2019 Annual Report

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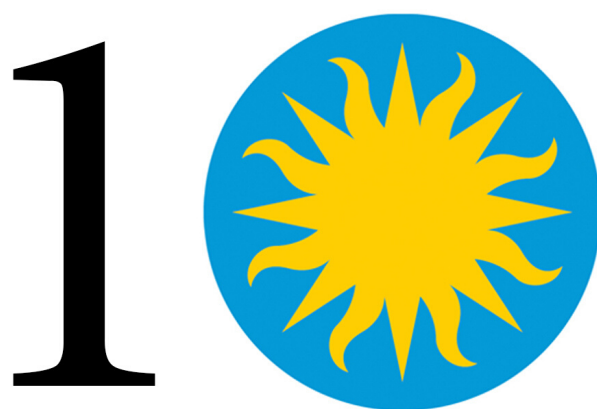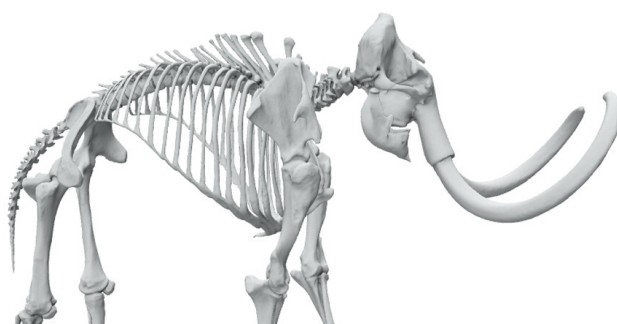
YEARS

Smithsonian
DIGITIZATION PROGRAM OFFICE

The past year was momentous for the Digitization Program Office. In 2019 we celebrated our 10th anniversary with a party, and with reflection on how far we have come and where we need to go to help the Smithsonian increase the quality, quantity, and impact of its digital collections.

First, how far we have come....

In 2009, object and specimen collections were digitized within the Smithsonian's various museums, archives, and libraries (units) on a project-by-project basis. While intra-unit digitization is an important component of a Smithsonian digitization strategy (as units need to digitize segments of their holdings to support critical activities such as publication, exhibition, and conservation etc.), in a collection the size of the Smithsonian's, this strategy alone yields insufficient results. Just how insufficient was made clear by our Policy and Analysis program which, in 2010, conducted the first-ever digitization assessment to identify what portions of each units' collections had been digitized. The results were sobering. Fifty years of digitization efforts (yes, the Smithsonian began creating digital records in the late 1960s!) yielded only one million digital assets of varying quality.

Our Mass Digitization program was created to identify ways to hasten this pace by focusing on efficiencies in the digitization process that are derived from conducting high-throughput digitization. The results are undeniable. In its six years of existence, DPO's Mass Digitization Program - with support from our colleagues in the National Collections Program (NCP) - has increased the number of Smithsonian digitized collections by four million, doubling digitization production rates almost every year since that program began.
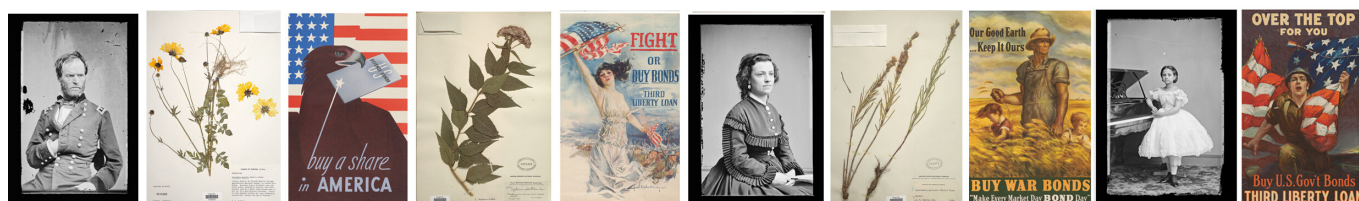
In 2010 we established our 3D Digitization Program to explore 3D digitization and its potential for using Smithsonian collections in new ways. Since that time, we have 3D-digitized hundreds of Smithsonian assets of ever-increasing complexity, broken new ground with emerging technology in this arena, and now are poised to scale up digital production in this area as well.
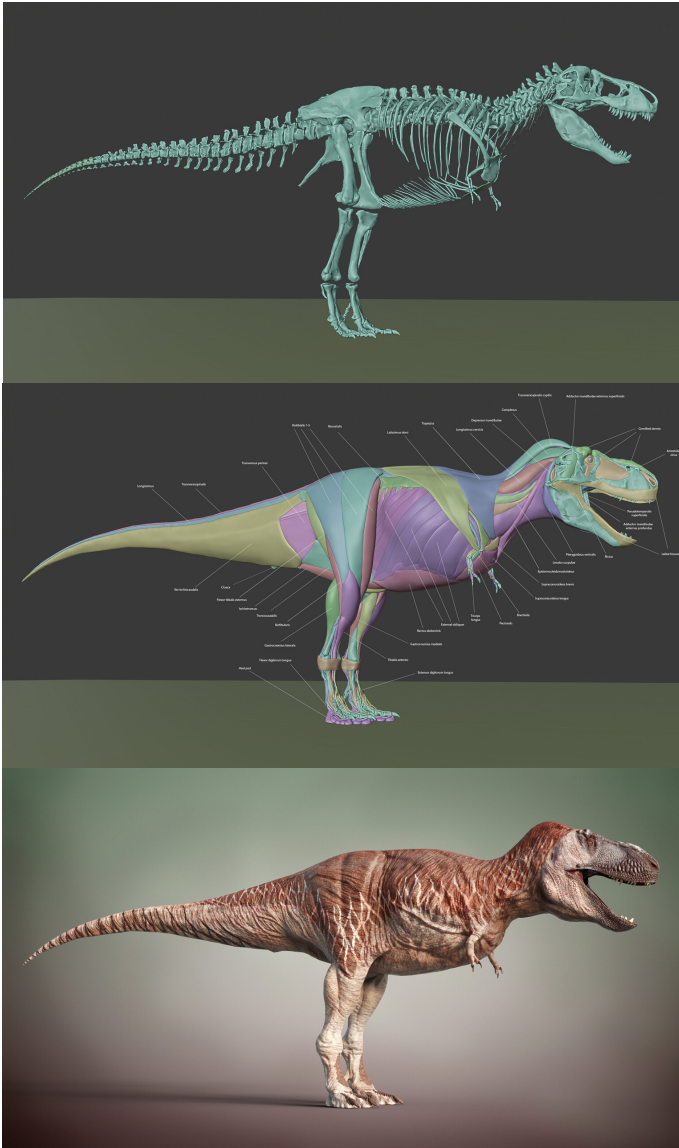
We continue to be leaders in cultural heritage digitization, as evidenced by the number of inquiries and visits we receive from colleagues and presentations we are asked to give around the world. In 2019, we hosted over seventy visitors to our offices and scanning/digitizing sites, gave a dozen professional papers and presentations, and attended fifteen other conferences and special events.

So what is next as we move into our second decade? During our annual department retreat, we focused on ways to deliver greater service and increase digital production. Building on the entrepreneurial spirit of the DPO team and the interns and fellows we have hosted, we will support entrepreneurs-in-residence to kickstart more innovation, develop staff "shadowing" programs to leverage our knowledge and build greater capacity across units, and create guides, tutorials, tours and other tools that support digitization staff across the Smithsonian.

We are excited to support the pan-Institutional efforts leading the Smithsonian to open access in 2020, and are proud that the majority of the over three million digital assets in the open access inaugural collection were digitized by our Mass Digitization and 3D Digitization programs in collaboration with the National Collections Program, units and technology partners. These "digital building blocks" will lead to an explosion of use and creativity. We look forward to seeing where this journey takes the Institution, and how we can create more digital assets to support it.

Diane Zorich - Director - Digitization Program Office, OCIO

This past year the 3D program developed and released 3D open source software tools designed to help the Smithsonian and the larger cultural heritage community preserve, process, create stories, and publish 3D content. We created a prototype 3D repository called **Packrat**, an automated processing tool called **The Cook**, and a 3D viewer, authoring, and publishing tool called **Voyager.** All are available on GitHub, and we are excited about taking these tools further in 2020.

We also completed and launched many high-profile projects in collaboration with Smithsonian units:

To support the National Museum of Natural History's Deep Time exhibit, our team released the *T. rex* and Triceratops model on our **Voyager** viewer. This model is the culmination of work that began back in 2014.

To commemorate the 50th anniversary of the Apollo 11 moon landing, and in collaboration with the National Museum of Air and Space, our team released the 3D scan of Neil Armstrong's space suit. This scan data was used for a *Time Magazine* Augmented Reality (AR) experience and *Smithsonian Channel* AR app, and received a great deal of positive national press. The suit scan also was launched on Google Search AR, and you can now type "Neil Armstrong" on your phone and hangout with him in AR. The same data was used for 'Apollo at the Park', a project in which 1:1 3D-printed replicas were created from our scan data and displayed at Major League baseball stadiums around the U.S.
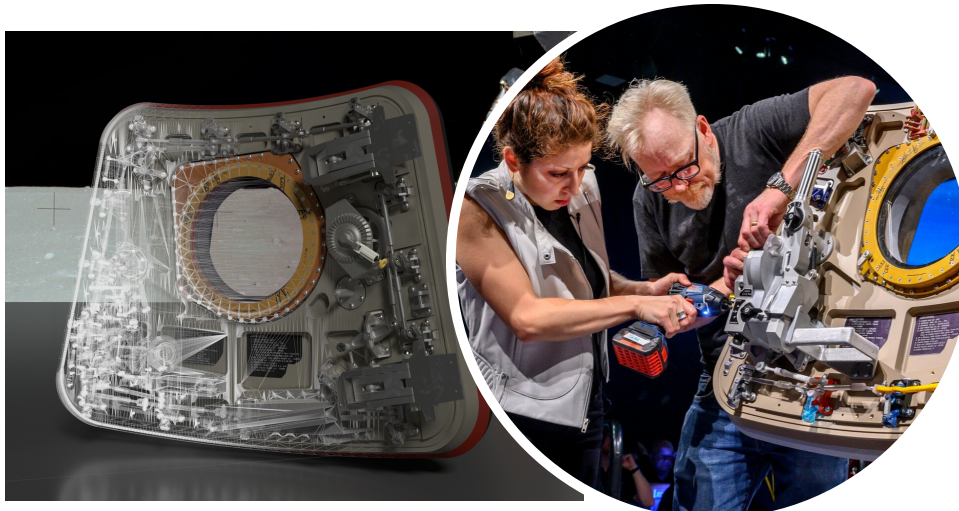
Palaeontologist, musculoskeletal biologist, and paleo-artist Matthew Dempsey downloaded the DPO's 3D scan data of The Nation's *T. rex* and created this digitally sculpted soft tissue study.

The 3D team also worked closely with former MythBusters host and designer/fabricator Adam Savage, master fabricator Jen Schachter, and Bradley University student and DPO intern Andrew Barth *(not pictured)*, to create a crowd-sourced build of the Apollo 11 Command Module Hatch entitled, 'Project Egress'.

In 2019 the Mass Digitization Program strategically revamped its approach to pan-Smithsonian digitization efforts, moving from a project-by-project approach (such as our thematic *Mass Digitization x Many Museums* project to digitize the Smithsonian's smaller museums) to a programmatic strategy. Going forward, 100% of our digitization efforts will be based on unit prioritization, as documented in Unit Digitization Plans (UDPs).

These efforts will be scheduled twice a year on a six-month cycle, with ambitions to launch ten to eleven mass digitization projects per year. This new programmatic approach is possible largely due to the efforts of our sister Policy and Analysis Program in DPO, and the work it does with each museum, archive, and library to develop and manage the UDPs. Our first six-month cycle was completed at the end of 2019, with projects launched for the Smithsonian Gardens' *Druse Collection*, the National Museum of African Art's *Egyptian Postcard Collection*, the National Museum of American History's *Numismatics Coin Collection*, and two projects at the National Museum of Natural History in the Departments of Paleobiology and Entomology. When completed in 2020, these projects will create almost one million additional digitized objects and specimens across the Institution.

The Mass Digitization Program continues to integrate its new Informatics Program, which started last year, into its programmatic activities. This program's data-driven architecture approach uses data directly from its source (e.g., collections information systems (CIS), digital asset management system (DAMS)) to create throughput-enhancing utilities such as a "Virtual Barcode Reader" and a new Quality Inspection Tool, and also drives progress and Key Performance Indicator (KPI) reporting. This approach lets us tackle more digitization projects, reduce sources of errors, and generate reports automatically.

In 2019 we also completed our first collaborative project with Google Arts & Culture, digitizing almost 20,000 National Museum of American History posters from World Wars I and II. The posters and their stories will be available on Smithsonian public web platforms and the Google's Arts and Culture web platform.

The Mass Digitization Program's work to date has brought the total number of digitized Smithsonian collections to four million since the program's inception in 2014. Many of these digitized collections will be available in the inaugural Smithsonian Open Access offering in 2020.

7,254 items in the National Museum of African Art's *Egyptian Postcard Collection* were prioritized for digitization based on NMAfA's Unit Digitization Plan. In addition, resources were provided to the unit for barcoding, rehousing, and catalog enrichment.
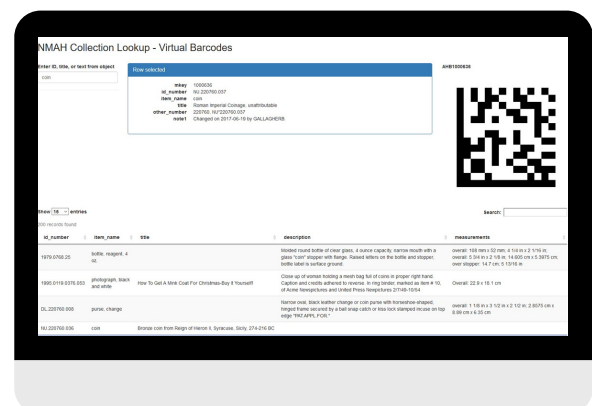
Our "Virtual Barcodes" utility allows staff in Mass Digitization projects to search objects in the collection information systems (CIS) by keyword or accession number and generate a data-matrix barcode. This is used to reduce manual data entry to match the images to the record of the object in the CIS.
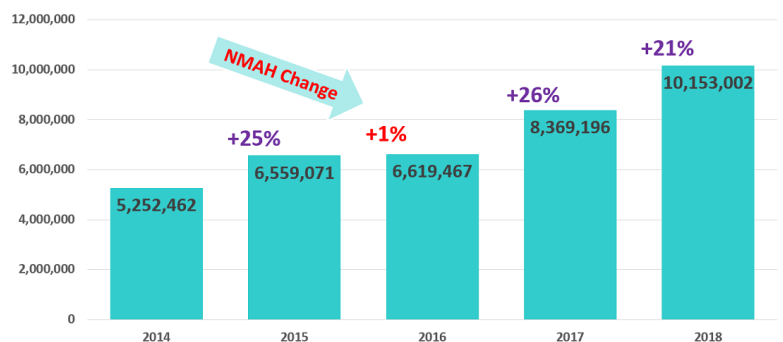

25,082 coins were digitized from three notable collections in the National Numismatic Collection at the National Museum of American History.

The Smithsonian's collecting units (as defined under Smithsonian Directive 600), continue to report great progress in the annual Digitization Assessment. The Assessment reports on work undertaken in the previous fiscal year, so the numbers reported in the FY 2019 Assessment represent work done in FY 2018.

The results show that in FY 2018, the museum, archive, and library units together created a total of 1.3 million standard digital descriptions (+13% over FY2017) and 1.8 million standard digital surrogates (+21% over FY 2017). These describe and represent our 155 million museum object/specimen collections, 163,000 cubic feet of archives and 2.2 million library volumes that have been prioritized for digitization. To learn more, visit the Smithsonian Metrics Dashboard **(https://www.si.edu/dashboard)**.

In 2019, twenty Smithsonian collecting units submitted their Unit Digitization Plans (UDP) for 2020-2022. Reported on a three-year cycle, these strategic plans are a look-ahead at all aspects of planning for digitization in each unit, including the units' management of digitization activities; capacity, risks and needs; funding sources and partnerships; and digitization goals and priorities. The UDPs are an opportunity for units to review and articulate their planned digitization activities, and to highlight possible areas where DPO can support that work.

FY 2014 - 2018
Total Standard Digital Surrogates – M, A, L

NMAH Change

Year	Value	Change
2014	5,252,462	
2015	6,559,071	+25%
2016	6,619,467	+1%
2017	8,369,196	+26%
2018	10,153,002	+21%

Analysis based on digitization assessment data FY 2018 V1.0 Final

SPECIAL INITIATIVE: AUDIOVISUAL MASS DIGITIZATION

Alison Reppert Gerber, Smithsonian Institution Archives Preservation Coordinator, preparing audio tapes for digital preservation.

Two special initiatives were undertaken in 2019. The first, a pilot project to digitize audio collections from the Smithsonian's Archives of American Art and the Smithsonian Institution Archives, was conducted in concert with the Digitization Program Advisory Committee (DPAC) subcommittee on Audiovisual Mass Digitization. In the spring of 2019, members of this group worked with the DPO Policy and Analysis team to prepare and ship audiotapes to an off-site contractor for digital preservation. Through this pilot, the working group developed physical, capture, virtual and quality control mass digitization workflows. This was the first time that DPO has worked with AV collections material to explore a strategy for a multi-unit mass digitization project.

The second initiative reviewed implementation of web content accessibility guidelines for digital AV assets at the Smithsonian. The Program engaged a contractor to investigate current practices among Smithsonian AV archivists, gauge their knowledge of existing Federal and Smithsonian requirements, and highlight best practices. A survey of AV collections also identified areas in need of resources to make Smithsonian AV collections accessible to those who are differently-abled. A final report on the findings with recommendations for action is expected in early 2020. In addition, the contractor gave Smithsonian AV archivists a preview of the findings in a half-day workshop, which included a review of Federal requirements and their implementation at the Smithsonian, and practical application of various AV accessibility tools.

DPO continued to be an attractive and dependable partner and frequent test ground for innovative digital content with various technology companies, such as the creation of a 3D visualization and multi-user experience for education with collaborator *Magic Leap,* and testing of new 3D laser scanning technology with *FARO*. The interest of one of the largest and most established technology companies in forming a joint venture to develop content shows the potential for the Smithsonian as a digital content provider that we hope will become more of a driving force behind digitizing our collections. Expectations are that the Smithsonian's adoption of open access in 2020 will make the Institution more attractive to donors and partners. In the run-up to the Smithsonian's launch of its Open Access Initiative we are attracting support from parties who recognize the importance of the Smithsonian's vast and diverse collections as a content repository and as a resource for data science.

The Smithsonian's 2018 Annual Report, sent to 20,000 donors and others with key relationships to the Institution, put the spotlight on DPO's 3D and Mass Digitization programs, as well as the Data Science Lab. Thanks to the Office of Advancement, DPO and the Data Science Lab had the opportunity to present our work at the Annual Smithsonian Weekend with an exciting combination of lightning talks and a fireside chat about augmented reality and virtual reality at the Smithsonian. We also presented to the San Francisco and Los Angeles Regional Councils and the Smithsonian National Board, reaching key donor constituencies. Donors are hungry to know more about what the Smithsonian is doing in the digital world, and we foresee doing more outreach to similar groups going forward.

2019 was also the second time DPO's Digitization Conference sought sponsorships to cover some of the hard costs of this increasingly important event for the cultural heritage community. We were able to increase fundraising from our 2017 conference levels, thanks in large part to sponsors such as Autodesk and Microsoft, who stepped up to the new top Platinum-level sponsorship. Smithsonian CIO Deron Burba also handed out the new Smithsonian Digitization Partnership Awards to *Autodesk* and *FARO* at the conference, in recognition of their generous support over the years.

As we adopt open access for our digital collections in 2020, we expect increased opportunities to work with partners and donors who appreciate the Smithsonian's bold leadership in this area, and who see increased opportunities to create value when they partner with the Smithsonian.

The 2018 Smithsonian Annual Report with various Smithsonian 3D models created by DPO's 3D team represented on the cover.

Smithsonian's San Francisco and Los Angeles Regional Council Meeting. From left: Vince Rossi, Smithsonian 3D Program Supervisor; Smithsonian National Board member Todd Smith, aka LL Cool J; Ken Rahaim, Mass Digitization Program Supervisor; Rebecca Dikow, Data Scientist & Head of the Smithsonian Data Science Lab.

Emmanuel Gallo, Principal Software Engineer for Autodesk, accepting the new Smithsonian Digitization Partnership Award from Smithsonian Chief Information Officer, Deron Burba.

Anaís Perez

After receiving their degree in Interdisciplinary Sculpture from the Maryland Institute College of Art in 2019, Anaís joined the 3D team to assist with 3D processing and data management. When not at the Smithsonian they enjoy cooking for friends at home and spending time in their studio where they create animations.

3D interns:

Adlan Ramly

(Penn State) Adlan is studying user experience design and software engineering. While at DPO he worked on an augmented reality (AR) mobile phone game using Smithsonian 3D assets. His work was selected among the top ten in a contest sponsored by Niantic, an augmented reality gaming platform.

Stuart Richardson

(University of Utah) Stuart came to DPO after graduating from William J. Palmer High School in Colorado Springs, where he developed a number of VR experiences in art history and physics. While at DPO he used Smithsonian 3D assets to expand on a VR experience he was developing about the Apollo 11 mission to the moon.

Andrew Barth

(Bradley University) Using 3D scans of the Apollo 11 Command Module, Andrew reverse-engineered the hatch from the module as a first step in enabling a crowd-sourced, full-scale replica of the hatch to be created as part of 'Project Egress', sponsored by Tested.com.

Natalia Monsivais

(East Los Angeles College) Natalia Monsivais came to DPO through the East Los Angeles College Internship program, run by the Smithsonian Office of Fellowships and Internships and the Smithsonian Latino Center. She spent a month in the office learning how to perform experimental structured light 3D scanning on a small collection of insects from National Museum of Natural History.

Volunteers/Interns

Bobby Richter

Bobby came to DPO as a volunteer, processing structured light data of coins from the National Numismatics Collection at the National Museum of American History. In the winter, he participated in a three-month internship with DPO while attending the University of Maryland Global Campus, helping us process macro structured light data of corals from the National Museum of Natural History. Bobby also was instrumental in helping run the 2019 Smithsonian Digitization Conference.

Karina Elizabeth Gomez

(Johns Hopkins University) Karina is pursing her Master's in Museum Studies while working as a museum educator at the Liberty Science Center in NJ. She helped DPO plan and implement the social media strategy for the Smithsonian's 2019 Digitization Conference.

New opportunities

This year we said farewell and good luck to **Max Anderson** and **Joe Conrad**, 3D Specialists working in our 3D Digitization Program. Max will be pursuing graduate studies in fine arts, and Joe has taken a new position as a 3D Specialist in Digital Humanities and Heritage Collections at the University of South Florida. We also bid a fond farewell to **Teyobesta (Tey) Abebu**, a part-time contractor supporting the DPO Policy and Analysis program. Tey is completing her Master's in Public Policy at George Washington University and undertaking a full-time internship in the US Department of Justice. We wish them well and look forward to saying, "we knew them when....."

2019 Smithsonian Digitization Conference

DPO rounded out 2019 with the biennial Smithsonian Digitization Conference in October. Since its inception in 2006, the Conference has grown from a modest internal gathering of Smithsonian staff to a three-day event open to the public. The event began with a pre-conference day showcasing Smithsonian digitization projects. The DPO 3D team held a workshop introducing the new open source 3D pipeline they have been developing for processing, managing, and delivering complex 3D collections objects. Concurrently, the Mass Digitization Program hosted a two-day Quality Digitization Training Series Certification class for Smithsonian photographers with Digital Transitions Cultural Heritage using PhaseOne camera systems.

The following two-day program focused on the theme of engagement and included four keynote speakers (**Zander Rose**, Executive Director of the Long Now Foundation; **Chad Weinard,** Mellon Manager of Digital Initiatives of Williams College Museum of Art; **Safiya Noble**, Associate Professor, UCLA, Depts. of Information Studies and African American Studies; and **Christin Murphy,** Head of Signal Processing and Algorithm Development Branch and Head of Bio-inspired Research and Development Laboratory, Naval Undersea Warfare Center, Newport Division and six panels examining engagement from differing perspectives: Entertainment, Education, Research, Accessibility, Bridging Cultures, and Creativity. Over 300 people from down the street (e.g., Library of Congress, National Gallery of Art, World Bank) and around the world (e.g. India, Japan, Portugal) attended, representing a wide array of sectors (e.g., K-12 education, cultural heritage institutions, museums, libraries and archives, entertainment and technology industries, among others) The conference received broad coverage on social media during the event and extended attention when videos of the keynotes and panel presentations were released several weeks later. **View the online conference via youtube**

Day Two Keynote Speaker: Safiya Noble.

Day One Keynote Speaker: Zander Rose.

Peter Leonard, Director, Yale University's Digital Humanities Lab, presenting at the conference.

DPO Retreat

This year's annual department retreat was held at the National Zoo, near the Amazonia exhibit, which gave us a wonderful opportunity to admire a wily sloth and nose-diving birds (roseate spoonbills are amazing!) in between serious, "take-stock" discussions about what we want to accomplish over the next year. The potential of the Smithsonian's Open Access Initiative led to spirited discussion on how we can meet the anticipated demand for more digital assets as that initiative takes root.

We also discussed how far we have come programmatically, from a new office in 2009 with a mandate to increase the quality and quantity of digitized Smithsonian collections, to established programs in Policy and Analysis, 3D Digitization, and Mass Digitization that have altered the way the Smithsonian pursues digitization and digitization metrics. We left the retreat with several ideas (and follow-up tasks) on how we can strengthen what we do, foster innovation, and work toward helping craft Secretary Bunch's vision for a Virtual Smithsonian.

Digitization Program Office Advisory Committee *(DPAC)*

DPAC members advise DPO about its program and plans, and serve as conduits of information from DPO to their units and vice versa. Members serve a three-year term and are drawn from across the Smithsonian, representing all units and every type of profession that exists across the Institution.

In 2019, we said good bye and thanked the following members who completed their terms:
- Joanne Flores (Provost's Office)
- Virginia Gomez (OGC)
- Robert Horton (NMAH)
- Holly Little (NMNH)

We also welcomed the following new members, who will serve until 2022:
- Sherri Berger (NMAH)
- Lindsey Burkholder (OA)
- Jackie Chapman (SIL)
- Vicki Portway (NASM)
- Lynda Schmitz Furhig (SIA)

DPAC Subcommittees:

Audiovisual Mass Digitization Subcommittee *(Jessica Warner, Chair)*

During 2019 a working group of members of the Subcommittee (Taylor McBride OCIO-DAMS, Megan McShea AAA, Alison Reppert Gerber SIA, Crysal Sanchez OCIO-DAMS, Kira Sobers SIA, Dave Walker CFCH) worked tirelessly to develop workflows, prepare collections and perform quality control on digital preservation files for the first AV Mass Digitization pilot project.

3D Digitization Subcommittee *(Vince Rossi, Chair)*

The subcommittee met over the year to review the 3D metadata standards they have been developing and explore how their efforts were fueling the development of key open source tools – **The Cook**, **Packrat**, and **Voyager** – that will support more scalable, sustainable infrastructure for Smithsonian's 3D assets.

Informatics Subcommittee *(Luis J. Villanueva, Chair)*

This subcommittee held its inaugural meeting in mid-2019. Created to explore tools and methods for generating more and better digital records of Smithsonian objects and specimens, the subcommittee has sixteen members representing the Office of Information Technology and various Smithsonian museums. A charter to guide the efforts and activities of the group was discussed at the meeting, and a roadmap for future work is in progress.

TRAINING

For DPO, training is a two-way street. Our staff hone and expand their skills *and* help train other Smithsonian staff who wish to do the same.
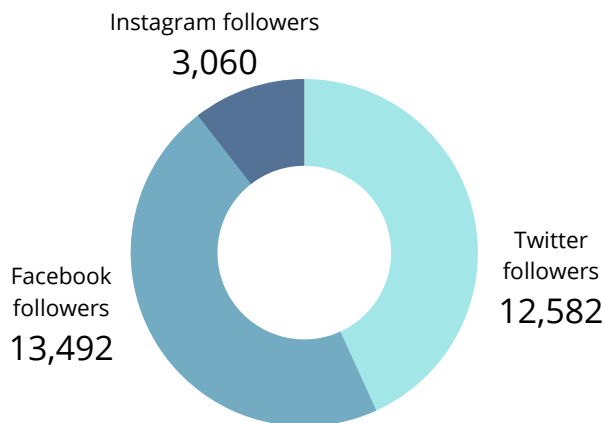
This year various DPO staff received training in Arc GIS, 3D imaging, Data Carpentries (instructor certification), Tableau, and Project Management certification. We offered, as part of our biennial Quality Digitization Training Series, PhaseOne training and certification for Smithsonian photographers. In addition, Luis J. Villanueva, DPO's Informatics Program Officer and certified Data Carpentries instructor, taught several courses on SQL and R to Smithsonian staff.

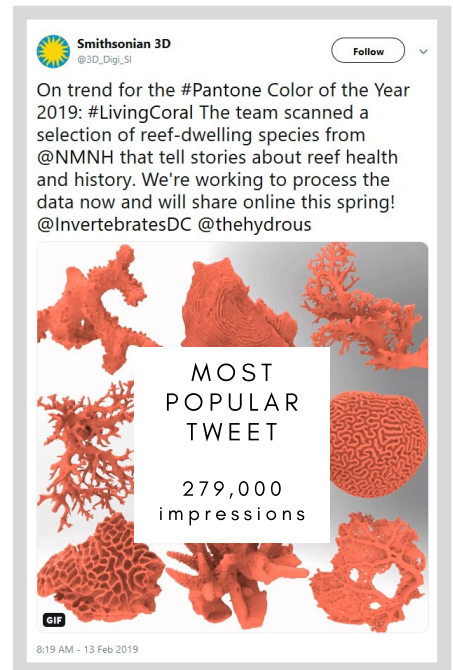Luis J. Villanueva teaching a Data Carpentries class.

PhaseOne training & certification class attendees.

SOCIAL MEDIA

Instagram followers
3,060

Facebook
followers
13,492

Twitter
followers
12,582

website visitors
dpo.si.edu & 3d.si.edu
747,098
total visits

YouTube
424,826
views

Smithsonian 3D
@3D_Digi_SI
Follow

On trend for the #Pantone Color of the Year 2019: #LivingCoral The team scanned a selection of reef-dwelling species from @NMNH that tell stories about reef health and history. We're working to process the data now and will share online this spring! @InvertebratesDC @thehydrous

MOST POPULAR TWEET

279,000 impressions

8:19 AM - 13 Feb 2019

OUTREACH

DPO staff presented their work at a dozen conferences, workshops, and classroom venues during the year. Some of these opportunities were Smithsonian-based, such as annual donor events, but many were at professional conferences further afield such as the All India Museum Summit in New Delhi and the 2D +3D conference in Amsterdam.
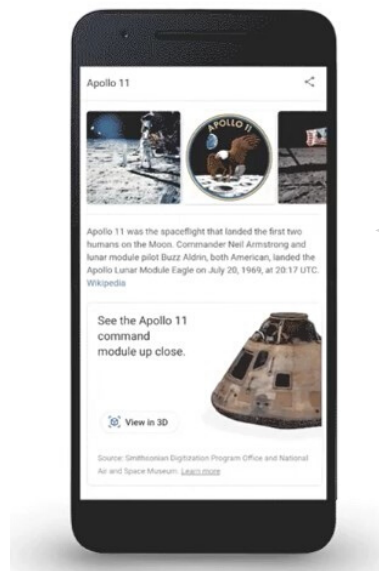
Search for "Apollo 11" from your AR-enabled mobile device to discover the command module (that carried Armstrong, Aldrin, & Collins to the moon) in augmented reality, brought to you by **@googlearts.**
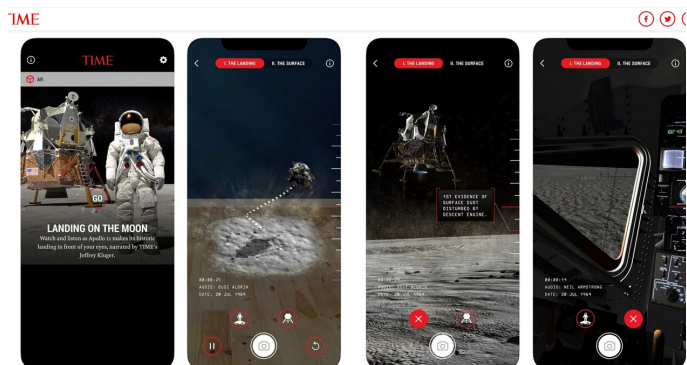

DPO Mass Digitization Staff, from left: Jeanine Nault, Nathan Anderson, Ken Rahaim, and Luis J. Villanueva.

DPO Director, Diane Zorich presenting in Ottawa at the Canadian Association of Museums Technology in Museums Symposia.

Dutch Von Ehrenfried, former NASA aircraft crewman and pressure suit tester at the Smithsonian 3D program's booth at the 2019 SpaceFest.

07/18/19 TIME Magazine:

Welcome to TIME Immersive's Apollo 11 'Landing on the Moon' Experience

05/27/19 Washington Post:

The Smithsonian is digitizing political and military posters — 18,000 of them

07/08/19 Wired Magazine: How Neil Armstrong's spacesuit was saved using 3D scanning

07/16/19 Microsoft: Microsoft makers recreate iconic Apollo 11 hatch for 50th anniversary of historic moon landing

06/17/19 connectingvets.com: You'll soon be able to view thousands of historic military and political posters digitized by the Smithsonian

07/18/19 engadget: Using NASA and Smithsonian data to depict the moon landing

09/05/19 Lifehacker.com: How to 3D Print Some of the Smithsonian's Artifacts at Home

07/17/19 Washington Post: How to dress for space: Explore five iconic spacesuits in 3-D

National Museum of American History - Posters Collections.

Digitizing Neil Armstrong's Spacesuit.

DPO is an office in the Smithsonian's Office of the Chief Information Officer. Our colleagues in OCIO assisted us in unheralded ways throughout 2019, 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, Transcription Center, Web Services, System Architecture and Product Assurance, Collections System Support, and Libraries and Archives System Support.

Special thanks to the Technical Plans, Policies and Project Management branch staff, who ease our way through Federal policies and procedures. We dedicate this year's annual report to **Vickie Cattaneo**, who has ably led this branch for many years. Her experience, guidance, and good sense have made our successes possible.

Digitization Program Office Staff

Diane Zorich
Director, Digitization Program Office

Kathy Adams
Contractor, 3D + Policy & Analysis Programs

Nathan Ian Anderson
Mass Digitization Program Officer

Jon Blundell
3D Program Officer

Megan Dattoria
3D Program Officer

Jeanine Nault
Mass Digitization Program Officer

Jaap Otte
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Anaís Perez
3D Specialist

Ken Rahaim
Supervisor, Mass Digitization Program

Vincent Rossi
Supervisor, 3D Program

Luis J. Villanueva
Mass Digitization Informatics Program Officer

Jessica Warner
Senior Policy & Analysis Program Officer

Additional Image Credits

Cover: clockwise from upper right; Bee specimen Dept. of Entomology, National Museum of Natural History. Cosmic Buddha laser scan, National Museum of Asian Art. Coin from the National Numismatic Collection at the National Museum of American History. 3D rendering of Neil Armstrong's Spacesuit, National Air and Space Museum. Woolly mammoth 3D model, National Museum of Natural History. Louis Comfort Tiffany Glass Candlestick, Cooper Hewitt Smithsonian Design Museum. Orchid flower, Smithsonian Gardens. Bell X-1 3D model, National Air and Space Museum.
Page 2: 3D rendering of Neil Armstrong's Spacesuit, National Air and Space Museum. Mass digitization images courtesy Dept. of Botany, National Museum of Natural History, WWI & WWII Posters courtesy of National Museum of American History, Glass Plate portraits courtesy of National Portrait Gallery.

Annual Report Design: Nathan Ian Anderson.