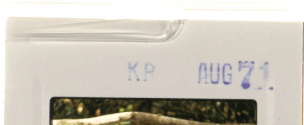
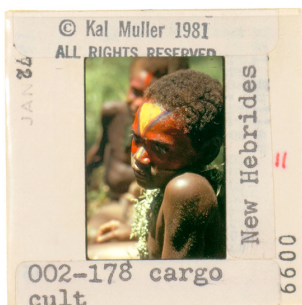
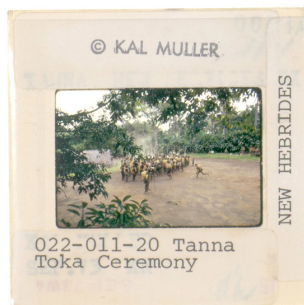


ANNUAL REPORT

2021



2021 is best characterized as the year we normalized our work in the pandemic. The adaptations made in 2020, when Covid-19 moved us to teleworking, have been tested and modified as we shifted our focus on how we can support the Smithsonian's digitization needs in this new environment.

Key for us was learning to function in "pandemic time" – that discomfiting state where surges and declines in the virus lead to conditions of constant change. We are grateful that the past year has brought with it vaccinations, boosters, and better safety protocols along with a deeper understanding of the SARS-CoV-2 virus and its transmission vectors. These efforts made it possible for the Smithsonian to reopen its museums to visitors and over time, to allow an increasing number of staff into offices to conduct on-site work.

As a result, our long-running botany mass digitization project at the National Museum of Natural History resumed, moving us closer to a 2022 completion date for digitizing the entire U.S. Herbarium (over four million specimens). Our Collections Digitization team also continued exploring ways to scale up the creation and enhancement of digital records so we can provide richer information about Smithsonian collections to all who use them.

Our 3D team continued to develop robust infrastructure for the Smithsonian's 3D collections, expanding the functionality of our 3D viewer "Voyager", creating a 3D repository "Packrat" to preserve and deliver 3D assets, and running newly developed processing software through its paces. They also were able to get on-site to capture dozens of items for the National Museum of American History's *Girlhood: It's Complicated* and *¡Pleibol! From the Barrios to the Big Leagues* exhibits.

The Policy and Analysis Program undertook its digitization assessments, and launched a new webinar training series, Digital Foundations, to help expand digital understanding and competency across the Smithsonian. They also redesigned DPO's Sharepoint site and started planning for the biennial Digitization Conference, which will take place (virtually) on March 22-24, 2022.

For more details about any of the work mentioned in this annual report, see our web site (dpo.si.edu). Many of the blog posts that you'll find here go into more detail on our projects.

Our work relies on so many colleagues from across the Smithsonian that we can only thank them in the aggregate. The National Collections Program has been a central partner from our inception, collaborating on Institution-wide assessments, providing the collections care staff needed for many of our projects, and offering guidance on far-flung issues such as budgets and strategy. We also owe a debt of gratitude to colleagues who supported our unit-based projects. By providing us with on-site space, staffing and oversight, and local support, unit staff are integral to every project we undertake. Finally, our home base – OCIO – provides the mooring we need to succeed, including technical services, funding, and colleagues who can make anything possible. At a time that continues to challenge us all, we extend our sincerest thanks to everyone for their unwavering support.

By strange coincidence, I find myself writing this message on January 6th, 2022. Anniversaries are milestones for reflection, and this one leaves me grateful for the entire DPO team, who remain focused on the future, and committed to the notion that the Smithsonian has an important role in shaping it.

Diane Zorich

Director, Digitization Program Office, OCIO



2022 Smithsonian
Digitization Conference
This Year We'll Be Virtual

SAVE THE DATES: MARCH 22 - 24, 2022

The 3D Program continues to create and leverage 3D-digitized objects so curatorial and educational staff can share rich stories and insights using the Smithsonian's collections. The Program made great strides this year in developing the infrastructure to support 3D digitization and content delivery efforts across the Institution with key enhancements to both the [Cook](#) and [Voyager](#) platforms, which support the processing and display of 3D data respectively, and the release of version 0.9.0 of Packrat, OCIO's system of record for 3D data, which is now feature complete for production use.

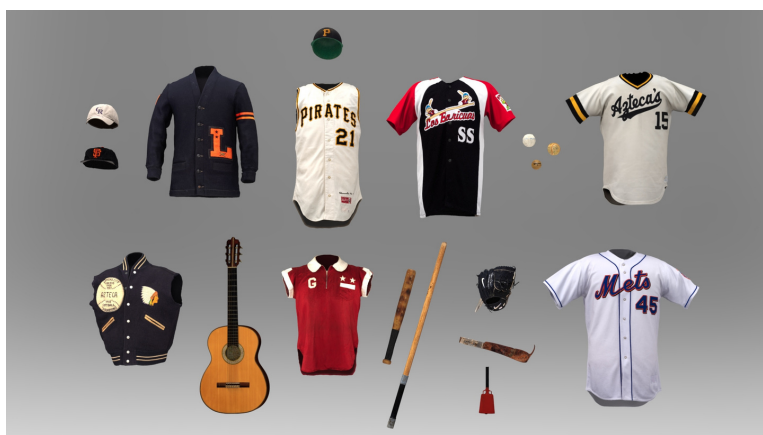
Significant enhancements were made to [Voyager](#), our open-source online 3D viewer, including integrating augmented reality (AR) experiences that require no downloads or plugins. We also added multilingual support to Voyager's user interface and content and accessibility features such as keyboard controls, screen reader support, and audio tours. Additionally, we explored 'sonification', a technique that uses sound to communicate the shape of a 3D model to users who are blind or have low vision. We had an uptick in the number of SI units (e.g., National Museum of African American History and Culture's [Searchable Museum](#), Smithsonian's [Learning Lab](#)) and external organizations who adopted Voyager as the display platform for their 3D models.

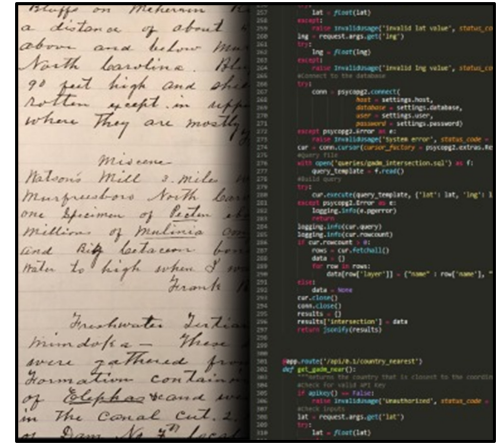
While access to physical museums and collections was limited in 2021, we collaborated with several partners to leverage existing digital assets and reach audiences in unprecedented ways. Working with Instagram and SI's social media team, we created Instagram AR filters for users to creatively explore several SI objects. We also worked with the National Museum of Natural History's Human Origins group and web team to recreate an educational experience (the [Mystery Skull Interactive](#)) using the Voyager platform, and with Adobe to create an educational, interactive AR coral reef experience using SI's open access content.

The 3D Program implemented a major capture project and several public launches during 2021. Through careful coordination with collections and safety staff, the team designed and installed a room-scale capture station at the National Museum of American History (NMAH) to capture human-sized garments with diffuse light and minimal air movement so that the garments would not shift while being imaged. Over 60 individual clothing items from NMAH's Girlhood collection were 3D-captured in this space, including items that represent pivotal moments in women's sports history (e.g., the tennis dress worn by Billie Jean King during the "Battle of the Sexes"), as well as items from the Virginia Lee Mead Collection representing the cultural traditions of Chinese-American women. The team also used this setup to capture Martha Washington's inauguration gown, a printing press for the Molina Family Latino Gallery, and an Emmett Till River Site commemorative marker. Most of these objects will be available online in March 2022.

We launched several other online projects, including 19 baseball artifacts from *Pleibol! In the Barrios and the Big League*. These interactive 3D experiences support the exhibit currently on display at NMAH and uniquely supplemented a SITES version of the exhibit by letting visitors experience AR versions of the objects in the exhibit space using QR codes. Finally, we collaborated with the Smithsonian Astrophysical Observatory to launch nine models using images generated by the Chandra X-ray Observatory. This striking 3D model collection features stars at various stages of the stellar life cycle.

Closing out the year, the 3D team was honored to receive an invitation from The Khronos Group to join its 3D Formats Advisory Panel. Participating in the work of this international standards consortium gives the Smithsonian a seat at the table in setting 3D standards and is an acknowledgement of the expertise of our team.





The Collections Digitization Program (formerly “Mass Digitization”) continues its programmatic approach to Smithsonian-wide digitization. From the priorities defined in the museums’ Unit Digitization Plans (UDPs), the Collections Digitization Program undertakes a steady stream of mass-digitization projects across the Institution. Due to the COVID-19 pandemic and the restricted access to collections that entails, the program has made a strategic pivot from object digitization to collection records digitization. We are applying the same collaborative teams, workflows, and processes developed for object digitization to this new area, which will result in more and richer collection records that support the work of educators, researchers, students, and the general public who use our collections.

This year, we are closing in on a major milestone: completing the digitization of four million botanical specimens in the U.S. National Herbarium, **marking the first time in the United States that a major herbarium’s collection has been digitized**. Because these specimens, located in the National Museum of Natural History (NMNH), date back centuries and span the globe, they provide unique research opportunities in areas such as drug development, agricultural studies of crop resilience, reconstruction of past ecosystems, new perspective on invasive species, and more.

We also were able to complete the imaging of nearly 35,000 35mm slides and slide sleeves from the National Anthropological collection of photographs of Vanuatu [New Hebrides], from the NAA’s Human Studies Film Archives. The images will be used by Indigenous communities on Vanuatu to identify people and traditions, directly impacting revitalization of the islands’ language and culture. Moreover, the digitization of historical documentation, such as this fieldwork photography, provides invaluable insight for climate change research, particularly in this region of the world.

As we’ve pivoted from object digitization to collection record digitization during the pandemic, our Informatics program has embarked on three projects: digitizing handwritten ledgers documenting tens of thousands of locality records at the NMNH’s Department of Paleobiology, digitizing accession records from dozens of handwritten volumes and thousands of pages at the National Museum of American History, and digitizing hundreds of thousands of handwritten object records from the Cooper Hewitt Smithsonian Design Museum’s card catalog. Soon anyone with an internet connection will have access to the immense amount of collections information found on the cards, ledgers, and registers from these museums.

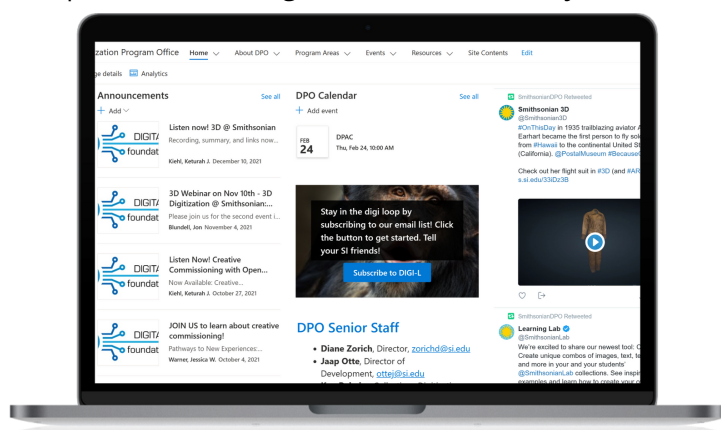
As we look to a future when the pandemic loosens its grip, the Collections Digitization Program has started planning for two large-scale projects:

1. A first of its kind collaborative project with The J. Paul Getty Trust and the National Museum of African American History and Culture to digitize the iconic Johnson Publishing Company archive. This archive, which contains photographs from major publications such as *Jet* and *Ebony* as well as unpublished materials, documents African American life from the second half of the 20th century into the first decade of the 21st. It includes images of celebrities as well as “slice of life” moments documenting African American communities.
2. With our continued experience in bringing cutting-edge technology to the digitization challenges that face us, the Collections Digitization Program, in collaboration with NMNH’s Department of Entomology, will embark on a multi-million specimen project to digitize all the pollinator insects in the collection. These digitized specimens will make it easier for researchers to study ecosystems, biodiversity, and our changing climate. Plans are underway to deploy a new state-of-the-art automated, robotic, conveyor technology for this project.

Despite entering another year teleworking in response to the COVID-19 pandemic, the Smithsonian's SD 600 collecting units continued to make progress characterizing their holdings and reporting them in the [Annual Collections Statistics report and the Collections & Digitization Assessment](#), which quantifies the physical and digital state of the Smithsonian's collections objects/specimens, archives, and libraries. After review with our partners at the National Collections Program, we jointly reported the updated numbers to the Office of Planning, Management, & Budget in support of the annual reporting of the Smithsonian's key performance indicators.

The results of the FY 2020 Assessment (which report on work undertaken in the previous year, i.e., FY 2019) show that the museum, archive, and library units together created a total of 381,000 standard digital descriptions (+3% over FY 2019), and 1.4 million standard digital surrogates (+13% over FY 2019) which describe and represent our 155.5 million museum object/specimen collections, 145,700 cubic feet of archives and 2.2 million library volumes that have been prioritized for digitization. For more detail, please visit the [Smithsonian Dashboard](#). The [2020-2022 Unit Digitization Plans Summary Report](#) was published in early 2021. This report highlights SD 600 collecting units' digitization goals and priorities for the future, as well as current challenges and risks which will impact funding, staff, and access to suitable digitization spaces down the road.

In 2021 DPO continued its work with the OCIO Office of Research Computing to compile and analyze responses from research and SD 600 collecting units to the 2020 Unit Data Management Plan for At-Risk Digital Assets. A report with the findings will be available in early 2022.



After a decade of incremental updates, the time was ripe in 2021 for sprucing up the [DPO SharePoint site](#). Policy and Analysis Assistant Keturah Kiehl did the lion's share of the work, with the guidance of the OCIO SharePoint team, to give the site a fresh look and make it easier to share our news, announcements, and program resources with our Smithsonian colleagues.

In response to conversations with our Digitization Program Advisory Committee (DPAC), DPO launched a new Digital Foundations webinar series to help develop and deepen digital literacy, competency, and capacity-building for all SI staff. Each webinar highlights important digital work taking place within the Smithsonian or by colleagues from other institutions. While we recognize that creating a digital-savvy workforce in an institution as large and varied as the Smithsonian is a challenge that requires a sustained, multi-pronged approach, this series is envisioned as one of many anticipated professional development opportunities that will help address the challenge.



We launched Digital Foundations with a two-part series facilitated by Ross Parry and Lauren Vargas from the [One-by-One initiative](#), hearing from the initiative's participants at the American Women's History Initiative, the Cooper Hewitt Smithsonian Design Museum, the National Air and Space Museum, and the Smithsonian American Art Museum, in one webinar, and following up with participants from cultural institutions in the UK in another.

The 2021 series also included a webinar on productivity tools used by various SI staff to assess digital maturity (Digital Culture Compass), clean up data (OpenRefine), and manage content (Jira); on CHSDM's innovative process of commissioning designers to create engaging digital experiences using SI Open Access content; and an overview of 3D digitization at the Smithsonian, from scanning to creating high resolution models to delivering these models to SI's digital audiences. Recordings and summaries for each webinar can be found on the [DPO SharePoint site](#).

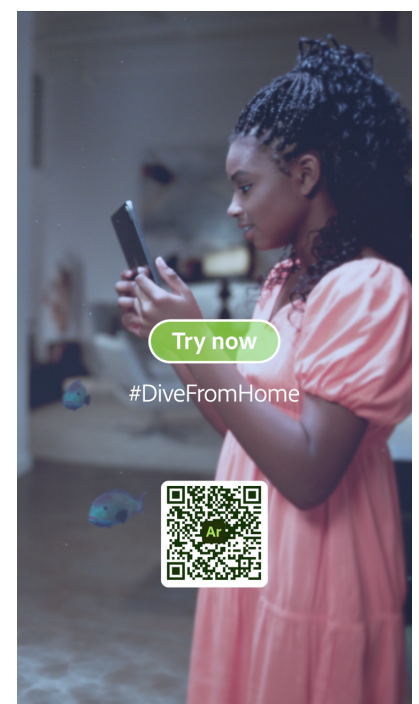
Development at DPO always works in close collaboration with other offices of OCIO, in particular its Finance & Administration office, and colleagues Smithsonian-wide from the offices of Advancement, General Council, Contracting, Public Affairs, and of course the museums, who together make the support DPO receives possible.

Thanks to the leadership of the Corporate Relations team of the Office of Advancement, Verizon expanded its relationship with the Smithsonian by supporting the “Our Shared Future: Reckoning with our Racial Past” Initiative. Over the next five years, Verizon will provide high fidelity 3D scanning of Smithsonian collections and artifacts for this initiative, and new digital experiences built around it. As part of the launch in January 2021, Verizon released AR objects from two National Museum of American History exhibitions: *Girlhood (It's Complicated)* which explores girlhood in the U.S. and how girls changed history in politics, education, work, health, and fashion, and *¡Pleibol! In the Barrios and the Big Leagues*, which shows how Latino communities played, celebrated, and changed the game of baseball. With Verizon's support, users can experience these 3D assets in AR alongside stories told by museum curators that contextualize the cultural significance of the objects.

We also had two stalwart partners continue their support this year. FARO Technologies, a founding supporter of the Smithsonian's 3D Digitization Program since 2011, and recipient of the 2019 Smithsonian Digitization Partnership Award, generously continued to make its 3D laser scanning technology for high-precision 3D measurement, imaging, and comparison of parts and compound structures available for the next several years. And Amazon Web Services generously agreed to renew its commitment to host the Smithsonian's Open Access data as part of the AWS Public Dataset Program for another two years.

A new partnership this year was undertaken with Adobe and The Hydrous (a non-profit educational organization) to create a unique augmented reality underwater experience, using the Smithsonian's Open Access 3D coral collections captured by DPO's 3D team. The interactive, immersive experience raises awareness about the threats facing ocean ecosystems like coral reefs, and showcases the power of our Open Access collections when we partner with scientists, educators, and creative and technical talent. This experience is part of The Decade of Ocean Empathy program, led by The Hydrous, and has been endorsed under the UN Decade of Ocean Science for Sustainable Development.

Although DPO's museum digitization work has slowed due to COVID-related restrictions, we continue to focus on the future. We are holding exciting discussions with industry leaders about emerging technologies that may be applied in museums. And the DPO team's own technical efforts are of interest to an increasing number of partners. Our 3D processing pipeline, and our Collections Digitization Program's operations excellence, continue to attract attention and inquiries from beyond the museum world.



#DiveFromHome, a new augmented reality experience developed by a partnership between SI, Adobe, and The Hydrous.



The 3D Program hosted **Taylah Hawks** as part of the DC Public School Teacher Externship Program. Ms. Hawks critiqued our 3D viewer (Voyager) and our 3D models, with an eye towards usability by students and teachers and applicability to the D.C. Public School curriculum.



The Collections Digitization Program hosted **Chandini Palem** as an intern on the informatics team. Ms. Palem contributed to machine learning utilities that identified elements of digital images for the enrichment of collection records.

COMMITTEES & SUBCOMMITTEES

Digitization Program Office Advisory Committee (DPAC)

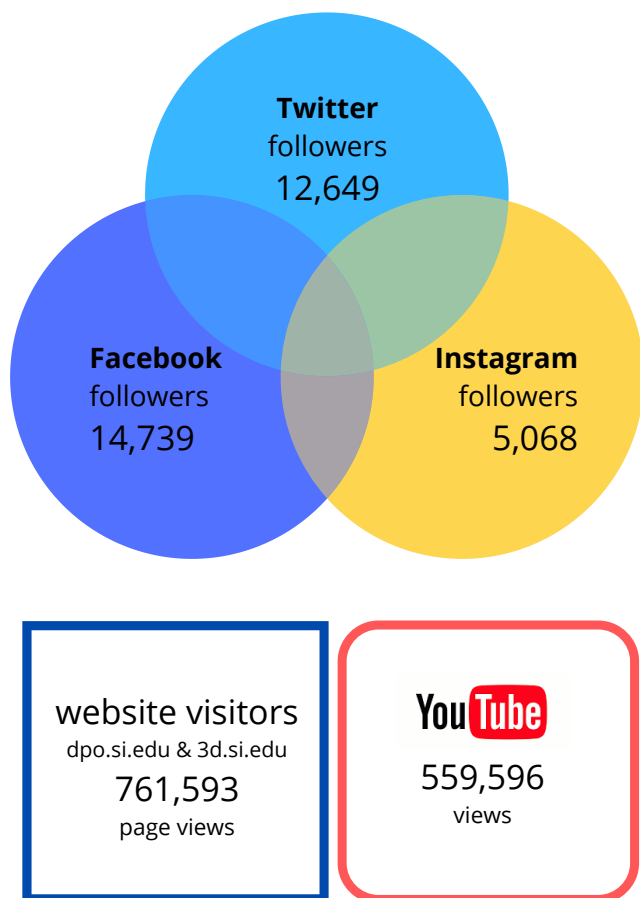
Members advise the DPO about its program and plans, and serve as conduits of information from DPO to their units. Members serve three-year terms and are drawn from across the Smithsonian, representing the many diverse units and professions that exist at the Institution.

In 2021, **Carolyn Royston**, Chief Experience Officer at CHSDM, completed her term on the Committee. We thank her for her years of service and sage advice. We also welcomed the following new members, who will serve until 2024:

- **Nancy Kennedy**, Digital Archives Specialist, OCIO-LASSB
- **Ryan King**, Program Manager, Office of Digital Transformation
- **Jeremy Munro**, Database Administrator, NMAfA

DPO staff served on several internal Smithsonian committees including:

- Audio Visual Archivists Institutional Leadership (AVAIL)
- Audio Visual Mass Preservation Initiative (AVMPI)
- Collections Information Management Committee (CIMC)
- Collections Information Systems (CIS) Pool Fund Allocation Committee
- DAMS Quarterly Users Group
- GUID Working Group
- National Museum of Asian Art Digital Strategy review
- NMNH Informatics Task Force
- OCIO Inclusion, Diversity, Equity, and Access Committee (OCIO-IDEA)
- Open Access Advisory Committee
- Open Access Infrastructure Team
- Open Access Partnerships Team
- OIR Strategic Plan Focus Group
- SD600 revision review
- Smithsonian/Getty Johnson Publishing Company Archive project
- Smithsonian Institution Archives & Special Collections Council (SIASC)



OUTREACH

DPO staff presented their work at over a dozen virtual conferences, workshops, and classroom venues during the year. Some of these opportunities were Smithsonian-based, but many were professional conferences in both the cultural and technology sectors, such as the Digital Futures Symposium, 2D + 3D Photography, Biodiversity Digitization, and MuseWeb 21. Staff also lectured in classes and public programs at Georgetown and George Washington University, the Rhode Island Institute of Technology, and the University of Delaware.

A poster for a virtual talk titled "Desafíos Museales" (Museum Challenges). The poster is for a "CHARLA VIRTUAL" (Virtual Talk) as part of the "CICLO DE CHARLAS CON EL INSTITUTO SMITHSONIANO" (Talk Cycle with the Smithsonian Institution). The topic is "MUSEOS Y digitalización de colecciones" (Museums and digitization of collections). The speaker is DIANE M. ZORICH, Directora de la Oficina del Programa de Digitalización del Instituto Smithsonian. The date and time are "LUNES 13 DE SETIEMBRE" (Monday, September 13) at "6:00 p.m.". The talk will be broadcasted via "CULTURA 24 TV" with simultaneous translation. The poster also features a photo of PILAR RÍOS, Jefa de colecciones del Museo de Arte de Lima - MALI.



12/21/21 TCTMagazine
Repatriations & restorations:
The growing role of digital
manufacturing technology in
cultural heritage

Revolutionizing remote learning **through augmented reality**

How the Smithsonian, the Hydrous, and Adobe Aero are building intuitive AR experiences that matter



11/9/21 Fast Company
Revolutionizing remote learning
through augmented reality

12/01/21 Nature: Footprint evidence of early hominin locomotor diversity at
Laetoli, Tanzania

06/01/21 Smithsonian Magazine: When the Physical World Meets the Digital
World, New Realities Emerge

05/20/21 NASA: Chandra Discoveries in 3D Available on New Platform

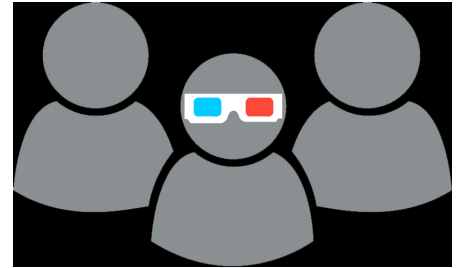
10/26/21 ZDNet: Adobe announces partnership with Smithsonian for AR ocean
exhibit

10/11/21 American Alliance of Museums Blog: “Activating Smithsonian Open
Access” Proposes New Models for Interacting with Museum Collections

03/24/21 Smithsonian National Air & Space Blog: Explore the Wright Flyer

• 3D Interest Group

The goal of the new 3D Interest Group is to build community around 3D technologies. We want to create a space to discuss all things 3D - from the basics (e.g., How do you get a 3D model? What can you with it?) to advanced technical topics around industry standard hardware and software. It is also a place to learn about the latest opportunities with 3D technology partners. Whatever your level of interest and expertise, we'd love for you to help us grow and evolve this community. Join the group [here](#).



• The Sculpin Hat

To highlight a remarkable project with the National Museum of Natural History's Repatriation Office and the Tlingit Indians of Alaska, the 3D Program produced a video that showcases the culturally restorative potential of 3D data. The video follows the story of a damaged sculpin hat in the Smithsonian collection as it is 3D scanned and then recreated from traditional materials using the 3D data and a combination of modern and traditional fabrication techniques. This recreation is then returned to the tribe in an emotional ceremony.

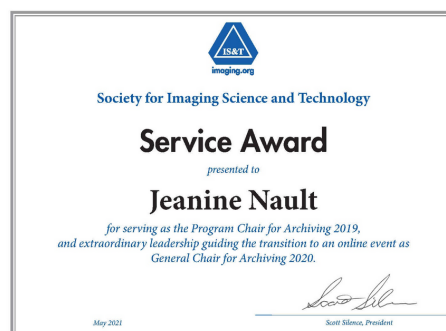


AWARDS

Jeanine Nault, DPO Mass Digitization Project Manager, received a service award from the Society for Imaging Science and Technology (IS&T) for her years of support and service to this professional organization.



CONGRATULATIONS



DPO is an office in the Smithsonian's Office of the Chief Information Officer. Our colleagues in OCIO assisted us in unheralded ways throughout 2021, as they do every year. We are particularly grateful to the following divisions and branches:

Network and Voice Services, Network Security, Desktop Services, DAMS Support, Help Desk, Research Computing, System Architecture and Product Assurance, Collections System Support, the Web team, and Libraries and Archives System Support.

2021 also brought the retirement of several Smithsonian staff who have been especially helpful to us over the years. Our thanks and good wishes go out to:

Michelle Gooch (OCIO)

Bob Horton (NMAH)

Matthew Jenkins (OCIO)

George Meyer (OCIO)

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Collections Digitization, Informatics Program Officer

Jessica Warner
Senior Policy & Analysis Program Officer

Additional Image Credits

Cover: upper right image: 3D render of Escaramuza five piece ensemble from the exhibition "*Girlhood (It's Complicated)*" at the National Museum of American History. Lower left images of slides from Kalman Muller films and photographs of Vanuatu [New Hebrides] digitized by the Collections Digitization Program. Courtesy the Human Studies Film Archive, Smithsonian Institution.

Page 3: from left: 3D render of baseball artifacts from the exhibition "*¡Pleibol! In the Barrios and the Big Leagues*" at the National Museum of American History. Behind the scenes image of 3D technician, Anaïs Perez, performing photogrammetry capture on a skating dress worn by Kristi Yamaguchi.

Page 4: from left: Image from Kalman Muller's films and photographs of Vanuatu [New Hebrides] digitized by the Collections Digitization Program. Courtesy the Human Studies Film Archive, Smithsonian Institution. Image showing Paleobiology ledger and python code.

Annual Report Design: Nathan Ian Anderson.