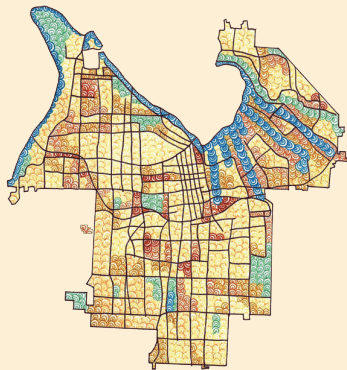
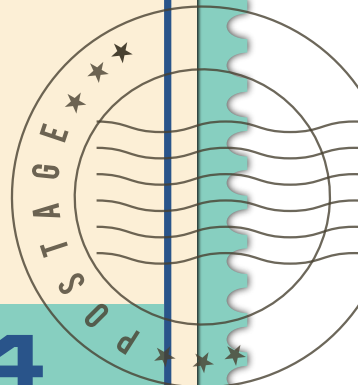


TACOMA, WASHINGTON

OCT.
16-19



nacis 2024



Tuesday 15th

6 PM	NACIS Board Meeting I (Torcello/Burano)
7 PM	Tuesday Night Meetup

Wednesday 16th

8:30 AM	Practical Cartography Day (Pavilion ABG)—Lunch served in Pavilion DEF at 12:00 PM
7 PM	Opening & Keynote (Pavilion ABG)
8 PM	Welcome Reception & Map Gallery (Venice)

Thursday 17th Pavilion BC

8:30 AM	Mapping Horizons
10:20 AM	Cartographic Narratives
12:20 PM	NACIS Lunch & Business Meeting (Pavilion AGD)
2 PM	Indigenous Cartography
4 PM	Cartography over Time & Space
5:30 PM	NACIS Fun Run & Walk
6:30 PM	NACIS Night Out & In

Pavilion EF

Tools of the Trade
Cartography & Community
Innovations & Insights
Putting the 'Art' in Cartography

Friday 18th Pavilion BC

8:30 AM	Web Mapping & Workflows
10:20 AM	Looking Forward, Looking Back
12:20 PM	Lunch Bunch; NACIS Board Meeting II (Cavallino)
1:20 PM	Cartographic Concepts
3:30 PM	Challenging Cartography
6 PM	Banquet & Student Cartography Awards (Pavilion ABC)
8:15 PM	Geodweb Geopardy! (Venice 1)

Pavilion EF

Mapping from the Ground Up
Tracking Process & Progress
Maps as Tools
Historical Cartography

Saturday 19th Turcello

9 AM	Workshop
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Conference at a Glance**Conference at a Glance****Thursday****Venice 1**

8:30 AM	Expansive Cartography
10:20 AM	Cartographic Visualization
2 PM	Cartographic Chronicles
4 PM	Wild & Wilderness Mapping

Econ Dev Boardroom

Native & Indigenous Critical Cartography
Updating the Cartographic Curriculum (3 PM) Toward a Cartographic Code of Ethics?

Venice 2 & 3

(8 AM) NACIS 101
NACIS Commons Map Gallery
Atlas in a Day

**Friday****Venice 1**

8:30 AM	Analysis to Action
10:20 AM	Innovations in Mapping
1:20 PM	Art & Design in Practice
3:30 PM	Making Connections

Econ Dev Boardroom

Applying Indigenous Research & Data Practices to Cartography
USGS OnDemand Topo
Questions Answered! Freelance Cartography

Venice 2 & 3

NACIS Commons
Map Gallery
Atlas in a Day



Welcome to NACIS 2024!

We are excited to welcome you back to Tacoma, WA, for NACIS 2024. We're thrilled to have you here with us to celebrate with and learn from our incredible members.

As we gather for our annual meeting, we respectfully acknowledge that we are in the ancestral lands of the Coast Salish people, specifically in the traditional homeland of the Puyallup Tribe of Indians. The NACIS Board of Directors pledges the society's support for the return and control of indigenous homelands by donating to the Indian Land Tenure Foundation.

This year's meeting is our biggest yet, with over 160 talks, panels, and social activities. We've planned a wonderful week with something for everyone, from cartographic historians to geospatial developers and everyone in between.

You can also connect with other members on Slack (nacis-workspace@slack.com) and share your experiences on social media—don't forget to use the **#NACIS2024** hashtag!

A complete and current guide to the conference is available online at nacis2024.sched.com, which will be updated throughout the week with any schedule changes.

As we like to say: do you love maps? Welcome home!

Hannah Dormido & Vicky Johnson-Dahl
NACIS 2024 Co-Chairs



Social Media & Other Information

Slack

Most conference communication is through Slack. Individual sessions have their own channels, listed throughout Sched and this program.

Need help during the conference? Grab a Board member with a red ribbon on their name tag, or send a message to **#help-attendee**.

Catch the latest updates on **#announcements**.

Introduce yourself and make new friends at **#hello**.

Feel like being sociable? Join the open chat **#nacis2024-home**.

X (formerly Twitter)

Share your experiences using the **#NACIS2024** hashtag.

YouTube

See past conferences on our channel at youtube.com/@nacis7166.

Code of Conduct

NACIS has a Code of Conduct and a no-tolerance policy for harassing behavior. See pg. 74 for how to report misconduct or raise concerns to the NACIS Ethics Committee.

Tuesday, October 16, 2024

Tuesday Night Meetup

6:00 PM–9:00 PM

Just arrived in town and want to catch up with fellow NACIS members?

Meet in the hotel lobby at 6:00 PM to go together as a group.

NACIS Board Meeting I

6:00 PM–8:00 PM

Torcello/Burano

Wednesday, October 16, 2024

Practical Cartography Day: Pavilion ABG

Moderators: Lily Houtman, Nat Kemeleokalani Douglass, Vicky Johnson-Dahl
Slack channel: #nacis2024-pcd

Coffee breaks will be served in the Rotunda

Morning Coffee

Morning Break

Lunch (**Pavilion DEF**)

Afternoon Break

8:00 AM–9:00 AM

10:15 AM–10:30 AM

12:00 PM–1:30 PM

3:15 PM–3:30 PM

8:30 AM–10:15 AM

Terrain Cartography for Non-Terrainers

Lourdes Ginart, U.S. Department of State

Freestyling: Mapping Mountain Landscapes with Blender's Non-Photorealistic Renderer

Andrew Tyrrell, South Arrow Maps

Procedural Mapping with Geometry Nodes in Blender

Peter Atwood, University of South Carolina

Forget About Tilesets: How to Use Static Files for Performant Interactive Stories

William Davis, The New York Times

Basemaps Don't Have To Be Boring

Brandon Liu, Protomaps LLC

LEGO Topographic Mapping

Atlas Guo, University of Wisconsin–Madison

Making a 3D Relief Globe

Zhaoxu Sui, The Pennsylvania State University

Practical Cartography Day: Pavilion ABG

10:30 AM–12:00 PM

Slip 'N Slide: Getting Funky with Open Source Slippy Maps

Janice Kai Chen, The Washington Post

Making Animated Maps that are Interactive Using Adobe Animate

Michael Cattell, The Pennsylvania State University

Map Animations with Design in Mind: Harnessing the Best Parts of Multiple Mapping Tools to Make Great Looking Animations

Jamie Robertson, Panthera

Blending Modes Demystified

Charles Preppernau, Esri

Mapping with Satellite Data (Beyond Landsat and Sentinel-2)

Robert Simmon

Messing Around with Voronoi Diagrams

Thomas Coughlin, Esri

1:30 PM–3:15 PM

Symbol Fonts: an Automated Workflow

Kate Leroux & Tony Cannistra, onX Maps

3D Mapping Kennecott Mines National Historic Landmark Utilizing LiDAR and Architectural Illustration

Guthrie Alexander

Making Complex Labels Work! Leveraging Label Expressions, Abbreviation Dictionaries, Priorities and Placement Properties in ArcGIS Pro

Carl Swanson, Oregon Department of Forestry

Building Tiny Custom Web Maps

Stephanie May

How to Mop the MAUP?

Maggie Mateu, atopia

Automated Geoprocessing and GIS Analysis for Recreational Trail Maps

Jake Belan & Chuck Kitterman, Green Trails Maps

Scrolly Map with Drone Footage? Alignment and Interactivity of Drone Footage in a Map-Based Scrollytelling Story

Shane Loeffler, CarbonPlan

3:30 PM–5:00 PM

The Shining: Mapping with Sparkle

Kenneth Field, Esri

Hand-Drawn and Antique Map Styles with QGIS

Andy Woodruff

Making Data Tactile Using 3D-Printed Maps

Lester Carver, Boston College

Creative Uses of Visual Media in Storytelling

Warren Davison, Esri

Mapping for 911/Emergency Dispatch

David Nuttall, Artimaps, LLC, & Santa Clara County Communications

Bringing Print Techniques into the Digital World: Blend Modes for Map Tiles

Amelia Hagen-Dillon, onX Maps

Vignettes for the Win!

John Nelson, Esri

Wednesday, October 16, 2024: Evening Events

Opening Session and Keynote Address 7:00 PM–8:00 PM
Pavilion ABG

Washington is Disneyland for Geologists

Keynote speaker: **Nick Zentner**

Slack channel: #nacis2024-keynote

Nick Zentner is a distinguished geologist, educator, and award-winning host dedicated to sharing his passion for science beyond the traditional classroom setting. He has been teaching geology at Central Washington University in Ellensburg, Washington, since 1992.

Mr. Zentner received the James H. Shea Award from the National Association of Geoscience Teachers in 2015, the Geological Society of America Public Service Award in 2023, and the E.R. Ward Neale Medal from the Geological Association of Canada in 2024, recognizing his outstanding contributions to advancing public understanding of earth sciences. He also received the Outstanding Achievement Award from the American Institute of Professional Geologists in 2024.



His PBS TV series *Nick on the Rocks* has received significant acclaim, including two Emmy Awards, for its informative content and compelling storytelling.

Mr. Zentner hosts a YouTube channel with video and livestreams of his geological explorations in the Pacific Northwest at [youtube.com/@GeologyNick](https://www.youtube.com/@GeologyNick). In November 2024 he will begin a new livestream series *Cascade Volcanoes A to Z*.

Wednesday, October 16, 2024: Evening Events

Welcome Reception & Map Gallery Opening 8:00 PM–10:00 PM
Venice

Map Gallery

Organizer: **Amy E. Rock**

Slack channel: #nacis2024-mapgallery

The 2024 Map Gallery features a wide array of printed and digital maps and posters created by NACIS members and student cartographers, and will be open through the conference from the Wednesday evening reception until mid-day on Friday.

The QR codes attached to maps indicate entries in the Student Dynamic Map Competition. Scan the codes to see the online maps.

Bright lettered flags indicate entries in the Student Map and Poster Competition. Make sure to cast your ballot for your favorites.

Award winners for both the dynamic map and the map and poster competition will be announced during the Friday evening banquet.

2023 Student Winners

Zibo Map of Culture and Tourism

Atlas Guo, University of Wisconsin–Madison



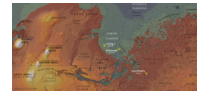
they mark me out as being trans

Bethany Craig, University of Kentucky



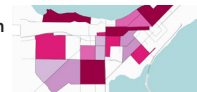
Understanding Mars: the Goldilocks Planet

Sid Ramavajjala, University of Wisconsin–Madison



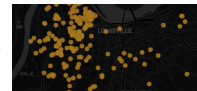
A Queer Geography of UW-Madison

Sarah Fogel, University of Wisconsin–Madison



Foreclosure Sales in Louisville, KY

Jacon Saindon & Michael McCanless, University of Kentucky



Thursday, October 17, 2024: Morning 1

Coffee breaks will be served in the Rotunda

Morning Coffee	8:00 AM–9:00 AM
NACIS 101	8:00 AM–8:30 AM
Morning Session I	8:30 AM–10:10 AM
Morning Break	10:10 AM–10:20 AM

Venice 2 & 3 (Map Gallery)

NACIS 101

Joanna Merson, University of Oregon

Sarah Bell, Esri

David Nuttall, Artimaps

Daniel Wood, NPR

Nat Case, INCase

Hanna Dormido, The Washington Post

Vicky Johnson-Dahl, USAID

Are you attending NACIS for the first time and feeling a little overwhelmed? Join your New Attendee Ambassadors at a special introductory session designed specifically for you. Whether you're looking to make the most of the sessions, connect with fellow cartography enthusiasts, or navigate the event easily, meet us in the Map Gallery for a warm welcome and some pro tips to start your conference off right!

Venice 2 & 3 (Map Gallery)

NACIS Commons

Slack channel: #nacis2024-mapgallery

Reserve the NACIS Commons to set up an ad hoc informal gathering on a topic that interests you. Maybe you want to discuss your favorite map projections with fellow enthusiasts, or maybe you're a student who wants to network with other students and share advice.

A sign-up sheet will be available at the registration desk, and reservations are first come, first served.

When the room is not in use, the NACIS Commons is a quiet space to sit and chat with colleagues and friends, old and new.

Pavilion BC

Mapping Horizons

Moderator: Molly O'Halloran

Slack channel: #nacis2024-pavilionbc

Acceptable Interpretations

Mark Denil, *sui generis*

Make Your Mark: Results and Pitfalls of Starting a Cartography Contest

U.S. Department of State International Boundaries and World Polygons Datasets

Gene Thorp, U.S. Department of State

Slow Maps: Student Explorations in Data Design

Lily Lindros, University of Oregon

Rebuilding Natural Earth: An Updated Public Preview of Version 6

Nathaniel Vaughn Kelso, Kelso Cartography

Pavilion EF

Tools of the Trade

Moderator: Nat Case

Slack channel: #nacis2024-pavilionef

Visualizing Multidimensional Climate Data on the Web with Zarr and @carbonplan/maps

Shane Loeffler, CarbonPlan

What's New in Eduard?

Dilpreet Singh, Monash University

Felt in Action

Mamata Akella, Felt

Integrating Use-Specific Styles into a Generalized Map Hierarchy

Lauren James, Apple

A New Tool for Interactive Flow Mapping

Paulo Raposo, Faculty ITC - University of Twente

Venice 1

Expansive Cartography

Moderator: Jim Thatcher

Slack channel: #nacis2024-venice1

Using Interactive Maps to Enhance Healthcare Equity

Zachary Sherman, Virginia Polytechnic Institute and State University

Algorithmic Design Defaults: Implications and Possibilities

Jim Thatcher, Oregon State University

For Mapping in Folds: Space is Not a Grid

Alexis Wood, University of California, Berkeley

The Pasifika Film Database: Mapping Islands, Oceans and Identities Beyond Imperialism and Militarisation

Clancy Wilmott, University of California, Berkeley

Mapping Reese Street: Black Cartographies and Community Mapping in Athens, Georgia

Jerry Shannon, University of Georgia

Thursday, October 17, 2024: Morning 2

Morning Session 2	10:20 AM–12:10 PM
Panel: Indigenous Critical Cartography	10:20 AM–12:10 PM
NACIS Lunch & Business Meeting (Pav. AGD)	12:20 PM–2:00 PM
Atlas in a Day Announcement (see p. 28)	1:45 PM–2:00 PM

We invite everyone to participate in our annual NACIS business meeting.
Slack channel: #board-public

Venice 2 & 3 (Map Gallery)

NACIS Commons

Slack channel: #nacis2024-mapgallery

Economic Development Boardroom Native & Indigenous Critical Cartography & Counter-Mapping

Moderator: Nat Kemeleokalani Douglass
Slack channel: #nacis2024-edb

Elspeth Iralu, University of New Mexico
Laurel Mei-Singh, University of Texas at Austin

Drawing on their research and experience, speakers in this panel will examine how counter-mapping and decolonial initiatives challenge colonial mapping practices and recenter Native and Indigenous communities and methodologies. Speakers will broadly explore the intersections of cartography, Indigenous spatial justice, carceral geography, spaces of resistance, and counter-mapping.

Pavilion BC Cartographic Narratives

Moderator: Nick Martinelli
Slack channel: #nacis2024-pavilionbc

Roots and Migrants

Chiamaka Nwajiaku, University of Iowa

Comparative Evaluation of Univariate and Bivariate Choropleth Maps: Perceptual and Cognitive Insights from an Eye-Tracking Study

Michalis Kantartjis, University of Iowa

Who's On First: Ready for Map Display

Nathaniel Vaughn Kelso, Kelso Cartography

Spatial Analysis of Fire-Armed Related Crime in Atlanta

Olalekan Alamoh, Georgia State University

Ride, Sink, or Swim: Mapping Extreme Floods and the Burdens of Buses in Queens, NYC

Nicholas Dante Lucchetto, Hofstra University

Enhancing Visual Realism in Web-Based 3D Terrain Maps

Ondřej Procházka, Seznam.cz

Pavilion EF Cartography & Community

Moderator: Rebecca Ramsey
Slack channel: #nacis2024-pavilionef

Mapping Black Women's Independence: Uncovering Hidden Homeowners

Mia Nigro, University of Nebraska at Omaha

Park Slam Dunk: Scoring with StoryMaps

Eliana Macdonald, Vancouver Board of Parks and Recreation

Branching Out: Navigating Kentucky's Urban Tree Canopy Grant Adventure

Rebecca Ramsey, Kentucky Division of Forestry

Cutting for New Openings: Alternative Representations of a Railway Line

Àlex Muñoz Viso, University of Kentucky

Census Maps for Public Knowledge

Jia Zhang, Columbia University

Venice 1 Cartographic Visualization

Moderator: Brooke Marston
Slack channel: #nacis2024-venice1

Mapping Light and Shadow on Mount Everest

Carl Churchill, The Wall Street Journal

Visualizing Change: How Map Design Shapes Our Views on Glacier Retreat

Fangsheng (Jasper) Zhou, University of Oregon

Canyon Cartography

Brandon Plewe, Brigham Young University

Natural Scene Designer Pro 8

Tom Patterson, National Park Service (retired)

Introducing Tiled Texture Shading

Leland Brown, Instituto Superior Técnico

Thursday, October 17, 2024: Afternoon 1

Coffee breaks will be served in the Rotunda

Atlas in a Day	2:00 PM–5:00 PM
Afternoon Session 1	2:00 PM–3:50 PM
Panel: Cartographic Curriculum	2:00 PM–3:00 PM
Panel: Cartographic Ethics	3:00 PM–4:00 PM
Afternoon Break	3:50 PM–4:00 PM

Economic Development Boardroom

Towards a Cartographic Code of Ethics?

Slack channel: #nacis2024-edb

Aileen Buckley, Esri

Nat Case, INCase

Martin Gamache, National Geographic Society

Tim Wallace, New York Times

Brooke Marston, U.S. State Department

Neil Allen, East View Companies

What would a general code of ethics in cartography look like? So as a field where practitioners are unlicensed, work for a wide range of employers and clients, and come from spectrum of backgrounds, is there a basis for a broader code? Do we as cartographers have a way of standing up to non-cartographers who ask us to do things that are “wrong” as mapping? Panelists will present about how codes of ethics function within their work context, and discuss how these might be reflected into the wider field.

Economic Development Boardroom

Updating the Cartographic Curriculum

Slack channel: #nacis2024-edb

Meghan Kelly, Syracuse University

P. William Limpisathian, University of Wisconsin–Madison

Jim Thatcher, Oregon State University

Heather Rosenfeld, Smith College

Craig Dalton, Hofstra University

Laura Kurtzberg, Florida International University

LaToya Gray-Sparks, Virginia Commonwealth University

Avery Everhart, University of British Columbia

What should cartographic curricula look like today? Our mapping tools, theoretical approaches and concepts, readings, assignments, and strategies for assessment are shifting. Also in flux are those who are recognized as doing mapping or teaching. Our panelists will discuss their experiences, insights, and new visions for cartographic curricula.

Pavilion BC

Indigenous Cartography

Moderator: Gareth Baldrice-Franklin

Slack channel: #nacis2024-pavilionbc

Illustrating Ahupua‘a, the Hawaiian System of Land Stewardship

Rosemary Wardley, National Geographic

Mushing and Mapping: Finding the Ancient Cedars of the Boundary Waters

Jake Steinberg, Minnesota Star Tribune

Where Rivers, Mountains and People Meet

Jeff Clark, Clark Geomatics

Creating a Digital, Indigenous Walking Tour of UW-Madison: Reflections on Collaboration, Justice, and Place

Gareth Baldrice-Franklin, University of Wisconsin–Madison

Wairarapa Glistening Water: Reflections on a Co-Designed Spatial Narrative Virtual Reality (VR) App

Mairead de Roiste, Te Herenga Waka / Victoria University of Wellington

A Land Acknowledgment Map for Northern Utah

Ryan Frazier, Weber State University

Pavilion EF

Innovations & Insights

Moderator: Patrick Kennelly

Slack channel: #nacis2024-pavilionef

Who Owns Massachusetts?: a New Interactive Map for Identifying Institutional Ownership

Eric Huntley, Massachusetts Institute of Technology

All the Joys of Mapping (and Seeing!) the Total Solar Eclipse of 2024

K.K. Rebecca Lai, The New York Times

Unidrome: Mapping Every Aerodrome Worldwide with Cloud Native Data

Alex Polvi, Barbless Maps

A Complicated Wilderness: Mapping Guadalupe Mountains National Park

Becca Holdhusen, National Park Service

Exploring Intra-Annual Variations in Urban Effects on Precipitation in the Atlanta, GA, USA Region

Olamiposi Fagunloye, Georgia State University

Raster-to-Vector Heat Maps: Multiscale Visualization Approach to Mapping and Interacting with Big Geospatial Data

Yanbing Chen, University of Wisconsin–Madison

Venice 1

Cartographic Chronicles

Moderator: Travis White

Slack channel: #nacis2024-venice1

Mapping Vitality in Earth Systems

Maggie Camillos, University of California, Berkeley

Washington State Through Terrain and Time

Daniel Coe, Washington Geological Survey

Mountains of Evidence: Using Forensic Landscape Photography and GIS to Prosecute Illegal Hunting in the Remote Mountain Landscapes of Canada’s Yukon Territory

Gerry Perrier, Yukon Department of Environment

Spatio-Temporal Analysis of Power Generation from Interconnected Solar Arrays in San Juan County, Washington

Matt Sommer, The Pennsylvania State University

Taking UCSF’s Health Atlas National

Eric Brelsford, Stamen Design

A Field of Honor Forever: Mapping Flight 93 National Memorial

Alex Fries, National Park Service

Thursday, October 17, 2024: Afternoon 2

Afternoon Session 2	4:00 PM–5:30 PM
NACIS Fun Run & Walk	5:30 PM–6:30 PM
NACIS Night Out	6:30 PM–10:00 PM
NACIS Night In	7:00 PM–10:00 PM

NACIS Night Out

Slack channel: [#nacis2024-night-out](#)

There will be no organized Night Out this year, but we encourage you to find fellow cartographers to explore Tacoma's restaurants and enjoy the local nightlife.

You can leave Night Out ideas on the message board near the registration desk, and you are welcome to organize via the [#nacis2024-night-out](#) Slack channel.

NACIS Night In

Slack channel: [#nacis2024-night-in](#)

We're trying something new this year! Have dinner on your own, then join us back at the Map Gallery for a low-key evening with carto-pals old and new—we'll have puzzles, board games, and crafts. You're welcome to bring your own mappy games or host map-related activities.

Per hotel regulations, **absolutely no outside food is allowed**. You can order drinks and food from the hotel bar.

Venice 2 & 3 (Map Gallery) NACIS Commons

Slack channel: [#nacis2024-mapgallery](#)

Pavilion BC Cartography over Time & Space

Moderator: Sarah Bell

Slack channel: [#nacis2024-pavilionbc](#)

Visualizing a Contemporary Humanitarian Crisis: Exploratory Mapping of Migrant Deaths from the Unstructured Text of Newspaper Accounts

Rachel Daniell, Pratt School of Information

Visualizing Change Over Time on the Web

Jeremy Bartley, Esri

Close: an Interactive, Multi-Modal Travel Time Map

Nathaniel Henry, Henry Spatial Analysis

Navigating Election Night: Behind the Scenes of Visualizing 2024 Election Results

Clare Trainor, Reuters

High-Resolution Elevation Tiles for Enhanced Terrain Rendering

Lee France, onX Maps

Pavilion EF Putting the 'Art' in Cartography

Moderator: Jessica Breen

Slack channel: [#nacis2024-pavilionef](#)

Maps as Poetry

Richard Bohannon, Metro State University–Saint Paul

Revitalization of a University Building Interior: Abstracting Geographies Through Cartographic Public Art Installations

Cynthia Brewer, The Pennsylvania State University

The Cartographic Art of the Opposite of Bespoke

Nicholas Bauch, Esri

Drawing Participation: A Real-Time, Peer-to-Peer Tool for Participatory Planning and Design

Carlos Sandoval Olascoaga, Northeastern University

A Pop-Up Book: Visualizing the Spatial Sensitivity Analysis

Seda Salap-Ayca, Brown University

Venice 1 Wild & Wilderness Mapping

Moderator: Riley Champine

Slack channel: [#nacis2024-venice1](#)

Mapping the Final Frontier from the Inside Out

Jere Suikkila, Mappedin

Re-Imagining the Creation of Vintage-Style Maps: Old West

Chinna Subbaraya Siddharth Ramavajjala, National Renewable Energy Laboratory

Mapping Urban Wilds in Watercolor: Nature and Humanity Interwoven in India and South Africa

Darren Sears, Independent Artist-Cartographer

Wild World Goes Worldwide: Tales from an Extraordinary Map Launch

Anton Thomas, Anton Thomas Art

3D Oblique Mapping of Mountains Above the Arctic Circle: Two Maps of Alaska's Remote National Parks

Joe Milbrath, National Park Service

Friday, October 18, 2024: Morning 1

Coffee breaks will be served in the Rotunda

Morning Coffee	8:00 AM–9:00 AM
Morning Session I	8:30 AM–10:10 AM
Morning Break	10:10 AM–10:20 AM

Venue 2 & 3 (Map Gallery) NACIS Commons

Slack channel: #nacis2024-mapgallery

Pavilion BC Web Mapping & Workflows

Moderator: Joanna Merson

Slack channel: #nacis2024-pavilionbc

Creating Beautiful Open-Source Interactive Maps With R and D3

Henry Beimers, NORC at the University of Chicago

Telling the Story of Changing Populations with Mapping Historical New York: a Digital Atlas

Kelsey Taylor, Stamen Design

Displacement Vulnerability and Mitigation Tool

Abigail Fleming, University of Miami

Demystifying Cloud Native Geospatial for Working with Data at Scale

William Lyon, Wherobots

How to Improve Your GIS to Graphic Design Workflow

Julia Olson, Esri

Pavilion EF Mapping from the Ground Up

Moderator: Silas Hill

Slack channel: #nacis2024-pavilionef

Atlas in a Day: Imagining a Black Counter-Atlas of Abolition

Kela Caldwell, University of Wisconsin–Madison

Mapping the Future of Food in Climate Change with VACS Earth Genome

Caroline Carter, Stamen Design

In the Hot Seat: Acquiring Kernel Density Heat Map Design Guidance Through Delphi and Survey Methods

Lauren McKinney-Wise, City of Portland & Portland State University

Cheap and Pricey: NPR Leveraged Free Tools To Build and Host Our Own Slippy Maps. Was It Worth It?

Daniel Wood, National Public Radio

Creating a 3D Map of the Haleakalā Volcano on Maui

Jim Eynard, National Park Service

Venue 1 Analysis to Action

Moderator: Chelsea Nestel

Slack channel: #nacis2024-venue1

Modeling Bicycle Ridership: Challenges, Opportunities, and Scalable Solutions for Northwest Arkansas

Nelofar Qulizada

Measuring Trust in Maps: Introducing the MAPTRUST Scale

Timothy Prestby, The Pennsylvania State University

The Azimuthal Arctic

John Cloud, National Museum of Natural History, Smithsonian Institution

What Does it Mean to Understand a Map?

Amy Griffin, RMIT University

“By Dint of Some Unshowy Beauty”: a Concordance Analysis of Aesthetic Vocabulary in Cartographic Textbooks 1928-2023

Chelsea Nestel, University of Wisconsin–Madison

Friday, October 18, 2024: Morning 2

Morning Session 2	10:20 AM–12:20 PM
Panel	10:20 AM–12:10 PM
Lunch Bunch	12:20 PM–1:20 PM
NACIS Board Meeting II (Cavallino)	12:20 PM–1:20 PM

Lunch Bunch

Join fellow NACIS members for lunch on Friday!

We're reserving tables at a few restaurants close to the hotel. At each table will be a veteran NACIS member to talk about anything that comes up. A great opportunity for first-timers or those who want to network or socialize. Choose a group and sign up at the registration desk by Friday 10:00 a.m.

Venice 2 & 3 (Map Gallery)

NACIS Commons

Slack channel: [#nacis2024-mapgallery](#)

Economic Development Boardroom

Applying Indigenous Research & Data Practices to Cartography

Moderator: Nat Kemeleokalani Douglass
Slack channel: [#nacis2024-edb](#)

A Recipe for Ethical Geographic Work with Indigenous Communities

Niiyokamigaabaw Deondre Smiles,
University of Victoria

Applying Indigenous Research and Data Practices Panel

Niiyokamigaabaw Deondre Smiles,
University of Victoria
Annita Hetoevehotohke'e Lucchesi

This panel will explore the importance of integrating Indigenous knowledge and data practices into cartography. Speakers will discuss how modern cartographic practices can improve to support Indigenous communities and how considerations for decolonizing cartographic practices help address colonial power dynamics and violence perpetuated via maps.

Pavilion BC

Looking Forward, Looking Back

Moderator: Daniel Wood
Slack channel: [#nacis2024-pavilionbc](#)

City as Museum: Reimagining Urban Wayfinding and Storytelling

Gurpreet Kaur

Globes: an App for the Apple Vision Pro

Bernie Jenny, Monash University

Creating Thematic Maps with the Help of Generative AI

Kristian Ekenes, Esri

Leveraging a Living Atlas of the World

Emily Meriam, Esri

The Past, Present, and Future of Stamen Maps

Alan McConchie, Stamen Design

A User Study of Relief Inversion and a Benefit of Sky Models

Patrick Kennelly, Long Island University

Pavilion EF

Tracking Process & Progress

Moderator: Travis White
Slack channel: [#nacis2024-pavilionef](#)

Bringing Transparency to Freelance Mapmaking

Daniel Huffman, somethingaboutmaps

Discussing Current Limits and Future Opportunities in Mobile Map Design

Lily Houtman, The Pennsylvania State University

Digital Diary: Writing Down Your Notes and Your Process

Rachel Stevenson, State Government

Defining a Brand of Cartography

Lee France, onX Maps

Are You Mappier than a 5th Grader?

Dave McLaughlin, The Pennsylvania State University

Evaluating Beescape NexGen

Anthony Robinson, The Pennsylvania State University

Venice 1

Innovations in Mapping

Moderator: Elisabeth Leaf
Slack channel: [#nacis2024-venice1](#)

Building the Definitive Draft for River Craft: the John Day Boater's Guide

Gabriel Rousseau, Bureau of Land Management

Accessible Map Display at Apple Maps

Sarah Bergquist, Apple

Thematic Mapping in Augmented Reality: Challenges and Opportunities

David Retchless, Texas A&M University at Galveston

Mapping the Construction of the Qosh Tepa Canal in Northern Afghanistan

Danielle Henry, BlackSky

Coloring Outside of the Lines: Sketch Mapping Fear, Safety, and Community for LGBTQ+ Students Amidst Anti-LGBTQ+ Legislation

Natalie Correa, University of Wisconsin–Madison

Friday, October 18, 2024: Afternoon 1

Coffee breaks will be served in the Rotunda

Afternoon Session 1

Panel: USGS OnDemand Topo

Afternoon Break

1:20 PM–3:20 PM

1:20 PM–3:20 PM

3:20 PM–3:30 PM

Venue 2 & 3 (Map Gallery)

NACIS Commons

Slack channel: [#nacis2024-mapgallery](#)

Economic Development Boardroom

How Can the USGS' Initiatives for OnDemand Topo Meet Your Needs?

Slack channel: [#nacis2024-edb](#)

Andrew Stauffer, Bethany Walker, Alex Kaufman, & Marcelle Caturia, U.S. Geological Survey

In 2022, the National Geospatial Program and the National Geospatial Technical Operations Center launched an application called topoBuilder that allows users to request customized topographic maps, referred to as OnDemand Topos. Currently topoBuilder offers 1:24,000-scale and 1:100,000-scale map products. The USGS anticipates expanding the product catalog to more scales and use cases, while enhancing The National Map data for automated topographic mapping. Join us in this panel discussion as we overview the current state of topoBuilder and our near-term roadmap, and engage in a discussion about USGS topographic mapping, authoritative data, and citizen-mapping needs.

Pavilion BC

Cartographic Concepts

Moderator: Sarah Bell

Slack channel: [#nacis2024-pavilionbc](#)

Towards a Cartographic Ethics: Summarizing and Synthesizing 35 Years of Academic Debate

Lucinda Roberts, University of Oregon

"The Map is Hers": Gender and Copyright in Early 20th Century Los Angeles

Christina Dando, University of Nebraska at Omaha

Unearthing Geotechnical Knowledge in the Library

Chris Salvano, LA Metro Transportation Research Library & Archive

The New Illinois Digital Atlas

Christopher Sutton, Western Illinois University

A New Look at Sketch Maps

Michael Peterson, University of Nebraska at Omaha

OpenHistoricalMap: the Most Open-Ended Map in History

Minh Nguyễn, OpenHistoricalMap

Pavilion EF

Maps as Tools

Moderator: Jim Meacham

Slack channel: [#nacis2024-pavilionef](#)

Untangling Rhode Island's Forest Habitat: Interactive Mapping at the Confluence of Art and Cartography

Quinn Cowing, Brown University

Teaching Atlas Project Management: Lessons and Reflections

P. William Limpisathian, University of Wisconsin–Madison

Understanding Lhasa through Declassified Spy Satellite Images

Tsering Shawa, Princeton University

Where Did They Go? Mapping Out-Migration From Mammoth Cave National Park, 1920-1940

Collins Eke

Mapping Archaeology and Landscape in the Mongolian Altai Mountains: Transitions in Cartography from 1994 to 2010

James Meacham, University of Oregon

Mapping Vulnerabilities: Projected Extreme Heat Risk for Southern Mobile Home Residents

Laura Diaz-Villaquiran, Southeast Energy Efficiency Alliance

Venue 1

Art & Design in Practice

Moderator: Vicky Johnson-Dahl

Slack channel: [#nacis2024-venue1](#)

How to Write a Cartography Tutorial

Heather Smith, Esri

Cartography as Spatial Information Practices

Jack Swab, University of Kentucky

Changes You Can Make to Your Workflows to Make More Accessible Maps

Vanessa Knoppke-Wetzel, GreenInfo Network

Creating an Organizational Cartography Guide

Gray McKenna, Washington State Department of Natural Resources

A Retrospective on a Career in Museum Mapping and GIS

Daniel Cole, Smithsonian Institution

Friday, October 18, 2024: Afternoon 2

Afternoon Session 2
Panel: Freelance Cartography

3:30 PM–5:00 PM

3:30 PM–4:30 PM

CP Editorial Board Meeting
Evening Events (see p. 26)

6:00 PM–7:00 PM

6:00 PM–9:15 PM

Venice 2 & 3 (Map Gallery)
NACIS Commons

[Slack channel: #nacis2024-mapgallery](#)

Economic Development Boardroom
Questions Answered! Everything You Wanted to Know About Freelance Cartography in 60 Minutes

[Slack channel: #nacis2024-edb](#)

Rick Lederer-Barnes, Upstate GIS
David Nuttall, Artimaps
Daniel Huffman, somethingaboutmaps
Margot Dale Carpenter, Hartdale Maps
Erin Greb, Erin Greb Cartography

Come be part of a moderated discussion/Q&A session with four independent cartographers (plus a bonus fifth playing the role of moderator!). Each panelist, with unique backgrounds and experiences, is excited to give you a look into our world of freelancing. Thinking about starting your own business but not sure how? Already freelancing, but need some advice? Come ask us! Plus topics that all self-employed cartographers contend with on a regular basis—clients, expenses, time management, and more.

Pavilion BC
Challenging Cartography

Moderator: Rosemary Wardley
[Slack channel: #nacis2024-pavilionbc](#)

Mount St. Helens Historic Topography Project
Joe Bard, U.S. Geological Survey

Some Totally Not Terrifying Math of Terrain Cartography
Gene Trantham, independent

Challenging White Innocence Through an Atlas of U.S. National Landmarks
Alethea Steingisser, University of Oregon

Making Maps More Accessible at the U.S. National Park Service
Jake Coolidge, National Park Service/Colorado State University

The Junk Consortium: Cartography and World-Building
Jeffrey Linn, Conspiracy of Cartographers

Pavilion EF
Historical Cartography

Moderator: Hans van der Maarel
[Slack channel: #nacis2024-pavilionef](#)

Time Travel with Cartography: Mapping Philadelphia's Urban Landscape Evolution Across Two Centuries
Emily Zhou, University of Pennsylvania

The Impact of WWII on Cartography
Judith Tyner, CSU Long Beach (emerita)

Will-o'-the-Wisp, Map Collection Tours, Hauntology and Deep Time Spectres
Larry Laliberte, University of Alberta

Mapping History Using Digital Tools
Eric Rodenbeck, Stamen

Venice 1
Making Connections

Moderator: Aileen Buckley
[Slack channel: #nacis2024-venice1](#)

Dynamic Deployment and Mirroring of PostGIS Geospatial Data Repositories using Kubernetes, Helm and Other Open Source Technologies: a System Component-Based Approach to Geospatial Data Sharing and Publication
Chris Mader, University of Miami

Discovering and Explaining Ecological Connectivity
Mir Rodriguez Lombardo, Almanaque Azul Foundation

Handling Complex Content within Georeferenced Historical Atlases
Adam Cox, University of Illinois Urbana-Champaign

Using Old Maps for New Insights on America's Cities
Riley Champine, University of Richmond

Continuing a Classic: Map Use, 9th Edition
Patrick Kennelly, Long Island University; Aileen Buckley, Esri; Jon Kimerling, Oregon State University (emeritus)

Friday, October 18, 2024: Evening Events

6:00 PM–8:00 PM

Pavilion ABC

NACIS Banquet & Student Awards

Host: Hannah Dormido

Slack channel: #nacis2024-banquet

Dine with your fellow mapmakers and cheer on the winners of the student map & poster competitions!

City of Tacoma v. Andrus: Tacoma's (Losing) Fight to End Federal Recognition of the Puyallup Tribe

Keynote speaker: Dr. Danica Sterud Miller

Dr. Danica Sterud Miller (Puyallup Tribe of Indians) is a distinguished educator renowned for her expertise in American Indian and Indigenous Studies.

Currently, she holds the esteemed position of Co-Director at the Center for American Indian and Indigenous Studies (CAIIS) at the University of Washington Tacoma. Dr. Miller is an associate professor at the Culture, Arts and Communication division of the School of Interdisciplinary Arts and Sciences.



Her notable achievements include the receipt of UW Tacoma's Distinguished Teaching Award, recognizing her innovative pedagogical approaches in Native American studies. Dr. Miller's teaching methodologies incorporate immersive experiences such as field trips, captivating storytelling, and hands-on learning techniques.

Friday, October 18, 2024: Evening Events

8:15 PM–9:15 PM

Venice 1

Geodweeb Jeopardy!

Organizers: Joanna Merson, University of Oregon; Dennis McClendon, Chicago Cartographics (honorary)

Slack channel: #nacis2024-geopardy

Join the fun in a longstanding NACIS tradition—our own very mappy version of Jeopardy! Contestants can sign up for a team at the registration desk. Winners take home prizes, and we all leave having learned more than when we arrived.

If you prefer to watch from the sidelines, join the audience to cheer on (and heckle) the contestants in this highly entertaining show of geography trivia—with a special new twist in honor of Dennis McClendon.

Saturday, October 19, 2024: Workshop

9:00 AM–12:00 PM

Turcello

Stay Up-To-Date on ArcGIS StoryMaps and Living Atlas

Organizers: Aileen Buckley & David Asbury, Esri

Slack channel: #nacis2024-workshops

At this workshop, you will learn practical print and web tips from facilitators to improve accessibility in your map products. Then, you will explore some of these tips via small group discussions, where we will assess some example maps (provided by us or brought by participants) and chat about possible improvements. We also will learn from each other (tell us your tips) and chat about where we would like the industry to grow to be able to improve accessibility in map products.

Before the workshop, organizers will send resources for those who are interested. After the workshop, participants are welcome to join the organizers for lunch (not included) to continue the discussion.

Make an Atlas in a Day!

Alicia Cowart, University of Wisconsin–Madison
Cartography Lab
Darin Jensen, Guerrilla Cartography

Demonstrating the power of real-time data mining, map design, and collaboration, the Atlas in a Day Challenge asks participants to create maps based on a one-word theme to be compiled into an atlas—all within 24 hours. This one-day challenge will begin with the reveal of the atlas theme at the NACIS Business Lunch on Thursday.

Enjoy the camaraderie of your fellow NACIS guerrillas as we collectively build and compile our crowdsourced atlas narrative. The final atlas will be available as a free, downloadable PDF on Guerrilla Cartography's website, with a print version offered at cost to participants after the event.

Feel free to use the NACIS Commons for collaborating on the Atlas in a Day.

Cartographic Perspectives

Publish with *Cartographic Perspectives*, the only free, online, open-access journal in cartography.

Cartographic Perspectives is peer-reviewed and includes full-length articles, short technical notes, book reviews, and tutorials.

Want to submit an article? See submission guidelines at cartographicperspectives.org.

Interested in doing a book review? Contact cp_book_reviews@hotmail.com.

Mentoring Program

In 2023, NACIS launched its inaugural Mentor Program, pairing 21 early-career members with experienced cartographers. Together they engaged in a 6-month series of self-guided, one-on-one remote conversations about navigating the early career years and beyond.



Consider joining the 2025 Mentor Program! Applications open in January. Visit nacis.org/initiatives/nacis-mentor-program.

NACIS Store

nacis.org/initiatives/nacis-apparel

Discover the NACIS shop, where stylish shirts, mugs, and more await. Your purchase not only adds geographic charm to your life but proceeds go toward worthy NACIS initiatives like travel grants and contest awards.

Feeling inspired? Submit your design at nacis.org/initiatives/nacis-apparel/submit-t-shirt-artwork to make a map-tastic impact!

Swing by our conference shop table to snag the 2024 Tacoma shirt, one-of-a-kind enamel pins, or a NACIS is Nicest sticker. Relive your conference moments with these distinctive keepsakes for years to come!



Atlas of Design

Volume VII available now!

atlasofdesign.org/order



Volume VII of the **Atlas of Design** features 33 maps from cartographers around the world. Each map is accompanied by commentary from the cartographer.

Available near registration (for pre-order pickup) or online (to be shipped).



Volumes 1 through 7 in stock
25% Discount for NACIS Members!

Buy online now, ship it home! >>>

3D mapping Kennebec National Historic Landmark Utilizing LiDAR and Architectural Illustration

Guthrie Alexander

A walkthrough of how terrestrial LiDAR and architectural illustration techniques were utilized to create an accurate 3D map of Kennebec National Historic Landmark for use in the updated Unigridd brochure.

PCD Afternoon Session I, 1:30 pm–3:15 pm

3D Oblique Mapping of Mountains Above the Arctic Circle: Two Maps of Alaska's Remote National Parks

Joe Milbrath, National Park Service

This presentation will explore techniques and a short tutorial describing the creation of two National Park Service maps for Bering Land Bridge National Preserve and Gates of the Arctic National Park and Preserve. The talk will share approaches to mapping expansive mountainous terrain with the help of Terrain Texture Shading and Eduard, a Swiss-style terrain rendering software. I'll explore the use of high-resolution land cover data, satellite imagery, and approaches to

digitizing complex hydro datasets for oblique views.

Wild & Wilderness Mapping, Thursday 4:00 pm–5:30 pm

Acceptable Interpretations

Mark Denil, *sui generis*

The painter John Constable's observation that "we see nothing truly till we understand it" and CS Lewis' character Ransom's that "you cannot see things till you know roughly what they are" both point to the well-established fact that interpretations create the very facts that prove them. Once we have accepted an artifact as a map, we have already situated it against a horizon of other maps—maps that, by definition, have interpretations. It is our juxtaposition of this new map with the map horizon that points us to an acceptable interpretation—"acceptable" being a key term that will vary for every individual and individual map. What constitutes an acceptable interpretation? How do we know one when we encounter it? How do we read a map?

Mapping Horizons, Thursday 8:30 am–10:10 am

Algorithmic Design Defaults: Implications and Possibilities

Jim Thatcher, Oregon State University; Meghan Kelly, Syracuse University; Craig Dalton, Hofstra University

This talk examines what we call taken-for-grantedness in some technologically-inflected design choices. Beginning from the ideas that maps are a means of telling stories and making claims about the world, this talk provides examples of how oft-unconsidered and routinely deployed algorithms are potential and realized sites of routinized design and algorithmic harm in how they present the world and in who they include and exclude from consideration. We focus on three cases in different registers of map making: projections, generalization, and classification. Each involves common algorithms deployed in cartographic workflows in classroom, government, agency, and research settings.

Expansive Cartography, Thursday 8:30 am–10:10 am

All the Joys of Mapping (and Seeing!) the Total Solar Eclipse of 2024

K.K. Rebecca Lai, William B. Davis, & Josh Katz, *The New York Times*

The total solar eclipse of 2024 captured the attention of millions as it crossed North America on April 8, 2024. To help readers get the best experience possible, our team created a cloud forecast map to help readers find the best spots. We will share our design and development process, the lovely reader feedback we got, and our own experience of seeing a total solar eclipse for the first time. On eclipse day, we also published a video of satellite imagery showing the shadow of the moon as it passed across the Earth.

Innovations & Insights, Thursday 2:00 pm–3:50 pm

Are You Mappier than a 5th Grader?

Dave McLaughlin, The Pennsylvania State University

Building on a Career Day presentation about the life of a Geospatial Data Visualization Software Engineer, I developed and facilitated a 90-minute mapping workshop for thirty-five fifth graders. Working with colored pencils and paper, and using

Beescape (beescape.psu.edu) as the model, we started with some creative cartography, learned how to encode research data from biologists onto our maps, then investigated the landscape to determine the most beneficial areas for pollinators. See photos from the session, and hear about the process and lessons learned from putting together a reusable lesson plan to inspire the next generation of cartographers.

Tracking Process & Progress, Friday 10:20 am–12:20 pm

Atlas in a Day: Imagining a Black Counter-Atlas of Abolition

Kela Caldwell, University of Wisconsin–Madison

Building on critical cartographies of African American freedom struggles (Alderman et al, 2001), I explore the political potentials of producing a Black counter-atlas of racial violence in an effort to challenge and re-historicize how anti-black violence is defined and categorized. In this paper, I draw on participant surveys, mapping creations, and my reflections from a Design Challenge workshop hosted by the UW–Madison Cartography Lab to explore visualizing and re-historicizing anti-black violence through atlas co-creation. Here, I share lessons from

the Design Challenge as an opportunity to imagine what futurities might emerge from producing and placing cartographic visualizations of abolition in relationship with each other.

Mapping from the Ground Up, Friday 8:30 am–10:10 am

Automated Geoprocessing and GIS Analysis for Recreational Trail Maps

Jake Belan & Chuck Kitterman, Green Trails Maps

Utilizing open-source GIS data, our presentation will showcase a handful of geoprocessing scripts (using PyQGIS) and workflows to identify optimal areas for new map development, vector data processing, raster pre-processing, GPX data cleanup, metadata management, cartographic automation, and more! Join us to explore how these tools can enhance marketing strategies through spatial analysis and simplify map production using Python. These advancements can empower GIS users to make data-driven decisions and enhance GIS workflows.

PCD Afternoon Session I, 1:30 pm–3:15 pm

The Azimuthal Arctic

John Cloud, National Museum of Natural History, Smithsonian Institution

Gerardus Mercator (1512–1594) and Richard Edes Harrison (1901–1994) researched and created important maps of the boreal and Arctic realms, for distinctly different purposes, almost half a millennium apart. But both cartographers were illuminating climate change, based on their own historical research, their acute observations of their eras, and their mastery of globes. Their azimuthal perspectives were foundational and will remain the keys to our own responses to climate change.

Analysis to Action, Friday 8:30 am–10:10 am

Basemaps Don't Have To Be Boring

Brandon Liu, Protomaps LLC

Basemaps for web mapping: boring or exciting? Basemaps are an essential part of any web map, whether they're from Google, Esri, or an OpenStreetMap-based provider. You might think basemaps are a "solved problem": choosing an existing off-the-shelf lets cartographers move on to more interesting problems. What if basemaps were exciting? What if, more importantly, interactive, global-scale basemaps could be

downloaded, created, and customized using simple open source tools? This talk will go over how to do just that using the Protomaps basemap, including data sources (Natural Earth, OSM, Overture), cartographic generalization strategies, label localization, and customization for the practical cartographer.

PCD Morning Session I, 8:30 am–10:15 am

Blending Modes Demystified

Charles Preppernau, Esri

Blending modes are a powerful tool for compositing layers in our mapping projects, but what exactly are they doing, and how do they work? What exactly is happening under the hood when you select modes like Exclusion or Vivid Light, and how can you as a cartographer take advantage of their behavior? This talk aims to provide an introduction and some reference materials for understanding how blending modes work, how you can use that knowledge in your cartography, and a demonstration of some interesting ways that some of the more obscure modes can be used.

PCD Morning Session II, 10:30 am–12:00 pm

Branching Out: Navigating Kentucky's Urban Tree Canopy Grant Adventure

Rebecca Ramsey, Kentucky Division of Forestry

In February, the Kentucky Division of Forestry (KDF) launched a \$1.8 million Urban and Community Forestry Grant Assistance Program to enhance urban tree canopies in underserved communities. To help applicants, KDF used an ArcGIS Online Web Experience Build featuring an interactive Eligibility Map (based on Climate and Economic Justice Screening Tool and Tree Equity Score data), a StoryMap detailing the methodology and grant specifics, Survey123 for initial contact, and a dashboard to track applications. Join us in exploring this Web Experience Build and see how we communicated this groundbreaking grant program and its eligible areas.

Cartography & Community, Thursday 10:20 am–12:10 pm

Bringing Print Techniques into the Digital World: Blend Modes for Map Tiles

Amelia Hagen-Dillon, onX Maps

Advanced blending techniques have long been used in the creation of static maps where cartographers can leverage advanced tools like Photoshop and Blender to combine raster layers in a way that adds depth and detail instead of obscuring or flattening an image. Tile-based mapping applications have struggled to leverage those tools in a scalable way. In this talk, we'll look at a method of introducing advanced blending techniques for map tiles and how we leveraged it at onX to create vibrant bathymetry tiles for lakes in Minnesota.

PCD Afternoon Session II, 3:30 pm–5:00 pm

Bringing Transparency to Freelance Mapmaking

Daniel Huffman, somethingaboutmaps

Freelancing mapping can be a lonely business. Without regular insight into our peers, we're left wondering if we're making the right business decisions. Should I make everyone sign a contract? Should I charge a flat rate or hourly? And the biggest one:

how much should I charge my clients? It's easy to be uncertain about what we're doing if we don't know what's typical for our peers. Since 2018, Daniel Huffman and Aly Ollivierre have been conducting a biennial survey of freelance cartographers in order to bring transparency to the business and help all of us thrive. In this presentation, we'll have a look at some of the results of the last several years, both the expected and the surprising.

Tracking Process & Progress, Friday 10:20 am–12:20 pm

Building the Definitive Draft for River Craft: the John Day Boater's Guide

Gabriel Rousseau & Monic Morin, Bureau of Land Management

The Bureau of Land Management recently published a comprehensive boater's guide for the John Day River. The John Day drains nearly 8,100 square miles of central and northeast Oregon. It is one of the nation's longest undammed rivers, 147.5 miles of which were designated as a Wild & Scenic River by Congress in 1988. This talk will take you through the three-year process of field work, data collection, content writing, layout and design, and revision. This guide maps 185 river miles at 1 inch to 1/2 mile

and is an invaluable resource for education, navigation, safety, and maintaining a sustainable ecosystem.

Innovations in Mapping, Friday 10:20 am–12:20 pm

Building Tiny Custom Web Maps

Stephanie May

Ever wondered how you can create custom web maps for your portfolio, passion project, or job WITHOUT setting up a tile server, web server, or cloud services account? Hoping to do it without too much coding or cost? Got some maps you made and just want to display with a little bit of interactivity? This talk will walk you quickly through what you need to do to create and show interactive web maps serverlessly with PMtiles, Protomaps JS, and MapLibre.

PCD Afternoon Session I, 1:30 pm–3:15 pm

“By Dint of Some Unshowy Beauty”: a Concordance Analysis of Aesthetic Vocabulary in Cartographic Textbooks 1928-2023

Chelsea Nestel, University of Wisconsin—Madison

How has Euro academic cartography arrived at its current aesthetic epistemologies? I examine this question using corpus analysis from linguistics, analyzing the changing in-line usage of the word aesthetics and related words design, taste, beauty, art, and style. My analysis reveals how aesthetic concepts such as judgment, value, objects, attitude, and experience have been expressed over time. These aesthetic concepts are integral not just to how maps are made, but how they are experienced and used, constructing cartographically “good” maps.

Analysis to Action, Friday 8:30 am–10:10 am

Canyon Cartography

Brandon Plewe, Brigham Young University

Over the years, a great deal of research has been done and dozens of techniques have been developed for portraying the beautiful and rugged landscape of mountains. Much less time has been spent on their counterpart, canyons, especially landscapes

that feature rocky cliffs and canyons without mountains, such as the Colorado Plateau in the Southwestern United States. We experimented with existing and new techniques that can be composited to create maps of canyonlands that emphasize their ruggedness and beauty and help visitors more effectively understand and travel through them.

Cartographic Visualization, Thursday 10:20 am–12:10 pm

The Cartographic Art of the Opposite of Bespoke

Nicholas Bauch, Esri

Pixel-perfect detailing, custom tracing, nudging hex codes: all marks of the artistic precision we adore in powerful cartographic design. But how might we maintain adherence to strong spatial storytelling when creating a large number of maps for an audience who, on average, won't spend more than 8 seconds reading them? Frequently absent of legends and even text, geographical representation goes to new places when designing maps “at scale.” From the perspective of MapX—the carto team for Esri's public-facing website—I outline challenges, and share design system strategies that help answer the question: how

to show the beauty and elucidative capacity of cartography when there are nearly 2,500 web pages calling for new, cutting-edge maps?

Putting the 'Art' in Cartography, Thursday 4:00 pm–5:30 pm

Cartography as Spatial Information Practices

Jack Swab, University of Kentucky

Definitions of cartography typically revolve around the construction and study of visual representations of geographic phenomena. In this presentation, I add to this definition by advancing the idea of cartography as the study of spatial information practices. Understanding how individuals find, evaluate, and use maps (and other forms of spatial information) is critical to advancing both the construction and study of maps. Although aspects of a spatial information practice exist in cartography currently—such as UI/UX or wayfinding research—by more readily centering a pluralistic view of spatial information practices we can expand cartography beyond the study of the visual.

Art & Design in Practice, Friday 1:20 pm–3:20 pm

Census Maps for Public Knowledge

Jia Zhang, Center for Spatial Research, Columbia University

The census is a data-centric method of governing in theory only. In practice, as with most technocratically designed processes, it is a perfect storm of politics and bureaucracy. To visualize census data for public knowledge is to, on the one hand, show where and how people live, and on the other, it is an opportunity to expose some of the hidden infrastructure surrounding how the data is made. This talk will cover a series of 8 maps that attempt to provide new entry points into and build more intuitive readings of large public datasets like the Census. Topics include the structure of census geographies, utilizing satellite imagery for comparisons, and the afterlife of census data in products like the Social Vulnerability Index.

Cartography & Community, Thursday 10:20 am–12:10 pm

Challenging White Innocence Through an Atlas of U.S. National Landmarks

Alethea Steingisser, Erik Steiner, Laura Pulido, Sophia Ford, & Jenna Witzleben, University of Oregon

The InfoGraphics Lab is working on a new atlas, *Monumental Denial: U.S. Cultural Memory and White Innocence*, that explores how the more than 2,400 United States National Historic Landmarks (NHL) systematize and reflect embedded cultural narratives of white supremacy and colonialization. Through maps, data graphics, photographs, and topical essays, the atlas reveals how NHLs reinforce white innocence and deny the cultural memory of marginalized people. From the official site nomination materials to the formal public messaging at the sites, more than 90% of NHLs fail to acknowledge the racially-based events, people, and processes that are key to understanding the importance of the sites in the context of U.S. history.

Challenging Cartography, Friday 3:30 pm–5:00 pm

Changes You Can Make to Your Workflows to Make More Accessible Maps

Vanessa Knoppke-Wetzel, GreenInfo Network

At GreenInfo Network, we have spent time in the last few years making changes to our interactive production workflows to improve accessibility in our web products, and we also continue to create accessible print maps for our clients and partners. I will share some of what we have learned about accessibility design for the web from the last few years, as well as share out tips and tricks from our experience with print products as well.

Art & Design in Practice, Friday 1:20 pm–3:20 pm

Cheap and Pricey: NPR Leveraged Free Tools To Build and Host Our Own Slippy Maps. Was It Worth It?

Daniel Wood, National Public Radio

This year, NPR published an extremely detailed tool to help gardeners around the country understand the updated USDA plant hardiness zone map. To do this, we built our own slippy maps, utilizing all free and open-source tools: Maplibre GL

JS, Protomaps, OpenMapTiles, Tilezen, OSM data, and more. The final product was so cool. It is extremely cheap (in \$) and extremely costly (in time, if you're a noob like me). Come and weigh the costs and benefits together. You will learn about the recent (re)explosion of open source tools for making detailed, performant, and pretty maps online; how ChatGPT helped me understand documentation I didn't want to read; and what I'd do differently next time.

Mapping from the Ground Up, Friday 8:30 am–10:10 am

City as Museum: Reimagining Urban Wayfinding and Storytelling

Gurpreet Kaur

The talk explores the concept of a city as a living museum, where each landmark tells a story, turning urban landscapes into engaging narratives that enhance wayfinding. It will showcase how this idea can transform urban exploration, guiding visitors and residents through the city's rich historical and cultural stories via its unique landmarks. An example use case will highlight how users can engage with the city's stories, making each landmark a

portal to the past and a navigation guide in the present.

Looking Forward, Looking Back, Friday 10:20 am–12:20 pm

Close: an Interactive, Multi-Modal Travel Time Map

Nathaniel Henry, Henry Spatial Analysis

Close (<https://close.city/>) is an interactive web map showing travel times to nearby amenities via walking, biking, and public transit across every block in the United States. This presentation describes how Close visualizes travel times from 8 million city blocks to 4 million destinations using publicly-available data sources and tools, with an emphasis on newly-released data from the Overture Maps project. Common public reactions, incorporating crowdsourced feedback, and extensions of Close will also be covered.

Cartography over Time & Space, Thursday 4:00 pm–5:30 pm

Coloring Outside of the Lines: Sketch Mapping Fear, Safety, and Community for LGBTQ+ Students Amidst Anti-LGBTQ+ Legislation

Natalie Correa, University of Wisconsin–Madison

Over 500 state-level bills were introduced in the US that negatively targeted members in the LGBTQ+ community in 2023. I sought to investigate how introduced and passed legislation impacted how college students think about space. I used sketch mapping and interviews to gather student perceptions and interviews to gather student perceptions of fear, safety, and community within the US. The use of sketch mapping provided direct linkages between where students perceived these characteristics and why they perceived them. I then aggregated the results in ArcGIS Pro to create synthesized maps that showed the areas of fear, safety, and community. My research offers insight on using sketch mapping on a large scale in addition to using sketch mapping to understand perceived realities.

Innovations in Mapping, Friday 10:20 am–12:20 pm

Comparative Evaluation of Univariate and Bivariate Choropleth Maps: Perceptual and Cognitive Insights from an Eye-Tracking Study

Michalis Kantarijis, Caglar Koylu, & Juan Pablo Hourcade, University of Iowa

Our study evaluates univariate and bivariate choropleth maps using eye-tracking technology to uncover key perceptual and cognitive differences among tasks such as identifying patterns and comparing regions. Data analysis from 75 participants showed that bivariate maps, while initially challenging, enable more efficient and, in some tasks, accurate interpretation of complex spatial patterns. Self-reported measures indicated improved performance and reduced mental demand with bivariate maps. Additionally, our introduction of an interactive legend led users to explore the map interface more thoroughly. Gaze heatmaps and scan path analyses revealed distinct visual patterns, suggesting that bivariate maps, contrary to previous research, can enhance map reading efficiency.

Cartographic Narratives, Thursday 10:20 am–12:10 pm

A Complicated Wilderness: Mapping Guadalupe Mountains National Park

Becca Holdhusen, National Park Service

Guadalupe Mountains encompasses complex cultural narratives that extend well beyond the park boundary. In this talk, I provide background about the park's geology, ecology, and cultural history and the ways these pieces have shaped the story of a lesser known park. I review a series of 3D and planimetric maps I made for the park and invite the audience to speculate about ways to include interpretive clues that would give map readers a deeper understanding of the cultural context of the park.

Innovations & Insights, Thursday 2:00 pm–3:50 pm

Continuing a Classic: Map Use, 9th Edition

Patrick Kennelly, Long Island University; Aileen Buckley, Esri; Jon Kimerling, Oregon State University (emeritus)

No other cartography textbook has withstood the test of time like *Map Use: Reading, Analysis, Interpretation*. Since its debut in 1978, nearly a half-century ago, it has remained a stalwart companion for

instructors, students, self-learners, and professionals. *Map Use*, 9th edition, allows us to not only update the book with some of the best maps recently made, and produce the book in both print and e-book format, but it also provides us with a unique perspective into what has changed over the years—and what has remained the same. It allows us to evaluate what is currently most important in map use and mapmaking so that we can, in effect, present the state of the art in those areas of our field. Yet, for all that has changed over the years, the underlying philosophy of *Map Use* remains the same—a good map user must understand, at a basic level, what goes into the making of a map.

Making Connections, Friday 3:30 pm–5:00 pm

Creating a 3D Map of the Haleakalā Volcano on Maui

Jim Eynard, National Park Service

The summit in Haleakalā National Park, at 10,023 feet (3,055m), is the tallest peak on the island of Maui in Hawaii. This map uses high resolution aerial imagery and elevation data in a 3D perspective view to show the dramatic summit area including the road to the top, the visitor centers, viewpoints, and the many trails in the nearly 7 mile wide

steep sided depression, often referred to as a crater.

Mapping from the Ground Up, Friday 8:30 am–10:10 am

Creating a Digital, Indigenous Walking Tour of UW-Madison: Reflections on Collaboration, Justice, and Place

Gareth Baldrice-Franklin, University of Wisconsin–Madison

Mapping Teejop is a digital walking tour centered on Indigenous history and presence on the University of Wisconsin–Madison campus. This presentation discusses the multi-layered process of creating Mapping Teejop, particularly the importance of collaboration and flexibility with students and community members. Walking tours can evoke a more intimate connection to place, and this project is situated without our attempts to reinforce the position of campus as an Indigenous place.

Indigenous Cartography, Thursday 2:00 pm–3:50 pm

Creating an Organizational Cartography Guide

Gray McKenna, Washington State Department of Natural Resources

The National Audubon Society is a hemisphere-wide conservation organization that is known for its strong visual identity. Many Audubon employees are GIS users who regularly produce maps for outreach, planning, and advocacy. However, until recently, there were no Audubon-specific resources for designing maps. To address this need, we created a Cartography Guide using ArcGIS Hub. This guide empowers users of all skill levels to create high-quality, accessible maps that integrate Audubon's visual identity. This presentation will cover how we created this guide to be responsive to our users' wide range of needs and the impact this guide has had on Audubon's cartographic communications.

Art & Design in Practice, Friday 1:20 pm–3:20 pm

Creating Beautiful Open-Source Interactive Maps With R and D3

Henry Beimers, NORC at the University of Chicago

Some of the major difficulties in web mapping come from translating your tabular data into the right format for visualization. With the r2d3 R package, creating beautiful interactive online maps using the JavaScript D3 library is just another part of your data processing workflow in R. This talk will discuss how to use R to interface with JavaScript D3 through the r2d3 package to create beautiful interactive maps for the web, R Markdown reports, or Shiny applications in an efficient and fully open source process.

Web Mapping & Workflows, Friday 8:30 am–10:10 am

Creating Thematic Maps with the Help of Generative AI

Kristian Ekenes, Esri

Since OpenAI's release of ChatGPT nearly two years ago, the number of artificial intelligence assistants has exploded in software applications in almost every industry. We'll explore the role generative AI assistants play in creating thematic maps from an end user's natural language. I'll

describe Esri's approach in building an AI mapping assistant for ArcGIS Online and summarize findings discovered from user testing, research, and the implications it has on mapping workflows moving forward.

Looking Forward, Looking Back, Friday 10:20 am–12:20 pm

Creative Uses of Visual Media in Storytelling

Warren Davison, Esri

Photos, illustrations, and maps are powerful tools for visual storytelling. Compositing these elements together within web maps can open the door for endless creative exploits. This talk explores some creative combinations of media and maps for storytelling in ArcGIS StoryMaps, from the conventional to the unconventional, and how they can be used to craft engaging visual experiences.

PCD Afternoon Session II, 3:30 pm–5:00 pm

Cutting for New Openings: Alternative Representations of a Railway Line

Àlex Muñoz Viso, University of Kentucky

In this paper, I draw from Bergmann and Lally (2021) to explore the possibilities of cutting the map to represent (1) distance in non-mathematical terms and (2) urban space as a human experience. The paper reflects on the process of mapping urban railway infrastructure in the Metropolitan Area of Barcelona, emphasizing the disruption it creates to both the urban landscape and social life. Thus, the cut disrupts the map replicating how the railway disrupts urban space, opening new blank spaces in the canvas that offer new possibilities for cartographic representation. In my case, it allowed for the creation of a reflective space where testimonies narrate personal and community experiences and stories about life in an urban landscape ripped in half.

Cartography & Community, Thursday 10:20 am–12:10 pm

Defining a Brand of Cartography

Lee France, onX Maps

In late 2022, onX maps, a company focused on mapping recreational pursuits for millions of outdoor enthusiasts, decided to invest big into cartography. They formed a team dedicated to defining the look and feel of their foundational product: the map. In this talk we'll dive into that team's journey to discovering what it means to define a brand of cartography and how to anchor around that brand to create beautiful map designs that are highly functional and tailored to the needs of specific user groups.

Tracking Process & Progress, Friday 10:20 am–12:20 pm

Demystifying Cloud Native Geospatial for Working with Data at Scale

William Lyon, Wherobots

As data volumes continue to grow in the geospatial world, tooling and data formats from the big data ecosystem are being applied to the geospatial world. This enables more distribution and new types of data analysis, yet can be frustrating when trying to integrate with some GIS workflows. In this talk, we'll examine why cloud-native data

formats for geospatial are becoming popular and how to work with them by looking at GeoParquet, STAC, Cloud Optimized GeoTiffs, PMTiles, and Apache Sedona.

Web Mapping & Workflows, Friday 8:30 am-10:10 am

Digital Diary: Writing Down Your Notes and Your Process

Rachel Stevenson, State Government

When writing code, one can often add comments about their process as they write their script or program. When developing a map product, there lacks this inability to track comments throughout the map-making process. While yes, task tracking exists in ArcGIS Pro, I find it lacks the ability capture my thought process. One of my best practices is to track my process through details notes. In this presentation, I'll share with you how I track my map-making process and why you should consider making this practice apart of your workflow.

Tracking Process & Progress, Friday 10:20 am-12:20 pm

Discovering and Explaining Ecological Connectivity

Mir Rodriguez Lombardo, Almanaque Azul Foundation

Awareness of ecological connectivity has become critical in a rapidly changing world and increasing fragmentation of natural areas. I will talk about how we met the challenges of not only creating a high-resolution map of functional ecological connectivity for Panama, but also of how to effectively communicate the results. Making the map began by assembling various data sources, then surveying experts, and finally many iterations of running the data through a connectivity algorithm (Omniscape). We interpreted the results informed by environmental threats, as well as local land and water defense struggles, then liaised with teachers to created a digital and paper map of "natural corridors" intended to be used in the classroom.

Making Connections, Friday 3:30 pm-5:00 pm

Discussing Current Limits and Future Opportunities in Mobile Map Design

Lily Houtman, The Pennsylvania State University

Designing maps for mobile devices is increasingly important in our modern work. Following a preliminary study focused on mobile thematic maps in the context of data journalism, I highlight a few key limitations in this area of research: types of interactivity, time constraints, simultaneous design, and ability to conduct user testing. In addition to presenting conclusions from my previous work, I describe potential avenues for future work on the same subject. I plan to make audience engagement a significant portion of my talk, gaining knowledge from currently practicing data journalists and others who work on mobile thematic maps to help inform my future research questions.

Tracking Process & Progress, Friday 10:20 am-12:20 pm

Displacement Vulnerability and Mitigation Tool

Abigail Fleming, University of Miami

The Environmental Justice Clinic (EJC) and the Frost Institute for Data Science & Computing at the University of Miami

developed the Displacement Vulnerability and Mitigation Tool (DVMT), a three-part, web-based tool that uses data analytics to forecast the risk of displacement a proposed development may cause and equip community stakeholders with research-informed mitigation strategies.

Web Mapping & Workflows, Friday 8:30 am-10:10 am

Drawing Participation: A Real-Time, Peer-to-Peer Tool for Participatory Planning and Design

Carlos Sandoval Olascoaga, Northeastern University

Drawing Participation (DP) was created to increase accessibility and to provide a scalable and open platform for shared planning and design. DP is a peer-to-peer, collaborative geospatial computing system tool that integrates drawing, mapping, spatial analysis, version-control, and algorithms for design synthesis. Drawing Participation is a model for collective and collaborative planning methods and interfaces that enable large groups of people to work together in ill-defined design problems. In this presentation we will present, first, the conceptual and technical background of

DP; second, the technical implementations of the tool; and third, a case study of the implementation of the tool to collaboratively develop parcel maps in informal settlements in Sub-Saharan Africa.

Putting the 'Art' in Cartography, Thursday 4:00 pm-5:30 pm

Dynamic Deployment and Mirroring of PostGIS Geospatial Data Repositories using Kubernetes, Helm and Other Open Source Technologies: a System Component-Based Approach to Geospatial Data Sharing and Publication

Chris Mader, Timothy Norris, & Julio Perez, University of Miami

Online GIS repositories (implemented using technologies such as ArcGIS Hub, for example) typically support two models for data access: data download and API support. Here we will present a system component model for data sharing based on Kubernetes and PostGIS. We are using this approach at the University of Miami as part of the Frost Institute for Data Science and Computing (IDSC) Geospatial Digital Special Collections (GDSC) data resource. This approach enables the replication of

fully functional sets of PostGIS databases combined with API services that can be used to build de-coupled software applications, as well as for other purposes where mirroring pieces of a repository is beneficial. We will also present a quick case study of an actual software application, that used replicated components, for illustration purposes.

Making Connections, Friday 3:30 pm-5:00 pm

Enhancing Visual Realism in Web-Based 3D Terrain Maps

Ondřej Procházka, Seznam.cz

Web-based 3D terrain maps employ technologies like HTTP/2 and WebGL to generate dynamic perspective views from underlying DEMs and landcover data in real-time, offering an interactive experience within your browser. In this talk, I will discuss some of my recent efforts to upgrade a global web-based 3D terrain map, focusing on achieving enhanced visual realism, improved terrain representation, and better rendering performance.

Cartographic Narratives, Thursday 10:20 am-12:10 pm

Evaluating Beescape NexGen

Anthony Robinson, Lily Houtman, Dave McLaughlin, & Christina Grozinger, *The Pennsylvania State University*

Beescape NexGen makes it possible to visualize pollinator health metrics across landscapes. As part of an iterative user-centered design process, we evaluated a Beescape prototype and found many areas for improvement. This work led to a comprehensive re-design. In this talk we report results from a recent usability and utility evaluation with beekeepers and the re-designed Beescape NexGen. Our findings make clear that our iterative design process has benefited its usability and utility, and we have clear directions now for how to support its continued evolution.

Tracking Process & Progress, Friday 10:20 am–12:20 pm

Exploring Intra-Annual Variations in Urban Effects on Precipitation in the Atlanta, GA, USA Region

Olamiposi Fagunloye, *Georgia State University*

This study investigates the intra-annual variations in urban effects on precipitation in the rapidly urbanizing Atlanta, GA

region. By analyzing over two decades of precipitation data from 70 stations, along with land cover, imperviousness, and atmospheric reanalysis data, the research aims to determine the spatial variability and seasonal differences in urban impacts on precipitation totals, frequency, and intensity. Geostatistical techniques like kriging will generate high-resolution precipitation surfaces, while correlation analyses will assess the relationship between upwind urban land and precipitation characteristics. The findings will contribute to a comprehensive understanding of urbanization's influence on precipitation patterns, informing urban planning and water resource management strategies.

Innovations & Insights, Thursday 2:00 pm–3:50 pm

Felt in Action

Mamata Akella, *Felt*

Felt is a powerful tool for data exploration, spatial analysis, cartography, and collaboration. It enables more people in your organization to work with maps and collaborate in real time through its modern, easy-to-use interface packed with powerful features. Join this talk to learn how to work with a variety of data formats,

advanced filtering and search capabilities, robust spatial analysis tools, and intuitive cartographic controls that together simplify the data exploration and mapmaking process and are uniquely Felt. Whether you are a beginner or an experienced professional, see how Felt improves workflows, enhances team communication, and enables informed decision-making through practical examples and a live demo.

Tools of the Trade, Thursday 8:30 am–10:10 am

A Field of Honor Forever: Mapping Flight 93 National Memorial

Alex Fries, *National Park Service*

Established in 2002 and first opened in 2015, Flight 93 National Memorial in Somerset County, Pennsylvania honors the passengers and crew of United Airlines Flight 93, one of the four aircraft seized by terrorists during the September 11 attacks and, due to the courageous actions of its passengers and crew, the only plane which did not reach its intended target. The combination of the memorial's mission to retell the story of a tragedy that still occupies living memory and the rather iterative nature of its construction has made this one of the more challenging NPS units to map in recent years. This talk will thus be a brief overview of my role

in developing a set of maps for the park's ongoing project to overhaul some of its interpretive media, including a refreshed Unigrd brochure and a new wayside exhibit. In particular, I will discuss the sort of balancing act that needed to be managed between conveying the story of Flight 93, with both the power and sensitivity it deserves, and the reality of making practical considerations that ensure the maps will remain useful for orientation and storytelling to the widest audience possible—among them being a design decision for the new park map that largely breaks from NPS tradition and may in fact be the first park brochure map to implement the technique in question.

Cartographic Chronicles, Thursday 2:00 pm–3:50 pm

For Mapping in Folds: Space is Not a Grid

Alexis Wood, Sophia Perez & Elizabeth Fiske, *University of California, Berkeley*

This presentation asks if the limitations of contemporary mapping can be traced to our tools or to limitations in our cartographic theory. Using an approach informed by the Deluzian fold and the Benjaminian constellation, I question cartographic scale

and conceptions of spacetime through various material investigations.

Expansive Cartography, Thursday 8:30 am–10:10 am

Forget About Tilesets: How to Use Static Files for Performant Interactive Stories

William Davis, *The New York Times*

Slippy maps are essential to web cartography, but they often include unnecessary data and can render inconsistently as individual tiles are processed. In this talk, I'll share examples of web maps that use static json, png, and mp4 files to create smoother storytelling experiences on interactive maps. You'll also learn how to start building similar maps using open-source tools like gdal, ffmpeg, mapshaper, and maplibre GL JS.

PCD Morning Session I, 8:30 am–10:15 am

Freestyling: Mapping Mountain Landscapes with Blender's Non-Photorealistic Renderer

Andrew Tyrrell, *South Arrow Maps (freelance cartographer)*

Blender has been adopted by many cartographers. It is a useful tool for generating natural (though also potentially unnatural) looking terrain shading. Its physical based renderer can be used to create realistic effects which can be incorporated into maps as one or more raster layers. Less well known is Blender's non-photorealistic renderer: Freestyle. Freestyle detects silhouettes, edges, and creases of virtual objects, which can be styled as vectors either within Blender or in graphics software such as Adobe Illustrator. This presentation provides an overview of how I use Freestyle to create stylised oblique views of mountain landscapes, illustrating backcountry hiking trips, summers spent in the wilderness, and trans-Alpine adventures.

PCD Morning Session I, 8:30 am–10:15 am

Globes: an App for the Apple Vision Pro

Bernie Jenny, Dilpreet Singh, & Kadek Satriadi, Monash University; Evan Thornberry & Niles Dorn, David Rumsey Map Center, Stanford Libraries

Globes is a new app for the Apple Vision Pro headset that shows globes at the David Rumsey Map Center at Stanford Libraries. Virtual globes are rendered with unprecedented visual clarity and detail, and they can be freely scaled and positioned. This presentation will demonstrate the features of the Globes app and discuss its development. Additionally, we will explore future applications of augmented reality for visualizing maps and globes, and showcase how tangible globes can be augmented with virtual visualizations.

Looking Forward, Looking Back, Friday 10:20 am–12:20 pm

Hand-Drawn and Antique Map Styles with QGIS

Andy Woodruff

Do you love the look of hand-drawn maps? Are you, like me, bad at drawing things by hand? Come along to learn the next best thing: faking it with computers! We'll look

at how to create some hand-drawn and/or antique map styles in QGIS—expressions, geometry generators, and more—including general tips as well as specific styles and examples to download.

PCD Afternoon Session II, 3:30 pm–5:00 pm

Handling Complex Content within Georeferenced Historical Atlases

Adam Cox, University of Illinois Urbana-Champaign

While georeferencing a single map is an easy one-off process, applying the work across a whole atlas (or multi-volume set) is a challenging task—especially when pages have multiple insets and the atlas contains more than one category of maps. How do you structure this work, and create cohesive output? This presentation will describe the novel hierarchical approach within OldInsuranceMaps.net, a crowdsourced web georeferencing platform designed around the complexities of Sanborn fire insurance maps. Facilitating the creation of seamless mosaics from this collection has resulted in a robust, abstract workflow that could be applied to any other maps or collections as well.

Making Connections, Friday 3:30 pm–5:00 pm

High-Resolution Elevation Tiles for Enhanced Terrain Rendering

Lee France & Tony Cannistra, onX Maps

3D mapping is now common across many applications and industries, yet a high-resolution 3D Map tailored to outdoor enthusiasts has been lacking. onX maps, a company focused on mapping our natural spaces, has attempted to fill that void by developing highly detailed elevation tiles built from lidar resolution data. These new elevation tiles are allowing us to render landscapes in incredible 3D detail helping users of these maps better understand and interpret crucial terrain features. In this talk we'll dive into why we tackled this major challenge and how we did it, and take a look at some of the beautiful map products resulting from this incredible elevation data.

Cartography over Time & Space, Thursday 4:00 pm–5:30 pm

How to Improve Your GIS to Graphic Design Workflow

Julia Olson & Sarah Bell, Esri

Many cartographers start their maps in a GIS before exporting into a graphic design program. ArcGIS Maps for Adobe Creative Cloud was designed with these mappers

in mind. We will share new capabilities as we demonstrate how we created our Pacific Northwest-based map gallery poster using the ArcGIS Pro-to-Adobe Illustrator workflow. Our demo will incorporate Maps for Adobe features, like automatic symbol replacement, automated symbol library creation, well-organized data visualization, vector tile basemaps, and more!

Web Mapping & Workflows, Friday 8:30 am–10:10 am

How to Mop the MAUP?

Maggie Mateu, atopia

The Modifiable Area Unit Problem (MAUP) occurs when quantities of a spatial phenomenon are aggregated into spatial partitions or areal units (such as countries, districts or a grid). The resulting summary values (totals, rates or densities) are influenced by both the shape and scale of the aggregation unit and often distort the real phenomenon's spatial repartition. There are a few ways of overcoming this issue, by getting rid of spatial partitions and playing with cartographic design. I will be using QGIS to show you step-by-step some easy tips and tricks I've been using to mop the MAUP.

PCD Afternoon Session I, 1:30 pm–3:15 pm

How to Write a Cartography Tutorial

Heather Smith, Esri

I've been writing cartography tutorials at Esri for almost six years. I'd like to share some of the methods, tricks, and principles that I've learned and employed over that time, including: 1) How to keep a tutorial short without sacrificing learning objectives; 2) how to go beyond button-clicking and explain how to make decisions; and 3) how cartography skills translate to writing skills. (How becoming a better writer made me a better cartographer and vice versa.)

Art & Design in Practice, Friday 1:20 pm–3:20 pm

Illustrating Ahupua'a, the Hawaiian System of Land Stewardship

Rosemary Wardley, National Geographic

Come join as a cartographer makes more of a graphic and less of a map and explore what can be learned from embracing the collaborative process working with Indigenous Hawaiian artists and knowledge holders. Featured in the July *National Geographic* "Special Issue: Indigenous Futures, Ancient Practice, Future Promise" is

an illustration that looks at the historical and future applications of ahupua'a land divisions.

Indigenous Cartography, Thursday 2:00 pm–3:50 pm

The Impact of WWII on Cartography

Judith Tyner, CSU Long Beach (emerita)

Prior to WWII, cartography was a "mere tool" for geographers, not a discipline. There was only one American textbook, and few universities and colleges offered courses in cartography. There were also no courses in air photo interpretation and map reading. During and after the war, the number of universities that offered cartography classes increased dramatically and the subject had morphed from a tool to a discipline. This paper examines the impact of the war on the field over a short period of time.

Historical Cartography, Friday 3:30 pm–5:00 pm

In the Hot Seat: Acquiring Kernel Density Heat Map Design Guidance Through Delphi and Survey Methods

Lauren McKinney-Wise, City of Portland & Portland State University

Kernel density heat maps have emerged as a new, popular thematic map type. Yet, unlike other thematic map types, little if any published guidance exists for effective heat map design. This is significant because maps are highly persuasive objects that are often utilized to communicate important information. To address this literature gap, I conducted a Delphi experiment with cartographic experts to gather heat map design guidance and then tested the effectiveness of the expert-informed heat map design guidance among public reference librarians in the US using an online survey. This is a shortened version of my master's thesis presentation.

Mapping from the Ground Up, Friday 8:30 am-10:10 am

Integrating Use-Specific Styles into a Generalized Map Hierarchy

Lauren James, Apple

Apple's Maps app is constantly evolving as we create new offerings for our users. Our latest undertaking necessitated integrating new data into an existing hierarchical structure, with emphasis on a considered and balanced redesign of layers. This challenging puzzle included needed technical advancements across several codebases and a cross-functional effort. Maps' Cartography team will present the design and data decisions behind this undertaking.

Tools of the Trade, Thursday 8:30 am-10:10 am

Introducing Tiled Texture Shading

Leland Brown, Instituto Superior Técnico

Texture shading is an algorithm to enhance visual detail in canyons, ridges, and structural features of a terrain. But suppose you want a seamless map of a very large area. If you divide the map into tiles and texture shade each one separately, the tiles won't match properly at the edges. Until now, the only solution was to process the entire dataset as a unit, potentially needing more time or memory space than you have available. Now the algorithm has been

extended to process tiles individually while taking into account their context in the surrounding map. The result is texture-shaded tiles that fit together seamlessly into a single image. This makes texture shading practical even on datasets of 100,000 x 100,000 pixels or larger.

Cartographic Visualization, Thursday 10:20 am-12:10 pm

The Junk Consortium: Cartography and World-Building

Jeffrey Linn, Conspiracy of Cartographers

As part of the Junk Consortium, I collaborated with faculty to teach world-building to students at the USC School of Cinematic Arts. The Consortium is a group of 15 universities, led by production designer Alex McDowell, imagining far-future societies built on the detritus of our current world. Alex has designed a framework for fictional societies--using mandalas to envision rich cultures--integrating politics, economy, philosophy, and environment. With a map of the world as the foundation, richly imagined societies can be created. I will present the techniques I use for creating fictional geographies, Alex's techniques for world-building, and the societies imagined

by students based on these techniques and my maps.

Challenging Cartography, Friday 3:30 pm-5:00 pm

A Land Acknowledgment Map for Northern Utah

Ryan Frazier, Weber State University

This short talk will display the land cessation map created for Northern Utah and Weber State University regions. We will address the process that led us to the current map and show a few steps and iterations that we took to arrive at this current version.

Indigenous Cartography, Thursday 2:00 pm-3:50 pm

LEGO Topographic Mapping

Atlas Guo, University of Wisconsin--Madison

Calling all LEGO enthusiasts! Have you ever dreamed of bringing your love for LEGO bricks into a topographic map? Join me in unveiling the secrets behind my physical LEGO map of Wisconsin, and a virtual 3D-rendered LEGO map of Colorado! Practically, ArcGIS Pro will be used for exploratory map design, and LEGO Studio for further configurations and 3D rendering.

But the adventure doesn't end there! I will try to briefly review and discuss the essential elements relevant to LEGO cartography. Feeling inspired? Let your imagination soar and get ready to craft your very own LEGO map masterpiece!

PCD Morning Session I, 8:30 am-10:15 am

Leveraging a Living Atlas of the World

Emily Meriam, Esri

In 2014 Esri's ArcGIS Living Atlas of the World (LAW) debuted as a community GIS that allowed for sharing across the world, a new kind of "living atlas" of geographic information. The LAW was designed to provide meaningful access to GIS content openly shared and to be an online catalog of authoritative and best available geographic information from individual organizations, partners, and the global GIS community. In this presentation, learn how to use this vast collection of geospatial information for cartographic purposes. The maps shown will be from Esri's founder Jack Dangermond's first authored book called *The Power of Where*.

Looking Forward, Looking Back, Friday 10:20 am-12:20 pm

Make Your Mark - Results and Pitfalls of Starting a Cartography Contest

The results of an ad hoc cartography contest designed to create a sense of belonging and honor deceased cartographer friends will be presented, along with some pitfalls, tips, and tricks to help create a stronger sense of belonging in the mapping industry.

Mapping Horizons, Thursday 8:30 am-10:10 am

Making a 3D Relief Globe

Zhaoux Sui, The Pennsylvania State University

If you want to DIY a globe for yourself, I will give you my experiences of crafting a 3D relief globe when I was in high school, including what materials I used, how I sketched out the coastline and important topographic features, how I made 3D topographic relief, and how I painted based on the vegetation. It is really fun and family friendly, so try it out!

PCD Morning Session I, 8:30 am-10:15 am

Making Animated Maps that are Interactive Using Adobe Animate

Michael Cattell, *The Pennsylvania State University*

Adobe Animate is a way for cartographers to turn a static map into an animated map with interactive elements. In this talk, I walk through a workflow for bringing geospatial data into Animate, adding animations, and then adding web elements to allow users to play, pause, and click around the animation to learn more about the data. This allows for key messages to be highlighted and for map users to explore the data. The example used is an animated map of Amtrak's long-distance route that highlights stations only served at night-time.

PCD Morning Session II, 10:30 am–12:00 pm

Making Complex Labels Work! Leveraging Label Expressions, Abbreviation Dictionaries, Priorities and Placement Properties in ArcGIS Pro

Carl Swanson, *Oregon Department of Forestry*

Oregon Department of Forestry's Protection District Maps are 1:100,000 products that cover each of ODF's 12 districts across the state. Comprised of 53 maps that cover around 74,000 square miles, they are used by local ODF district staff and are sold to the public for recreational use. Formerly, these maps were made with annotation and map graphics for labels. Over the last few years our GIS Team has focused on moving our Protection District Maps from annotation and graphic labels to dynamic labeling using the attributes from our enterprise data. This presentation will describe our label strategy, with some practical examples of our label expressions and cartographic process.

PCD Afternoon Session I, 1:30 pm–3:15 pm

Making Data Tactile Using 3D-Printed Maps

Lester Carver, *Boston College*

This presentation will demonstrate how to build 3D maps for printing using the free and open-source software, Blender. Going beyond printing 3D topographic maps, this talk focuses on representing spatial data in a 3D format in order to offer a mixed, visual and tactile experience for communicating data to users instead of a purely visual experience. It explores how making data tactile can make data visualization more accessible to users with limited or impaired vision and can engage users in new and unique ways.

PCD Afternoon Session II, 3:30 pm–5:00 pm

Making Maps More Accessible at the U.S. National Park Service

Jake Coolidge, *National Park Service/Colorado State University*

As a consensus around best practices for accessible interactive maps emerges, it's up to cartographers like myself, working with the US National Park Service, to apply these best practices. I'll review the guidance we followed, how we tested our current maps for accessibility, made plans to address

numerous issues, and began the process of remediating existing maps. This long-overdue work remains in the initial stages and is ongoing. I aim to emphasize that no matter how large and daunting the task may seem, it is possible to build partnerships and make real progress towards maps that work better for everyone.

Challenging Cartography, Friday 3:30 pm–5:00 pm

Map Animations with Design in Mind: Harnessing the Best Parts of Multiple Mapping Tools to Make Great Looking Animations

Jamie Robertson, *Panthera*

Getting a map animation to look exactly the way you want can be tricky—sometimes a single tool will do most of what you want, but compromises to your intended design are often made. By using the powerful Temporal Controller feature of QGIS to manage the data-driven aspects of the animation and Adobe Illustrator/MAPublisher to control the basemap and typography, it's possible to have your cake and eat it, too. With a fascinating dataset collected on the Olympic Peninsula, we'll explore how the process works, the important settings to make the

various software packages to play nicely together, and the tips and tricks that will save you a lot of headaches on your next map animation project.

PCD Morning Session II, 10:30 am–12:00 pm

“The Map is Hers”: Gender and Copyright in Early 20th Century Los Angeles

Christina Dando, *University of Nebraska at Omaha*

In the United States, maps and charts have had the possibility of copyright protection since 1783, but not all mapmakers take this step. In Los Angeles in the 1910s, Laura Whitlock, a woman mapmaker, and N. Bowditch Blunt, a draftsman, both copyrighted their maps. Blunt would go on to illegally copy Whitlock's work, and Whitlock sued him for copyright infringement, resulting in a precedent-setting case. Why did they copyright their work? How did they know to take this step? What might copyright have represented to them?

Cartographic Concepts, Friday 1:20 pm–3:20 pm

Mapping Archaeology and Landscape in the Mongolian Altai Mountains: Transitions in Cartography from 1994 to 2010.

James Meacham, *University of Oregon*

The high valleys of the Altai Mountains of Mongolia contain some of the richest concentrations of rock art and ancient monuments in North Asia. Starting in 1994, an international team assembled to study these complexes. During a 16-year period of annual field work, rapid advances in available geospatial base data and mapping technology allowed the team's cartographers to radically improve the mapping of the region's landscape and archaeology. This presentation covers the evolution of the maps and data visualizations from the research, which ultimately contributed to the complexes' designation as a UNESCO World Heritage Site.

Maps as Tools, Friday 1:20 pm–3:20 pm

Mapping Black Women's Independence: Uncovering Hidden Homeowners

Mia Nigro, University of Nebraska at Omaha

The process of researching and mapping historically disenfranchised populations can be challenging. As part of research with the Omaha Spatial Justice Project, we began investigating historic Black homeownership in Omaha. In the process, we discovered that this included a previously overlooked population of unmarried women homeowners. This paper will discuss the work to identify, locate, and map these homeowners and acknowledge their contributions to the Omaha landscape. This work represents an effort to use cartography to represent "women's geographies, spaces, and experiences through maps."

Cartography & Community, Thursday 10:20 am-12:10 pm

Mapping for 911/Emergency Dispatch

David Nuttall, Artimaps, LLC, & Santa Clara County Communications

This talk will look at David's non-art maps, his "other life" as a consultant working with GIS for 911 and Emergency Dispatch operations. What are the mapping and data needs for a communications center dealing with incoming calls and then the dispatching of emergency vehicles? This talk will look at the data sources, manipulations required, and the end-user facing maps and how they differ from other uses of GIS data to allow for the extremely time-sensitive workflow of a 911 center and in-vehicle use. David will use his work with Santa Clara County, CA as a use-case for all aspects of this unusual GIS workflow.

PCD Afternoon Session II, 3:30 pm-5:00 pm

Mapping History Using Digital Tools

Eric Rodenbeck, Stamen

It's easy to think that our current maps represent a 1:1 relationship with the world as it is now; Google and others have given us tools to be able to navigate so effortlessly that the problem of mapping seems solved. Going back in time, though, presents

a different set of challenges. Historical maps and spatial representations operate according to a different set of rules than our current maps do, and much can be lost in translation. Using examples from Stamen projects for the Alan Turing Institute, Columbia University, the Getty Institute, the University of Richmond, and Densho's maps of Japanese-American internment camps, among others, this talk will offer an overview of the problem space of historical mapping in a digital context, as well as provide examples of solutions arrived at through hard-won grapplings with sometimes difficult histories.

Historical Cartography, Friday 3:30 pm-5:00 pm

Mapping Light and Shadow on Mount Everest

Carl Churchill, *The Wall Street Journal*

Mount Everest has developed a mountaineering industry built around summiting the highest peak on earth. This industry has had to adapt to changing climactic conditions on the route, as the glacier that hikers on the southern, or Nepali, route, rely on has been gradually collapsing. As part of a year-long graphics project for *The Wall Street Journal*, I

constructed a 3D model of Everest with open-source tools and combined detailed reporting with simulated physical conditions to portray to our readers how Everest expeditions must race against a melting glacier to reach the top.

Cartographic Visualization, Thursday 10:20 am-12:10 pm

Mapping Reese Street: Black Cartographies and Community Mapping in Athens, Georgia

Jerry Shannon, Amber Orozco, & Amy Andrews, University of Georgia

Our paper describes an ongoing community partnership to map the Reese Street neighborhood in Athens, Georgia. This historically Black neighborhood is recognized as both a national and local historic district, but few Black residents remain due to gentrification pressures. Our research works from the 1958 Athens city directory, archival records, and oral histories to map this community at the end of the Jim Crow era. Our partnership includes community members, academic geographers from the University of Georgia, and staff at a local historic preservation organization. This collaboration ensures that the results of this

work can be used to advocate for policies that protect its remaining residents from displacement.

Expansive Cartography, Thursday 8:30 am-10:10 am

Mapping the Construction of the Qosh Tepa Canal in Northern Afghanistan

Danielle Henry, BlackSky

The Qosh Tepa Canal is a planned 285km canal diverting water from the Amu Darya River into northern Afghanistan for irrigation, with the goal of making Afghanistan food independent. Roughly 100km of the canal are complete, and progress continues under the Taliban government. BlackSky has been closely monitoring the progress of the canal's construction using a combination of custom-tasked BlackSky imagery, Sentinel-2 data, commercial satellite imagery, and open-source research. BlackSky's multifaceted approach to monitoring and mapping the canal has produced novel insights about the canal's construction, geopolitical impact, and long-term viability.

Innovations in Mapping, Friday 10:20 am-12:20 pm

Mapping the Final Frontier from the Inside Out

Jere Suikkila, Mappedin

Wayfinding has come a long way—from stick and stone star charts to HD mapping with centimeter accuracy, and autonomous vehicle guidance. Yet, when we look at city maps around the world we see the stark reality. 99% of buildings are unmapped. With all of today's technologies, how can our built world be so opaque? In this talk, we'll explore the indoor challenges we face, and how they can be solved. We'll discover the similarities and differences between outdoor and indoor mapping. And, you'll find an exciting future of indoor navigation where one map everywhere truly connects people, businesses, and information.

Wild & Wilderness Mapping, Thursday 4:00 pm-5:30 pm

Mapping the Future of Food in Climate Change with VACS Earth Genome

Caroline Carter & Kelsey Taylor, Stamen Design

In support of the US Department of State's Vision for Adapted Crops and Soils (VACS) initiative, Stamen Design teamed

up with Earth Genome to create VACS Explorer, an interactive cartographic tool that allows users to compare the modeled viability of different crops in Africa in 2050 depending on which UN climate change scenario unfolds. Climate change will test agriculture practices across the globe in ways humans can't fully predict. We built the VACS Explorer in an attempt to make these agricultural decisions more data-driven. Hear how we use features like small multiples, supplementary sand & soil and nutrition data, a navigable minimap, and more to build out this experience for all users.

Mapping from the Ground Up, Friday 8:30 am–10:10 am

Mapping Urban Wilds in Watercolor: Nature and Humanity Interwoven in India and South Africa
Darren Sears, Independent Artist-Cartographer

This talk will build on the theme of last year's—my collage-like watercolor maps, accentuating edges around pieces of the natural world, intended to capture a sense of fragility and imminent collapse but at the same time unintentionally recasting that

instability as ecological flow and flux that can itself be considered natural. I will present two watercolors depicting urban-nature interfaces, one in Cape Town and the other (largely imagined) combining multiple places in Rajasthan, India. These works have turned out to emphasize, in very different ways, the interpretation of ecological change as perennial and energizing rather than necessarily destructive—as representing the inherent dynamism and interconnectivity of human and natural processes.

Wild & Wilderness Mapping, Thursday 4:00 pm–5:30 pm

Mapping Vitality in Earth Systems
Maggie Camillos, Clancy Wilmott, & Alexis Wood, University of California, Berkeley

Understanding the earth as alive is essential to developing the relationship of respect and reciprocity with our environment, which is necessary for long-term human evolution and to deepen our scientific understanding of interconnectivity amongst earth systems. Essential to developing this understanding is both reframing our understanding of vitality itself and developing visualization techniques to communicate this concept when applied to earth systems. Thus, the realm of earth systems science

cartography is an important frontier in the development of a living understanding of the earth. In this presentation, I will offer an emergent conceptualization of vitality that incorporates earth systems and critique traditional earth systems cartography in pursuit of an emergent cartographic technique in line with this definition.

Cartographic Chronicles, Thursday 2:00 pm–3:50 pm

Mapping Vulnerabilities: Projected Extreme Heat Risk for Southern Mobile Home Residents

Laura Diaz-Villaquiran, Southeast Energy Efficiency Alliance

Extreme heat is the leading cause of weather-related death in the United States, and Southern communities are particularly vulnerable to it. This research examines the geospatial relationship between projected heat increases in the U.S. South and the prevalence of mobile housing units. Preliminary findings indicate that counties in Florida, Texas, Louisiana, Georgia, Alabama, and Mississippi are highly vulnerable. Mobile home residents, who often face concentrated disadvantages such as high energy costs, low incomes, and

rural isolation, are particularly at risk. This research highlights the need for targeted interventions to leverage hazard resiliency and energy efficiency in these communities.

Maps as Tools, Friday 1:20 pm–3:20 pm

Mapping with Satellite Data (Beyond Landsat and Sentinel-2)

Robert Simmon

National and international scientific agencies like NASA, NOAA, and the ESA have been monitoring the Earth at a global scale for decades. The data they have collected include specialized measurements like land cover classification, ocean color, vegetation health, and solar energy absorbed at the Earth's surface. Unfortunately, much of this data is rarely mapped, in part because it is stored and distributed in scientific formats that can be difficult or impossible to read with off the shelf tools. In this talk I will show how to use GDAL to extract data from Hierarchical Data Format (HDF) into formats readable by commonplace mapping software.

PCD Morning Session II, 10:30 am–12:00 pm

Maps as Poetry

Richard Bohannon, Metro State University–Saint Paul

Maps tell a story, but tell it slant. While they have long been used as narrative aids (such as in Esri's Story Maps), most maps do not have a linear, narrative structure, and the story-telling aspect of mapping is often metaphorical—maps have agendas and perspectives. This paper proposes a complementary, alternative metaphor—maps as poetry—using historic and contemporary maps to show how poetry might be a helpful model for the work of maps and the map-making process. Both poetry and maps are sparing and restrained—poetry in its use of language, maps in their selections from the landscape. Both also use rhythm and balance (aural for poems, visual for maps) to evoke a particular mood, feeling or tenor. Poetry is a particularly useful metaphor because, like most maps, it can be non-linear, conveying ideas through images without walking the audience directly through their meaning.

Putting the 'Art' in Cartography, Thursday 4:00 pm–5:30 pm

Measuring Trust in Maps: Introducing the MAPTRUST Scale
Timothy Prestby, The Pennsylvania State University

Contemporary research on trust in maps is limited by inconsistent and untested measures of trust. This talk outlines the development and evaluation of the MAPTRUST Scale: a numerical rating scale that exclusively measures the degree to which someone trusts a map. Accordingly, we found that trust in maps can be measured by asking people to rate how well a set of 12 adjectives describe a map: accurate, correct, error-free, honest, trustworthy, credible, fair, reliable, reputable, objective, authentic, and balanced. This scale can be a useful tool for researchers and practitioners alike to measure an individual's trust in maps.

Analysis to Action, Friday 8:30 am–10:10 am

Messing Around with Voronoi Diagrams

Thomas Coughlin, Esri

In mathematics, a Voronoi diagram is a partition of a plane into regions where each location within a region is closer to its associated point than to any other input point. As a beginner mapmaker participating

in the #30DayMapChallenge, one of my greatest challenges was figuring out the possibilities of what maps I could make beyond choropleth and bivariate maps. I think Voronoi diagrams are great for novice mapmakers looking to add some simple spatial analysis to their mapmaking. Come hear about Voronoi diagrams in nature, some of my mapmaking projects with them, and how you can add them to your own maps with commercial and open-source software.

PCD Morning Session II, 10:30 am–12:00 pm

Modeling Bicycle Ridership: Challenges, Opportunities, and Scalable Solutions for Northwest Arkansas

Nelofar Qulizada

This paper addresses the growing significance of bicycling in urban settings and the challenges in accurately estimating bicyclist counts. The objective is to enhance current methods and improve the placement of counters within Northwest Arkansas. Existing studies often need to provide precise estimates, prompting the need for a more comprehensive approach. Our methodology involves a thorough

comparative analysis of data from various sources, including crowdsourced, contextual, and location-specific data. We tune the values of the model parameters to obtain the best fit for our data from multiple sources and then assess accuracy by comparing our model predictions to independent ground truth measurements that were not used to fit the model.

Analysis to Action, Friday 8:30 am–10:10 am

Mount St. Helens Historic Topography Project

Joe Bard, U.S. Geological Survey; Christina Friedle & Blair Stuhlmuller, Portland Community College

The eruption of Mt. St. Helens on May 18, 1980, dramatically changed the mountain and the areas adjacent to the volcano. Since the eruption, the U.S. Geological Survey Cascades Volcano Observatory (CVO) has been documenting the topographic changes of the volcano to build a catalog of elevation datasets. Recently, this work has focused on developing DEMs from historic topographic maps. In 2022, CVO formed a co-op with the Portland Community College GIS program to engage students in this effort. In this talk, we will detail the project, our progress

to date, and hear from students who have co-authored these products.

Challenging Cartography, Friday 3:30 pm–5:00 pm

Mountains of Evidence: Using Forensic Landscape Photography and GIS to Prosecute Illegal Hunting in the Remote Mountain Landscapes of Canada's Yukon Territory

Gerry Perrier, Yukon Department of Environment

Big game hunting is an annual activity for many Yukon residents who hunt primarily for subsistence. Non-residents hunt with a licensed professional outfitter, focused more on trophies. Yukon's vast wilderness requires careful wildlife management to sustain hunter harvests due to a growing human population. Regulations dictate eligible species, timing and location of hunting activities. Geographic location plays a crucial role in managing wildlife and regulating hunting. Although most hunters follow the rules, some do not. This presentation presents three illegal hunting cases, illustrating how investigators use field photography, topographic modeling, and

cartographic design to prove geographic location in court.

Cartographic Chronicles, Thursday 2:00 pm–3:50 pm

Mushing and Mapping: Finding the Ancient Cedars of the Boundary Waters

Jake Steinberg, Minnesota Star Tribune

News cartographers don't often get out into the field. But in February, the *Minnesota Star Tribune* sent me on a 5-day dogsled journey into the Boundary Waters to find what may be the oldest tree in the state—a cedar said to be over a thousand years old. In this talk, I will discuss how this journey informed my map design, the nuances of spelling Indigenous place names, adapting historical maps into a pastiche style, and breaking down organizational silos to make a cross-departmental project like this happen.

Indigenous Cartography, Thursday 2:00 pm–3:50 pm

Natural Scene Designer Pro 8 Tom Patterson, National Park Service (retired)

Natural Scene Designer 8, due for release this autumn for Mac and Windows, has new features useful to cartographers. 1) In Download Terrain Models, the following DEMs are available through a map interface: GMTED, SRTM, ALOS, Copernicus, Aster, MERIT, ArcticDEM, and REMA. Resolutions range from 1 to 1,000 meters. 2) NAIP Import allows the user to automatically download, unzip, reproject, resample, and overlay high-resolution aerial images on the current DEM. 3) With Texture Shade Blending, the user can add texture shading to 3D scenes, plan oblique relief, and shaded relief. You can control the amount and characteristics of texture shading, and where it occurs on a terrain.

Cartographic Visualization, Thursday 10:20 am–12:10 pm

Navigating Election Night: Behind the Scenes of Visualizing 2024 Election Results

Clare Trainor, Reuters

Not all news coverage is breaking news. Some events happen every year, every two years, or even every 4 years, like the U.S. presidential election. This talk breaks down how the Reuters Graphics team built a component-based system to visualize results for the 2024 election. I will explain the challenges of working with real-time election data, our process for combining results with geographic data, the design hurdles we faced, plus how we tested our components to ensure accurate results are shown on election night to our readers.

Cartography over Time & Space, Thursday 4:00 pm–5:30 pm

A New Tool for Interactive Flow Mapping

Paulo Raposo, Faculty ITC - University of Twente

Drawing cartographically-refined origin-destination (OD) flow maps in automated or semi-automated digital contexts remains difficult. This research presents a new, interactive and semi-automated tool for

OD flow map creation. Realized in a free and open-source application that runs using Python scripts and web technologies, this tool allows users to adjust the shape of OD flow arrows either universally or on a per-flow basis. A preview of the output flows is rendered live to the user as they make flow path adjustments. Output in georeferenced vector formats is exportable from the app for use in other settings, such as geographic information systems (GIS), web maps, or graphic design software.

Tools of the Trade, Thursday 8:30 am–10:10 am

OpenHistoricalMap: the Most Open-Ended Map in History

Minh Nguyễn, OpenHistoricalMap

OpenHistoricalMap (openhistoricalmap.org) is a time machine brought to you by the community that built OpenStreetMap. Zoom into any neighborhood in the world, turn to any time period in history, and there you will find the same micromapping detail you've come to expect in OpenStreetMap or – more likely – an utterly blank invitation to help build the most open-ended map in history, one story at a time.

Cartographic Concepts, Friday 1:20 pm–3:20 pm

Park Slam Dunk: Scoring with StoryMaps

Eliana Macdonald, CJ Schouten, Ganimul Singh, & Jeremy Bushell, Vancouver Board of Parks and Recreation

Park Slam Dunk isn't your average StoryMap—it's a full-court press of excitement! We're talking alley-oops of data, crossovers of community engagement, and three-pointers of storytelling. Playbook highlights include: Full-Court Data Drive: We'll break down how we dribbled through spreadsheets, slam-dunked project timelines, and bounce-passed budgets. Our secret weapon? A heatmap that shows where we need more dog parks. Fast Break Narratives: Imagine weaving project updates into halftime pep talks. "Team, we're down by two swings, but the seesaw pivot is coming in hot!" We'll share how we kept the crowd engaged with play-by-play narratives.

Cartography & Community, Thursday 10:20 am–12:10 pm

The Pasifika Film Database: Mapping Islands, Oceans and Identities Beyond Imperialism and Militarisation

Clancy Wilmott, Sophia Perez, & Elizabeth Fiske, University of California, Berkeley

In 2023–24, a team of researchers from the Critical Pacific Island Studies Collective at UC Berkeley assembled a database of films and documentaries set in the Pacific or directed by Pasifika filmmakers. This presentation discusses the myriad difficulties of translating this database into a web-map using pre-established mapping solutions in the context of the ongoing cartographic construction of the Pacific Ocean as a strategic region for militarization, territorialization, and annexation. To foreground self-determination, sovereignty, and epistemic justice, we argue that new cartographies are desperately needed, including island-centered feature sets, anti-imperialist systems of scale, and new visual conventions.

Expansive Cartography, Thursday 8:30 am–10:10 am

The Past, Present, and Future of Stamen Maps

Alan McConchie, Stamen Design

A decade ago, Stamen Design launched the Toner, Terrain, and Watercolor map styles built on OpenStreetMap data, which soon became an essential part of the open source mapping ecosystem. Last year we partnered with Stadia Maps to create all new versions of the Toner and Terrain maps, based on a modern mapping stack of vector tiles to keep them running for the next generation. In this presentation, we will discuss the opportunities and challenges of redesigning familiar map styles using a totally new set of tools, while still staying true to the well-loved aesthetics of the original maps.

Looking Forward, Looking Back, Friday 10:20 am–12:20 pm

A Pop-Up Book: Visualizing the Spatial Sensitivity Analysis

Seda Salap-Ayca, Brown University; Zhu Gaocanyue, Emma Hogarth, & Georgia Rhodes, Rhode Island School of Design

Sensitivity analysis plays a crucial role in deepening our understanding of models and facilitating clearer communication of their results by accounting for variations

in output and their dependency on inputs. When applied spatially, sensitivity analysis generates individual maps for the effects of each input as well as for their interactions. However, the challenge lies in simplifying the visual presentation of spatial sensitivity results. This project is a fusion of art and science designed to address this multidimensional visualization challenge by leveraging a pop-up structure to convey mapping information. The first layer of the book cover features graticules representing latitudes and longitudes, providing a foundational framework. The second layer, constituting the main body of the map, utilizes vibrant color zones to distinguish between regions, while blank spaces denote missing data. These colors, produced through a marbling technique, symbolize the intricate relationship between input and output in spatial models, illustrating how variations in input can yield diverse outputs. The third layer employs Turkish map folding, incorporating paper mechanisms shaped like collapsible houses, which cleverly obscure internal information, necessitating audience interaction to unveil insights. This folding structure transforms the map from two-dimensional to three-dimensional, adding depth and complexity while retaining visual appeal. By integrating artful design

with scientific rigor, this project offers a novel approach to conveying spatial sensitivity analysis results, making them more accessible and engaging to a wider audience.

Putting the 'Art' in Cartography, Thursday 4:00 pm–5:30 pm

Procedural Mapping with Geometry Nodes in Blender

Peter Atwood, University of South Carolina

Blender has recently been updated with a new tool called Geometry Nodes, a powerful system for procedurally generating and transforming 3D geometry. This talk will provide a general overview of some of the cartographic applications of this new tool. We'll look at how to get our data into Blender, how to use Geometry Nodes plot it in 3D space, and how to use Blender's attribute system and material editor to dynamically generate and animate symbols and colours to bring our map to life.

PCD Morning Session I, 8:30 am–10:15 am

Raster-to-Vector Heat Maps: Multiscale Visualization Approach to Mapping and Interacting with Big Geospatial Data

Yanbing Chen, University of Wisconsin—Madison

This project is an ongoing project that aims to create a multiscale visualization approach for rendering big geospatial data on the web. By seamlessly transitioning between raster and vector heat maps based on zoom level, the project will enhance the utility and performance of interactive web maps. Using tools like Datamaps, Tippecanoe, and MapboxGL JS, the project will develop a prototype to evaluate optimal transition points and visual consistency techniques. This approach will make geospatial data more accessible and usable, benefiting fields such as urban planning, transportation analysis, and environmental science.

Innovations & Insights, Thursday 2:00 pm–3:50 pm

Re-Imagining the Creation of Vintage-Style Maps: Old West

Chinna Subbaraya Siddharth Ramavajjala & Billy Roberts, National Renewable Energy Laboratory

Identification of digitally translatable aesthetics is a critical design decision involved in recreating a vintage map. Often, vintage effects are limited to blending of discolored paper or adding texture. To create a “precise” vintage map from an era, cartographer should not only be cognizant of the geography and history of the mapped geography, but also print techniques used. Therefore, we would like to present a formalized cartographic workflow to perform a holistic design transfer and discuss techniques utilized in creation of old west maps.

Wild & Wilderness Mapping, Thursday 4:00 pm–5:30 pm

Rebuilding Natural Earth: An Updated Public Preview of Version 6

Nathaniel Vaughn Kelso, Kelso Cartography; Tom Patterson, National Park Service (retired)

In 2021, we announced plans to rebuild Natural Earth, a popular source for open map data. Just as musicians remix their best albums, we’ve redrawn geometries to have more precision and alignment with modern terrain models and are introducing a more detailed feature compilation to bridge the zoom gap in global base maps when pairing with OpenStreetMap. 30 months later, with countless hours from many volunteers, we are closing in on public release of Natural Earth version 6. Hydrography has gained GIS attributes, admin areas have polygons, populated places coverage has almost doubled, with all the roads added to get you between them. Raster themes have all been updated with the new hydro and relief, and a new classified landcover theme added.

Mapping Horizons, Thursday 8:30 am–10:10 am

A Recipe for Ethical Geographic Work with Indigenous Communities

Niyokamigaabaw Deondre Smiles, University of Victoria

This talk approaches methods and guidelines for decolonial geographic research through a lens of conducting ethical, respectful research with Indigenous communities in human and physical geography and across the quantitative-qualitative spectrum. Using a historical and contemporary discussion of the entanglement of the discipline of geography with colonial and imperial structures, along with an overview of potential steps that researchers should bear in mind when engaging with Indigenous communities in research endeavors, this talk works to answer the key questions: What comprises decolonial research? How can researchers in geography work towards accomplishing it in a way that is attentive to the needs of communities they work with and within, while meeting their own research objectives? Special attention is paid to the unique needs of students and early career scholars.

Applying Indigenous Research & Data Practices to Cartography, Friday 10:20 am–12:10 pm

A Retrospective on a Career in Museum Mapping and GIS

Daniel Cole, Smithsonian Institution

For the past 39 years, I have served as the Smithsonian’s cartographer. I started working with the Anthropology department at NMNH, researching, designing and creating maps for the Handbook of North American Indians and related work. In 1990-91, I moved to serving the entire Smithsonian for building GIS at the Institution while also providing cartographic work for any staff needing it for their publications and work in science, art, and history. Since 1999, I have also been involved with exhibits’ staff as well having contributed maps and geospatial data displays for over 20 exhibits in 7 museums, the Folklife Festival, SI Archives, and SITES. This presentation will review my past and present work until my retirement in December 2024.

Art & Design in Practice, Friday 1:20 pm–3:20 pm

Revitalization of a University Building Interior: Abstracting Geographies Through Cartographic Public Art Installations

Cynthia Brewer & Helen Greatrex, The Pennsylvania State University; Nate Cherok, ALL4; Harrison Cole, Exit Design

Public art fits within a broader discourse of university renovation, undertaken to attract and retain students, enhancing the appearance and functionality of campus environments. We describe cartographically inspired floor and wall designs for a renovated space within the Department of Geography at Penn State. Hallway floor designs used pentagonal tiles, creating a coarse rasterization of local physical features and historical movement paths. Back-lit wall panels have a global emphasis. High-contrast shapes were chosen from six continents. They show human (building footprints, parcels, and indigenous land claims) and physical patterns (major rivers, lagoons, and ice). A local panel shows the ridge-and-valley terrain of central Pennsylvania.

Putting the 'Art' in Cartography, Thursday 4:00 pm–5:30 pm

Ride, Sink, or Swim: Mapping Extreme Floods and the Burdens of Buses in Queens, NYC

Nicholas Dante Lucchetto, Hofstra University

New York City experiences many extreme flooding events. One of the worst was September 2023, when 9.8 inches of rain fell in a single day. For the low-elevation borough of Queens, where 52% of people rely on public transit, the burdens of flooding are worsened by sparse subways and stranded cars. Therefore, buses are a critical mobility and safety tool during a weather emergency in Queens. This study looks at how flooding affects New York City bus performance and infrastructure by incorporating metrics like bus delay data, precipitation records, and 311 reports. This study helps uncover how—and where—a multi-faceted climate event affects the daily life of Queens residents and how NYC buses keep on rolling amid our climate crisis.

Cartographic Narratives, Thursday 10:20 am–12:10 pm

Roots and Migrants

Chiamaka Nwajiaku & Caglar Koylu, University of Iowa

I will present a web-based story map application, Roots & Migrants, aimed at increasing public scientific literacy and engagement with migration, kinship networks, and U.S. history. It is a part of an NSF project's broader impact activities, visualizing migration and family tree data alongside events, populations, and movements of underrepresented groups like Native Americans, African Americans, and Mexicans. Data will be extracted from historical sources; this accessible online tool helps the public and those with limited GIS background understand migration's challenges to First Nations. Roots & Migrants will be integrated into high school social studies curricula through collaborative workshops with teachers.

Cartographic Narratives, Thursday 10:20 am–12:10 pm

Scrolly Map with Drone Footage? Alignment and Interactivity of Drone Footage in a Map-Based Scrollytelling Story

Shane Loeffler, CarbonPlan

Transitioning seamlessly from a standard scrollytelling map into drone footage presented several challenges with alignment and interactivity. Here I'll walk the audience through my thought process for acquiring and aligning drone footage with a scrolling map sequence, as well as an overview of several options for tying the playback of the footage to scroll events. My anchor for this presentation will be a story I worked on with ProPublica, "The Tragedy of North Birmingham."

PCD Afternoon Session I, 1:30 pm–3:15 pm

The Shining: Mapping with Sparkle

Kenneth Field, Esri

Some places are like people: some shine and some don't. And maps that represent these places can shine too, quite literally. I'll share the design processes, decision-making, digital workflows, and the development of new styles to create custom thematic symbology that reflect the U.S. Total Eclipse

of April 2024. I'll do my best to share this work with a polish, rather than dull, talk on teasing out how we can make paper maps really glimmer. I'll also share some shiny new resources for the wider community to support making maps with luster.

PCD Afternoon Session II, 3:30 pm–5:00 pm

Slip 'N Slide: Getting Funky with Open Source Slippy Maps

Janice Kai Chen, The Washington Post

Don't get me wrong — I love a slick, modern slippy basemap (CartoDB Positron?? I owe you my life.) But I also love me some maximalism of 2000s internet... and sometimes I love a lot of pink...and sometimes I want lots of birds on my map. We can have it all! In this talk, we'll go through different ways to add a personal flair to your maps with MapLibre, an open source library for designing and publishing interactive web maps.

PCD Morning Session I, 10:30 am–12:00 pm

Spatial Analysis of Fire-Armed Related Crime in Atlanta

Olalekan Alamo, Georgia State University

The objective of my research is to employ geographic information systems (GIS) to map and analyze areas in Atlanta with a high incidence of firearm-related crimes. My aim is to improve public safety and increase the overall quality of urban life. I observed a notable concentration of firearm occurrences in distinct urban regions, as indicated by a high Moran's I value. This suggests that these crimes are not randomly spread around but occur in clusters. The results of my research stretched the possibility of implementing focused interventions in these areas of high criminal activity. This can lead to the development of more efficient crime prevention tactics and the creation of safer communities in Atlanta. This research is crucial for law enforcement and legislators who are looking for evidence-based solutions to urban crime.

Cartographic Narratives, Thursday 10:20 am–12:10 pm

Spatio-Temporal Analysis of Power Generation from Interconnected Solar Arrays in San Juan County, Washington

Matt Sommer, The Pennsylvania State University

Distributed rooftop solar arrays that are interconnected into the electrical distribution grid have variable output in space and time which may not match well with demand. Small utilities may not have good methods to analyze when and where generation is happening. Using the interactive visualization capabilities of a Shiny web application based on historical smart meter data can offer a way to analyze and understand when and where solar panels are providing power to the grid. This application uses the Shiny web framework to implement spatial and temporal filtering on distributed generation data. The data is visualized in the dashboard to show where, when, and how much power is generated, providing a glimpse into the spatial and temporal variability of distributed energy resources.

Cartographic Chronicles, Thursday 2:00 pm–3:50 pm

Symbol Fonts: an Automated Workflow

Kate Leroux & Tony Cannistra, onX Maps

As an outdoor-focused company, onX uses many icons to designate recreational points of interest on our maps. In this talk, we'll first describe how we use Figma to organize icons across our apps and communicate our iconography with other internal teams. We'll also share the automated workflow we developed that builds stylesheet glyphs and font files for web clients, and ensures a stable synchronization of glyph identifiers across our systems.

PCD Afternoon Session I, 1:30 pm–3:15 pm

Taking UCSF's Health Atlas National

Eric Brelsford & Kelsey Taylor, Stamen Design

Stamen Design recently worked with UC San Francisco to update and expand their Health Atlas. The Health Atlas is an interactive map that gives users ways to compare demographic and socioeconomic data with data about health care and health outcomes, from the state level down to the census tract. The Atlas was originally created to display data about California, but it now covers all 50 states, the District of Columbia,

and Puerto Rico. Come hear about how we handled the challenges around displaying granular data at the national level, created supplementary visualizations that help users understand and explore the data, and crafted the cartography that ties it all together, incorporating user feedback along the way.

Cartographic Chronicles, Thursday 2:00 pm–3:50 pm

Teaching Atlas Project Management: Lessons and Reflections

P. William Limpisathian & Alicia Adelle Iverson, University of Wisconsin—Madison

In the dynamic landscape of cartographic education and project management, how do we effectively prepare students for the multifaceted demands of modern map production? Beyond mastering cartographic techniques, students must also acquire the skills to take ownership, manage concurrent tasks, and collaborate seamlessly—a blend of competencies often overlooked in traditional cartographic curricula. This talk reflects on the challenges and insights from developing and teaching an exploratory atlas production and project management course. Drawing from our in-class experiences, we explore strategies that bridge the curricular gap between cartographic excellence

and effective project management. Our discussion encompasses practical tips, pitfalls to avoid, and successful approaches to modeling and managing a complex atlas project in the confines of a classroom.

Maps as Tools, Friday 1:20 pm–3:20 pm

Telling the Story of Changing Populations with Mapping Historical New York: a Digital Atlas

Kelsey Taylor & Eric Brelsford, Stamen Design

Earlier this year, Stamen Design re-partnered with the Center for Spatial Research at Columbia to further iterate on *Mapping Historical New York: a Digital Atlas*. MHNY shows how migration, residential, and occupational patterns shaped New York City during the 19th and 20th centuries. As the densest area in the United States, displaying complex individual- and dwelling-level data across New York City presented many design and technical challenges. Hear how we've updated the *Digital Atlas* to include vector dot density maps, proportional circles, and choropleths across many different slices of historical census data.

Web Mapping & Workflows, Friday 8:30 am–10:10 am

Terrain Cartography for Non-Terrainers

Lourdes Ginart, U.S. Department of State

Terrain cartography can be difficult for those of us who never received formal training in the skill. For years I struggled to understand how to create shaded relief, and I didn't want to rely on pre-made relief all the time. I wanted to make some of my own! Yet, once I learned I struggled to accept the time and software commitment. Many of my maps require shaded relief, but only as a background component, it is rarely the main feature. Finally after much trial and error, I developed a workflow that allowed me to create beautiful yet simple shaded relief with a lower time and software commitment. In this presentation, I'll show you what that workflow looks like and the results, and will hopefully make terrain cartography less intimidating for folks starting out.

PCD Morning Session I, 8:30 am–10:15 am

Thematic Mapping in Augmented Reality: Challenges and Opportunities

David Retchless, Texas A&M University at Galveston

Augmented reality (AR) platforms are increasingly popular in cartographic research and practice, especially for orientation and navigation. However, the potential of AR techniques for thematic mapping remains underexplored. AR tools: 1) share with thematic mapping an emphasis on making the invisible, visible; but 2) differ from thematic maps in design-relevant ways, including perspective and scale/extent. Drawing on my experience developing thematic maps and AR tools for coastal flooding, I consider challenges and opportunities associated with translating design principles for thematic mapping to the AR context, with a focus on abstraction and prominence of point symbols (but also encompassing other feature types, basemaps, and marginalia).

Innovations in Mapping, Friday 10:20 am–12:20 pm

Time Travel with Cartography: Mapping Philadelphia's Urban Landscape Evolution Across Two Centuries

Emily Zhou, University of Pennsylvania

In this presentation, I will delve into the process of reproducing old maps and rendering the early streetscapes of Philadelphia from an urban design project of mine focused on historic preservation. Drawing from historical land use maps, photographs, architectural data, and oral histories, we will compare the characteristics of maps and urban landscapes spanning three distinct eras in Philadelphia. Through this comparative analysis, I will discuss the various design decisions made at each stage of the project, which include choosing the texture, color, line-work, patterns, and typography. I will also outline the overall workflow from McNeel Rhino 3D to Adobe Software and share eight hands-on tips and tricks for designing historical maps in Illustrator as well as incorporating vintage effects into your work in Photoshop.

Historical Cartography, Friday 3:30 pm–5:00 pm

Towards a Cartographic Ethics: Summarizing and Synthesizing 35 Years of Academic Debate

Lucinda Roberts, University of Oregon

In 1990, J.B. Harley, asked, “Can There be a cartographic ethics?” He asked that question amidst a period of theoretical angst for the cartographic community, where, following the invention, development, and commercialization of geographic information systems (GIS), cartographers were left wondering how new technologies would upend traditional workflows. Nearly 35 years later, we have not come closer to answering Harley’s question with an actionable set of professional ethics. As the technology we use to construct maps rapidly develops and forces cartographers to update their workflows, the academic theory underpinning mapmaking has changed, too. Emerging technologies are once again posing a paradigm shift to our standard workflows; the proliferation of generative AI pushes us towards articulating a practical cartographic ethics. This presentation seeks to summarize and synthesize debates on ethics in the cartographic literature and to ground existing calls for professional cartographic

ethics in the existing debates and theory over the last 35 years.

Cartographic Concepts, Friday 1:20 pm–3:20 pm

Understanding Lhasa through Declassified Spy Satellite Images

Tsering Shawa, Princeton University

Lhasa is the spiritual and political center of Tibet. It is believed that in around 633 AD Tibetan emperor Songtsen Gampo moved his capital from the Yarlung valley to Lhasa. Before it became the capital of Tibet, it was a desolate and swampy valley. Today Lhasa is one of the largest and most vibrant cities in Tibet. In this talk, I will use declassified spy satellite images and maps to understand the extent of old Lhasa and identify important historical sites that do not exist now.

Maps as Tools, Friday 1:20 pm–3:20 pm

Unearthing Geotechnical Knowledge in the Library

Chris Salvano, LA Metro Transportation Research Library & Archive

Since 1962, the Los Angeles Metropolitan Transportation Authority (LA Metro) has been performing geotechnical studies

throughout Los Angeles County to support its subway and light-rail transportation initiatives. Beginning in late 2023, the LA Metro Library began surfacing spatial data from these historical reports and mapping them using GIS. This talk will discuss the library-led initiative to map this data as a means to help answer spatial inquiry-type reference questions, improve discoverability of Metro’s geotechnical knowledge, and better meet the information-seeking behaviors of Metro engineers. New avenues of potential collaboration between the library, the GIS unit, and engineers will also be addressed.

Cartographic Concepts, Friday 1:20 pm–3:20 pm

Unidrome: Mapping Every Aerodrome Worldwide with Cloud Native Data

Alex Polvi, Barbliss Maps

Building on our backcountry aviation mapping journey, the Unidrome project expands to a global scale, unifying all known open datasets to map known place to land an airplane in the world. We’ll explore the integration of cloud native data, geospatial analysis, and aviation software, highlighting

the innovative methods and challenges encountered. This project also serves as a case study for constructing and organizing cloud-native geospatial data, offering insights and best practices for similar large-scale endeavors.

Innovations & Insights, Thursday 2:00 pm–3:50 pm

Untangling Rhode Island’s Forest Habitat: Interactive Mapping at the Confluence of Art and Cartography

Quinn Cowing, Brown University

In designing a final project for my cartography course, I scoured journals and grew enamored with embroidered maps. Specifically, I was inspired by colcha embroidered maps from the San Luis Valley. These maps weave geography with cultural sights and rich history to make accurate representations of local areas. While these artworks heighten the cultural significance of maps, I wanted my embroidery to elevate map interactivity. Therefore, I embroidered the different layers of my map of Rhode Island forest types on separate sheets of tulle. The map viewer is thus able to interact with the map by selecting which layers they would like to view. This work ultimately melds

art and cartography to provide an exciting aspect of user interaction.

Maps as Tools, Friday 1:20 pm–3:20 pm

A User Study of Relief Inversion and a Benefit of Sky Models

Patrick Kennelly, Long Island University; Izabela Gołębiewska, Izabela Karsznia, & Katarzyna Borczon, University of Warsaw; Gene Trantham, independent; Arzu Çöltekin, University of Applied Sciences and Arts Northwestern Switzerland

Relief inversion, the perception that valleys are ridges and vice versa, can occur with shaded relief maps using southern illumination. While previous user studies have documented this effect and looked at lighting directions to avoid, we study whether inversion can be eliminated using multidirectional sky models. 352 participants were asked to look at shaded relief maps and identify valleys and ridges, compare elevation of points, identify elevation change of slopes, and associate elevation profiles. Results with shaded relief maps illuminated from 1) one direction from NNW 2) sky models from NNW or 3) sky models from SSW show no statistically significant difference, while 4) one direction from SSW led to significantly worse accuracy.

Additionally, no difference in response time may indicate users make no attempt to mentally re-invert relief.

Looking Forward, Looking Back, Friday 10:20 am–12:20 pm

Using Interactive Maps to Enhance Healthcare Equity

Zachary Sherman, Virginia Polytechnic Institute and State University

Our study utilizes a two-step floating catchment area (2SFCA) method to investigate disparities in healthcare accessibility from block groups within Virginia, focusing on both driving and transit modalities across various regions including Altavista, Greenville, Lynchburg, Richmond, Staunton, Williamsburg, and Winchester. By integrating demographic prevalence data from the CDC, we quantitatively assess accessibility scores for different social groups and locations. Our methodology employs advanced geospatial analysis techniques, leveraging Google API for precise travel time estimation. A key objective is identifying the social groups and block groups that exhibit the most significant disparities between car and transit accessibility scores. Preliminary findings indicate marked differences in

service accessibility, highlighting areas and populations with critical needs. By pinpointing the block groups with the largest disparities in accessibility, our study not only sheds light on the spatial and social dimensions of healthcare equity but also informs targeted policy interventions aimed at bridging the gap between everyday citizens identifying nearby healthcare services. Leveraging ArcGIS Dashboards and ChatGPT, our team, and collaboration with the American Dental Association, we transform our accessibility data into actionable insights for policymakers and the general population. Our innovative AI integration methods allow policymakers and everyday people to perform spatial queries with an easy conversation-like interface. Using ChatGPT API, we train and leverage our accessibility data to prompt responses for both numeric responses and spatial queries, a limitation in the current status of geographic AI research.

Expansive Cartography, Thursday 8:30 am-10:10 am

Using Old Maps for New Insights on America's Cities

Riley Champine, University of Richmond

Given the widespread attention redlining has received in recent years, some might think studying old maps of housing discrimination has grown stale. But even after a decade of work by the University of Richmond's Digital Scholarship Lab (DSL), fresh documents, stories, and data continue to surface, leading to the release of the third version of their flagship project, Mapping Inequality. This talk will explore the latest features and design enhancements of the project website, illustrating how they add depth to an expanded collection of redlining documents. We'll also discuss the DSL's latest project and our efforts to incorporate detailed Sanborn fire insurance maps into the study of urban health disparities in redlined areas.

Making Connections, Friday 3:30 pm-5:00 pm

Vignettes for the Win!

John Nelson, Esri

As a photography student I spent many hours in the darkroom exposing a backlit negative onto photographic paper. Without a doubt the most magical part

of the process, from my perspective, was selectively exposing various parts of the print to more or less light; we called it dodging and burning. Painting with light. A large element of dodging and burning was creating a vignette around the print: a faded perimeter of more or less exposure to draw the eye into the center of the composition. Let's talk about that from the cartographer's perspective.

PCD Afternoon Session II, 3:30 pm-5:00 pm

Visualizing a Contemporary Humanitarian Crisis: Exploratory Mapping of Migrant Deaths from the Unstructured Text of Newspaper Accounts

Rachel Daniell, Pratt School of Information; Molly Miranker, Texas State University

How might we visualize a humanitarian crisis when available geospatial data is limited? We navigate this question in our ongoing research on deaths of migrating persons along the US-Mexico border, where thousands have perished but documentation has been limited in scope and form. Our current work explores mapping unstructured text data from Texas newspapers to further document places where human remains have

been found -- seeking to map approximate coordinates and qualitative terms like "near the county road" and "along the river." We will present cartographic expressions of these data and discuss with the audience potential ways to map qualitative data on humanitarian crises and what such maps might raise, recenter, and uncover.

Cartography over Time & Space, Thursday 4:00 pm-5:30 pm

Visualizing Change Over Time on the Web

Jeremy Bartley, Esri

There are various ways to visualize how spatial data changes over time in both print and online cartography. This session provides an overview of 10 different approaches to visualizing change over time on the web. We will cover both cartographic styles that focus on time, the role of animation, and newer techniques such as geo-referenced streaming high-definition videos that show changes on the earth over time in a rich and interactive way. Each method will be described with examples showing scenarios when each

type of visualization works well and when it struggles.

Cartography over Time & Space, Thursday 4:00 pm-5:30 pm

Visualizing Change: How Map Design Shapes Our Views on Glacier Retreat

Fangsheng (Jasper) Zhou, University of Oregon

This presentation explores the emotional and perceptual impacts of 2D versus 3D map designs on viewers' understanding of glacier retreat due to climate change. Utilizing the South Cascade Glacier as a case study, this research examines how different visual representations can influence public perceptions and emotional responses to environmental changes. Through a user study involving a diverse group of participants, the study aims to highlight the effectiveness of map design in communicating complex geographic information and raising awareness about the pressing issue of climate change.

Cartographic Visualization, Thursday 10:20 am-12:10 pm

Visualizing Multidimensional Climate Data on the Web with Zarr and @carbonplan/maps

Shane Loeffler & Kata Martin, CarbonPlan

Climate data (and many other scientific datasets) are often massive, multidimensional, and challenging to get into desktop GIS and cartography tools, let alone a web map. @carbonplan/maps is an open source tool for efficiently visualizing this complex data on the web by leveraging the emerging Zarr format and WebGL. Here we showcase its use in a recent project exploring a new dataset simulating the efficiency of ocean alkalinity enhancement (OAE), a carbon removal technique. The OAE Efficiency Map allows exploration of nearly 700 global ocean simulations, allowing scientists and system actors to get a better sense of where and when the most effective carbon removal is possible.

Tools of the Trade, Thursday 8:30 am-10:10 am

Wairarapa Glistening Water: Reflections on a Co-Designed Spatial Narrative Virtual Reality (VR) App
Mairead de Roiste, Te Herenga Waka / Victoria University of Wellington

Kahungunu ki Wairarapa and the SpatialThink Lab at Te Herenga Waka Victoria University of Wellington co-designed and co-created a simple spatial VR (Virtual Reality) application for a unique storytelling experience for five wetlands in the Wairarapa in Aotearoa New Zealand. We use ambisonic sound, 360-degree video, landscape representation, and recorded narratives composed by Kahungunu to tell the korero (stories) of these wetlands. This presentation will detail the collaborative underpinnings of the project and discuss the decisions and compromises made to represent the wetlands while following the needs and values of the iwi (tribe).

Indigenous Cartography, Thursday 2:00 pm–3:50 pm

Washington State Through Terrain and Time

Daniel Coe, Washington Geological Survey

From the canyons and coulees of the high desert—to the ice capped volcanoes of the Cascade Range—to the wild coastline at the edge of the Pacific, Washington State harbors a treasure trove of topographic gems. At the Washington Geological Survey, we tell the story of these landforms through interpretive maps and imagery. In this presentation, we will go on a cartographic tour of the state using high-resolution elevation data as our guide.

Cartographic Chronicles, Thursday 2:00 pm–3:50 pm

What Does it Mean to Understand a Map?

Amy Griffin, RMIT University; Anthony Robinson, The Pennsylvania State University

Generative AI technologies can do a remarkably good job of (re)producing digital representations of some things that exist in the material world (though not maps yet!). Some images produced by tools like DallE-3 or Midjourney look remarkably "real". To achieve these outcomes, AI technologies employ statistics to characterize the datasets

they are fed and identify patterns in these datasets. When scholars and practitioners describe how artificial intelligence technologies work, we say they "learn" things about the world. But does AI really understand anything? This talk will explore the question of what it means to understand a map and to what extent AI technologies can understand maps.

Analysis to Action, Friday 8:30 am–10:10 am

What's New in Eduard?

Dilpreet Singh, Bridget Walker, Matthew Siegenthaler, Owen Davies, Griffin Collins, & John Phan, Monash University; Tom Patterson, National Park Service (retired)

Eduard is an app for creating shaded relief with machine learning at <https://eduard.earth>. In our presentation, we will showcase tools added since Eduard's introduction at NACIS 2022, including improved relief shading, ambient occlusion shading, texture shading, and layers with blend modes, curves, masks, blur, and sharpening filters. We will also preview future extensions of Eduard, including ongoing work on the generalization of small-scale contour lines with machine learning. Finally, we will show

shaded relief artwork created by users of Eduard.

Tools of the Trade, Thursday 8:30 am–10:10 am

Where Did They Go? Mapping Out-Migration From Mammoth Cave National Park, 1920-1940

Collins Eke

The 52,830-acre Mammoth Cave National Park, located in the karst region of south-central Kentucky, was formally established in July of 1941, culminating a nearly three-decade process of park creation that displaced several thousands of residents of the proposed park area. Based on a sample taken from the 1920 U.S. Census, the residents' migration destinations in the 1930 and 1940 censuses were mapped in a geographic information system. The data collected was represented through choropleth maps and graduated circle maps. Maps were also constructed to identify destinations of specific sociodemographic subgroups of migrants — Black, White, homeowners, and renters.

Maps as Tools, Friday 1:20 pm–3:20 pm

Where Rivers, Mountains and People Meet

Jeff Clark, Clark Geomatics

A spectacular route from Vancouver to Pemberton links the Pacific Ocean to the snowy peaks of the Coastal Mountains in SW British Columbia. Scenic Highway 99 clings to the eastern slope of Howe Sound, a glacier-carved fiord, through Squamish and north alongside the Cheakamus River as it makes its way past Whistler to Pemberton. The Lil'wat, one of the First Peoples of the Sea to Sky, aptly refer to their home as the place "where rivers, mountains and people meet." This talk will cover my cartographic decisions, tools, techniques and data used to create the terrain, and how I incorporated First Nations place names to recognize the long indigenous presence in the area to produce this geographically expressive map, *The Essential Geography of the Sea To Sky*.

Indigenous Cartography, Thursday 2:00 pm–3:50 pm

Who Owns Massachusetts?: a New Interactive Map for Identifying Institutional Ownership

Eric Huntley, Asya Aizman, & Milan Chuttani, Massachusetts Institute of Technology

Institutional ownership of residential properties is a matter of urgent concern, but one that is obfuscated by the difficulty of identifying shared ownership given the common practice of creating a different LLC for each property. This presents, among other things, a data science problem, in that identifying the scale of shared ownership requires entity resolution approaches that are dependent on access to multiple large datasets. We will present a new interactive map, Who Owns Massachusetts, that attempts to make discovery of institutional ownership possible throughout the Commonwealth. We will introduce the tool's functionality, novel datasets we are making available in building the tool, and future directions for development and research.

Innovations & Insights, Thursday 2:00 pm–3:50 pm

Who's On First: Ready for Map Display*Nathaniel Vaughn Kelso, Kelso Cartography*

The Who's On First (WOF) gazetteer is a big list of places, each with a stable identifier, and a set of common and optional descriptive properties about that location. Since launching in 2015, the project has gained global coverage by aggregating open data sources, including from hundreds of authoritative government census and statistical organizations. The WOF gazetteer's focus on populated places (including localities, townships, and neighborhoods), name localization, and internationalization has proven useful for search and reverse geocoding applications. However, until recently, it was hard to draw data on a map. Recent work has made it easier to load the data into common GIS tools via a shapefile distribution, to attribute polygons with "official" concordance IDs useful for choropleth mapping, and to filter features based on population and feature class into zoom buckets to display and label town spots on a slippy map.

Cartographic Narratives, Thursday 10:20 am–12:10 pm

Wild World Goes Worldwide: Tales from an Extraordinary Map Launch*Anton Thomas, Anton Thomas Art*

After a 3-year odyssey drawing Wild World – a vast world map of nature – I put my colored pencils aside to launch prints. Anticipation had built up over the years, so meeting the demand was always going to be challenging. But when the map received an array of international press coverage, that challenge spiraled into an extraordinary period of intensity. This is the story of a small map business managing rapid growth: how it happened, how I managed it, and what I learned about business, media, and cartography. It's one thing to follow your heart creating maps, but creating a thriving business to support that passion is another. I'm excited to share my journey! Plus – I discuss what's next for my mapmaking in the aftermath of Wild World.

Wild & Wilderness Mapping, Thursday 4:00 pm–5:30 pm

Will-o'-the-Wisp, Map Collection Tours, Hauntology and Deep Time Spectres*Larry Laliberte, University of Alberta*

In renewing ways to navigate institutional spaces of maps, and their containers, recent William C. Wonders map collection engagement workshops incorporated tactile ambience, aurals, and experiential movement to open up ways to re-read cartographic renderings as apparitions, situating their re-inscription, and retention in the spectres of deep time. By beckoning maps through hauntology – a praxis that disrupts the fabric of the normalized and operates in the fault lines of authorized histories, in-person tours construct terrains that interrogate and counter settler cartographies inhabiting a spatial corpus of colonial history. A history that continues to confer power and haunt the landscape.

Historical Cartography, Friday 3:30 pm–5:00 pm

NACIS WORD SEARCH

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CARTOGRAPHY
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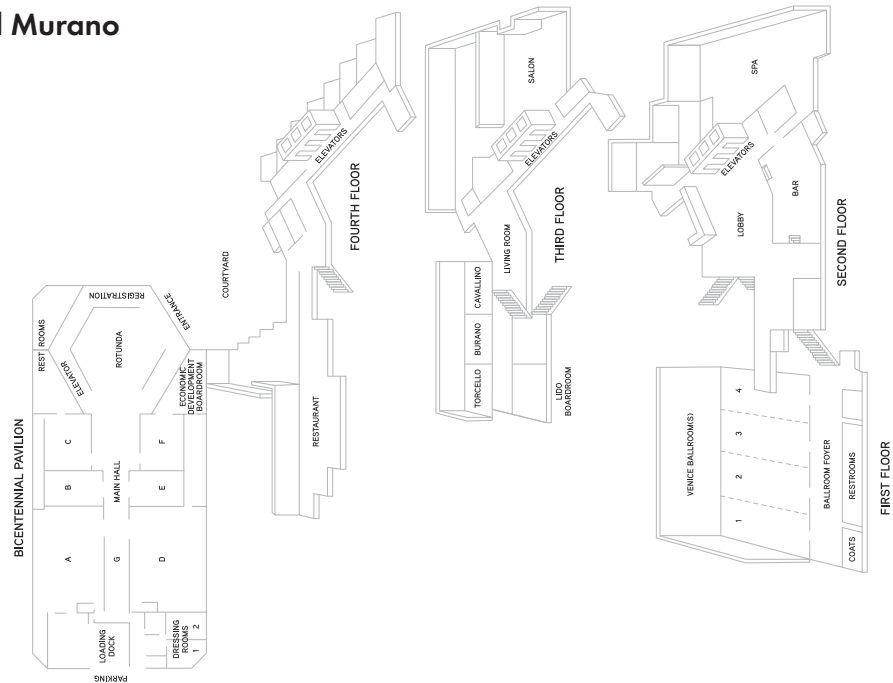
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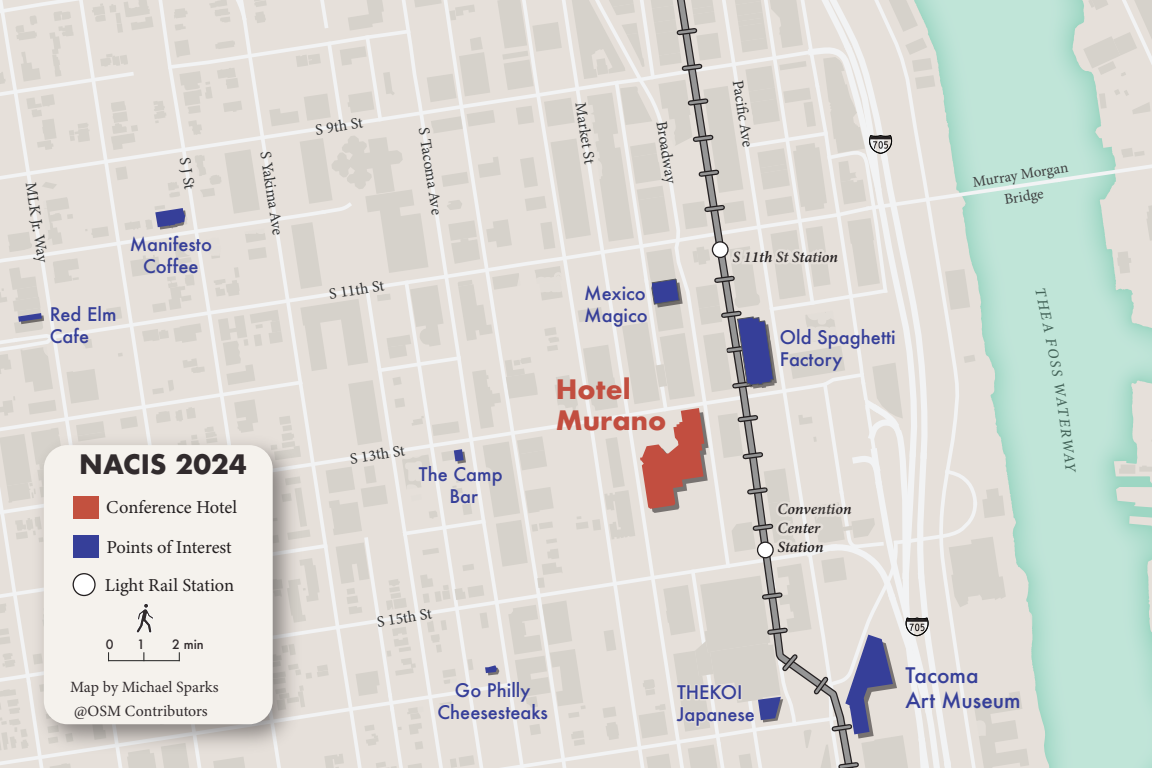
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 Points of Interest

 Light Rail Station



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Manifesto Coffee

Red Elm Cafe

Mexico Magico

Old Spaghetti Factory

The Camp Bar

Go Philly Cheesesteaks

THEKOI Japanese

Tacoma Art Museum

S 11th St Station

Convention Center Station

Murray Morgan Bridge

THEA FOSS WATERWAY

