

Chris Stavroudis
membership secretary

Chela Metzger
Head, Library Conservation Center
UCLA Library
1640 1/2 Veteran Avenue
Los Angeles, CA 90024
tele. (424) 270-3876
EMail: cmetzger@library.ucla.edu
Book Conservation

Cindy Moreno
Post-baccalaureate Conservation Intern
J. Paul Getty Center
51 Rose Ave
Venice, California 90291
United States
EMail: cmoreno@getty.edu
Books and Paper

Jennifer Myers
Assistant Conservator
Western Center for the Conservation of
Fine Art
4158 Ames St
Denver, CO 80212
tele. (513) 335-9730
EMail: myersjm@udel.edu
Paintings Conservation

Louise Orsini
40 Princeton Rd
Malden, MA 02148
tele. (617) 650-1511
EMail: orsiniconsv@gmail.com
Painting Conservation

Kaylie Sagara
Conservation Technician
Academy Museum of Motion Pictures
6067 Wilshire Blvd.
LOS ANGELES, CA 90036
tele. (310) 247-3000 x3098
EMail: ksagara@oscars.org
Conservation Technician

Abby Schleicher
Andrew W. Mellon Fellow in Paper Con-
servation
The Menil Collection
2001 Westheimer Road
Apartment 418
Houston, Texas 77098
tele. (913) 461-4711
EMail: abbydschl@gmail.com
Conservator

Tatyana Thompson
Head Conservator
Tatyana M. Thompson and Associates, Inc.
1453 B 14th Street
Santa Monica, CA 90404-2787
tele. (310) 451-4135
EMail: info@thompsonconservation.com
Paintings

Articles You May Have Missed

What Happens To 3D-Printed Materials When They Get Older?," *Forbes*, 12/30/2022

Art, sculptures and even mass-produced objects are often built to last. Paintings from the 17th and 18th century look almost as lively as they did when they were drying on the easel. Even Lego bricks that spent 25 years in the sea or on the beach still look brand new today.

But what will 3D-printed objects look like in the future? 3D printers to create rapid on-demand objects have only been around for a short time. Some museums use them to create tactile models for interactive displays or even to create structural parts to support restoration projects.

Either way, these are not temporary whimsical creations, but structures that they would likely still want to be in perfect shape several years down the line. We haven't had the technology for long enough to really know what will happen to these objects over time.

To find out, art conservation researchers at the Universidad Complutense de Madrid in Spain subjected two types of 3D printing materials to an artificial accelerated aging process. They tested two materials regularly used for filament-based 3D printing: Acrylonitrile Butadiene Styrene (ABS) and Polylactic Acid (PLA).

For both they tested a piece of the filament that's fed into the printer, and a small rectangle of printed material. Both ABS and PLA showed chemical changes when they were subjected to their rapid aging simulations.

But of the two, PLA fared a bit better than ABS did. ABS lost more of its color after UV radiation or temperature changes, and the material structure became more fragile and a bit warped.

PLA only showed very minor changes after UV radiation, but did show some bulges in the material after spending time in the temperature chamber.

"Notre Dame Cathedral on Track for 2024 Reopening, Spire to Rise in 2023," *Alteia*, 01/06/2023

The reconstruction effort at Notre Dame de Paris is on schedule for their planned 2024 reopening.

Recent progress reports have painted a hopeful picture of the iconic French cathedral, which was catastrophically

damaged by the April 2019 blaze. Now, plans for beautifying and updating the areas surrounding the building have emerged as well.

Leaders of the project have announced the completion of the reconstruction of the collapsed stone vault in the north transept. This is significant because it will allow the team to begin work on the vaulted ceilings of the transept crossings. The transept crossing is the spot that supported the spire, which crumbled into the building during the fire.

Meanwhile, art restorers are still diligently working to repair the many priceless works of art that were placed in jeopardy by the fire. These include murals, frescoes, stained glass windows, sculptures, and ironworks. Some of the sculptures were irreparably damaged, and these are being recreated by artists and craftsmen.

The more than 1,000 trees needed to reconstruct the spire have already been acquired. It will be reconstructed as it appeared before the fire, in the 19th-century design of renowned architect Viollet-le-Duc.

Much of the 2025 work will focus on the landscape around Notre Dame, which will also receive a few updates. The updates will keep climate change in mind to provide a more comfortable waiting experience for guests and tourists.

These include hundreds of trees for shade, as well as trickling water on the stone ground in order to reduce ambient heat. A new visitor's center is also in the planning phase.

Conservation of Spanish Armada Invasion Maps Reveals Red Ink Details were Added Hundreds of Years Later," *The Art Newspaper*, 01/10/2023

Conservation work on a unique set of 16th-century hand-drawn maps, the earliest surviving representations of the failed Spanish Armada invasion of England in 1588, has revealed that, although beautifully drawn in black ink on fine-quality paper, and of great historic importance, they were judged insufficiently attractive for a late 19th-century sale.

The map's convincingly antique, delicate shades of red were added either for an auction or by the book dealer who bought them and sold them on at a handsome profit to the Astor family.

The maps, certainly based on

eye-witness accounts, may have been commissioned by Admiral Lord Howard of Effingham, but his final account used a set of engravings by the royal cartographer Robert Adams and the engraver Augustine Ryther—the British Museum has a complete set—which had already been published.

The maps are generally in good condition. The complete set was sent by the museum to the National Archives in London for study and a condition assessment, the first time the two institutions have worked together.

Non-invasive tests revealed Flemish watermarks, which, with some marginal notes, suggests a craftsman probably working in London at a time when the Flemish were recognised as the best cartographers in Europe. The iron gall ink was 16th century and in good condition despite slight fading and paper corrosion—but the surprise was the reds, only available from the late 19th century.

“The only possible conclusion was that the original maps were not coloured,” says Natalie Brown, the senior conservation manager at the National Archives. The work has implications for hundreds of antique maps in their collections.

“Keeping it real—fashion supremo Erdem Moraloğlu is fascinated by museum conservation,” *The Art Newspaper*, 4/6/23

The Turkish fashion designer Erdem Moraloğlu looked to an unlikely source for his latest collection—museum conservators at some of the most illustrious museums in the UK.

The Financial Times describes how Moraloğlu, whose starry clients include the Princess of Wales and Julianne Moore, visited conservation departments at the National Gallery, Victoria & Albert Museum and Tate Britain, seeking inspiration for his spring/summer 2023 collection.

The FT piece outlines how Moraloğlu drew on his findings—“facsimiles of the labels conservators use to track and classify artworks appeared stitched to some hemlines. And all the protective vellums and dust sheets became glass organza veils draped over crystal- and sequin-embellished dresses.”

Canadian-born Moraloğlu was fascinated in particular by Larry Keith’s work at the National Gallery who was busy restoring a 16th-century work by

Parmigianino when the fashion supremo first visited in April last year.

“I love a museum. There’s just something in the walls of those kinds of extraordinary places,” Moraloğlu says, musing on the power of these wondrous repositories.

“Censored Woman Painter Artemisia Laid Bare in Restoration,” *RFI*, 01/14/2023

Using gentle, circular motions, an art restorer gently cleans the painting of a half-nude woman that was censored more than 300 years ago by a prudish descendant of Michelangelo.

The piece by Artemisia Gentileschi, the Italian Baroque’s trailblazing woman artist, is undergoing restoration to rediscover her original vision, hidden for centuries under a thick layer of strategically placed paint.

Artemisia painted “Allegory of Inclination” in 1616 to glorify Italy’s most celebrated artist, Michelangelo Buonarroti. The painting, which many believe to be a self-portrait of Artemisia, depicts a female nude sitting atop a cloud, representing innate creative talent and drive.

It was commissioned by Michelangelo’s great-nephew, who turned his ancestor’s home into a sumptuous residence and museum to celebrate his genius. About 70 years after the work’s completion, a more puritanical descendant of Michelangelo hired an artist to modify the painting, concerned about the possible effect of the nudity on his wife and children. He hired Tuscan artist Baldassare Franceschini to paint a veil over the figure’s breasts and heavier drapery over her loins. That extra layer of oil paint now presents too great a risk to remove.

Centuries of smoke, and varnish added in the 1960s, have imparted an orangey fake tan to the figure’s skin, while the brilliant blue sky painted with lapis lazuli has turned a sickly grey-green.

After a careful restretching, resins will be added to strengthen the fibres of the canvas and re-adhere the paint. Thus far, X-rays and other imaging techniques have revealed not only the underlying nudity but also changes made to the eyes and hands as Artemisia worked.

“What you’d think is under the veil is under the veil. It’s all there!” laughed conservator Elizabeth Wicks, the head of the team of conservators.

During an exhibit that starts in September, visitors will be able to see the work up close before the painting permanently returns to the palazzo’s ceiling. They will be able to view a digital image that reveals its various layers while exploring the modern techniques that helped uncover them.

“Unusual Compound Found in Rembrandt’s The Night Watch,” *Science Daily*, 01/17/2023

An international team of scientists from the Rijksmuseum, the CNRS, the ESRF the European Synchrotron, the University of Amsterdam and the University of Antwerp, have discovered a rare lead compound, lead formate, in Rembrandt’s masterpiece The Night Watch.

This discovery, which is a first in the history of the scientific study of paintings, provides new insight into 17th-century painting technique and the conservation history of the painting.

Analyses revealed the presence of an unexpected organo-metallic compound: lead formates. This compound had never been detected before in historic paintings: “We identify them in areas where there is no lead pigment, white, yellow. We think that probably they disappear fast, this is why they were not detected in old master paintings until now,” explains Victor Gonzalez, CNRS researcher at the Supramolecular and Macromolecular Photophysics and Photochemistry laboratory.

Why did this one not disappear then? For Katrien Keune, head of science at Rijksmuseum and professor at the University of Amsterdam (the Netherlands), this finding is key to understanding Rembrandt better: “The lead formate gives us valuable new clues about the possible use of lead-based oil paint by Rembrandt and the potential impact of oil-based varnishes from past conservation treatments, and the complex chemistry of historic oil paintings.”

Scientists worked with the hypothesis that Rembrandt used an organic medium (linseed oil) containing dissolved lead oxide (PbO litharge) to enhance its siccative properties.

"Thanks to the unique analytical performance of the ESRF, the world's brightest synchrotron light source, we could map the presence of formates at a micrometric scale, and follow their formation over time," explains Marine Cotte, scientist at the ESRF.

The spatial organization of the compounds at the micro-scale and the dynamics of their formulation made it possible for the researchers to suggest new hypotheses on the chemical conditions of their in situ crystallisation in old paint layers. "In addition to providing information on Rembrandt's pictorial techniques, this research opens up new avenues on the reactivity of historical pigments, and therefore on the preservation of heritage," explains Koen Janssens, Professor at the University of Antwerp.

"Familiar Face Set to Return to LAX Later this Year," *Airport World*, 01/17/2023

After nearly three years off view to the public while it underwent professional conservation, the famed bronze portrait bust of former Los Angeles Mayor, Tom Bradley, is finally back at Los Angeles International Airport (LAX) and ready to be installed in its new permanent home.

The bust, a 10-foot-tall bronze and granite sculpture created by artist Serge Sarkis in 1987 and gifted to LAX by Mayor Bradley – Los Angeles' first black mayor, who served for 20 years in office – was removed from its former location outside the Tom Bradley International Terminal entrance in 2020 during construction work on the building.

During the work, the LAX art team has overseen the careful restoration and conservation of the bust by Sculpture Conservation Studio, Carnevale & Lohr, and Modern Art Foundry.

Sculpture Conservation Studio was key in preparing the sculpture for its removal as well as cleaning and preparing the surface for the addition of a new patina to the bronze. Carnevale & Lohr spearheaded the removal and crating of the sculpture as well as fabrication of its base plate.

The original fabricator, Modern Art Foundry, sent a team from New York to refresh the aged patina of the sculpture's surface. The restoration

work was completed at a cost of about \$65,000 and was funded by LAWA through the City of Los Angeles' Public Art Program and LAWA's Capital Improvement Program.

"Man Rescued After Getting Trapped Inside Famous Sculpture," *Daily Correspondent*, 4/3/23

Firefighters in Canada completed an unusual rescue mission when a 26-year-old man got stuck inside a large public art sculpture.

Known as Talus Dome, the sculpture is made up of more than 1,000 handcrafted metal balls stacked into a mound. The man tried to climb the sculpture only to accidentally slip through an opening.

Created by artists Benjamin Ball and Gaston Nogues, the Talus Dome has been polarizing among residents of Edmonton, Alberta, since its installation in 2011. The sculpture is situated next to the Quesnell Bridge, which allows vehicles to cross the North Saskatchewan River.

The shiny, reflective spheres mimic piles of rock or gravel, serving as a reminder that "the landscape has been altered by the bridge, a rigid, controlled construction that meets our needs to traverse the obstacle of the river," according to the city's public art website. "It refers to the coexistence of the man-made and the natural."

On Sunday evening, a passerby called first responders and told them that someone—or something—was stuck inside the sculpture. Once firefighters arrived on the scene, they had to break out some heavy-hitting rescue equipment to extricate the man, including the tool known as the jaws of life, which is typically reserved for car accidents.

"It's definitely a first for me," says Troy Brady, district chief of Edmonton Fire Rescue Services, to CTV News' Adam Lachacz. "It's definitely different than what we would typically use the jaws of life for."

In total, three crews were brought in to help free the man, including a technical rescue team. Firefighters had to cut into the sculpture and remove one of the spheres to get the man out.

After roughly an hour and a half, he emerged. While he was physically unharmed, he was promptly charged with one count of mischief over \$5,000.

"Tests of Augmented Reality Device 'Hololens' Show Promise at the University of Delaware," *Delaware Public Media*, 01/20/2023

Faculty at the University of Delaware Program in Art Conservation are using a new piece of so-called "mixed reality" technology called 'HoloLens.' They describe it as augmented reality, but with more features and the potential to not only help people with mobility issues, but make collaboration in art conservation and many other sectors seamless.

The coronavirus pandemic sent many fields into the virtual world – as people were unable, for a time, to meet in person safely. Now, tech originally used for safety is having an impact on fields like art conservation.

University of Delaware professor Joelle Wickens – Associate Director of the UD Program in Art Conservation and an Assistant Professor of Preventive Conservation – can't access the upper floors of the Rockwood Museum from her wheelchair. Now, she can see it through the eyes of her students thanks to HoloLens.

HoloLens is a virtual headset that projects what the wearer sees back to a monitor, in this case, Wickens' laptop. She has ideas to use the tech rather than sending people for art preservation surveys and exhibitions. She says it could also aid in distance learning.

"After Brazil Unrest, Painstaking Effort to Restore Damaged Treasures," *RFI*, 01/22/2023

Randall Felix delicately handles the wood on a 19th century chair whose armrest was ripped off when supporters of Brazil's far-right former president Jair Bolsonaro stormed Congress earlier this month. "The shock is great," the 63-year-old master craftsman at the Senate museum told AFP. "It's all part of our life, so when we see that a piece has been treated like that, it's very difficult."

The chair on Felix's desk is just one of dozens of precious objects destroyed in the unrest, when on January 8, Bolsonaro backers ransacked the presidential palace, Supreme Court and Congress in Brasilia, refusing to recognize his election defeat.

The rioters destroyed priceless works of art, rare furniture that is part of the national heritage, and left the walls

of the historic government buildings covered in graffiti messages calling for a military coup. Damages inflicted in the riots total 18.5 million reais (around \$3.5 million), according to government estimates.

Since then, employees who are usually busy with Congress heritage preservation have been hard at work trying to save the institution's priceless pieces of art and furniture.

"We grabbed flashlights and went to look for fragments. We had to do archaeological work in the middle of the rubble," said Gilcy Rodrigues, head of restoration at the museum.

After painstakingly identifying and cataloging the remains, Rodrigues and her colleagues got to work repairing paintings, tables, rugs, ornaments, and sculptures. Rodrigues, who for 30 of her 58 years watched over the museum's assets, cannot hold back her tears.

Thanks to their efforts, some 60 percent of the objects damaged in the Chamber of Deputies have been successfully restored -- though at a great cost to the staff. Ismail Carvalho, who is in charge of the Senate's restoration laboratory, lamented, "It's more than aesthetics," he said. "Suddenly, in an insane act, all our work literally went down the drain. It's very sad."

"Resurrecting Pieces of Goan Art Through Conservation and Restoration," *O Heraldo*, 01/29/2023

The growing need of art conservation is seen in Goa, as besides humidity one of the biggest issues to damage artworks is a sudden change in weather, which is visible with climate change.

Goans are blessed to have professionals from across the world imparting practical training on how to save these artefacts. Teresa Teves Reis is a conservator-restorer from the Polytechnic Institute of Tomar, Portugal.

Falling in love with the unique art that was created in Goa centuries ago, she has been travelling to work on the study and research of the challenges behind the conservation and restoration of these artworks and artefacts. She is currently in Goa as a part of the research team from Project Old Goa Revelations at the gallery of Viceroy's.

"This art in Goa is quite a

unique and hybrid collection as it shows how local artist made their interpretation to the European models which circulated in Goa, with their own paintings and iconography.

Goa has its own challenges when it comes to preserving objects including the excessive humidity. However, it not just the weather conditions but the abrupt changes that can lead to further damage. "Artefacts and paintings are used to the conditions in Goa including humidity. But if there is a strong fluctuation like an abrupt environmental changes, it can lead to damage and to the development of other agents of degradation."

For the past six years, every year Caterina Goodhart travels from London to Goa in the hope that the younger generation of Goan artists will preserve and conserve Goan art. She is a lecturer and painting conservator who is currently in Goa for this year's Art Conservation Course that will be held by The Archdiocese of Goa and Daman.

The one year certificate course at Convent of St John of God, Old Goa, will offer an introduction to conservation and restoration of paintings, polychrome statues and gilded artefacts.

"Gruppe Mural Restoration Behind Schedule," *Salem News*, 02/06/2023

Salem has extended an agreement with an art conservation center to restore a mural that was part of the old McDonald's building on the waterfront for decades.

The Gruppe mural, as it is known, was taken to the Williamstown Art Conservation Center in 2020 to be restored. But the conservation center missed the deadline for the project and asked the committee for a year's extension.

The mural was painted on an inside wall of the McDonald's in the 1970s by renowned Cape Ann artist Emile Gruppe and his son, Robert. It depicts an aerial view of Beverly Harbor stretching across the old Beverly-Salem bridge to Salem.

The McDonald's closed in 1994 and the building was purchased by the city. Since the mural is 23 feet long and was painted directly on the wall, it remained in the building, mostly unseen by the public, for the next 25 years.

The building was finally demol-

ished in 2019 to make way for a new restaurant. The city went to great lengths to remove the mural before the demolition and take it to Williamstown. The plan is to display it in the Beverly Public Library once it is restored.

Conservators at the Williamstown Art Conservation Center recently reached out to the city to ask if they could cut the Gruppe mural into three or four pieces in order to make it easier to transport and eventually hang in the Beverly library. Chairman Bill Finch said the commission agreed that the mural could be cut into sections, but will have further discussions on the details. "The issue is transporting it without doing damage," Finch said. "It's heavy and fragile."

"Revealing the Risqué Art of Pompeii's House of the Vettii," *Atlas Obscura*, 02/07/2023

The House of the Vettii is one of the most important and spectacular sites in Pompeii.

Its nearly 12,000 square feet are replete with bronze and marble sculptures. Elaborate frescoes adorning the walls, have elicited careful study since the site's excavation in the mid 1890s. And this year, after a restoration that took two decades, its treasures are newly accessible to the public, in all their colorful detail.

And we do mean colorful: Take the portrait of Priapus, the god of fertility, whose tumescent member is roughly the size of his forearm.

The inhabitants of the House of the Vettii were Aulus Vettius Restitutus and Aulus Vettius Conviva, wine merchants who made their fortunes after being freed from slavery. Their path to prosperity was not an uncommon one—the House of the Vettii dates to a time when a self-made aristocracy was growing in Pompeii.

The House of Vettii, was one of the first sites to be unearthed using modern archeological techniques, and its artifacts were left in situ so their context could be preserved for future scholars and the public.

However, Pompeii's early caretakers made some well-intentioned mistakes. To protect frescoes from the region's heat and humidity, they painted on a solution of wax and benzine, darkening the colors and making the images far

less crisp and lively.

The wax had two effects,” says Steven Tuck, a classics professor at Miami University of Ohio, “One is that everything looks muddy. There’s volcanic dust all over Pompeii still, and it sticks to the surface of the wax and makes the paintings much harder to see.” The other problem, he explains, is less obvious but more serious: Wax doesn’t expand and contract with changes of temperature in the same way plaster does, and over time that material conflict caused cracks in the walls.

Technology, however, has come a long way. The recent restoration of the House of the Vettii involved the painstaking removal of dirt and wax using lasers, a process called photoablation. Ultrasound and thermal imaging helped conservators understand how the walls themselves were deteriorating, and how to shore them up without damaging the frescoes. The payoff, by all accounts, was worth the effort.

“Visitors can See Famed Florence Baptistry’s Mosaics in Italy up Close,” *Associated Press*, 02/08/2023

Visitors to the Baptistry of San Giovanni in Florence, opposite the city’s Duomo, are getting a once-in-a-lifetime chance to see its ceiling mosaics up close thanks to an innovative approach to a planned restoration effort.

Rather than limit the public’s access during the cleaning of the vault, officials built a 32 meter scaffolding platform for the art restorers that will also allow small numbers of visitors to see the ceiling mosaics at eye level.

The six-year restoration project is the first in over a century. It initially involves conducting studies on the current state of the mosaics to determine what needs to be done. The expected work includes addressing any water damage to the mortar, removing decades of grime and reaffixing the stones to prevent them from detaching.

The Baptistry of San Giovanni and its mosaics have undergone previous restorations over the centuries, many of them inefficient or even damaging to the structure. During one botched effort in 1819, an entire section of mosaics detached. Persistent water damage from roof leaks did not get resolved until 2014-2015.

Roberto Nardi, director of the Archaeological Conservation Center, the private company managing the restoration, said the planned work wouldn’t introduce any material that is foreign to the original types of stone and mortar used centuries ago.

“Saving Rodeo History: The Conservation Project,” *Cowboys and Indians*, 02/18/2023

The ProRodeo Hall of Fame and Museum of the American Cowboy in Colorado Springs, “educates the public about rodeo, its history and impact on Western American culture, and provides recognition to rodeo notable of the past and present and serves as an inspiration for the future.”

One important recent and ongoing undertaking in the service of that mission: the Panoramic and Oversized Photo Preservation Project.

The photographic journey started four years ago when exhibits and collections coordinator Megan Winterfeldt found 120 oversize and panoramic historical cowboy photos, dating 1917 to 1959, rolled in paper tubes in the collections building. The photos captured some of the sport’s earliest superstars, including Jim Shoulders, Casey Tibbs, and Gene Autry.

Many of the images were in severe disrepair. “I knew I didn’t have the skills to restore the images myself, so I turned to the Conservation Center for Art & Historic Artifacts,” Winterfeldt says. “They helped me write a grant to secure restoration funding, which we got in 2019 through the National Park Service’s Save America’s Treasures program.s.”

They also sold some old NFR posters to jump-start the project. The first donation they received toward the project was from Hall of Fame stock contractor Cotton Rosser, who recognized himself in one of the images.

The CCAHA started with the photos least in need of refurbishing — about 75 percent were completed this June. Conserving the photographs requires that they be humidified, flattened, cleaned, mended, stabilized, retouched, and digitized.

To continue the work, the ProRodeo Hall of Fame must raise \$95,500 to match federal grant funds and is seeking donations.

“Be Careful with Polar Solvents When Restoring Historical Paintings, Warn Scientists,” *Phys.org*, 2/22/2023

Even small amounts of water can lead to rapid formation of metal soap crystals in historical oil paintings. Researchers at the University of Amsterdam and the Rijksmuseum warn in particular against using polar solvents that often contain traces of water.

The combination of water and solvent can have especially disastrous consequences, they report in *Physical Chemistry Chemical Physics*.

Paintings conservators use solvents such as alcohol and acetone, for example to remove old varnish layers and dirt. But the commonly used polar organic solvents often contain small amounts of water. The Amsterdam researchers now show that the solvent allows the traces of water to penetrate very quickly and deeply into paint layers. There, they accelerate the formation of metal soap crystals.

Metal soaps are a well-known problem in paintings conservation. They can often be seen as small white dots on the paint surface. Moreover, they can reduce the mechanical stability of historical paints, which can cause them to crack and flake.

“Metal soaps form naturally over time due to the chemical dynamics between the components of the paint,” says first author Dr. Joen Hermans. “But some paintings are a lot worse off than others. We now think that these differences are partly caused by previous treatments. That is why in our publication we warn to be on the alert for traces of water in the solvents.”

The researchers established the effect of the solvent-water combination in two ways. In the laboratory, they studied ‘fake paints’: polymeric model systems containing zinc soaps that are on the verge of crystallizing. “Using infrared light, we saw how the water penetrated deep into the paint and catalyzed the crystallization of the zinc soaps there,” says Hermans.

He explains that the idea for this research had been around for a long time, but he only recently managed to create the right ‘metastable’ model paint.

After demonstrating the effect in the lab, the researchers also took a closer look at real historical oil paintings. They studied small paint chips from

paintings where the pigment zinc white had been applied. There too, they found that zinc soap crystals could rapidly form when exposed to small amounts of water.

“Not all pieces of oil paint reacted in the same way, which shows that there is a huge variety in the chemical properties of oil paint,” Hermans says.

What did become clear, he says, is that oil paint swelling under the influence of the solvent has no influence on the zinc soap crystallization process. “That swelling was always seen as the main cause, but we have now managed to debunk that,” he says.

Hermans is pleased that there is now a spectroscopic method to determine whether a specific historical paint has a risk of zinc soap crystallization under the influence of water: “Conservators are always looking for tests to help them estimate the risks of proposed restoration treatments. Our method can give them confidence that a treatment is not going to cause harm.”

For restoration and conservation practice, there is also other good news: “Short-term exposure to solvent in itself does not need to be a problem, as long as it is completely water-free.”

“How Ukrainians Are Defending Their Cultural Heritage From Russian Destruction,” *Smithsonian Magazine*, 02/22/2023

The Smithsonian Cultural Rescue Initiative (SCRI) and its partners are aiding in the fight to protect the Ukraine’s history and to document attempts to erase it.

Russia’s war in Ukraine is particularly cruel in attacking civilian targets, and it’s also marked by a strong cultural element. To date, almost 1,600 cases of potential damage to Ukrainian cultural heritage sites have been documented, including some 700 monuments and memorials, and more than 200 museums, archives and libraries.

Notably, more than 500 are religious sites—places of worship and cemeteries—with those of the Ukrainian Orthodox Church specifically targeted.

In 2020, at a Washington, D.C. symposium organized by the SCRI, Ihor Poshyvailo, the director of the Maidan Museum in Kyiv, warned American and international colleagues that culture was becoming an object of war, as Russification policies in the regions captured in

2014 were aimed at diminishing a Ukrainian presence.

In 2021, curator and former U.S. Army “monuments woman” Cori Wegener in partnership with the Virginia Museum of Natural History, established the Cultural Heritage Monitoring Lab to examine the status of cultural sites in crisis zones based on methods developed for Syria and Iraq during the period of ISIS terrorism.

Using satellite imagery, the lab has documented more than 28,000 sites. Last year, with the Russian invasion of Ukraine on February 24, the lab ramped up its efforts employing still more satellites, including some with specialized sensors that can detect heat signatures to record “kinetic” activity to monitor bombing and fires.

Using that data, the lab’s analysts are able to see how closely the heat signatures align with cultural sites. Given satellite coverage, they can reference images over a period of time to pinpoint when the damage occurred and how extensive it is. The lab has also used satellite monitoring to document looting.

At the outset of the war, many Ukrainian museums hastily evacuated their collections to other locations, sometimes to basements, underground storage facilities or safe sites removed from major Russian attack zones. While providing immediate protection, this presented another major problem. Storing collections in places without proper climate control and inadequate air circulation often leads to the development of mold, fungus and other problems that have to be mitigated.

Svitlana Stryelnikova, director general of the National Research Restoration Center of Ukraine, and her staff of conservators were charged with caring for Ukrainian national collections. But the center’s few vehicles were needed for civil defense purposes and unavailable.

Thanks to contacts through the U.S. State Department, the Smithsonian enlisted Uber, which had been providing free transport for refugees fleeing Ukraine. The company generously embraced the challenge.

Stryelnikova needed passenger vans to carry teams of up to 16 conservators daily along with equipment and supplies around the country to service stored but still endangered collections. The trips are daunting, as the conserva-

tors traverse war zones and find museums and facilities severely damaged, bereft of roofs and walls, and lacking power and utilities. Sometimes collections are in disarray, evidence of hurried packing and evacuation.

Conservators across Ukraine have taken stock of the situation, salvaging collections and materials as best they can. They’ve conducted inventories and composed condition reports. Warfare introduces a whole slew of challenges beyond the ken of typical museum work—but the Ukrainian conservators, collection managers, museum directors and others have been vigilant in their defense of those items documenting their nation’s history, art, culture and identity.

“Strange Marks Began to Appear on a 600-Year-Old Leonardo da Vinci Codex,” 4/19/23

Leonardo da Vinci’s Codex Atlanticus is a sprawling 12-volume collection of the Italian polymath’s work, with sections devoted to crossbows, parachutes, waterwheels, folklore, and all manner of other topics.

Given its enormous value as a historical artifact, the Codex has been carefully preserved over the past 600 years. But in 2006, researchers were alarmed to discover unexplained black spots appearing on some of its pages, even though the document is housed in a strictly controlled and secured microclimatic environment at the Biblioteca Ambrosiana in Milan.

Fortunately, these dark stains have only been observed on “passepartout” paper that was attached to the Codex during 20th century restoration efforts; the original folios that da Vinci scribbled on have not been stained. Still, the origin of the marks remained a mystery for more than a decade, leaving scholars baffled.

Now, scientists from the Politecnico University of Milan (POLIMI) think they may have finally cracked the case after analyzing a single page of the Codex, known as Folio 843, with sophisticated and non-invasive techniques.

This approach revealed that the stained sections are contaminated with metacinnabar, a compound containing mercury and sulfide that may be linked to glue used in past restoration efforts, along with ambient air pollution.

"This blackening phenomenon of the passepartout, observed on approximately 210 pages of the Codex starting from folio 600 onward, raised great concern," the POLIMI team said in a recent study published in *Scientific Reports*. "Microbiological studies have been conducted since 2008, which allowed to rule out any type of microbiological attack on the Codex (both passepartout and folio) as the cause of the black stains."

"The goal of this multi-analytical study is to characterize the materials and the deterioration patterns of Folio 843 and propose a hypothesis on the formation of the black stains," the researchers added.

After the stains were discovered, the Codex was unbound and its 1,119 leaves were stored individually on new passepartout mounts in acid-free boxes. Prior work on the document had established the presence of mercury in the stains.

The researchers studied the folio using hyperspectral photoluminescence imaging and UV fluorescence imaging, which exposed the presence of various glues on the margins. These glues were used to connect the folios to the passepartout papers as part of a project conducted by the Laboratory for the Restoration of Ancient Books at the Abbey of Grottaferata between 1962 and 1972.

In addition, the team detected small particles in the stains that measured about 100 to 200 nanometers. An analysis performed at the European Synchrotron Radiation Facility in Grenoble, France, revealed that these particles are made of the special crystalline compound metacinnabar, which is made from mercury and sulfur.

The glue used by the Grottaferata restorers may have contained a white mercury salt that was added to prevent microbiological infestations, according to the study. The sulfur component may have also been introduced through adhesives, though the POLIMI researchers propose that air pollution could have been a factor, given that Milan had high levels of sulfur dioxide in its air until the late 20th century.

It's still unclear exactly how metacinnabar arose from these components, but the new study provides the strongest explanation for the worrisome marks.

"For sale: San Francisco Art Institute campus, \$50-million Diego Rivera mural included," *LA Times*, June 30

The financially troubled San Francisco Art Institute has put its campus on sale, and the deal includes a building adorned by a multimillion-dollar mural by famed artist Diego Rivera.

Facing a debt of about \$20 million, the school at one point considered selling Rivera's "The Making of a Fresco Showing the Building of a City" by itself to stay afloat. But rumors that the mural could be moved out of the school and the city sparked outrage among artists, professors and city leaders. Worried that the artwork could leave San Francisco, faculty and city leaders pushed to keep it exactly where it sits.

Unable to meet its debts, however, SFAI filed for Chapter 7 bankruptcy protection on April 19, and on Tuesday, the real estate company Cushman & Wakefield announced it had been hired to sell the historic campus, including Rivera's 1931 mural.

Built in 1926, the campus includes more than 93,000 square feet in two buildings, along with the school's iconic bell tower, courtyard, library, classrooms and galleries.

The school has produced such creative arts luminaries as photographer Annie Leibovitz, director Kathryn Bigelow, and painter Kehinde Wiley.

No price has been listed for the entire campus. The sale is expected to bring in a hefty sum, however, since the Rivera mural sitting inside one of the two buildings is estimated in the bankruptcy filings to be valued at \$50 million, making it its most valuable asset.

In the late 1920s, SFAI had sought to commission Rivera to travel to San Francisco and paint a mural, but the Mexican artist's ties and communist ideology made it a challenge to obtain a visa. In 1930, then-SFAI President William Gerstle helped Rivera obtain a visa and commissioned the work, which is considered a tribute to the industrial worker, according to SFAI.

The painting shows the construction of a city and the making of a fresco, and depicts the various types of people involved in the task, including manual laborers, engineers, artists and architects.

Staying true to his ideals of celebrating the worker, Rivera conspicu-

ously placed construction workers, laborers and artists, with rolled-up sleeves and overalls, higher in the 74-foot-wide painting. The only men wearing suits, the rich and powerful, are placed at the bottom of the work. Rivera, with a brush and palette in hand, is seen off center of the painting with his back to the viewer.

An outsized depiction of a laborer in the mural has a red star on his breast pocket, suspiciously similar to a symbol of communism, but which Rivera insisted was a tobacco label.

"They Have Finished Moving 225 Tons of Reimagined Art," 4/3/23

With considerable effort, a landscape sculpture featuring huge granite boulders has been trucked across Washington, D.C., to its new home at American University.

For four decades, a sculpture of artfully placed granite boulders bordering a reflecting pool occupied the courtyard of an international headquarters in Washington D.C., creating an urban oasis in the shadows of the tall modernist buildings.

But six years ago, the National Geographic Society, decided that the sculpture, known as "Marabar" and designed by the artist Elyn Zimmerman, was in the way of expansion plans for its headquarters, and later agreed to help find it a new home.

Now the boulders, reconfigured a bit but still weighing some 225 tons, surround a different, crescent-shaped reflecting pool, in an open space on the campus of American University. The spot is sunnier than the old home of the sculpture, which also has a new name, "Sudama."

On Tuesday the university will officially rededicate the sculpture, which has been placed atop a hill behind the university's Kay Spiritual Life Center, near a grove of cherry blossoms and a slope covered with daffodils.

Sylvia Burwell, American University's president, said that within hours of the construction fences coming down, she watched as students gathered at the sculpture. "There were so many," she said. "Some of them contemplating, just sitting and thinking."

Major works of landscape architecture are rarely moved, but when they do relocate the process raises all kinds

of questions, not just about logistics like who is going to pay for the trucks, but also about how the forms interact in a changed space.

Zimmerman said her goal was to preserve the granite shapes of the five large central boulders that she carefully crafted more than 40 years ago. She shifted the angles slightly, and moved seven ancillary stones closer to the pool than they had been at National Geographic. “What appealed to me about this site was that it was so very different from the original location of ‘Marabar,’” Zimmerman said. “The new site indicated a different vocabulary.”

“You could say that it’s been revived, and make an analogy with the theater,” Birnbaum said. “This is a happy occasion, like a great revival where the original artist is reconceiving the work in a different context, just as playwrights have done for many decades.”

Elizabeth Meyer, director of the Landscape Studies Initiative at the University of Virginia, described the relocation effort, which took “Marabar” from one site only to re-emerge as “Sudama” at another, as incredible because Zimmerman had full agency to reimagine and relocate her own work. “Site matters,” Meyer said. “It definitely matters.”

“Marabar,” Zimmerman’s original work, was named after a fictional cave referenced in E.M. Forster’s novel “A Passage to India.”

For her sculpture, she carefully selected, shaped and polished a dozen granite boulders she found in Minnesota and the Dakotas and then had them trucked to Washington.

But “Marabar” was in the way when the society drew up plans to build a new entrance pavilion with a rooftop garden and submitted them to District of Columbia in 2019. The society had already told Zimmerman of its plan to remove the sculpture and asked if she had an alternative site. The removal plan drew strong criticism and the society later took the lead in helping to relocate the work at its own expense.

“We are honored,” the society said in a statement, “to donate this important work of art, which has been reimagined by the artist in an installation for this new site, in a setting selected by the artist for quiet contemplation.”

Zimmerman, 77, took a direct role in the relocation project, which began

last fall when the huge rocks were trucked over to the university campus. She was given a choice of eight different sites on the university’s 84-acre campus.

“This Is the Lightest Paint in the World,” *Wired*, 4/6/23

Debashis Chanda had trouble finding a physicist who could paint. The researchers in his nanoscience lab at the University of Central Florida had already worked out the kinks in the high-end machinery needed to create a revolutionary new kind of cooling paint. They had filled vials with vivid colors. But when it came time to show it off, they hit a wall. “We could barely draw a butterfly by hand.”

They did it anyway. The shape and the four-color design do look basic, but the simplicity is deceptive. If you zoom in deep—to invisible dimensions—this paint is almost nothing at all like the paint you know.

Color surrounds us in nature, and we re-create it with pigments. “But nature has a very different way of creating color than we do,” Chanda says.

Some of nature’s most vivid looks—the kind worn by peacocks, beetles, and butterflies—come from topography. Submicroscopic landscapes on the outer surfaces of peacock feathers, beetle shells, and butterfly wings diffract light to produce what’s known as structural color. It’s longer-lasting and pigment-free. And to scientists, it’s the key to creating paint that is not only better for the planet but might also help us live in a hotter world.

In a paper published this month in *Science Advances*, Chanda’s lab demonstrated a first-of-its-kind paint based on structural color. They think it’s the lightest paint in the world—and they mean that both in terms of weight and temperature.

The paint consists of tiny aluminum flakes dotted with even tinier aluminum nanoparticles. A raisin’s worth of the stuff could cover both the front and back of a door.

It’s lightweight enough to potentially cut fuel usage in planes and cars that are coated with it. It doesn’t trap heat from sunlight like pigments do, and its constituents are less toxic than paints made with heavy metals like cadmium and cobalt.

Chanda’s lab members stumbled upon their innovation by accident. They hadn’t set out to make paint. They wanted to make a mirror, specifically a long, continuous, aluminum mirror, built using an instrument called an electron beam evaporator. But in every attempt, they’d notice small “nanoislands,” clumps of aluminum atoms tiny enough to be invisible yet large enough to disrupt the mirror’s shine.

Nanoislands appeared all over the surface of what was now—frustratingly—not a continuous mirror. “It was really annoying,” Chanda recalls.

Then came an epiphany: That disruption was doing something useful. When ambient white light hits aluminum nanoparticles, electrons in the metal can get excited—they oscillate, or resonate. But when dimensions dip into the nanoscale, atoms get extra picky. Depending on the aluminum nanoparticle’s size, its electrons will oscillate only for certain wavelengths of light. This bounces the ambient light back as a fraction of what it was: a single color. Layering aluminum particles on a reflective surface had amplified the colorful effect.

Which color? That depends on the size of the nanoislands. “Just by shifting the dimension, you can actually create all colors,” Chanda says. Because structural color can blanket an entire surface with just a thin, ultralight layer, Chanda thinks this will be a game changer—for airlines. It could shave off 1,000 pounds for each plane, which would reduce fuel needs.

Structural paint may also last longer. Pigment molecules break down in sunlight but structural color doesn’t—so it doesn’t fade. Chanda’s team also realized that, unlike conventional paint, structural paint doesn’t absorb infrared radiation, so it doesn’t trap heat. The new paint is inherently cooling in comparison: Based on preliminary experiments, it can keep surfaces 20 to 30 degrees F cooler than conventional paint.

Baumeister thinks it has uses far beyond aviation, including in mediating the “urban heat island” effect, which creates high temperatures in cities. Keeping buildings cool without using electricity would create a more sustainable infrastructure. “If the outside temperature is 95 degrees, and if you can maintain below 80 degrees, there is enormous savings of AC and energy,” says Chanda.