BUILDING CAPACITY FOR LIBRARY 3D AND VR:

EXPERT PERSPECTIVES ON STRATEGIC DIRECTIONS FOR LIBRARIES

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Virginia Tech

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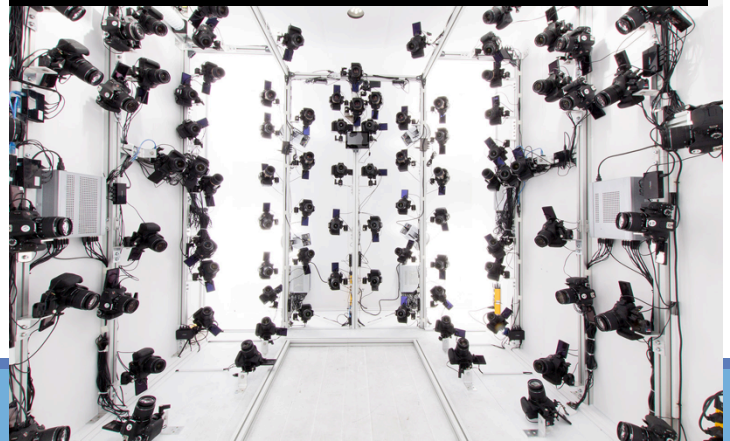
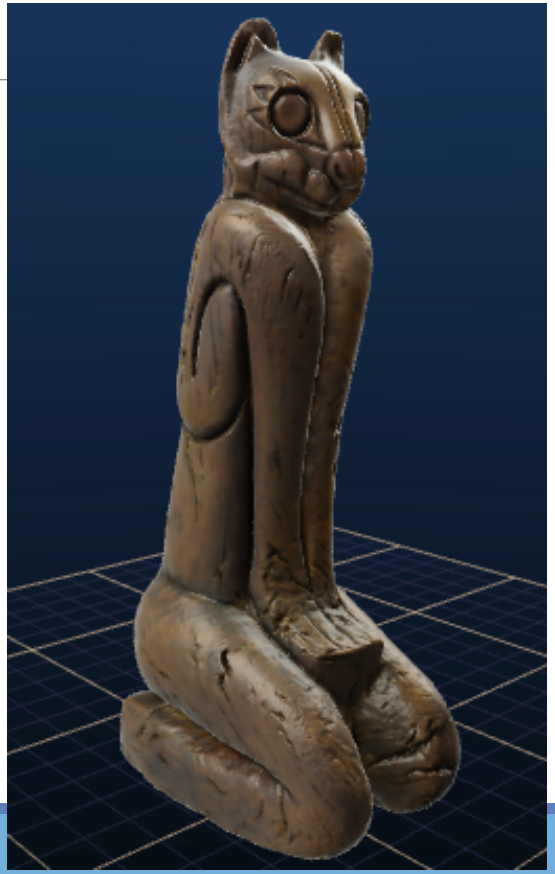
Why should libraries be involved in 3D or virtual reality technology?

Project Rationale





Project Rationale

amazon prime

All | 3d scanner

Deliver to Nathan
Blacksburg 24060

Browsing History | Nathan's Amazon.com | 12 Days of Deals | Gift Cards | Whole Foods | Registry | Sell | EN

XYZprinting Handheld 3D Scanner 1.0 Pro
by XYZprinting

$194.19 - $305.80 prime
Some options are Prime eligible

In stock on December 13, 2018

More Buying Choices
$170.89 (9 used & new offers)

3D Systems iSense 3D Scanner for iPad 4G 350415
by 3D Systems

$708.28 (1 new offer)

Matter and Form MFS1V1 3D Scanner
by Matter and Form

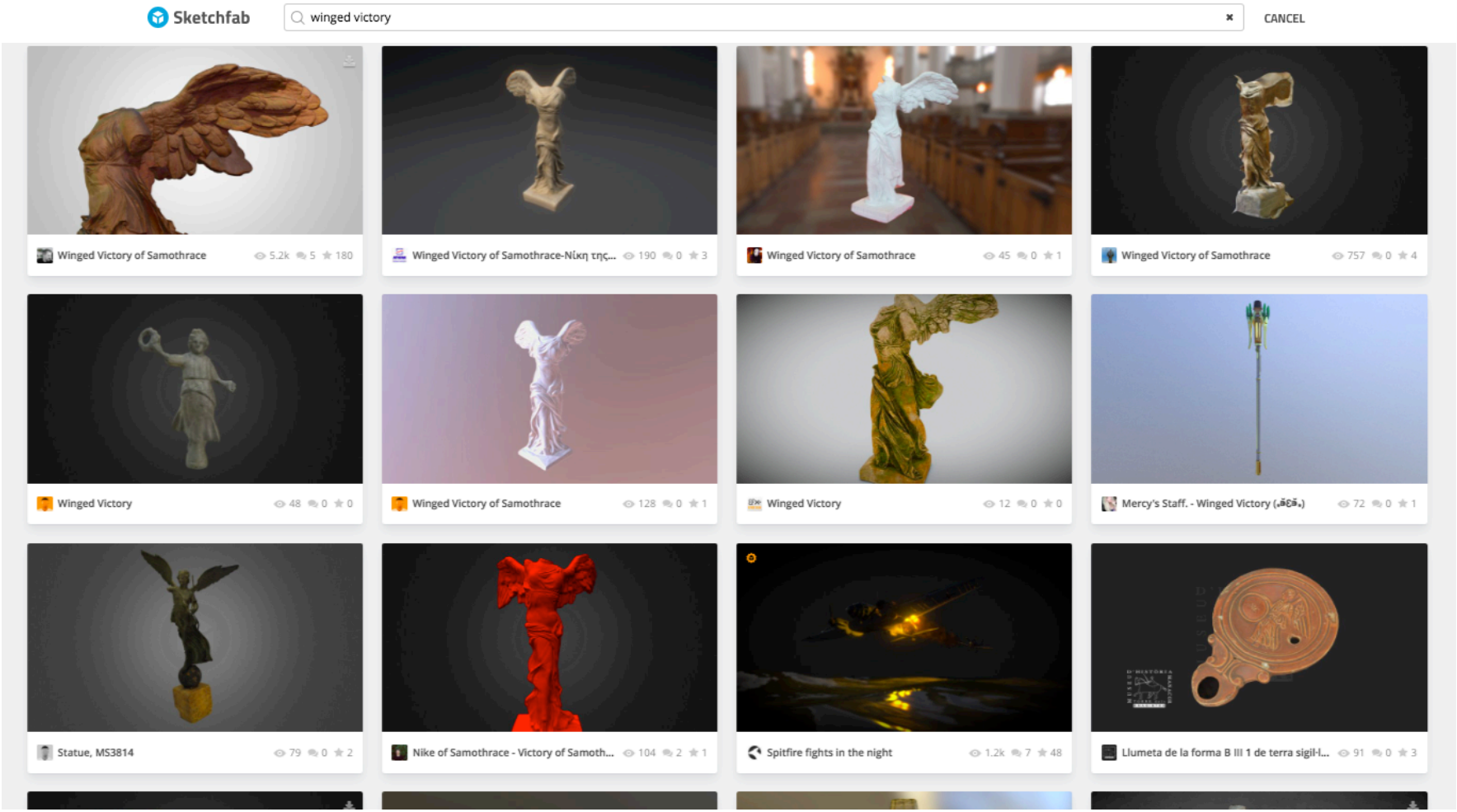
$425.00 ~~$449.00~~ prime
FREE Delivery by **Wed, Dec 12**

More Buying Choices
$337.23 (7 used & new offers)

3D Systems iSense 3D Scanner
by 3D Systems

$555.19 - $706.28

Project Rationale


Sketchfab
winged victory
CANCEL
Winged Victory of Samothrace 5.2k 5 180
Winged Victory of Samothrace-Νίκη της... 190 0 3
Winged Victory of Samothrace 45 0 1
Winged Victory of Samothrace 757 0 4
Winged Victory 48 0 0
Winged Victory of Samothrace 128 0 1
Winged Victory 12 0 0
Mercy's Staff. - Winged Victory (ᵃᵉᵃ) 72 0 1
Statue, MS3814 79 0 2
Nike of Samothrace - Victory of Samoth... 104 2 1
Spitfire fights in the night 1.2k 7 48
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Overview and Goals

- Form holistic knowledge from normally siloed areas of 3D/VR
- Develop best practices to support 3D/VR throughout the research lifecycle
- Establish guidelines that can serve multiple research contexts and use cases that libraries may need to support as researchers increasingly adopt 3D/VR as a research tool.
- Develop strategies that libraries can use for creating policies and workflows for providing 3D/VR related research services.

Project Team

VIRGINIA TECH

- Nathan Hall, PI, Director, Digital Imaging & Preservation Services
- Julie Griffin, Associate Dean of Research and Informatics
- Zhiwu Xie, Chief Strategy Officer
- Andi Ogier, Director, Data Services

UNIVERSITY LIBRARIES
The University of Oklahoma

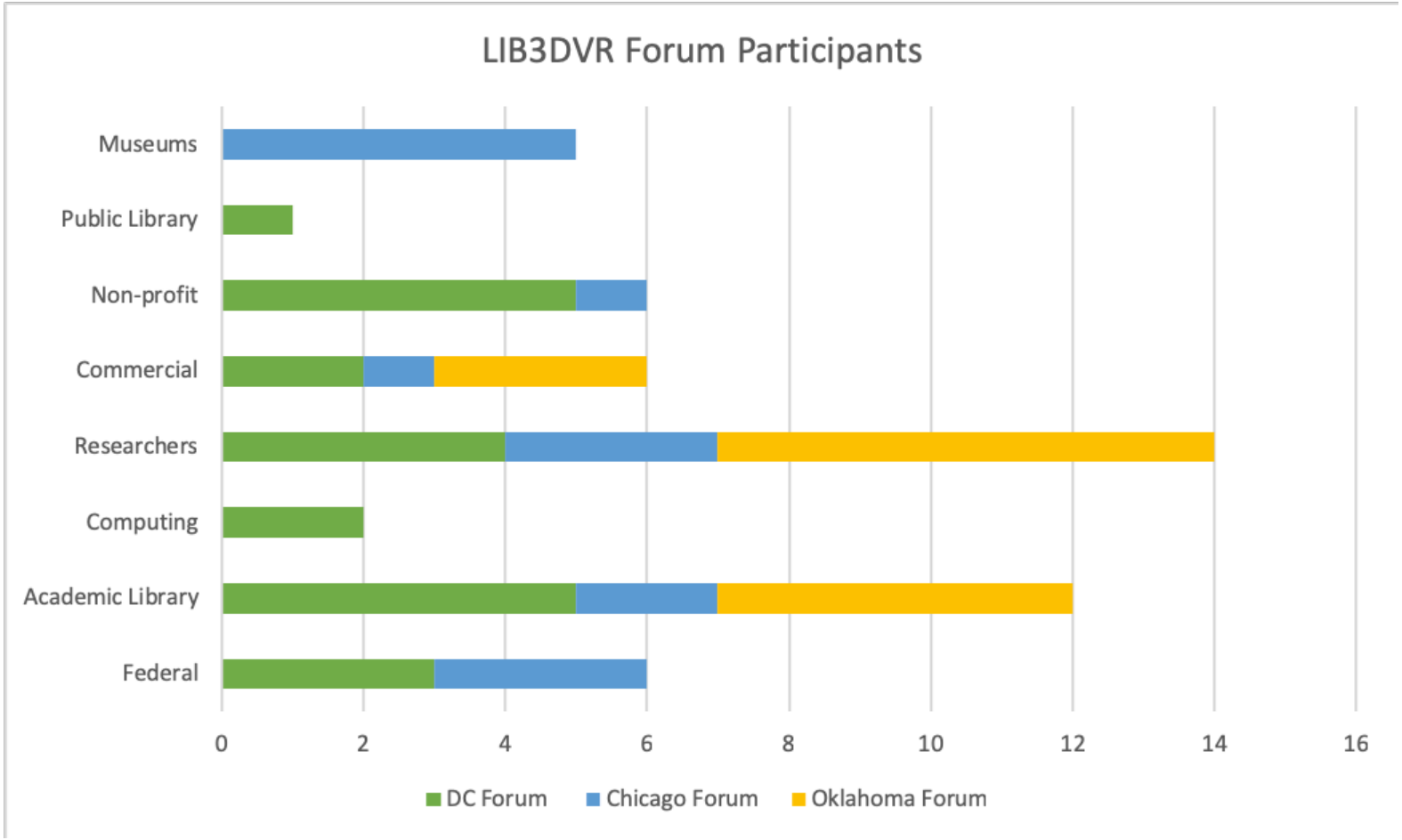
- Matt Cook, Co-PI, Head of Emerging Technologies
- Zack Lischer-Katz, CLIR Post-Doc Fellow
- Tara Carlisle, Head, Digital Scholarship Lab

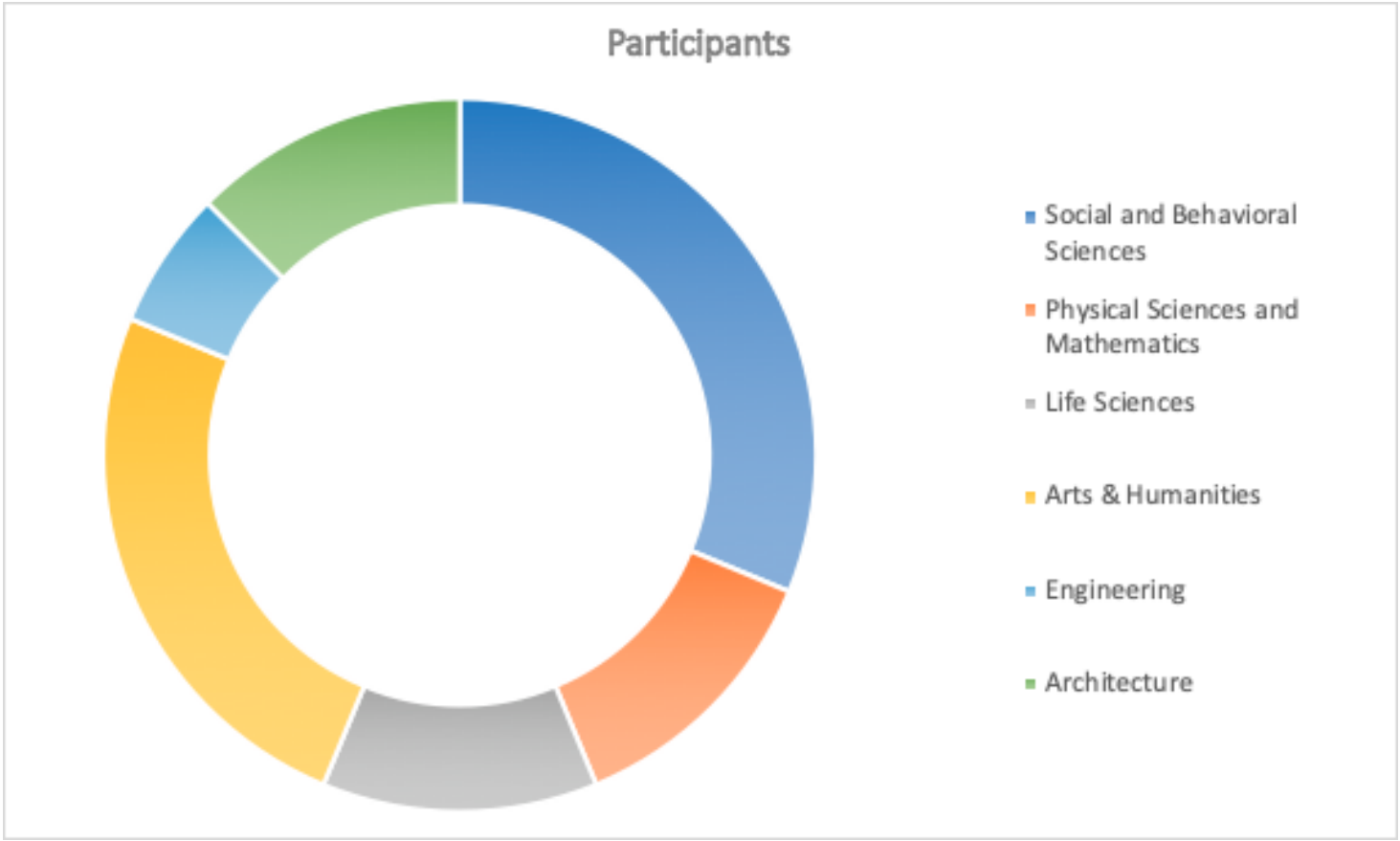
LIBRARIES

- Robert H. McDonald, Dean of Libraries (CU Boulder, formerly IU)
- Juliet Hardesty, Co-PI, Metadata Analyst
- Jenny Johnson, Head of Digitization Services
- Jamie Wittenberg, Head of Scholarly Communication

Advisors

- Carl Grant, Oklahoma University
- Patricia Hswe, Mellon Foundation
- Jason Jerald, NextGen Interactions, LLC
- Fred Limp, University of Arkansas Dept of Geosciences
- Clifford Lynch, Coalition for Networked Information
- Jerome McDonough, iSchool, University of Illinois
- Jennifer Moore, Washington University at St. Louis
- Bryan Carter, University of Arizona
- Diane Zorich, Smithsonian Digitization Program
- Margaret Dolinsky, Indiana University


LIB3DVR Forum Participants
Museums
Public Library
Non-profit
Commercial
Researchers
Computing
Academic Library
Federal
0
2
4
6
8
10
12
14
16
DC Forum
Chicago Forum
Oklahoma Forum


Participants
Social and Behavioral Sciences
Physical Sciences and Mathematics
Life Sciences
Arts & Humanities
Engineering
Architecture

Washington DC Forum Attendees

Vince Rossi, Smithsonian Institution

Jon Blundell, Smithsonian Institution

Thomas Rieger, Library of Congress

Stuart Snydman, Stanford University Libraries

Chad Hutchens, University of Wyoming Libraries

Kristy Golubiewski-Davis, UC Santa Cruz University Library

Jamie Wittenberg, Indiana University Libraries

Jennifer Moore, Washington University in St. Louis University Libraries

Jackson Cothren, Center for Advanced Spatial Technology, University of Arkansas

Nicholas Polys, Virginia Tech Advanced Research Computing

Doug Boyer, Duke University

Edward Triplet, Duke University

Angel Nieves, Hamilton College

Adam Summers, University of Washington

Jarrod Schmidt, Creaform

JD Schaumberg, Online Resources Inc.

Carla Schroer, Cultural Heritage Imaging

Rami Madbouly, Arc/k Project

Scott Purdy, Arc/k Project

Doug Gann, Archaeology Southwest

Jeffrey Spies, Center for Open Science

Liz Sundermann-Zinger, Baltimore County Public Library

Oklahoma Forum Participants

Anthony Sanchez, University of Arizona Libraries

Peter Schreiner, North Carolina State University Libraries

Jennifer Moore, Washington University – St. Louis Libraries

Jasmine Clark, Temple University Libraries

Derek Miller, IUPUI Libraries

James Hopfenblatt, U of Missouri

Bill Sherman, Indiana University

Meredith Thompson, MIT

Scott Warren, University of North Texas

Kimberly Eke, University of Pennsylvania Libraries

Bimal Balakrishnan, University of Missouri

Dave Frederick, University of Arkansas

Justin Gatenburg, Virtualitics

Erin Washington, Embodied Labs

Keita Funakawa, Nanome

Chicago Forum Attendees

John Bates, Chicago Field Museum
JP Brown, Chicago Field Museum
Jamie Kelly, Chicago Field Museum
Helen Robbins, Chicago Field Museum
Kate Webbink, Chicago Field Museum
Jennifer Moore, Washington University - St. Louis
Mark Phillips, University of North Texas
David Wilcox, Duraspace

Darrell Hurt, NIH 3D Print Exchange
Meghan McCarthy, NIH 3D Print Exchange
Jaime Mears, Library of Congress
Margaret Dolinsky, Indiana University
Heather J. H. Edgar, University of New Mexico
April Isch Neander, University of Chicago
Stefan Serbicki, Electronic Arts
Gregory Dawe, UC San Diego's Qualcomm Institute

High Level Overview of Forums

Washington DC Forum: 3D/VR Content Creation and Publishing

3D scanning and modeling. Storage, access, and management. Integration of 3D data into existing research and scholarly communication services. Metadata requirements

Oklahoma Forum: 3D/VR Visualization and Analysis

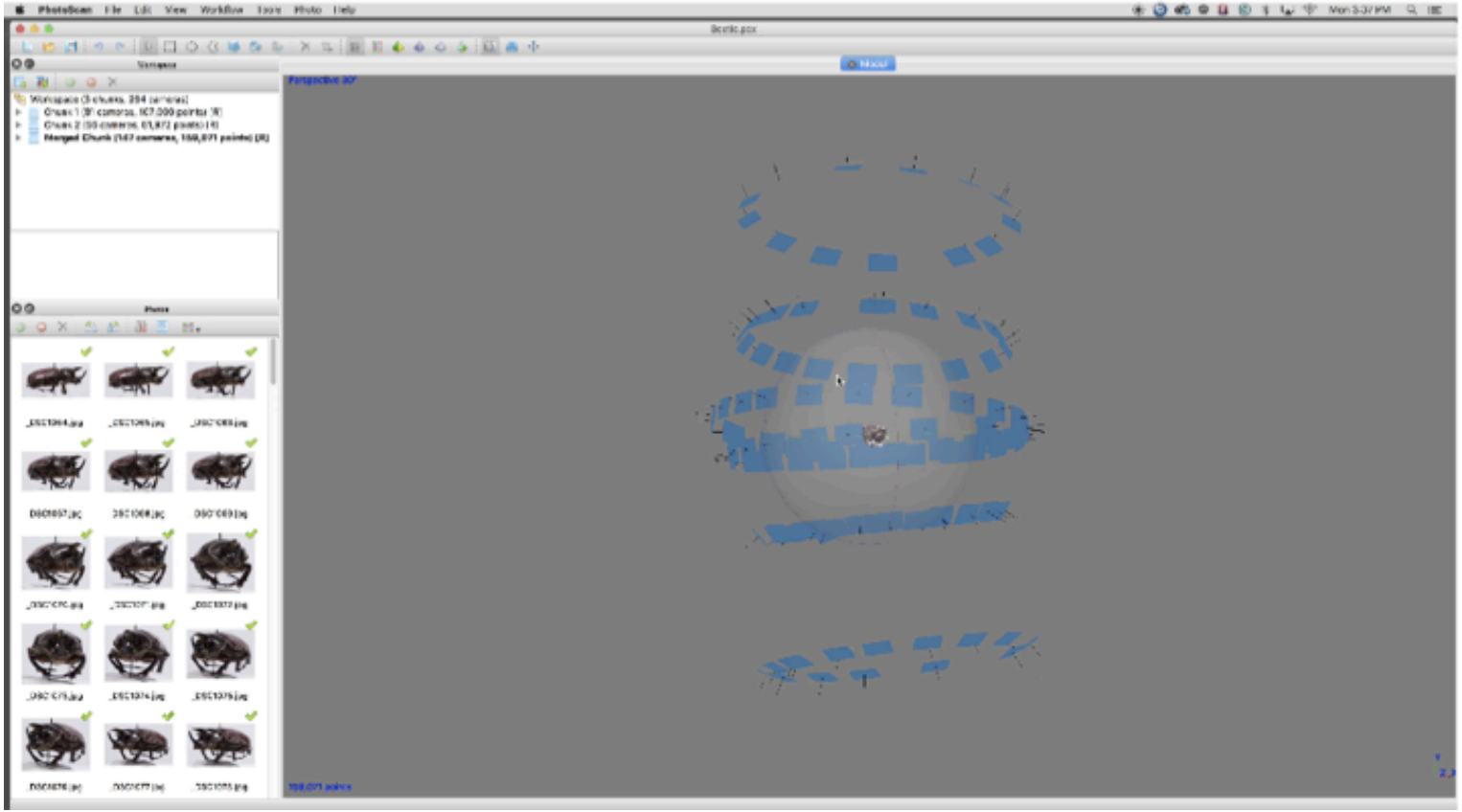
3D/VR tools, Using VR to support other library services, Human centered issues of 3d/VR technology use. modifying/ repurposing 3d models

Chicago Forum: 3D/VR Repository Practices and Standards

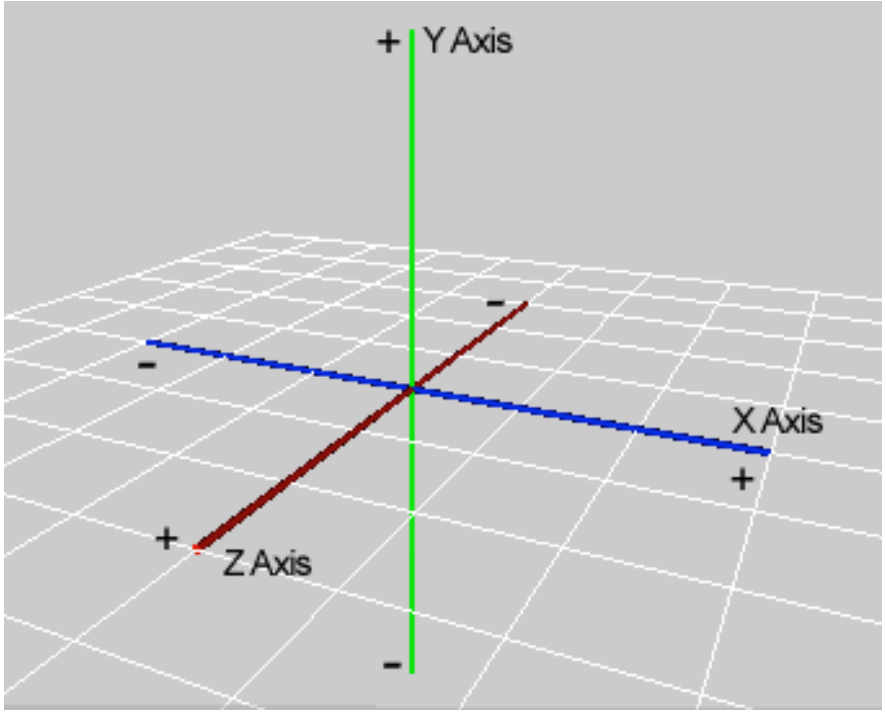
National Repository and Preservation Efforts. 3D/VR repository policies and practices. Implications for different levels of library support. Implications for existing digital preservation models and practices

Reconstruction. Representation. Preservation.

Cost, Bandwidth, Storage

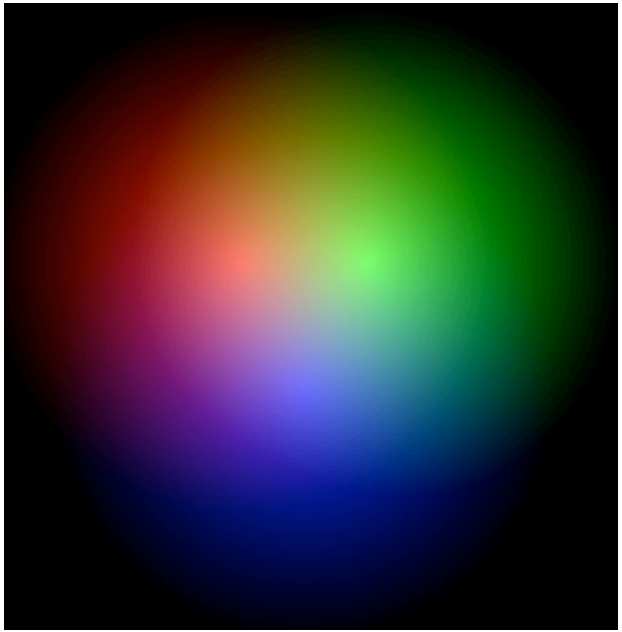

PhotoScan File Edit View Workflow Tools Photo Help
Workspace
Photos

Representing spatial data



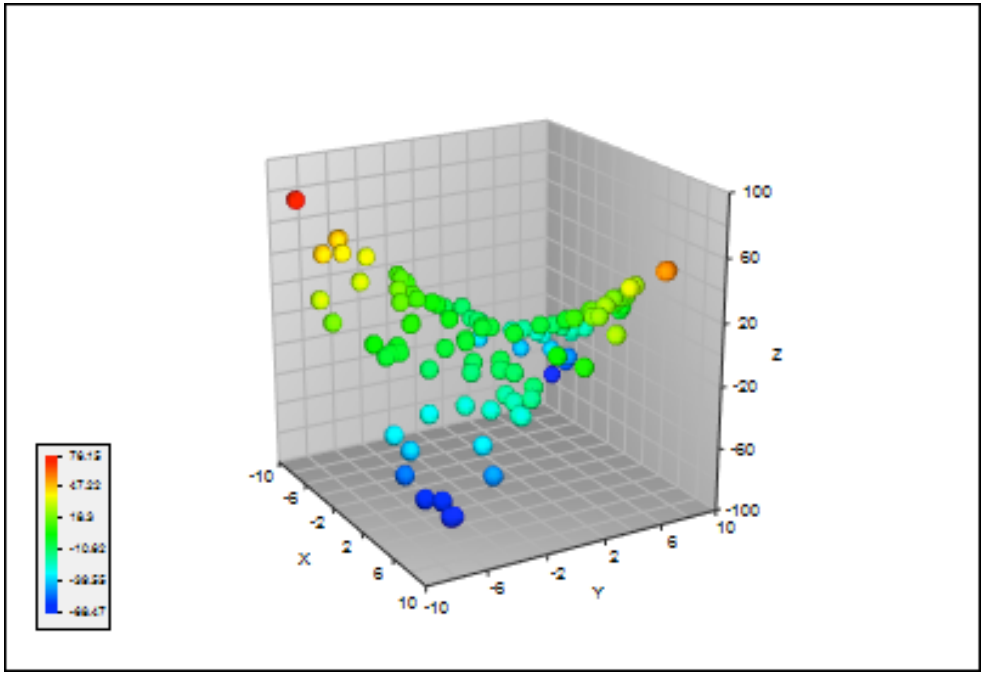
Representing color data

Color Chart	R	G	B	Color Name
	0	0	0	Black
	255	255	255	White
	224	224	224	Light Gray
	128	128	128	Gray
	64	64	64	Dark Gray
	255	0	0	Red
	255	96	208	Pink
	160	32	255	Purple
	80	208	255	Light Blue
	0	32	255	Blue
	96	255	128	Yellow-Green
	0	192	0	Green
	255	224	32	Yellow
	255	160	16	Orange
	160	128	96	Brown
	255	208	160	Pale Pink



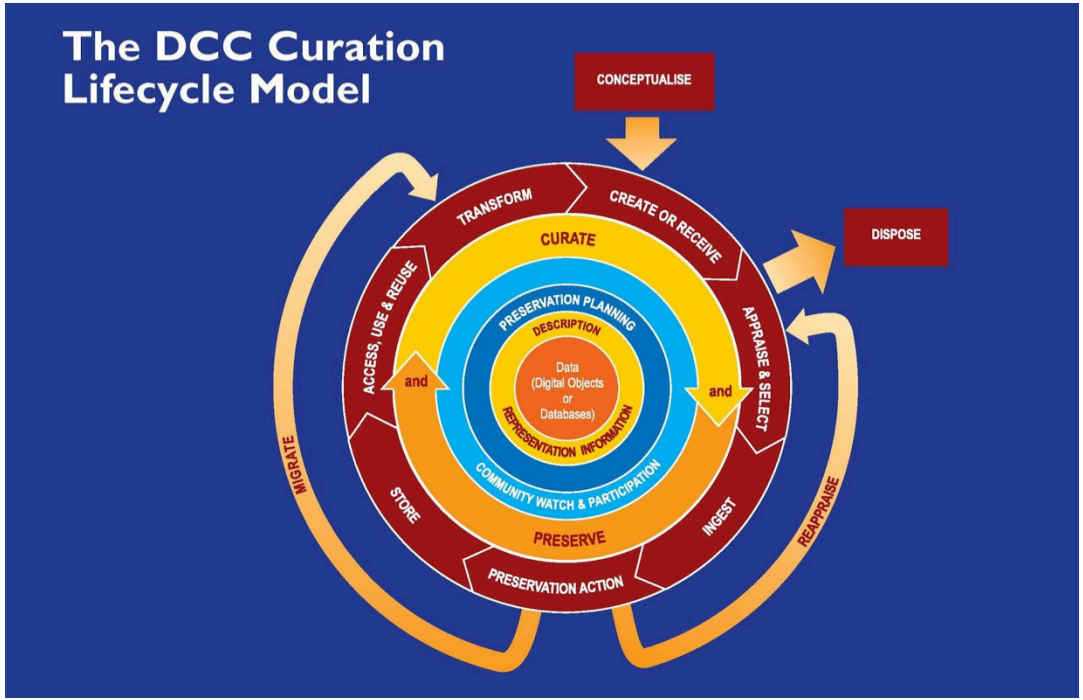
Representing color and space

X	Y	Z	R	G	B
17	32	218	200	177	130
940	234	364	198	15	98
454	65	567	200	113	9
236	735	83	48	76	91
78	903	35	79	215	10
72	418	234	94	198	78
615	892	756	222	167	65
567	345	919	218	189	74



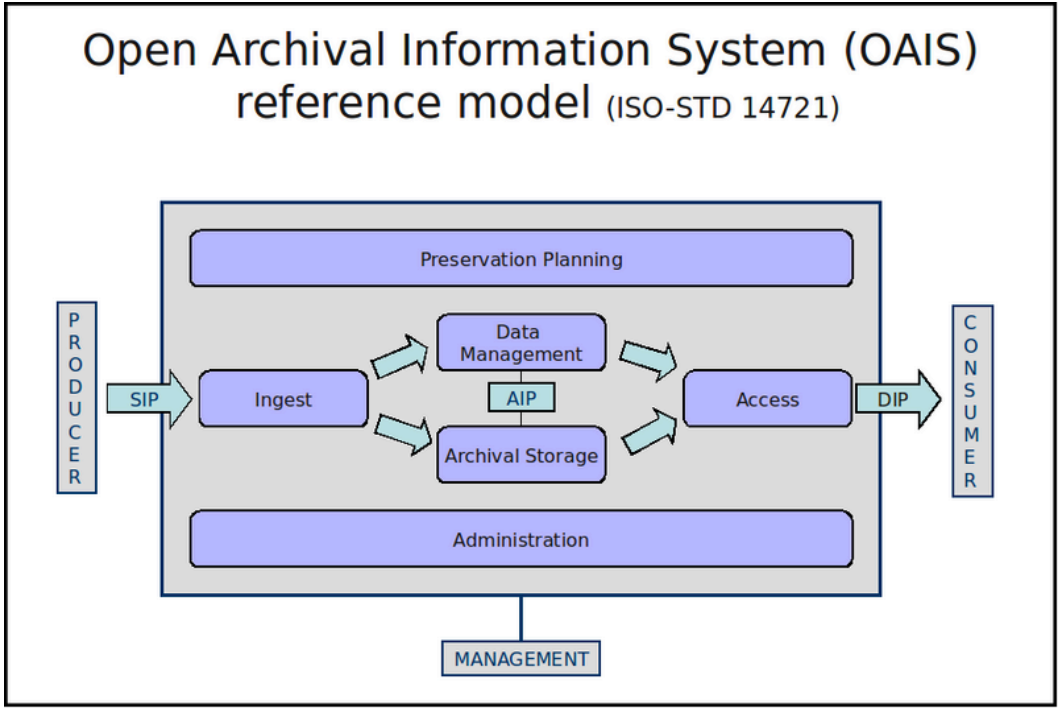
1. What **repository features** are necessary or helpful to 3D data management?
2. What **workflows** or best practices can be applied to 3D data to aid storage and management?
3. What are the **implications** of 3D data on current preservation models?

The DCC Model



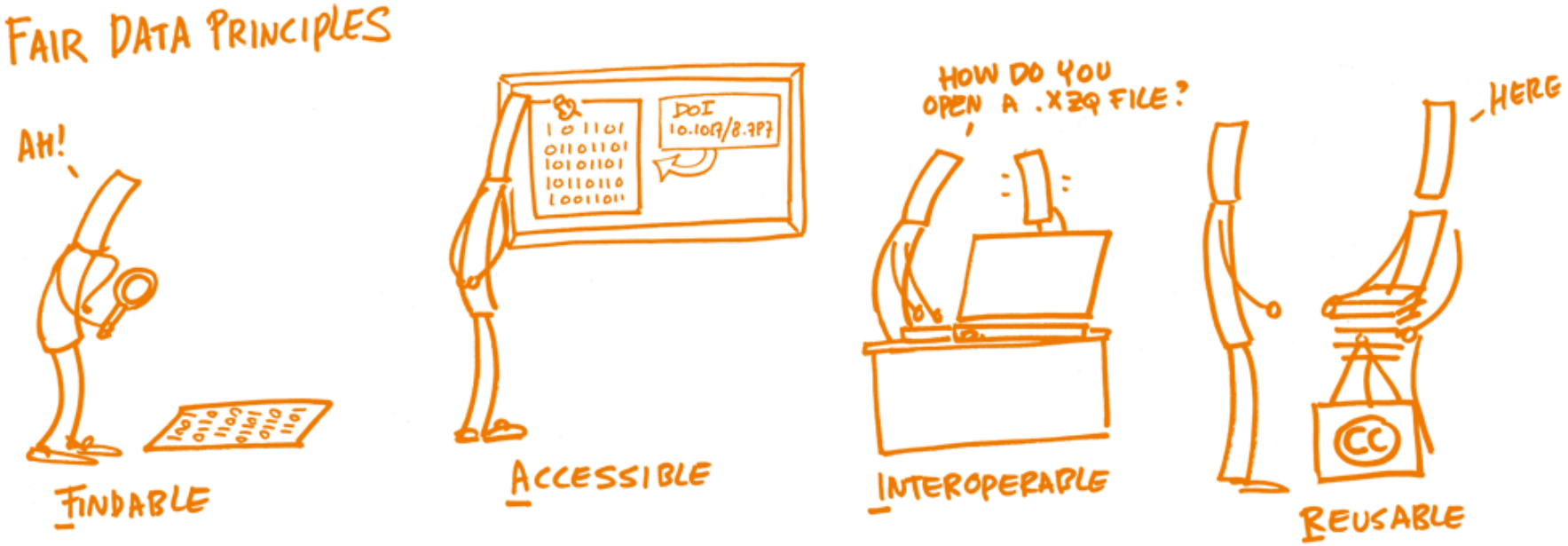
http://www.dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf

The OAIS Reference Model



https://wiki.archivematica.org/File:OAIS.png

The FAIR Data Model



https://www.fosteropenscience.eu/learning/managing-and-sharing-research-data/#/id/5b2ccc7d7ce0b17553f69063

Intellectual Property

Building Rome on a Cloudless Day

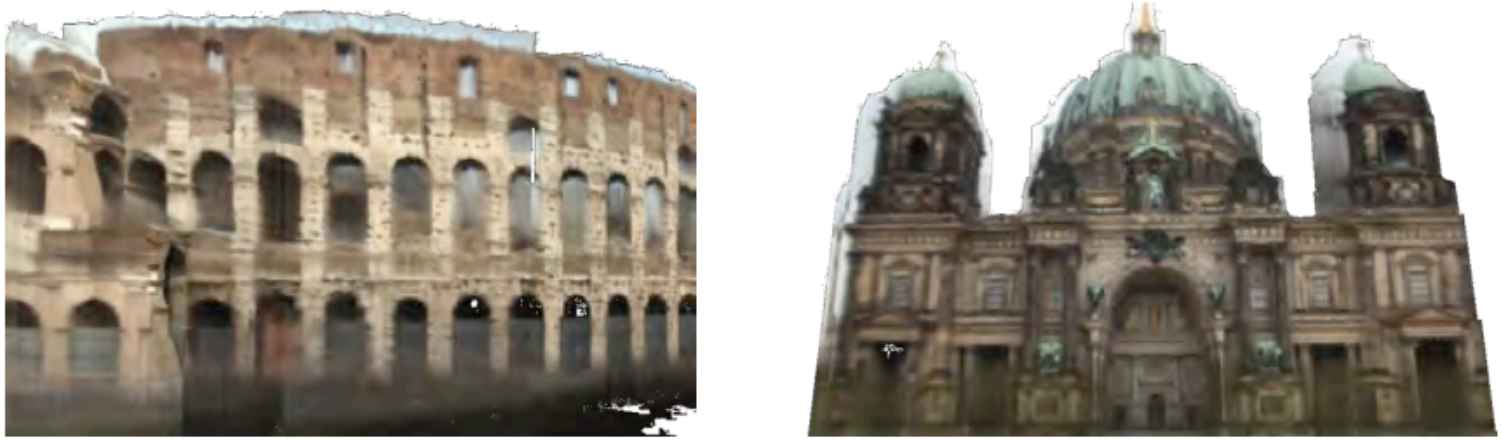


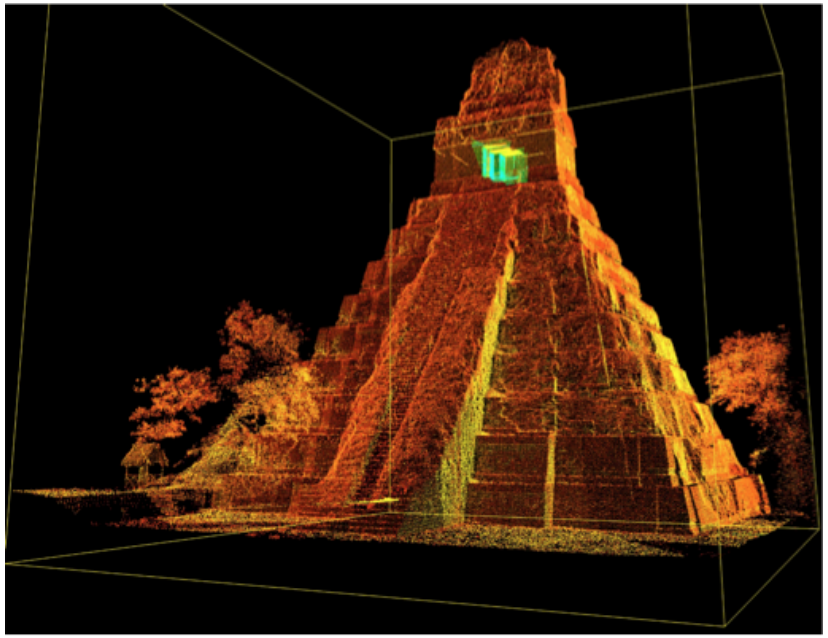
Fig. 1. Example models of our method from Rome (left) and Berlin (right) computed in less than 24 hrs from subsets of photo collections of 2.9 million and 2.8 million images respectively.

Frahm, J.-M., Fite-Georgel, P., Gallup, D., Johnson, T., Raguram, R., Wu, C., … Pollefeys, M. (2010). Building Rome on a Cloudless Day. In K. Daniilidis, P. Maragos, & N. Paragios (Eds.), Computer Vision – ECCV 2010 (pp. 368–381). Springer Berlin Heidelberg.

Rights and Crowdsourced Photogrammetry

https://www.flickr.com/photos/thomashawk/3213118303

CyARK and Google Arts and Culture: Ananda Ok Kyaung Temple in Bagan, Myanmar



https://artsandculture.google.com/theme/4AJygukOpwsKJA

Digital Colonialism

“Quasi-imperial power over a vast number of people, without their explicit consent, manifested in rules, designs, languages, cultures and belief systems by a vastly dominant power.”

Renata Avila
Senior Digital Rights Advisor
WWW Foundation

Digital Repatriation

"The return of items of cultural heritage in a digital format to the communities from which they originated."

MUKURTU

https://www.sas.upenn.edu/dpic/Drum/Welcome/VirtualMuseum

Summative Implications for Academic Libraries

- Metadata
- Adapt existing infrastructure
- Privacy
- Ethics
- Intellectual Property
- Research/teaching/exhibition

Questions?

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Nathan Hall
Director, Digital Imaging & Preservation
Virginia Tech
nfhall@vt.edu