published literature on treatment options combined with the inexorable degradation issues pose significant challenges for elastomeric material conservation. Therefore, this study aims to disseminate our preliminary results for treating deteriorating rubber objects with a selection of appropriate adhesives.

ECPN Posters

AIC's Emerging Conservation Professionals Network Liaison Program / Ashley Stanford – ECPN Outreach co-Officer¹, Michaela Paulson – ECPN Outreach co-Officer¹, Caitlin Richeson – ECPN Chair¹

¹Emerging Conservation Professionals Network, Washington, DC, USA

The Emerging Conservation Professionals Network (ECPN) is a forum and network for AIC members who are entering the field of conservation. This includes undergraduate students, pre-program individuals, graduate students, recent graduates, and early-career professionals. The ECPN Liaison Program began as a way to connect ECPs in far flung regions and has developed into a robust network with over 50 liaisons facilitating conversation, support, and community throughout the country. Through a straightforward application process coordinated with the ECPN Outreach Officers, liaisons are selected to be part of one of four distinct programs: Regional Liaisons, Graduate School Liaisons, Speciality Group Liaisons, and Committee and Network Liaisons. This poster will showcase the Liaison Program and highlight ways Liaisons have collaborated, grown, served their communities, and promoted awareness of the field this term, despite major obstacles to gathering due to the pandemic.

Knowledge is Power: Take-aways from the Emerging Conservation Professionals Network 2018 Compensation Survey / Caitlin Richeson¹

¹Emerging Conservation Professionals Network, Washington, DC, USA

In 2014, AIC and FAIC conducted a general compensation survey, **which included** extensive analytics that are helpful for understanding compensation levels across specializations, geographic regions, employment setting, and years of professional experience. The AIC and FAIC report includes the median salary for professionals based on years of experience in the field, grouping the data into 5-year periods (e.g. 0-5 years, 6-10 years, etc.). The survey provided information on issues of compensation affecting different demographics in the field of conservation. The data has become a valuable resource for conservators to instantly understand the state of the field and guide future compensation negotiations.

Recognizing the value of such information, in 2018 the Emerging Conservation Professionals Network (ECPN), created a similar survey focusing on the current realities of employment specifically for early-career or emerging conservation professionals. The Emerging Conservation Professionals Employment Survey targeted United States citizens and professionals employed in the United States. The survey captured a total of 351 valid responses, with respondents from pre-program, graduate, and post-graduate career stages. Results from this survey

are presented in a long-form report on the ECPN Resources subpage of the AIC website. These results are accompanied by complementary materials including compensation spreadsheets of publicly available information and a bibliography.

Whether negotiating a contract for the first time or renegotiating a compensation package, knowledge is power. By committing to salary transparency, we can elevate our field through informed facts and realistic figures. This poster aims to act as a continuing resource for emerging conservation professionals by compiling and elucidating key data points from the ECPN Employment Survey and supplemental resources. The information presented will embrace salary transparency and provide support for members of the conservation community as they continue to navigate the field at various stages of their careers.



