

North American  
Cartographic  
Information Society

43rd Annual  
Meeting

October 11-14  
2023

PITTSBURGH

Millenia of human settlement

COAL HILL

- 1751 Fort Duquesne
- 1756 Seven Years War
- 1761 Fort Pitt

- 1775 Revolution
- 1792 First iron foundry

- 1852 First railroad
- 1866 "Hell with the lid off"
- 1875 First steel mill

- 1910 Peak steel

- 1945 "City of smoke"
- 1949 Renaissance I

- 1977 Renaissance II

- 1981 Collapse of steel

- 2017 "Robotics Row"

nacis

## Conference at a Glance

### Tuesday

- 6 PM NACIS Board Meeting I (**Fountainview**)
- 7 PM Tuesday Night Meetup (**Shorty's Pins x Pints**)

### Wednesday

- 9 AM Practical Cartography Day (**Grand Station III-IV-V**)—Lunch served in **Admiral Ballroom** at 12:05 PM
- 7 PM Opening & Keynote (**Grand Station III-IV-V**)
- 8 PM Welcome Reception & Map Gallery (**Grand Station II**)

### Thursday

#### Grand Station I

- 9 AM Cartographic Research I
- 10:40 AM Cartographic Research II
- 12 PM NACIS Lunch & Business Meeting (**Admiral Ballroom**)
- 2 PM Terrain Representation
- 4 PM Changing Landscapes
- 5:30 PM CP Editorial Board Meeting (**offsite**); NACIS Fun Run & Walk
- 6:30 PM NACIS Night Out (**Sly Fox PGH Brewery at the Highline**)

#### Grand Station III

- Design & Aesthetics I
- Design & Aesthetics II
- Ethics in Mapmaking
- Outside the Neatline: Maps in Any Medium

### Friday

#### Grand Station I

- 9 AM Nature and Conservation
- 10:40 AM Hazards and Safety
- 12 PM Lunch Bunch; NACIS Board Meeting II (**Fountainview**)
- 2 PM Rethinking Map Conventions
- 4 PM (De)Constructing Cartographic Norms
- 6 PM Banquet & Student Cartography Awards (**Grand Station I-II**)
- 8:15 PM Geodweeb Geopardy! (**Grand Station III**)

#### Grand Station III

- Diversity, Equity, & Inclusion I (9:20 Panel)
- Diversity, Equity, & Inclusion II (11:20 Panel)
- Mapping Cultural Heritage
- Data Visualization

### Saturday

- 10 AM ON Workshops & Evening Field Trip

## Conference at a Glance

Thursday	Grand Station V	Edenburg	Grand Station II (Map Gallery)
9 AM	Historical Cartography		Birds of a Feather—CRISIS ALERT
10:40 AM	Cartographic Narratives		NACIS Commons
2 PM	Retrospectives	Panel: The Process is the Product	
4 PM	Education	Panel: Creativity & Cartographic Practice	
Friday	Grand Station V	Edenburg	Grand Station II (Map Gallery)
9 AM	Collections, Databases, & Resources I		NACIS Commons
10:40 AM	Collections, Databases, & Resources II		Birds of a Feather—Web Maps with React
2 PM	Open Source	Panel: 30 Years of Web Mapping	
4 PM	Web & Mobile Cartography	Panel: Creative Urban Cartography ...in 50 Maps	

Program current as of September 18, 2023;  
check [nacis2023.sched.com](https://nacis2023.sched.com) for updates.

Cover artwork and maps by Tim Welch  
Program design by Brooke Marston & Elaine Guidero

# Welcome NACIS 2023 Attendees!

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On behalf of the 2023 NACIS Annual Meeting organizers and Board of Directors, it is our pleasure to welcome you this week to Pittsburgh, PA. We are excited and grateful you can join us for our 43rd Annual Meeting here on the shores of the Monongahela River.

Our conference is occurring on the ancestral lands of the Adena and Hopewell cultures, and the Seneca and Monongahela peoples—who were later joined by refugees of other tribes including the Delaware, Shawnee, Mingo, and Haudenosaunee tribes—and we respectfully acknowledge that this is the ancestral and contemporary homeland of many indigenous peoples. The Board of Directors pledges the society's support for the return and control of indigenous homelands with an annual donation to the Indian Land Tenure Foundation.

With over 140 talks, panels, workshops, and social activities, there are plenty of mappy wonders and cartographic pleasures for everyone. A complete and current guide to the conference is available online at [nacis2023.sched.com](https://nacis2023.sched.com). This site will be

updated throughout the conference with any schedule changes as we receive new information.

Thank you for choosing to be part of our NACIS community and especially for joining us for NACIS 2023!

**Brooke Marston and Hannah Dormido**  
*NACIS 2023 Co-Chairs*





## Social Media & Other Information

### Slack

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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 **#nacis2023-home**.

### X (formerly Twitter)

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Share your experiences using the **#NACIS2023** hashtag.

### YouTube

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See past conferences on our channel at [youtube.com/@nacis7166](https://youtube.com/@nacis7166).

### Code of Conduct

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NACIS has a Code of Conduct and a no-tolerance policy for harassing behavior. See pg. 69 for how to report misconduct or raise concerns to the NACIS Ethics Committee.

## Tuesday, October 10, 2023

### Tuesday Night Meetup

*Organizer: Erik Breedon*

7:00 PM–9:00 PM

Shorty's Pins x Pints

353 N. Shore Drive

Pittsburgh, PA 15212

Just arrived in town and interested in meeting some fellow NACIS members? Come over to Shorty's and sample their rotating drafts, cocktails, or non-alcoholic offerings while enjoying retro games like duckpin bowling, shuffleboard, bocce, and pinball.

Meet in the hotel lobby at 6:00 PM to join Erik for the walk over, visiting the famous Point State Park along the way.

Please note that Shorty's is cashless.

### NACIS Board Meeting I

6:00 PM–8:00 PM

Fountainview

**Wednesday, October 11, 2023**

## **Practical Cartography Day: Grand Station III-IV-V**

*Moderators: Hannah Dormido, Lourdes Ginart, & Nathaniel Douglass*

*Slack channel: #nacis2023-pcd*

*Coffee breaks will be served in the Grand Station III Foyer*

Morning Coffee 8:00 AM–9:00 AM

Morning Break 10:30 AM–10:45 AM

Lunch Break 12:05 PM–1:30 PM

Afternoon Break 3:15 PM–3:30 PM

Notes

9:00 AM–10:30 AM

### **Developing an Open-Source Cartography Toolkit**

*Alexander Parlato, Ross Thorn, and  
Damon Burgett, Stamen Design*

### **The Map on Your Map: Making an Inset Locator Map**

*Vicky Johnson-Dahl, USAID*

### **Vary Your Maps with Variable Fonts**

*Craig Williams, Esri*

### **Bringing the Power of Mentorship to Cartography**

*Rebecca Ramsey and Kate Leroux, NACIS*

### **How to Be a More Equitable Cartographer**

*Lourdes Ginart, U.S. Department of State*

# Practical Cartography Day: Grand Station III-IV-V

10:45 AM–12:05 PM

## **Sites of Shame: Telling the Stories of Interned Japanese Americans Through Maps**

*Eric Brelsford and Kelsey Taylor, Stamen Design*

## **Designing for Change: Creating Robust Workflows to Map Iteratively**

*Leanne Abraham, The New York Times*

## **Introducing Vector Basemaps in MAPublisher!**

*Riley Sweeney, Avenza Systems*

## **Creative Cartography with Arcade Expressions**

*Warren Davison, Esri*

1:30 PM–3:15 PM

## **Stitching the Earth**

*Kate Leroux, onX Maps*

## **Chasing Shadows: Mapping "Crossing" Solar Eclipse Paths**

*Michala Garrison, National Aeronautics and Space Administration*

## **How to Talk About the Thing You Made**

*Lyzi Diamond, Salesforce*

## **Visualizing the Real-World Impact of Bitcoin's Energy Usage**

*Zach Levitt, The New York Times*

3:30 PM–5:10 PM

## **Rebuilding Natural Earth: A Public Preview of Version 6**

*Nathaniel V. Kelso, Kelso Cartography; Tom Patterson, U.S. National Park Service (retired)*

## **Beyond Greyscale: Hillshading in Full Color**

*Matthew Chwastyk, National Geographic*

## **FlowMapper.org: Flow Mapping Made Easy!**

*Caglar Koylu, University of Iowa*

## **Using Artificial Intelligence to Deal with the Hardest Part of a Mapping Project**

*Michael McNeil, St. Tammany Parish Assessor's Office*

## **Building a 3D Topo Map**

*Jennifer Mapes, Kent State University*

## **Terrain for Flatlanders**

*John Nelson, Esri*

## Wednesday, October 11, 2023: Evening Events

Opening Session and Keynote Address 7:00 PM–8:00 PM  
Grand Station III-IV-V

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### Crafting a Cartography Mystery: Seeking the Truth about Maps through Fiction

Keynote speaker: **Peng Shepherd**

Slack channel: #nacis2023-keynote

To launch the 43rd Annual Meeting of NACIS, author Peng Shepherd joins us to share her experience writing *The Cartographers*, a mystery novel based on a 1930s map containing a New York phantom settlement which took on a life of its own. She will discuss what the journey taught her about writing fiction and creating maps, and how the two disciplines are much more similar than they might first appear.

Peng Shepherd is the nationally bestselling, award-winning author of *The Cartographers*, *The Book of M*, and the forthcoming *All This and More*. Her novels have been named a “Best Book of the Year” by *The Washington Post* and a “Best Book of the Summer” by *The Today Show* and *NPR*, as well as featured in *The New York Times*, *The LA Times*, *Good Morning America*, and more. Her work has been translated into over 10 languages, and optioned for TV and film. She was born in Phoenix, Arizona, where she rode horses and trained in classical ballet, and has lived in Beijing, Kuala Lumpur, London, Mexico City, and New York.



## Wednesday, October 11, 2023: Evening Events

Welcome Reception & Map Gallery Opening 8:00 PM–10:00 PM  
Grand Station II

*Organizer: Amy Rock*

*Slack channel: #nacis2023-grandstation2*

The 2023 NACIS Map Gallery features a stunning array of printed and digital maps and posters. Sprinkled throughout the gallery you will find QR codes on some maps—this indicates a dynamic map entry, and you should scan the code to see the fascinating online components to these posters.

Keep your eyes open for the bright lettered flags, indicating an entry into our annual Student Map and Poster Competition. **And please vote for the best!**

### 2022 Winners

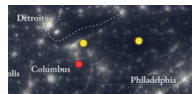
#### Global Covid-19 Vaccine Apartheid

*Kenny Stancil, University of Kentucky*



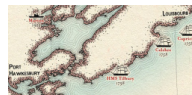
#### Dark Sky Sanctuaries

*Aileen Clarke, Austin Novak, & Jake Steinberg, University of Wisconsin–Madison*



#### Shipwrecks of Nova Scotia

*Peter Atwood, Centre of Geographic Sciences*



#### Slivers of an Ancient Forest

*Jake Steinberg, University of Wisconsin–Madison*



## Thursday, October 12, 2023: Morning 1

Coffee breaks will be served in Grand Station IV

Morning Coffee

8:00 AM–9:00 AM

Morning Session I

9:00 AM–10:20 AM

Morning Break

10:20 AM–10:40 AM

Notes

## Grand Station II (Map Gallery)

**Birds of a Feather—CRISIS ALERT:  
Mapping on a Very Tight Deadline**

*Slack channel: #nacis2023-grandstation2*

*Vicky Johnson-Dahl, USAID; Dylan Moriarty, The  
Washington Post*

When disaster strikes, cartographers need to be able to provide clear, accurate information. Join two mappers who do this for a living, in journalism and international development, for a practical crash course in high-pressure, short-turnaround cartography.

We'll present a randomly generated disaster and work hands-on with attendees through all the steps from initial data collection to final publishing specs, to produce professional-quality maps for disaster response. **Attendees will need to bring their computer to participate.**

## Grand Station I

### **Cartographic Research I**

*Moderator: Jim Thatcher*

*Slack channel: #nacs2023-grandstation1*

#### **Mind the Map, or Don't: Implications and Potential of Aphantasia for Map Cognition Research**

*P. William Limpisathian, University of Wisconsin–Madison*

#### **Slicing OSA-UCS Color Space to Inspire Bivariate Color Scheme Design for Thematic Maps**

*Cynthia Brewer, The Pennsylvania State University*

#### **COVID-19 Dashboard Functionality & Design: Assessing Dashboard Design Service Providers for Health Disaster Response**

*Lucy Roberts, University of Oregon*

#### **Mapping Guatemala-U.S. Migration: A Case Study in Critical Visual Storytelling**

*Nick Underwood*

#### **Enhancing Cartographic Design Through Artificial Neural Networks: A Geometric Approach for Map Generalization**

*Chinna Subbaraya Siddharth Ramavajjala, Namburi GNVV Satya Sai Srinath, and Ramakrishna Raju Gangaraju, University of Wisconsin–Madison*

## Grand Station III

### **Design & Aesthetics I**

*Moderator: Hans van der Maarel*

*Slack channel: #nacs2023-grandstation3*

#### **Creating the Next-Generation Wayfinding Kiosk Maps for the City of Pittsburgh**

*Mingshi Yu and Mike Ernst, Arup; Aaron Sukenik, Pittsburgh Downtown Partnership*

#### **Mapping Geopolitics and Energy Flows in Modern Europe**

*Martin Gamache and Scott Elder, National Geographic Society; Eric Knight*

#### **Allure & Apprehension, Preciousness & Precariousness: Mapping the Islands of Lord Howe & Robinson Crusoe**

*Darren Sears*

#### **Tidying Up NPS Map Symbols**

*Alex Fries, U.S. National Park Service*

## Grand Station V

### **Historical Cartography**

*Moderator: Daniel Huffman*

*Slack channel: #nacs2023-grandstation5*

#### **Colonial Cartography of Hokkaido**

*Jeff Howarth, Middlebury College*

#### **The Return of Copperplate Maps**

*David Kulbeth, Columbus Cartography*

#### **Cloth of the World: Maps on Fabric**

*Judith Tyner, California State University, Long Beach*

#### **Uniting the States with Telegraphs: Mapping America's First Digital Revolution**

*Lauren Winkler, Lauren Winkler Cartography; Edmund Russell, Carnegie Mellon University*



## Thursday, October 12, 2023: Morning 2

Morning Session 2

NACIS Lunch & Business Meeting  
(Admiral Ballroom)

We invite everyone to participate in our annual  
NACIS business meeting.

*Slack channel: #board-public*

Notes

10:40 AM–12:00 PM

12:00 PM–2:00 PM

## Grand Station II (Map Gallery) **NACIS Commons**

*Slack channel: #nacis2023-grandstation2*

Join together with other attendees 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 create a space to network with other students and share advice.

Reserve the NACIS Commons and add whatever you think our conference is missing! A sign-up sheet will be available on-site and reservations are first come, first served.

When the room is not in use, the Commons also serves as a quieter space to sit and chat away from the more crowded areas.

## Grand Station I

### **Cartographic Research II**

Moderator: P. William Limpisathian

Slack channel: #nacis2023-grandstation1

#### **Multi-Method Mapping as an Approach to Transdisciplinary Research**

*Heather Miles, University of Manchester*

#### **Cartotopia: An Atlas of Artificial Intelligence Maps**

*Clancy Wilmott, University of California, Berkeley*

#### **Small Multiples as a Gallery of Possibilities**

*Meghan Kelly, Syracuse University*

#### **Slow Cartographies: Thoughts on a Slow Map Movement**

*Jörn Seemann, Ball State University*

#### **Axioms for Indoor Map Design**

*Madison Draper, Mappedin*

## Grand Station III

### **Design & Aesthetics II**

Moderator: Vicky Johnson-Dahl

Slack channel: #nacis2023-grandstation3

#### **Drawing the Entire Planet by Hand: A Wild World Map of Nature**

*Anton Thomas*

#### **Developing a Historic Landscape Style**

*Michael Horner, Cartistic Endeavors*

#### **National Geographic's 1:1 Million "Ukraine: A Year at War" Map**

*Martin Gamache and Alex Tait, National Geographic Society*

#### **Mapping San Francisco's Fog**

*Scott Reinhard, The New York Times*

#### **Californian Snowflakes**

*Kenneth Field, Esri*

## Grand Station V

### **Cartographic Narratives**

Moderator: Rebecca Ramsey

Slack channel: #nacis2023-grandstation5

#### **Making Lines Come Alive: Expedition Mapping at National Geographic**

*Soren Walljasper and Patricia Healy, National Geographic*

#### **Narrative Transportation in Cartography: The Potential to Be Lost in a Map Story**

*Carolyn Fish, Samantha Ruth Brown, and Stuart Steidle-Nix, University of Oregon*

#### **Towards Nonlinear Narratives: Online Atlas Storytelling**

*Gareth Baldrice-Franklin, University of Wisconsin–Madison*

#### **Creative Cartography and the Historical Diary: Some Approaches and Experiments**

*Sterling Quinn, Central Washington University*

#### **Epistemology and Hand-Drawn Map Narratives**

*Richard Bohannon, Metro State University–Saint Paul*

## Thursday, October 12 2023: Afternoon 1

Coffee breaks will be served in Grand Station IV

Afternoon Session 1

2:00 PM–3:40 PM

Afternoon Break

3:40 PM–4:00 PM

Notes

Grand Station II (Map Gallery)

### NACIS Commons

Slack channel: #nacis2023-grandstation2

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Edenburg

### **The Process is the Product: How Mapping Prejudice Powers Community Racial Covenants Mapping**

Moderator: Michael Corey

Slack channel: #nacis2023-edenburg

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Michael Corey, Mapping Prejudice

Anne Bonds, University of Wisconsin–  
Milwaukee

Justin Schell, University of Michigan Library

Mapping Prejudice uses critical cartography and advanced digital tools to map racial covenants. The project's new "Deed Machine" solves many problems that have long blocked large-scale covenant research. But as thousands of volunteers have taught us, the purpose is not to find as many covenants as possible, but to use community participation to drive reparative change.

## Grand Station I

### **Terrain Representation**

Moderator: Pat Kennelly  
Slack channel: #nacis2023-grandstation1

#### **Polar DEMs: Mapping Terrain from Space and Releasing It to the Public**

Jesse Bakker, Polar Geospatial Center

#### **Towards a Web-Based, Multi-Resolution 3D Terrain Map of the Earth**

Ondřej Procházka, Seznam.cz

#### **Analyzing Volume Loss of Alpine Glaciers and Visualizing Their Retreat in Glacier National Park, 1850–2020**

Catherine Wang, Equinox Gold and The Pennsylvania State University

#### **Re-Orienting the Map**

Leland Brown

#### **Soaring Above Pinnacles National Park: An Exercise in Oblique Mapping for Hiker Safety**

Joe Milbrath, U.S. National Park Service

## Grand Station III

### **Ethics in Mapmaking**

Moderator: Sarah Bell  
Slack channel: #nacis2023-grandstation3

#### **Maps for Good and Evil**

Aileen Buckley, Esri

#### **“Ethical Problems in Cartography” Revisited**

Nat Case, INCase

#### **The Ethics of AI-Generated Maps: A Study of DALL-E and Implications for Cartography**

Yuhao Kang, University of South Carolina;  
Qianheng Zhang and Robert Roth, University of Wisconsin–Madison

#### **Towards a Journalistic Cartography Code of Ethics**

Jake Steinberg

#### **To Trust or Not to Trust Maps, That Is the Question**

Timothy Prestby, The Pennsylvania State University

## Grand Station V

### **Retrospectives**

Moderator: Elaine Guidero  
Slack channel: #nacis2023-grandstation5

#### **Fifty Years of Unclassed Choropleth Mapping: What Will It Take?**

Michael Peterson, University of Nebraska–Omaha

#### **When Henry Silverstein Got Cold: Mapping Census Data to Uncover a Case of Fraud**

Tammy Hepps, Homestead Hebrews

#### **Navigating the Transition: Insights from a Contributor and User Perspective on Paper to Digital Nautical Charts**

Taylor Krabiel, National Oceanic and Atmospheric Administration

#### **The GeoGraphics Lab: Instructions for Growth, Care, and Maintenance**

Harrison Cole, Exit Design

#### **Building a Map Company from Scratch: The Story of Purple Lizard**

Michael Hermann, Purple Lizard Maps

## Thursday, October 12, 2023: Afternoon 2

Afternoon Session 2

CP Editorial Board Meeting (**offsite**)

NACIS Fun Run & Walk

NACIS Night Out (**Sly Fox PGH**)

4:00 PM–5:20 PM

5:30 PM–6:30 PM

5:30 PM–6:45 PM

6:30 PM–10:00 PM

### NACIS Night Out

Sly Fox PGH Brewery at the Highline  
46 S. 4th Street

Join us at Sly Fox for NACIS Night Out! This your chance to make new carto-friends and catch up with those you already know. This is a pay-your-own-way event. Sly Fox is a restaurant and brewpub about a 20-minute walk from the hotel.

Notes

## Grand Station II (Map Gallery) **NACIS Commons**

*Slack channel: #nacis2023-grandstation2*

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### Edenburg

#### **Creativity and Cartographic Practice: Inspiration, Constraints, & Lessons Learned**

*Moderator: Will Payne*

*Slack channel: #nacis2023-edenburg*

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*Alicia Cowart, University of Wisconsin–Madison*

*Carolyn Fish, University of Oregon*

*Will Payne, Rutgers University*

*Craig Dalton, Hofstra University*

*Eve McGlynn, University of California, Berkeley*

This panel will explore the tension between innovative cartographic practice and institutional and logistical constraints. We will discuss what gets people excited about pushing boundaries with mapmaking, how to make creative approaches fit within the confines of various modes of production, how people have worked to square those circles, and whether they were successful (the lessons learned!).

## Grand Station I **Changing Landscapes**

Moderator: Lourdes Ginart

Slack channel: #nacis2023-grandstation1

### **Measure of Urban Growth with Land Use and Land Cover Change in Kendall County, Illinois**

Ayomide Adepeju, Western Illinois  
University

### **A Hexagram Bin Analysis of Growth Trends Using 2009–2022 Annual Parcel Data from Tallahassee, Florida**

Cherie Bryant, University of Wisconsin–  
Madison and City of Tallahassee

### **Quantifying the Impact of Floods on Agriculture and Built-Up Areas in the Malawi Lowlands**

Nelofar Qulizada

### **Why 2024 Won't Be like 1984: Historic Maps As Contemporary Sources**

Alexander Tarr, Worcester State University;  
Will Payne, Rutgers University

## Grand Station III **Outside the Neatline**

Moderator: Ross Thorn

Slack channel: #nacis2023-grandstation3

### **Those Maps Are Electric! Messing Around with Electronics in Cartography**

Janice Kai Chen, *The Washington Post*

### **Here Be Monsters: A Map-Based Storytelling Game for Imagining Alternative Academic Futures**

Heather Rosenfeld, *Smith College*

### **A Synesthete's Atlas: Performing Cartography**

Eric Theise

### **Human Terrain: A Closer Look**

David Nuttall, *Artimaps*

### **Designing for Play: Climate Change, Cartography, and Board Games**

Jim Thatcher, *Oregon State University*

## Grand Station V **Education**

Moderator: Daniel Huffman

Slack channel: #nacis2023-grandstation5

### **Reflections on Penn State's Embedded Geovisual Analytics Course: Travels to the European Union**

Fritz Kessler and Beth King, *The  
Pennsylvania State University*

### **How Design Students Engage Spatial and Cultural Understanding Through Mapping**

Tim Hamnett, *Virginia Commonwealth  
University*

### **Experiential Mapping on the Elk Ridge Land Trust**

Bill Wetherholt, *Frostburg State University*

### **Adding Relevancy to the Learning**

Martha Bostwick, *Nova Scotia Community  
College*

## Friday, October 13, 2023: Morning 1

*Coffee breaks will be served in Grand Station IV*

Morning Coffee

8:00 AM–9:00 AM

Morning Session I

9:00 AM–10:20 AM

Morning Break

10:20 AM–10:40 AM

Notes

Grand Station II (Map Gallery)  
**Birds of a Feather: I've never built  
a web map with React.js before!**  
*Slack channel: [#nacis2023-grandstation2](#)*

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*SzuYu Chen and Kati Perry, The Washington  
Post*

Bring your laptop and let's build  
a map on the web! Using a code  
sandbox, we'll walk through the steps  
to making a choropleth map and  
answer any questions along the way.



## Grand Station I

### **Nature and Conservation**

Moderator: Elaine Guidero

Slack channel: #nacis2023-grandstation1

#### **Beescape NexGen: Geovisualization for Pollinator Ecology**

Anthony Robinson, Lily Houtman, Dave McLaughlin, Timothy Prestby, and Christina Grozinger, The Pennsylvania State University

#### **Maps for Wildlife Conservation: Introducing the Global Initiative on Ungulate Migration**

Ian Freeman, Wyoming Migration Initiative

#### **Flyover State: Whooping Cranes Through Iowa's Past and Future**

Kristen Greteman, Iowa State University

#### **Birds \*Are\* Real! Using Interactive Maps To Make eBird Data Accessible**

Lauren Oldham, Cornell University

## Grand Station III

### **Diversity, Equity, & Inclusion I**

Moderator: Travis White

Slack channel: #nacis2023-grandstation3

#### **Accessibility and Data Visualization**

Frank Elavsky, Carnegie Mellon University

#### **Panel**

#### **Diversity, Equity, & Inclusion I: Disability & Accessibility**

Vanessa Knoppke-Wetzel & Tim Sinnott, GreenInfo Network

Frank Elavsky, Carnegie Mellon University

Do you design accessible maps? Do you know how to design accessible maps? What, exactly, is accessible design?

Join a discussion on accessibility in cartography and data visualization, with a focus on designing accessible content for people with a wide range of abilities and disabilities. Topics include the importance of more inclusive and equitable design practices, collaborating with and incorporating the perspectives of disabled users, moving beyond conventional notions of accessibility, and workflow and tool innovations.

## Grand Station V

### **Collections, Databases, & Resources I**

Moderator: Alex Tait

Slack channel: #nacis2023-grandstation5

#### **Representing and Interpreting Essential Work Through a Regional Lens**

Joanna Merson, Alethea Steingisser, and Erik Steiner, University of Oregon

#### **Creating the New Hampshire Zoning Atlas: A Behind-the-Scenes Look**

Rick Lederer-Barnes, Upstate GIS

#### **The Making of an Atlas of Travel Medicine: Mapping CDC Yellow Book**

Marielle Glynn, Centers for Disease Control and Prevention

#### **Processing Historic Aerial Photographs of Pennsylvania for Discovery and Analysis**

Nathan Piekielek, The Pennsylvania State University

## Friday, October 13, 2023: Morning 2

Morning Session 2	10:40 AM–12:00 PM
Lunch Bunch	12:00 PM–2:00 PM
NACIS Board Meeting II ( <b>Fountainview</b> )	12:00 PM–2:00 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 just be social. Choose a group and sign up at the registration desk by Friday 10:00 a.m.

Notes

## Grand Station II (Map Gallery) **NACIS Commons**

*Slack channel: #nacis2023-grandstation2*

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Join together with other attendees 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 create a space to network with other students and share advice.

Reserve the NACIS Commons and add whatever you think our conference is missing! A sign-up sheet will be available on-site and reservations are first come, first served.

When the room is not in use, the Commons also serves as a quieter space to sit and chat away from the more crowded areas.

## Grand Station I

### Hazards & Safety

Moderator: Ann Fritz

Slack channel: #nacis2023-grandstation1

#### Spatiotemporal Filtering of Tweets to Improve the Identification of Actionable Information for Emergency Management

Marcela Suárez, The Pennsylvania State University

#### Bushfire Map Comprehension: Understanding Its Relation to Risk Perception and Protective Action Decision-Making

Philippa Perry, Erica Kuligowski, Amy Griffin, Giia Pupedis, and Natasha Mondel-McCann, RMIT University

#### Field Checked for Accuracy

Chaney Swiney, Benchmark Maps

#### Stay the Course: Leveraging Maritime Traffic Patterns to Predict Future Behavior

Sean Kohlbrenner, Alexandros Troupiotis-Kapeliaris, and Christos Kastrisios, The Center for Coastal and Ocean Mapping

#### Felt: Your Swiss Army Knife for Hazard Mapping

Mamata Akella, Felt

## Grand Station III

### Diversity, Equity, & Inclusion II

Moderator: Lourdes Ginart

Slack channel: #nacis2023-grandstation3

#### Queer(ing) Cartography: What, For Whom, and Why?

Jack Swab, University of Kentucky

#### Beside and Slantwise: "Trans-ing" the Map

Jack Jen Giesekeing, Five College Women's Studies Research Center

### Panel

#### Diversity, Equity, & Inclusion II: Queer Cartography

Jack Swab, University of Kentucky

Jack Jen Giesekeing, Five College Women's Studies Research Center

Join our panelists as they dive into conversation about the past, present, and future of queer cartography and answer questions like: What is queer cartography? What is a queer map? Who is queer cartography for? Who is considered a queer cartographer? What role does cartography play in recounting the history of queer spaces, places, and people?

## Grand Station V

### Collections, Databases, & Resources II

Moderator: Sarah Bell

Slack channel: #nacis2023-grandstation5

#### Scaling Up Atlascope

Ian Spangler, Boston Public Library

#### Geospatial Digital Special Collections

Timothy Norris and Christopher Mader, University of Miami

#### Announcing Maps.com: A Celebration of Maps and the Cartographers Who Make Them

Joshua Stevens and Robby Deming, Maps.com

#### Going Digital with the Avenza Map Store

Rebecca Bennett, Avenza Systems

## Friday, October 13, 2023: Afternoon 1

Coffee breaks will be served in Grand Station IV

Afternoon Session 1

2:00 PM–3:40 PM

Afternoon Break

3:40 PM–4:00 PM

Notes

Grand Station II (Map Gallery)

### NACIS Commons

Slack channel: [#nacis2023-grandstation2](#)

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Edenburg

#### Panel

#### Thirty Years of Web Mapping: A Retrospective

Moderator: *Brandon Plewe*

Slack channel: [#nacis2023-edenburg](#)

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*Brandon Plewe, Brigham Young University*

*Kristian Ekenes, Esri*

*Jeremy Bartley, Esri*

*Nathaniel V. Kelso, Kelso Cartography*

A lot has happened since the interactive web map was invented in June 1993. In such a rapidly changing technological field, it is helpful to look back and reflect on how we got here and where we are headed. Panelists have had a wide variety of roles and experiences over these thirty years and will discuss the innovations, trends, mistakes, and players who have brought us to this moment. We also hope to have a fruitful discussion with the audience on what the future holds for the next thirty years of web mapping.

## Grand Station I

### Rethinking Map Conventions

Moderator: Amber Bosse  
Slack channel: #nacs2023-grandstation1

**Affective Maps?**  
*Matthew Wilson, University of Kentucky*

**Using Psychology to Make Better Maps**  
*Madeline Rouse, PlanetScape AI*

**The Petrofuture: Road Maps to Climate Change**  
*Jeffrey Linn, Conspiracy of Cartographers*

**Secure Political Claim: How Japanese Regulate Map Labeling on Southern Sakhalin Island (Karafuto)**  
*Zhaoxu Sui, University of Oregon*

**Erosion As Method(ology): Theorizing and Mapping Structures of Feeling**  
*Alexis Wood, University of California, Berkeley*

## Grand Station III

### Mapping Cultural Heritage

Moderator: Nick Martinelli  
Slack channel: #nacs2023-grandstation3

**Indigenous Lands in Apple Maps**  
*Bradley Herried, Apple*

**Reckoning With Our Origins: Our Founding Funders**  
*Christopher Van de Ven, University of the South*

**Incorporating Cultural Narratives into a Map of Guadalupe Mountains National Park**  
*Becca Holdhusen, U.S. National Park Service*

**Challenging White Innocence Through an Atlas of U.S. National Landmarks**  
*Alethea Steingisser, Erik Steiner, and Laura Pulido, University of Oregon*

## Grand Station V

### Open Source

Moderator: Janice Chen  
Slack channel: #nacs2023-grandstation5

**Public Data Tools for Understanding Urban Property Ownership**  
*Michael McCanless and Jacob Saindon, University of Kentucky*

**Cartography Pro-Tips: Creating Basemaps for Amazon Location Service**  
*Ross Thorn, Katie Kowalsky, and Kelsey Taylor, Stamen Design*

**Building QGIS Plugins with Python**  
*William Lyon, Neo4j*

**The Past, Present, and Future of Stamen Maps**  
*Alan McConchie, Stamen Design*

**Query the Earth: Over One Billion OSM Features in an Easy-to-Use Schema**  
*Jennings Anderson, Jonah Adkins, and Jacob Wasserman, Meta*

## Friday, October 13, 2023: Afternoon 2

Afternoon Session 2

4:00 PM–5:20 PM

Evening events (see p. 26)

6:00 PM–9:15 PM

Notes

Grand Station II (Map Gallery)

### **NACIS Commons**

*Slack channel: #nacis2023-grandstation2*

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Edenburg

#### **Panel**

#### **Creative Urban Cartography...in 50 Maps**

*Moderator: Alex Hill*

*Slack channel: #nacis2023-edenburg*

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*Vicky Johnson-Dahl, USAID*

*Evan Tachovsky, World Resources Institute*

*Anne Trubek, Belt Publishing*

*Alex Hill, Wayne State University*

Belt Publishing's "urban cartography series" includes books on Cleveland, Detroit, and Buffalo. The authors employ creative map design in order to spark new questions about their cities, invite new understandings, and give you a feel for a city you may never have visited. Join us for a lively and wide-ranging discussion with the authors and their publisher on their cartographic practice and process in distilling these three Rust Belt cities down to 50 maps.

## Grand Station I

### **(De)Constructing Cartographic Norms**

Moderator: Nat Case

Slack channel: #nacis2023-grandstation1

#### **Holding Space: A Case for Trauma-Informed Cartography**

*Amber Bosse, MapBosse Co.*

#### **Mapping Happiness: Uncovering the Landscape of Everyday Joys**

*Qingyue Li*

#### **Unsettled: Scars and Landscape**

*Bethany Craig, University of Kentucky*

#### **Thinking Beyond "Critique"**

*Dave Smith, Rutgers University*

#### **Connoisseurship**

*Mark Denil*

## Grand Station III

### **Data Visualization**

Moderator: Hannah Dormido

Slack channel: #nacis2023-grandstation3

#### **False Color for the Rest of Us**

*Daniel Wolfe, The Washington Post*

#### **Uncharted Backcountry: A Bush Pilot's Exploration in Creating a Modern Backcountry Sectional**

*Alex Polvi, Barbless Backcountry*

#### **Snowy Celebrations: Bending NWS Data for Frosty Festive Memories**

*Dylan Moriarty, The Washington Post*

#### **Community Mapping: What You Miss When You Fly Over**

*Ann Fritz, North Dakota Department of Environmental Quality*

#### **Producing a Map Series of Remote Alaskan Native Villages and Federal Lands**

*Mike Wissner, The Pew Charitable Trusts*

## Grand Station V

### **Web & Mobile Cartography**

Moderator: Kati Perry

Slack channel: #nacis2023-grandstation5

#### **How Should We Design Mobile Thematic Maps?**

*Lily Houtman, The Pennsylvania State University*

#### **Create Custom Basemaps for Desktop or Mobile Applications**

*Emily Meriam, Esri*

#### **Capturing the Essence of Los Angeles with Cartography**

*Kelsey Taylor, Stamen Design*

#### **Post-Scarcity Web Mapping with Protomaps**

*Brandon Liu, Protomaps*

#### **Spots and Dots: Building a Modern Web UI for Mapping Density with Gridded Proportional Symbols**

*Kristian Ekenes and Jeremy Bartley, Esri*



## Friday, October 13, 2023: Evening Events

6:00 PM–8:00 PM

Grand Station I-II

### **NACIS Banquet & Student Cartography Awards Presentation**

*Host: Brooke Marston*

*Slack channel: #nacis2023-banquet*

Enjoy a relaxing dinner with your fellow mapmakers, entertained by ever popular PechaKucha talks, and cheer on the winners of the student map & poster competitions!

8:15 PM–9:15 PM

Grand Station III

### **Geodweeb Jeopardy!**

*Organizers: Dennis McClendon, Chicago Cartographics;*

*Joanna Merson, University of Oregon*

*Slack channel: #nacis2023-jeopardy*

Take part in an entertaining NACIS tradition as Dennis McClendon channels host Art Fleming in a carto-oriented version of the TV show *Jeopardy!*

Join a team by signing up at the registration desk for your chance at winning some fabulous mappy prizes. Or join the audience to cheer the players when they get a tough one right, and good-naturedly heckle them when they miss one.

## Saturday, October 14, 2023: Workshops

10:00 AM–12:00 PM

Elwood I

### Let's Make Maps More Accessible!

*Organizers: Vanessa Knoppke-Wetzel, Stephen Smith, & Tim Sinnott, GreenInfo Network; Robert Roth, University of Wisconsin–Madison*

*Slack channel: #nacis2023-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.

1:00 PM–4:00 PM

Elwood I

### Dynamic Storytelling with Map Viewer & ArcGIS Story Maps

*Organizers: Ross Donihue, Cooper Thomas, & Warren Davison, Esri*

*Slack channel: #nacis2023-workshops*

Fork and knife. Mortar and pestle. Bow and arrow. Map Viewer and StoryMaps. Some instruments are best used in tandem, and the tools we use to create interactive map-based stories are no exception. In this workshop, we'll explore a variety of ways in which interactive web maps can be combined with ArcGIS StoryMaps.

Using real-world examples to guide our conversation, we will begin by identifying key concepts and techniques for effective place-based storytelling, including map choreography and selective focus. Then, we'll dive into hands-on exercises to see how these techniques can be implemented. By the end of the workshop, you'll be able to create interactive, map-based stories that engage, inform, and delight.

## Saturday, October 14, 2023: Evening Field Trip

8:00 PM–10:00 PM (doors at 7:30 PM)

Cost: \$20 at the door

Creative Coffee & Supply, 309 Smithfield St.

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### **A Synesthete's Atlas**

*Organizer: Eric Theise*

Real-time cartographic improvisations using projected, manipulated digital maps by Eric Theise in collaboration with flutist Theresa Abalos. Co-presented with Pittsburgh Sound + Image.

A visual wash of street grids, land masses, water bodies, and curiosities from built and natural environments. Orphaned labels. Saturated colors and subtle tints. Free-floating symbology. Jittery zooms, pans, and traversals. Glitches in crowdsourced data.

Since its Lisbon premiere in April 2022, A Synesthete's Atlas has been performed in museums, galleries, and microcinemas across North America. Theise's platform is based on OpenStreetMap data, open-source libraries, and a few thousand lines of JavaScript.

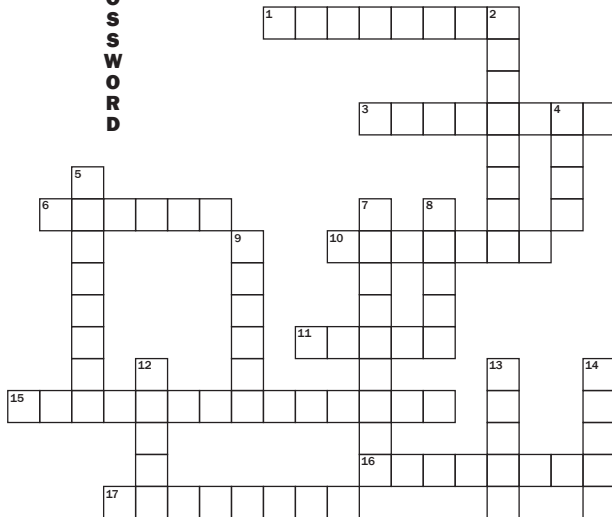
Theresa Seguritan Abalos is a Filipina-American improviser and collaborative flutist with the Pittsburgh Sound Preserve. She collaborates with spoken word artists, beat makers, dancers, and visual artists.

The performance will last 50 minutes and occasionally uses visual effects that may affect photosensitive viewers. Creative Coffee & Supply is an approximately 15-minute walk from the Sheraton at Station Square.

# nacis

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Answers on p.70

## ACROSS

1. Peng \_\_\_\_\_, New York Times bestselling author & 2023 keynote speaker
3. Pittsburgh's National Hockey League (NHL) team
6. NACIS 2019 was in this city
10. The Pittsburgh \_\_\_\_\_ played in the first World Series
11. During the 1920s, Pittsburgh produced almost 80% of all \_\_\_\_\_ made in America
15. The Pittsburgh Agreement, signed in 1918, ensured the formation of this country from two eastern European countries
16. This now ubiquitous symbol was invented by computer scientists at Carnegie Mellon University in 1982
17. Christine \_\_\_\_\_, first President of NACIS

## DOWN

2. \_\_\_\_\_ Incline is one of last two remaining in Pittsburgh
4. "Ooh. Aah. \_\_\_\_."
5. World's first modern art museum (opened in 1895)
7. The first NACIS meeting took place in this city
8. Society founded in 1980
9. Andy \_\_\_\_\_, Pittsburgh-born artist known for contributions to the 1960s Pop art movement
12. \_\_\_\_\_ Rivers Stadium, home to 10-Across from 1970-2000
13. This vaccine was developed at the University of Pittsburgh in the 1950s
14. Condiment company founded in Pittsburgh

## Cartographic Perspectives

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Interested in doing a book review? Contact **cp\_book\_reviews@hotmail.com**.

## Mentoring Program

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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 2024 mentor program! Applications open in January. Visit **nacis.org/initiatives/nacis-mentor-program**.

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**Accessibility and Data Visualization***Frank Evalsky, Carnegie Mellon University*

This talk provides a short introduction to accessibility and an overview of the history of practicing visualization and cartography for and with people with disabilities. I will share helpful frameworks for thinking about disability and access, in addition to my own experiences making visualizations more accessible. No prerequisite knowledge in coding or accessibility is required. This talk is intended to give everyone a sense of shared understanding of what accessibility is and how to practically design for it.

*Diversity, Equity, & Inclusion I: Disability & Accessibility, Friday 9:00 AM–10:20 AM*

**Adding Relevancy to the Learning***Martha Bostwick, Nova Scotia Community College*

A continuing challenge in my teaching practice is to show learners how the topics we cover in each class are relevant to the real-world situations they will find themselves in after graduation. This can be especially difficult in the introductory-level courses where they are just starting to grasp the concepts of GIS and cartography. In this presentation, I will be discussing a variety

of methods I use to accomplish this—community engagement, client relationships, project-based learning, topics of individual interest—and some examples of the new (and hopefully improved) project work.

*Education, Thursday 4:00 PM–5:20 PM*

**Affective Maps?***Matthew Wilson, University of Kentucky*

How might we study the affectivity of a map? How is the effectivity of a map different? As digital techniques transformed cartographic practice at mid-century, a receptivity to behavioral modes of experimentation and analysis crept into the drawing of a line. Draw a map, study the reading of the map, adjust the drawing, and repeat. Map effectiveness became a tantalizing gloss. I consider what it means to move beyond the effectiveness of maps as tools of communication. In doing so, I propose a renewal of a critical cartographic sensibility which maintains that the role of map design should be to create environments and that these environments may resist the implicit neo-Robinsonian determinisms of contemporary map study.

*Rethinking Map Conventions, Friday 2:00 PM–3:40 PM*

**Allure & Apprehension, Preciousness & Precariousness: Mapping the Islands of Lord Howe & Robinson Crusoe***Darren Sears*

The subtropical islands of Lord Howe (Australia) and Robinson Crusoe (Chile) are comparable in their physical geography and evolution of numerous unique species and habitats but have faced very different levels of human impact. In watercolor maps collaging multiple perspectives, I capture the inherently spatial characteristics of ecological diversity, isolation, and rarity as I experienced them on these two islands—features imbued with qualities of preciousness and fragility in light of past degradation and future threats. The fractured style itself evokes disruption and disintegration but also these ecosystems' natural state of flux in space and time, calling into question the very meaning of preciousness in the natural world.

*Design & Aesthetics I, Thursday 9:00 AM–10:20 AM*



### Analyzing Volume Loss of Alpine Glaciers and Visualizing Their Retreat in Glacier National Park, 1850–2020

*Catherine Wang, Equinox Gold and The Pennsylvania State University*

This presentation visualizes the volume loss of alpine glaciers and their retreat in Glacier National Park from 1850 to 2020 using geospatial techniques. Using historical topographic maps, aerial imagery, and satellite data, this study employed techniques such as spatial interpolation and feature extraction to quantify the changes in glacier area and volume over time and investigate their spatial and temporal patterns. An interactive web map allows users to explore the retreat of individual glaciers over time and quantifies their volumetric changes. The visualization and analysis highlight the rapid and accelerating nature of glacier retreat in the park and underscores the need for continued monitoring and conservation efforts.

*Terrain Representation, Thursday 2:00 PM–3:40 PM*

### Announcing Maps.com: A Celebration of Maps and the Cartographers Who Make Them

*Joshua Stevens & Robby Deming, Maps.com*

Cartography has a rich past, a vibrant present, and a future of limitless potential. Maps have served to educate, inform, inspire, and challenge us for centuries. And now more than ever new maps and cartographers are emerging at a pace that is nothing less than remarkable. Despite such an abundance, the general public and cartographic communities lack a shared space for finding and learning about amazing maps. Where do you go to discover new cartography and cartographers? To share your own maps? And to explore the breathtaking diversity cartography continues to offer? Allow us to introduce Maps.com.

*Collections, Databases, & Resources II, Friday 10:40 AM–12:00 PM*

### Axioms for Indoor Map Design

*Madison Draper, Mappedin*

People spend over 90% of their time indoors. How do we translate our spatial understanding of the indoor world cartographically? Can principles from outdoor cartography be replicated? Since

2011, Mappedin has created thousands of digital and print indoor maps for clients ranging from single-floor businesses to multistory campuses. This presentation will discuss axioms for how to read an indoor landscape, debate the applicability of outdoor cartographic principles to indoors, investigate the translational state between indoors and outdoors, and reveal Mappedin's design standards for aesthetic and intuitive indoor maps. We're eager to initiate a discussion on setting a professional standard among cartographers for indoor maps.

*Cartographic Research II, Thursday 10:40 AM–12:00 PM*

### Beescape NexGen: Geovisualization for Pollinator Ecology

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

Pollinator species are under threat from a wide range of human-induced environmental changes. Bees and other pollinators create critical linkages in natural and agricultural ecosystems. Through a multipart, user-centered design process, we iteratively developed an interactive web mapping system called Beescape NexGen. In this talk, we present the results of user

studies that helped us design the current system, as well as a demonstration of its current capabilities to visualize pollinator ecosystem health data, volunteer contributed plant/insect observations, and climate data.

*Nature & Conservation, Friday 9:00 AM–10:20 AM*

### **Beside and Slantwise: Trans-ing the Map**

**Jack Jen Gieseking, Five College Women's Studies Research Center**

Everyday stories of lesbian, gay, bisexual, trans, and queer (LGBTQ+) lives and spaces are often cut up in how this group is kept from their history and one another, and targeted by politicians, right wing groups, and mainstream press. Maps of LGBTQ+ spaces provide shared recognition, but also cover up what can be gained in the amalgamation of queerness on one map. As anti-trans and anti-drag laws and violence continue to grow, and drawing on trans theorists in and beyond geography, what can trans-ing the map offer critical GIS scholarship? How can absent maps and partial records of trans spaces propel us to

think beside and slantwise in the way we produce, share, and read maps?

*Diversity, Equity, & Inclusion II: Queer Cartography, Friday 10:40 AM–12:00 PM*

### **Beyond Greyscale: Hillshading in Full Color**

**Matthew Chwastyk, National Geographic**

Detailing a procedure for making shaded relief in photoshop that will create depth via the underlying data color rather than through multiplied greyscale values. I'll also show a well-tested technique for guaranteeing that vector layers move between illustrator and photoshop accurately and in the correct position.

*PCD Afternoon Session II, 3:30 PM–5:10 PM*

### **Birds \*Are\* Real! Using Interactive Maps To Make eBird Data Accessible**

**Lauren Oldham, Cornell Lab of Ornithology**

Using more than one billion eBird observations, the Cornell Lab of Ornithology used bird checklist data to create high-resolution data products and maps describing where and how many species occur every week of the year for approximately 2,200 species. Harnessing

the power of vector tiles and web mapping libraries, these once-static bird population visualizations were converted from PNG images and GIFs into dynamic, interactive web maps, bringing high-resolution bird data to the hands of laypersons and experts alike. Learn how these maps were created, the challenges of static versus dynamic bird maps, and how these maps have been used in the real world to help save shorebirds.

*Nature & Conservation, Friday 9:00 AM–10:20 AM*

### **Birds of a Feather—CRISIS ALERT: Mapping on a Very Tight Deadline**

**Vicky Johnson-Dahl, USAID; Dylan Moriarty, The Washington Post**

When disaster strikes, cartographers need to be able to provide clear, accurate information. Join two mappers who do this for a living, in journalism and international development, for a practical crash course in high-pressure, short-turnaround cartography. We'll present a randomly generated disaster and work hands-on with attendees through all the steps from initial data collection to final publishing specs to produce professional-quality maps for

disaster response. Attendees will need to bring their computer to participate.

*Map Gallery, Thursday 9:00 AM–10:20 AM*

### **Birds of a Feather—I’ve Never Built a Web Map with React Before!!**

**Kati Perry & SzuYu Chen, *The Washington Post***

Bring your laptop and let’s build a map on the web! Using a code sandbox, we’ll walk through the steps to making a choropleth map and answer any questions along the way.

*Map Gallery, Friday 9:00 AM–10:20 AM*

### **Bringing the Power of Mentorship to Cartography**

**Rebecca Ramsey & Kate Leroux, *NACIS***

This year, NACIS launched a mentorship program connecting 21 early-career cartographers with experienced professionals for six months of personalized one-on-one mentorship. In this lightning talk, the co-organizers will highlight the mutual benefits of mentorship for mentees and mentors, share anecdotes and data about participants’ experiences, preview program improvements for next year’s mentor program, and reveal

best practices you can use to be an effective mentor or mentee in any professional setting.

*PCD Morning Session I, 9:00 AM–10:30 AM*

### **Building a 3D Topo Map**

**Jennifer Mapes, *Kent State University***

With zero maker space experience, and only a month to work, I built a 4' x 6' 3D topographic map using a laser cutter. The map was part of a display illustrating the history of campus wetlands. I’ll talk through the research behind the map and then dive into detailing the GIS work, construction methods, and budget that went into building this very large map.

*PCD Afternoon Session II, 3:30 PM–5:10 PM*

### **Building a map company from scratch: the story of Purple Lizard**

**Michael Hermann, *Purple Lizard Maps***

Purple Lizard Maps founder and NACIS Past President, Michael Hermann, will share his start-up story from his first Pennsylvania State Forest retail map in 1997 to the current product line of award-winning recreational maps of the Mid-Atlantic region. The transition from mapmaker to business owner

## **Abstracts**

## **Bir–Bui**

and brand manager encompasses all facets of cartography, from design and production to publishing, sales, and distribution. From the initial creative cartographic idea to a customer buying your map, there are a long list of challenges. That journey is a constant stream of ripples, eddies, slack water, whitewater, dangerous hydraulics, and occasional stretches of smooth paddling and beautiful sunsets.

*Retrospectives, Thursday 2:00 PM–3:40 PM*

### **Building QGIS Plugins with Python**

**William Lyon, *Neo4j***

This talk will cover the process of using PyQGIS and Qt to build plugins for QGIS, an open-source desktop GIS application, through the lens of lessons learned building a QGIS plugin for the Neo4j graph database including use cases and examples of geospatial analysis and data visualization using graph data.

*Open Source, Friday 2:00 PM–3:40 PM*

## **Bushfire Map Comprehension: Understanding Its Relation to Risk Perception and Protective Action Decision-Making**

*Amy Griffin, Philippa Perry, Erica Kuligowski, Gita Pupedis, & Natasha Mondel-McCann, RMIT University*

Bushfires are a frequent risk to the lives and livelihoods of people in Australia. Because they cannot always be prevented, risk reduction requires good preparation and timely protective action decision-making. Bushfire maps provide key information about warnings and/or fire predictions to inform householders' protective action decisions. We report the findings from 94 semi-structured interviews focused on existing bushfire maps conducted in late 2022 and early 2023 with residents in four Australian states and territories and draw lessons for the design of both existing and future bushfire mapping products used by the general public.

*Hazards & Safety, Friday 10:40 AM–12:00 PM*

## **Californian Snowflakes**

*Kenneth Field, Esri*

A short flurry of a talk that is about real, actual snowflakes and not in the sense of those with an inflated sense of uniqueness, an unwarranted sense of entitlement. The 2022–2023 snow season saw record accumulation, particularly in the western United States. A perfect storm of a serendipitous discovery, an inspiration, and a purpose coalesced, and I made a map to celebrate California's record snowfall. I'll explain the process, share some resources, and discuss a custom printing approach to use print technology as a cartographic symbol. No rainbows were harmed in its construction and the map doesn't use a rainbow scheme either.

*Design & Aesthetics II, Thursday 10:40 AM–12:00 PM*

## **Capturing the Essence of Los Angeles with Cartography**

*Kelsey Taylor, Stamen Design*

Earlier this year, Stamen Design collaborated with Spherical to design a custom, branded vector tile basemap for their Living Infrastructure Field Kit mapping tool, which allows workshop participants to identify

opportunities for community projects in greater Los Angeles. Designing this map meant capturing the essence of L.A. while providing a clean slate upon which participants could dream about positive change. In this talk, we will discuss how we translated soft requirements (how should a map look or feel?) into a beautiful, useful basemap with brand elements, 3D terrain, and detailed landcover data.

*Web & Mobile Cartography, Friday 4:00 PM–5:20 PM*

## **Cartography Pro-Tips: Creating Basemaps for Amazon Location Service**

*Ross Thorn, Katie Kowalsky, & Kelsey Taylor, Stamen Design*

In 2022, Amazon Location Service brought on Stamen Design as a partner to help develop and launch new interactive basemap styles as part of their Open Data Maps collection. Together, we have produced four maps: light and dark versions of a full-color reference map suitable for data overlays, and a pair of more muted map styles appropriate for visualizing more complex data. In this talk, we discuss what makes these maps unique and best practices for making maps

using a global set of vector tiles built from OpenStreetMap data.

*Open Source, Friday 2:00 PM–3:40 PM*

### **Cartotopia: An Atlas of Artificial Intelligence Maps**

**Clancy Wilmott, University of California, Berkeley**

This paper presents a snapshot of preliminary findings from Cartotopia, an ongoing atlas project which uses historical and contemporary cartography and imagery to interrogate the power of both cartography and visual computation through a series of artificial intelligence maps. Drawing from sources such as the Library of Congress' Panoramic Mapping Collection, the USGS's DEM imagery, the Sanborn mapping collections, and the Ordnance Survey, it argues that the historical conditions of cartography—from production to analytic potential—are folded into machine learning through both cartographic and computational abstraction and generalization, revealing ongoing politics that linger in the dataset regardless of permutations.

*Cartographic Research II, Thursday 10:40 AM–12:00 PM*

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

**Alethea Steingisser, Erik Steiner, & Laura Pulido, University of Oregon**

The InfoGraphics Lab is working on a new atlas, Monumental Denial: U.S. Cultural Memory and White Innocence, which explores how the more than 2,400 U.S. 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.

*Mapping Cultural Heritage, Friday 2:00 PM–3:40 PM*

## **Abstracts**

## **Car—Clo**

### **Chasing Shadows: Mapping Crossing Solar Eclipse Paths**

**Michala Garrison, National Aeronautics and Space Administration**

While working at NASA, I was asked to design a large print map that highlighted not one, but two upcoming solar eclipses. This was a daunting task for a few reasons: 1) I had never made an eclipse map before; 2) while the eclipse paths wouldn't cross in real-time (for good reason), they would on the map; and 3) the balancing act of making the map useful, visually engaging, and not overwhelming. I'll share tips on how I turned a tangle of vectors and muddy tiffs into something beautiful that hopefully appeases the eclipse enthusiasts and inspires newbies.

*PCD Afternoon Session I, 1:30 PM–3:15 PM*

### **Cloth of the World: Maps on Fabric**

**Judith Tyner, California State University, Long Beach**

In the history of cartography, only rarely is the material on which the map was made mentioned. In fact, it is usually assumed to be paper except for such maps as the Babylonian clay tablet, Marshall Island stick charts, or maps on vellum. Any map that is not on paper is considered a cartographic

curiosity, or not a real map. But throughout history, maps have been created on silk, rayon, wool, cotton, and linen. The lines and symbols have been painted, printed, woven, drawn in ink, or stitched in thread. They have been used in war, education, wayfinding, protest, and decoration. Today, I make a brief survey of the role of maps on cloth.

*Historical Cartography, Thursday 9:00 AM–10:20 AM*

### Colonial Cartography of Hokkaido

**Jeff Howarth, Middlebury College**

In this paper, I explore historical maps of Hokkaido and discuss changes in terrain representation during the colonization of the island in the 19th century. I begin with Japanese maps made during Sakoku, a period of isolation that restricted trade with most western countries, and then trace changes that occurred after the opening of the harbor at Hakodate to American trade in the mid-19th century. As a transect in the history of cartography, Hokkaido illustrates the role of maps as instruments for

colonizing land and also shows how maps themselves are colonized terrains.

*Historical Cartography, Thursday 9:00 AM–10:20 AM*

### Community Mapping: What You Miss When You Fly Over

**Ann Fritz, North Dakota Department of Environmental Quality**

North and South Dakota are sometimes referred to as flyover states. Inspired by Faye Passow's map-based artwork, artist Cary Thrall and I created a map-based gathering activity for a meeting of North and South Dakotans. Our objective was to stimulate creativity, start conversations, create community, recognize meaningful places, and have fun. In addition to the map, we had a how to draw yourself as a cartoon activity. Over the course of the weekend, participants collectively created a What You Miss When You Fly Over map of the Dakotas, and captured cartoon faces of all the meeting participants. The activities created a gathering point for the meeting and was a conversation starter for participants who hadn't ever met before.

*Data Visualization, Friday 4:00 PM–5:20 PM*

### Connoisseurship and Cartographic Theory

**Mark Denil**

Most cartographic theory has just been map criticism. A critical evaluation of maps can inform theory, but it cannot serve in theory's place. A cartographic theory must operate at a level so general that individual maps cannot be inferred from it, but it must support the map-hood of every map. Connoisseurship, by contrast, involves knowledge, training, a familiarity with the subtleties of style, and an informed and discriminating taste. Theory underpins connoisseurship but is independent of it. We have seen too many instances of purported theories that try to collapse the two elements. This talk will explore the relationship between connoisseurship and cartographic theory and how they work together.

*[De]Constructing Cartographic Norms, Friday 4:00 PM–5:20 PM*

### COVID-19 Dashboard Functionality & Design: Assessing Dashboard Design Service Providers for Health Disaster Response

*Lucy Roberts, University of Oregon*

Data-driven dashboards played a significant role in collecting and conveying data to citizens during the COVID-19 pandemic. However, little research has assessed the functionality and design of these dashboards, especially for potential future crises. The availability of Platforms as a Service (PaaS) allows for the creation of dashboards but is traded against limitations on functionality. In this research, I used a content analysis of international COVID-19 dashboards to understand global variation in functionality. The variability was often driven by PaaS, not individual country policies. Given the need to allow for more variation in functionality, my research offers recommendations for PaaS to improve these systems for future crises.

*Cartographic Research I, Thursday 9:00 AM–10:20 AM*

### Create Custom Basemaps for Desktop or Mobile Applications

*Emily Meriam, Esri*

Esri has released a tool called the Vector Tile Style Editor, which gives access to their core collection of vector tile basemaps. The app allows scale level customizations with every element of the basemap modified. This session will show how to use the app, see how multiple basemaps can be combined, use the tool with your own layers, as well as learn about the latest enhancements that give cartographers the keys to the whole library...

*Web & Mobile Cartography, Friday 4:00 PM–5:20 PM*

### Creating the New Hampshire Zoning Atlas: A Behind-the-Scenes Look

*Rick Lederer-Barnes, Upstate GIS*

In May of this year, we launched the New Hampshire Zoning Atlas, only the third statewide zoning atlas in a nationwide movement to create a National Zoning Atlas. After wrangling zoning maps and regulations for 269 jurisdictions, the data had to be stitched together into a cohesive statewide zoning layer and analyzed to make some (hopefully) insightful conclusions on zoning's effect on housing in New

Hampshire. One of the challenges was how best to tell the story of zoning in New Hampshire (spoiler, using a StoryMap), and how to build an interactive viewer for users to explore the data in a meaningful way (spoiler #2, Experience Builder). Join me for a behind-the-scenes look at putting the StoryMap and Atlas Viewer together, and a brief demo of the final products.

*Collections, Databases, & Resources I, Friday 9:00 AM–10:20 AM*

### Creating the Next-Generation Wayfinding Kiosk Maps for the City of Pittsburgh

*Mingshi Yu & Mike Ernst, Arup; Aaron Sukenik, Pittsburgh Downtown Partnership*

Arup partnered with a consortium of Pittsburgh Business Improvement Districts to update the city's pedestrian wayfinding system, implemented in 1996. The new system aims to provide clear pedestrian-focused signage that help users navigate Pittsburgh's complex topography on foot. Harnessing the power of automation, 68 kiosk maps were created to show streets, blocks, parks, and landmarks with directions and walk-minute distances. We will present how we used a combination of common

mapping software (ArcGIS Pro, ArcGIS Maps for Adobe Creative Cloud, Adobe Illustrator, MAPublisher, FME, Python) to efficiently create accurate and informative maps that will be printed and installed on the streets of Pittsburgh.

*Design & Aesthetics I, Thursday 9:00 AM–10:20 AM*

### **Creative Cartography and the Historical Diary: Some Approaches and Experiments**

*Sterling Quinn, Central Washington University*

How can creative cartographic techniques help us to better understand someone's experience with place as recorded in a personal diary? Drawing from critical and feminist cartography literature, I propose a set of approaches for diary mapping including visualizing routines and cycles, zooming in on space and time, orienting the view around the writer's imagination of space, capturing multisensory experiences, and focusing on unseen phenomena such as feelings, relationships, and social boundaries. I demonstrate these through a series of maps inspired by The Diary of Elisabeth Koren, a 19th-century Norwegian immigrant who

extensively chronicled her first year in America.

*Cartographic Narratives, Thursday 10:40 AM–12:00 PM*

### **Creative Cartography with Arcade Expressions**

*Warren Davison, Esri*

Sometimes the symbol you've dreamt up for your map isn't available out of the box. In these cases, Arcade expressions and symbol effects in ArcGIS Pro can be used to extend the capabilities of the symbology panel and create some creative data-driven symbol markers. Combining these techniques, one can create and configure dynamic data-driven visualizations such as spike maps, hachures, and many other complex symbols from a single dataset.

*PCD Morning Session II, 10:45 AM–12:05 PM*

### **Creative Urban Cartography... in 50 Maps**

*Alex Hill, Wayne State University; Evan Tachovsky, World Resources Institute; Vicky Johnson-Dahl, USAID; Anne Trubek, Belt Publishing*

Belt Publishing's urban cartography series includes books on Cleveland, Detroit, and Buffalo. The authors employ creative map design in order to spark new questions about their cities, invite new understandings, and give you a feel for a city you may never have visited. Each book offers a deep dive into the oddities and inequalities that have generated fascinating urban phenomena that are unique to an individual city or sometimes shared by multiple cities. Join us for a lively and wide-ranging discussion with the authors and their publisher on their cartographic practice and process in distilling these three Rust Belt cities down to 50 maps.

*Panel, Friday 4:00 PM–5:20 PM*



### **Creativity & Cartographic Practice: Inspiration, Constraints, & Lessons Learned**

*Will Payne, Rutgers University; Eve McGlynn, University of California, Berkeley; Craig Dalton, Hofstra University; Alicia Cowart, University of Wisconsin-Madison; Carolyn Fish, University of Oregon*

This conversation with panelists from a variety of professional and academic backgrounds and roles will explore the tension between innovative cartographic practice and institutional and logistical constraints. We will discuss what gets people excited about pushing boundaries with mapmaking, how to make creative approaches fit within the confines of what you can do in academic, professional, and artistic modes of production, and how people have worked to square those circles, whether their efforts were fully successful (the lessons learned!). The panelists will discuss past, present, and future print and digital mapmaking projects they have participated in, including counter-mapping and working with marginalized communities.

*Panel, Thursday 4:00 PM–5:20 PM*

### **Designing for Change: Creating Robust Workflows to Map Iteratively**

*Leanne Abraham, The New York Times*

When making a map where you know key pieces of information will not be provided until the end of the process, creating a nimble data processing workflow can be extremely important for maintaining your own sanity. This talk will explore how to use common scripting and programming languages together, such as Python and Bash, to iteratively create analyses and designs that can be adjusted as quickly as your editor can type.

*PCD Morning Session II, 10:45 AM–12:05 PM*

### **Designing for Play: Climate Change, Cartography, and Board Games**

*Jim Thatcher, Oregon State University*

Maps and other forms of spatial data visualization remain one of the key means by which climate change risks and impacts are communicated to the public. These maps are often formal in nature, designed for and by subject matter experts with little input from the communities represented within them. This talk presents an alternative approach to the cartographic communication of climate change, one centered on iterative, interactive,

and inclusive design. Early work from a project that combines community input with climate modeling is presented. The goal of the project is the production of an educational game that, through cartographic design, enrolls players in the experience of climate change within that community.

*Outside the Neatline: Maps in Any Medium, Thursday 4:00 PM–5:20 PM*

### **Developing a Historic Landscape Style**

*Michael Horner, Cartistic Endeavors*

Cartography as art does not need to be without function. Developing a Historic Landscape Style for period maps seeks not only to communicate the natural and developed landscape for an area but seeks to do so in a visually appealing way. It is designed to communicate in three aspects: within a room, at arm's length, and up close, drawing the viewer into a deeper understanding and appreciation of the historic as well as present landscape through the intertwining of art and function. This presentation will show the processes used in

creating the map Long Island, New York and Vicinity circa 1850.

*Design & Aesthetics II, Thursday 10:40 AM–12:00 PM*

### Developing an Open-Source Cartography Toolkit

*Alexander Parlato, Ross Thorn, & Damon Burgett, Stamen Design*

Map design for vector cartography faces a unique set of challenges that make much-existing design tooling insufficient. In addition to translating design decisions into the specification of stylesheets, designers must understand the underlying data, its structure, and how it interacts with other features in the world to create maps. While tools such as Mapbox Studio have made this much easier, there are still gaps. In the past two years, Stamen Design has made a concerted effort to improve and add to its internal tooling for cartographic design. In this presentation, we will discuss some of these tools and how they let us incorporate design systems, view and compare maps, track changes, and create variations of map styles.

*PCD Morning Session I, 9:00 AM–10:30 AM*

### Diversity, Equity, & Inclusion I: Disability & Accessibility

*Travis White; Vanessa Knoppke-Wetzel & Tim Sinnott, GreenInfo Network; Frank Elavsky, Carnegie Mellon University*

Do you design accessible maps? Do you know how to design accessible maps? What, exactly, is accessible design? Join the panelists as they discuss accessibility in cartography and data visualization, with a focus on designing accessible content for people with a wide range of abilities and disabilities. Key topics include the importance of promoting more inclusive and equitable design practices, collaborating with and incorporating the perspectives of disabled users, moving beyond conventional notions of what makes a map accessible, and innovative workflows and tools that can help us enhance the accessibility of our maps.

*Diversity, Equity, & Inclusion I, Friday 9:20 AM–10:20 AM*

### Diversity, Equity, & Inclusion II: Queer Cartography

*Lourdes Ginart, U.S. Department of State; Jack Swab, University of Kentucky; Jack Jen Giesekeing, Five College Women's Studies Research Center*

So, you wanna talk about queer cartography? Join our panelists as they dive into conversation about the past, present, and future of queer cartography and answer questions like: What is queer cartography? What is a queer map? Who is queer cartography for? Who is considered a queer cartographer? What role does cartography play in recounting the history of queer spaces, places, and people? What does it mean to create and access queer data? What opportunities and challenges lie ahead for queer cartography?

*Diversity, Equity, & Inclusion II, Friday 11:20 AM–12:00 PM*

### Drawing the Entire Planet by Hand: A Wild World Map of Nature

*Anton Thomas*

Since childhood, I've dreamt of a map of nature. One that depicts Earth without the complications of the human world, representing physical geography via the

beauty of landscapes, and placing wildlife in the starring role. With all the intensity of modernity, it's easy to forget that we cohabit Earth with countless other lifeforms. And so, in 2020, I commenced *Wild World*. My take on a physical world map, it was recently completed after three painstaking years of work. It is a vast, hand-drawn compendium of nature with over 1,500 animals roaming it. Set in the present day, it celebrates a world around us that can still be cherished and protected. Join me on a tour of the planet as I discuss its themes and how it was made.

*Design & Aesthetics II, Thursday 10:40 AM–12:00 PM*

### **Enhancing Cartographic Design Through Artificial Neural Networks: A Geometric Approach for Map Generalization**

*Chinna Subbaraya Siddharth Ramavajjala, Namburi GNVV Satya Sai Srinath, & Ramakrishna Raju Gangaraju, University of Wisconsin—Madison*

Map generalization is a critical step of cartographic design and enables the de-highlighting of trivial map features to express a geographic phenomenon effectively. There are four main types of

cartographic operators: content, geometric, symbol, and label operators. This paper proposes using an Artificial Neural Network (ANN) as a tool for one of the geometric operators, simplification. Geometric features such as great circle distance, the angle between two points, and the density of points are inputs to an ANN. We use Topfer's Radical Law as a quality control measure to evaluate the proposed generalization method.

*Cartographic Research I, Thursday 9:00 AM–10:20 AM*

### **Epistemology and Hand-Drawn Map Narratives**

*Richard Bohannon, Metro State University—Saint Paul*

How do we communicate the limited truth of maps to broader publics? Maps are products of humans, with all our biases, and reduce our infinitely complex world into series of points, lines, and polygons. Over the past several years, I began writing stories using maps and presented in the style of graphic novels and offer up hand-drawn mapping as one tool to communicate a map's necessarily limited perspective. Based in part on the sociologist Pierre Bourdieu's understanding of jargon in

academic sociology—he defended jargon as an important reminder that sociological frameworks are models of reality, and not reality itself—this paper looks at how cartographers might communicate the limited, human-produced nature of their maps.

*Cartographic Narratives, Thursday 10:40 AM–12:00 PM*

### **Erosion As Method(ology): Theorizing and Mapping Structures of Feeling**

*Alexis Wood, University of California, Berkeley*

How might we map the coalescence of ruralities, climate change, and digitalities in northern California's state secessionist movements? Using the theoretical foundations of Raymond Williams' concept, structures of feeling, I argue for a critical cartographic representation of physical and sociopolitical process through the methodological frame of erosion and deposition. This experimental approach to theorizing and mapping this region allows both material and metaphorical investigation of the transfigurations of the physical, social, and digital, not only within themselves but

between one another through common processes across spatiotemporal scales.

*Rethinking Map Conventions, Friday 2:00 PM–3:40 PM*

### “Ethical Problems in Cartography” Revisited

*Nat Case, INCase*

Are our moral responsibilities mostly about integrity in our work or are we implicated in the larger, often problematic processes for which maps are made and used? A roundtable commentary in *Cartographic Perspectives* in 1990, and a follow-up commentary by J.B. Harley in 1991, in many ways set up this continuing question of cartography (and individual cartographer's) ethical and moral responsibilities. We seem as an organization to have come around to accepting Harley's argument that these larger processes are vital for us as cartographers to confront and address, but how does that conclusion then intersect with the other arguments about personal and professional integrity? Thirty-three years on, where have we gotten to?

*Ethics in Mapmaking, Thursday 2:00 PM–3:40 PM*

### The Ethics of AI-Generated Maps: A Study of DALL-E and Implications for Cartography

*Yuhao Kang, University of South Carolina; Qianheng Zhang & Robert Roth, University of Wisconsin–Madison*

The rapid advancement of artificial intelligence (AI) such as ChatGPT and DALL-E 2 have brought opportunities for improving productivity and raised ethical concerns. Here, we focus on the generation of maps using DALL-E 2. We first created an open-sourced dataset that includes synthetic (AI-generated) and real-world (human-designed) maps with a variety of settings. We subsequently examined DALL-E 2-generated maps and found they may raise ethical concerns such as inaccuracies, misleading information, unanticipated features, and irreproducibility. We developed a deep learning-based model to identify those AI-generated maps. Our research emphasizes the importance of ethical considerations in the integration of AI for cartography.

*Ethics in Mapmaking, Thursday 2:00 PM–3:40 PM*

### Experiential Mapping on the Elk Ridge Land Trust

*Bill Wetherholt, Frostburg State University*

This talk summarizes an experiential student mapping project initiated by the owners of a newly purchased 60-acre Maryland Environmental Trust in Grantsville (Garrett County). An original trail map given to the owners contained nonexistent trails and was altogether confusing. GPS data was collected during the Fall 2022 and Spring 2023 semesters by students from Frostburg State University. The data was extracted after each visit and overlaid onto satellite imagery along with a semitransparent georeferenced original map. After many iterations of ground truthing (and getting lost), a clean and accurate trail map emerged guided by landowner and student input throughout.

*Education, Thursday 4:00 PM–5:20 PM*

### False Color for the Rest of Us

*Daniel Wolfe, The Washington Post*

Visualizing raster data usually means more bands, more problems. With availability of multi- and hyper-spectral imagery, just how do we represent the data to a casual audience at first glance? We'll learn novel techniques to show change over time in night sky

data, flooding extents with SAR, and land subsidence with InSAR.

*Data Visualization, Friday 4:00 PM–5:20 PM*

### **Felt: Your Swiss Army Knife for Hazard Mapping**

*Mamata Akella, Felt*

At Felt, we believe that anyone anywhere should be able to create and share a map on the internet, and that the mapmaking process should be intuitive, approachable, and fun! We designed Felt with collaboration in mind from day one. Over the past year, we have introduced a variety of ways to enable individuals and organizations to do so more quickly and easily. Felt not only revolutionizes map creation, but also serves as a cornerstone in hazard mapping. By seamlessly integrating data collection, real-time collaboration, and public awareness, Felt offers a comprehensive toolset for creating and sharing informative hazard maps. This approach streamlines decision making based on data, fosters collaborative efforts among stakeholders, and ultimately contributes to safer and more resilient communities. Join this demo to learn more about how you can start incorporating Felt into your day-to-day mapping workflows

and begin collaborating on maps in new and powerful ways.

*Hazards & Safety, Friday 10:40 AM–12:00 PM*

### **Field Checked for Accuracy**

*Chaney Swiney, Benchmark Maps*

As a cartographer and field checker, I spend at least a month each year out on the road in a never-ending quest to verify and improve our maps. Though the data sources we use to compile our maps are many, varied, and always improving, there is no true substitute for getting boots on the ground (or wheels on the backroads), using the maps ourselves, and learning what can only be learned by being there. From the planning process back home to the dusty days in the field, this talk will outline how I run a field check and which tools, both digital and analog, support this work that is integral to our cartographic process.

*Hazards & Safety, Friday 10:40 AM–12:00 PM*

## **Abstracts**

## **Fel–Flo**

### **Fifty Years of Unclassed Choropleth Mapping: What Will It Take?**

*Michael Peterson, University of Nebraska Omaha*

Waldo Tobler introduced unclassified choropleth mapping in 1973. Using a drum plotter with a ball-point pen, he created crossed-line shadings at percent ink values proportional to the data, thus obviating the need for data classification. The method was criticized for not allowing the cartographer to generalize the map although it was recognized that there is no best way to classify data. Fifty years later, cartographers continue to present false representations through data classification. What will it take to rid choropleth maps of data classification?

*Retrospectives, Thursday 2:00 PM–3:40 PM*

### **FlowMapper.org: Flow Mapping Made Easy!**

*Caglar Koylu, University of Iowa*

FlowMapper.org is an open source and free web platform for automated production and design of origin-destination flow maps. This presentation will be a live demonstration of FlowMapper with three objectives. First, I'll provide tips and tricks for cartographic workflows for making

flow maps with alternative flow symbology and supplementary layers of node symbol, choropleth, and basemaps. Second, I'll feature tools for processing flow data and generalizing flow maps. Third, I'll share a database of flow data sets of a variety of physical and intangible flow data such as human mobility, migration, commodity, money, and information flows.

*PCD Afternoon Session II, 3:30 PM–5:10 PM*

### **Flyover State: Whooping Cranes Through Iowa's Past and Future**

*Kristen Greteman, Iowa State University*

One-hundred and seventy-six years ago, land use decisions put into motion the extirpation of the Whooping Crane in Iowa. By the turn of the 20th century, nesting cranes in Iowa were virtually nonexistent. Prior to this, the northern Iowa Prairie Pothole ecosystem was the historic breeding center for the species in North America. Using geospatial, scientific, and archival data, this paper constructs a spatial narrative about systems. Some systems were deemed more valuable than others and the decisions of a few changed the course for so many human and nonhuman beings.

*Nature & Conservation, Friday 9:00 AM–10:20 AM*

### **The GeoGraphics Lab: Instructions for Growth, Care, and Maintenance**

*Harrison Cole, Exit Design*

Do you want to start a cartography laboratory but don't know where to get funding, equipment, staff, or even furniture? What about establishing a cartography team inside a larger organization? How might cartography outreach and education factor into this? Have you ever wondered how much a single, commercial-grade door costs? In this talk, I answer those questions and more by telling the story of how I led the development of the GeoGraphics Lab at Penn State into a fully functional cartographic design, production, research, and outreach facility. I'll discuss unexpected challenges, thrilling adventures, and paint colors, among other things. Here's a preview: a nice door starts at around \$2,000.

*Retrospectives, Thursday 2:00 PM–3:40 PM*

### **Geospatial Digital Special Collections**

*Timothy Norris & Christopher Mader, University of Miami*

Curation of relevant geographic data for interdisciplinary research and storytelling can be challenging and time-consuming.

Data are often not findable, accessible, interoperable, or reusable (FAIR). The University of Miami Geospatial Digital Special Collections (GDSC) make geographic data more FAIR. Standard metadata elements are used to describe the collections and postGIS deployed on Kubernetes provides data as a scalable service. We will share lessons learned from two prototype special collections: urban resilience and disparities in health outcomes, both for Miami, Florida. Our goal is to share the GDSC framework as an open resource so others can implement similar geospatial digital special collections to speed up scientific discovery.

*Collections, Databases, & Resources II, Friday 10:40 AM–12:00 PM*

### **Going Digital with the Avenza Map Store**

*Rebecca Bennett, Avenza Systems*

You've made paper maps, but are you now curious about how people could use your maps in a digital format? Look no further than the Avenza Map Store! Available on the web and built into the Avenza Maps app, our platform has a global audience of millions of users who are downloading millions of maps worldwide each year and is the perfect

avenue to distribute your maps easily and securely. Learn how the Avenza Map Store can help promote your content and is the right answer to your digital map distribution needs.

*Collections, Databases, & Resources II, Friday  
10:40 AM–12:00 PM*

### **Here Be Monsters: A Map-Based Storytelling Game for Imagining Alternative Academic Futures**

*Heather Rosenfeld, Smith College*

Here be dragons is a trope in Medieval European cartography. Dragons were used to indicate uncharted territory, places that were less known to colonial powers. Here be monsters is a map-based storytelling game that riffs on 1) this trope; 2) Mark Diaz Truman and Avery Alder's postcolonial mapping game *The Deep Forest*; and 3) the Frankensteinian importance of embracing monstrosity in reimagining academia. This presentation will introduce the game, reflect on the design process, and share maps players have produced.

*Outside the Neatline: Maps in Any Medium,  
Thursday 4:00 PM–5:20 PM*

### **A Hexagram Bin Analysis of Growth Trends Using 2009–2022 Annual Parcel Data from Tallahassee, Florida**

*Cherie Bryant, University of Wisconsin–Madison and City of Tallahassee*

Meaningful analysis of population growth trends is critical for making environmentally and fiscally responsible decisions. Annual property appraiser data holds a wealth of information, but is challenging to analyze over time since parcel boundaries can change significantly. The presenter, a land use planner in the fast-growing state of Florida for 20+ years, completed a time analysis for Tallahassee, Florida by compiling 2009–2022 annual parcel data into static hexagram bins. Trends in residential and nonresidential development, property valuation, taxes, and homeownership are now easily explored via a public facing web app built using the ArcGIS SDK for Javascript. Data was prepared using Python. This is Phase 1 of a planned 3-phase project.

*Changing Landscapes, Thursday 4:00 PM–5:20 PM*

## **Abstracts**

## **Her–Hol**

### **Holding Space: A Case for Trauma-Informed Cartography**

*Amber Bosse, MapBosse Co.*

Cartographers working in or alongside activist movements often confront the challenging task of visualizing threats to community safety. Such threats, whether historical or contemporary, acute or ongoing, can lead to the development of both individual and collective trauma. This talk examines the multifaceted ways the presence of trauma impacts cartographic practice. Using frameworks from somatic therapy and polyvagal theory, I explore how a deepened commitment to supporting community safety at multiple scales can lead to the production of more effective maps. I'll introduce the practice of holding space as a method for cartographers to elevate their trauma competency.

*(De)Constructing Cartographic Norms, Friday  
4:00 PM–5:20 PM*

### How Design Students Engage Spatial and Cultural Understanding Through Mapping

*Tim Hamnett, Virginia Commonwealth University*

What we're doing, what we'd like to do, what we're not doing but would like to do and what we don't know we should be doing but would likely like to be doing. The Interior Design Department of Virginia Commonwealth University exists within the School of the Arts. Our university's location in Richmond, Virginia, both the Civil War-era capital of the Confederacy and the Harlem of the South, provides substantial opportunity to document a changing cultural narrative within our city and our region. The purpose of this presentation is to provide insight into our pedagogy as it pertains to student-driven cartography projects and to ask for input from you, experts in the field who, sadly for us, don't work within our eclectic building.

*Education, Thursday 4:00 PM–5:20 PM*

### How Should We Design Mobile Thematic Maps?

*Lily Houtman, The Pennsylvania State University*

As mobile device use increases, individuals are more likely to read the news on these smaller screens than in other print or digital formats. Maps are an essential element in many news stories, necessitating design considerations specific to mobile. Despite wide use in data journalism, mobile thematic maps are understudied in academic cartography which instead has focused on mobile navigation maps. I suggest that mobile-first thematic map design must become a priority in cartography. To contribute to this area of research, I present preliminary results from a study which characterizes the present and future of mobile-first thematic data journalism through interface mockups and interviews conducted with expert news cartographers.

*Web & Mobile Cartography, Friday 4:00 PM–5:20 PM*

### How to Be a More Equitable Cartographer

*Lourdes Ginart, U.S. Department of State*

Though many of us participate in discussions focusing on data ethics, data equity, or diversity, equity, and inclusion, we still leave asking But what can I do?. More so, many of the conversations centered around data ethics or data equity are primarily concerned with how organizations gather, protect, and use data. Few discussions are focused on how the cartographer (or data user) can protect, consider, or collaborate with the very same communities, people, and places they are mapping about. This talk aims to illustrate how cartographers can be more equitable in their day-to-day by providing listeners with a non-exhaustive list of actions that will answer that lingering question... But what can I do?

*PCD Morning Session I, 9:00 AM–10:30 AM*

### How to Talk About the Thing You Made

*Lyzi Diamond, Salesforce*

We are all writers by necessity. No matter what we make, do, or build, we will eventually have to explain it to someone else. When it's a technical project (like a map!),



the task becomes more difficult: we want to explain what we did, how we did it, and what we want the user to gain from it, all while keeping the reader engaged and excited. This talk will provide a brief introduction to the principles of technical writing and how cartographers (and everyone else) can use these principles to increase understanding through clear, concise explanations.

*PCD Afternoon Session I, 1:30 PM–3:15 PM*

### Human Terrain: A Closer Look

*David Nuttall, Artimaps*

This talk will look in detail at my Human Terrain series of maps, from a strange and uncertain idea nine years ago to a process that has been very impactful to me and people I have drawn on. Yes, Human Terrain mapping is hand-drawn plausible fictitious cartography created directly on skin—about 90 maps to date. These are normally temporary works of map body art (with hundreds of photographs taken), often mapping important aspects of people's lives including scars and other body imperfections. Two are now permanent tattoos! The talk will also give some insight

from feedback received from the mapping models perspective.

*Outside the Neatline: Maps in Any Medium, Thursday 4:00 PM–5:20 PM*

### Incorporating Cultural Narratives into a Map of Guadalupe Mountains National Park

*Becca Holdhusen, U.S. National Park Service*

How can maps of national parks be used to pique their audience's interest in the cultural history of the landscapes they represent? Often, park maps are used only as navigational tools by park visitors. In this talk, I speculate about ways to include interpretive clues and information in a new park map of Guadalupe Mountains National Park that would give map readers a deeper understanding of the complex cultural and ecological narratives surrounding the park.

*Mapping Cultural Heritage, Friday 2:00 PM–3:40 PM*

### Indigenous Lands in Apple Maps

*Bradley Herried, Apple*

Apple Maps strives to offer a basemap representing both the physical and political world—we include terrain and physical

environments, human settlements and connections, and administrative boundaries. We aim to be inclusive of all communities and local expectations. In this presentation, we will showcase a new basemap layer, Indigenous Lands, launched in April 2023 for the United States and Canada. We'll discuss the design and data decisions/challenges, custom interactive features, and community involvement. We've utilized a cartographic representation technique, tint bands, to represent this basemap layer—while remaining cohesive with the existing Apple Maps design—that could unlock future layers of similar geographic data types.

*Mapping Cultural Heritage, Friday 2:00 PM–3:40 PM*

### Introducing Vector Basemaps in MAPublisher!

*Riley Sweeney, Avenza Systems*

Explore the exciting future of MAPublisher as we take a deep dive into the new Vector Basemaps feature! This presentation will spark ideas and discussion through a demonstration of the functionality and workflow possibilities Vector Basemaps holds. We will also showcase the advancements in MAPublisher

and Geographic Imager that have been implemented since NACIS 2022.

*PCD Morning Session II, 10:45 AM–12:05 PM*

## **Making Lines Come Alive: Expedition Mapping at National Geographic**

*Soren Walljasper & Patricia Healy, National  
Geographic*

Routes have always been one of the most common uses for maps, but usually a simple line from point A to point B doesn't tell the whole story. At National Geographic, we often chronicle complex expeditions using a lot of different cartographic techniques. In this presentation, we discuss the different ways that we go from a plain line to complete narrative. From the summit of K2 to the Northwest Passage to the first trip around the world, each journey has a set of cartographic characters that we make it our goal to bring alive.

*Cartographic Narratives, Thursday 10:40 AM–  
12:00 PM*

## **The Making of an Atlas of Travel Medicine: Mapping CDC Yellow Book**

*Marielle Glynn, Centers for Disease Control  
and Prevention*

The CDC's Yellow Book is a biennial publication of health information for international travel, primarily intended for medical professionals. In the 2024 edition, 46 maps were used to illustrate complex and geographically diverse risk and prevention measures for a variety of diseases including malaria, yellow fever, meningitis, and more. This presentation covers the history of mapmaking throughout the decades of the Yellow Book's publication and the cartographic process used for the current edition. Cartography for the Yellow Book requires extensive communication and coordination with subject matter expert authors and reviewers to obtain data and plan map design to ensure scientific accuracy.

*Collections, Databases, & Resources I, Friday  
9:00 AM–10:20 AM*

## **The Map on Your Map: Making an Inset Locator Map**

*Vicky Johnson-Dahl, USAID*

What do you do when your map needs a little map of its own? You make a locator map! A good inset locator map enhances and illuminates your main product and doesn't take a lot of time and effort. A few quick little touches can really elevate your design. Join me for a selection of software-agnostic tips and tricks for making clear and effective locator maps.

*PCD Morning Session I, 9:00 AM–10:30 AM*

## **Mapping Geopolitics and Energy Flows in Modern Europe**

*Martin Gamache & Scott Elder, National  
Geographic Society; Eric Knight*

Researching, compiling, and depicting the geopolitical and energy context framing Europe's most significant military conflict since the end of the Second World War is not without challenges. On our June 2023 National Geographic Map of Eurasia, we highlight Cold War alliances, the expansion of NATO, EU and CSTO member countries, as well as document key conflicts and disputed territories included in National Geographic's de facto map policy. Overlaid

is the abstracted energy distribution network that fueled Europe's dependency on convenient Russian natural gas. The focus of our talk will be cartographic solutions for showing such a vast geography amidst a conflict that is simultaneously redrawing both Europe's borders and its energy infrastructure.

*Design & Aesthetics I, Thursday 9:00 AM–10:20 AM*

### **Mapping Guatemala-U.S. Migration: A Case Study in Critical Visual Storytelling**

**Nick Underwood**

What can critical cartographers and data journalists learn from each other? What does it look like to balance ethics and usability? I'll present insights from my master's thesis, a visual storytelling design study intended to address the persistent gap between critical geographic scholarship and conventional cartographic representation. Specifically, the failure of cartographers to ethically and effectively represent the structural and historical forces driving Guatemala-U.S. migration, as well as the personal and emotional repercussions of displacement. To address this problem, I carried out a hybrid design process synthesizing visual

storytelling practices from academic and professional settings.

*Cartographic Research I, Thursday 9:00 AM–10:20 AM*

### **Mapping Happiness: Uncovering the Landscape of Everyday Joys**

**Qingyue Li**

Happiness is a deeply personal concept. Its definition varies from practical to sublime. While it differs for everyone, we often associate it with materialism and validation. However, we have all experienced joy in smaller, profound moments. Our presentation explores and visualizes happiness, aiming to measure its subjective nature. Inspired by my Instagram project, [mappinghappiness\\_](#), we invite people worldwide to share their small joys. By challenging assumptions and analyzing everyday joy, we aim to communicate happiness's idiosyncrasies. Mapping can uncover practical commonalities and inspire a more diverse and generative practice of joy. With NACIS, we can derive deeper insights and offer a rigorous approach to fulfillment.

*(De)Constructing Cartographic Norms, Friday 4:00 PM–5:20 PM*

## **Abstracts**

## **Map—Map**

### **Mapping San Francisco's Fog**

**Scott Reinhard, *The New York Times***

Why does fog occur in San Francisco? In a story published in the *New York Times*, we used large amounts of data, mapping, and a range of visualization techniques to get to the fundamental nature of San Francisco's relationship with fog—from a global perspective down to the neighborhood level. I'll talk through some unique data sets we had access to, including 25 years of fog captured by satellites, as well as our simulation of fog rolling into the city on a typical summer day. This talk will focus on weaving together large amounts of complex data to tell a simple story that hits on a visceral level.

*Design & Aesthetics II, Thursday 10:40 AM–12:00 PM*

### **Maps for Good and Evil**

**Aileen Buckley, *Esri***

Like many things, maps can be used for good or evil. And, like most things, no map is inherently all good or purely evil. Different map types may seem to lean more towards either good or evil. Some are fun and interesting, especially when they advocate a belief that we associate with good. Others

may be designed to mislead or persuade readers to align their beliefs with something we correlate with evil. The conundrum is who gets to decide what is good and what is evil, and what if these change over time? Did the cartographer really think the map they were making was evil or did they think it would help educate or inform? In the end, the cartographer's intention seems to be the fulcrum upon which good and maps teeter.

*Ethics in Mapmaking, Thursday 2:00 PM–3:40 PM*

## Maps for Wildlife Conservation: Introducing the Global Initiative on Ungulate Migration

*Ian Freeman, Wyoming Migration Initiative*

Facing habitat deterioration and fractured landscapes, ungulate (hoofed mammal) migrations that have existed for countless generations are now at risk. One of the largest barriers to conservation efforts is the lack of detailed maps of empirical movements. Formed in 2020, the Global Initiative on Ungulate Migration (GIUM) aims to create a thorough inventory of ungulate migrations worldwide. Our team at the University of Wyoming has seen great success in mapping migrations of

the American West using GPS collars, but what are the challenges of translating this mapping approach to a global scale? In this presentation, I will address GIUM's current progress including our partnerships, data analysis, and cartographic design.

*Nature & Conservation, Friday 9:00 AM–10:20 AM*

## Measure of Urban Growth with Land Use and Land Cover Change in Kendall County, Illinois

*Ayomide Adepeju, Western Illinois University*

Urban growth is a global phenomenon associated with demographic and socioeconomic growth, leading to the expansion of commercial, industrial, and residential land uses to the detriment of mostly agricultural lands. This is the situation in Kendall County, Illinois. This paper combines remote sensing, GIS, and cartographic techniques to study the urban growth in Kendall County using NLCD data from 2001 to 2020. Cartographic processes were employed to visually emphasize the trend. The result shows that the urbanized area increased from 38 sq. mi. to 59 sq. mi. by 79% cultivated lands, 17% other vegetation, and 8% other land cover. The procedure gives a quantitative approach to

assessing urban growth, accompanied by effective mapmaking decisions.

*Changing Landscapes, Thursday 4:00 PM–5:20 PM*

## Mind the Map, or Don't: Implications and Potential of Aphantasia for Map Cognition Research

*P. William Limpisathian, University of Wisconsin–Madison*

Close your eyes and think about an apple. Some may mentally see a crisp apple. Others may vaguely see it or not at all. Now do the same but think about an apple park/orchard you visited. In 2020, psychology Twitter lit up after this poorly understood cognitive variation reached viral meme status. Twitter users were realizing that our ability to visually imagine varied greatly. More importantly, many people realized they lacked this ability altogether. This inability is called aphantasia. It has been linked to visual memory issues. However, its effects on map cognition are unclear. How does one read maps without being able to visually imagine those spaces? In this talk, I discuss the implications of aphantasia on map cognition research.

*Cartographic Research I, Thursday 9:00 AM–10:20 AM*

### Multi-Method Mapping as an Approach to Transdisciplinary Research

*Heather Miles, University of Manchester*

For my Ph.D., I have developed a multi-method approach to mapping for use as a research methodology across the discipline of geography and for transdisciplinary projects. This approach is concerned with the process of mapping as well as a final map per se. Multi-method mapping may, for example, elicit narratives during mapping or evoke more corporeal understandings, as well as map geospatial data. I am trialing this approach within a large transdisciplinary project that includes GIScientists, artists, and social scientists. I will present early findings from the evaluation. Can multi-method mapping enable these contrasting researchers to critically engage with their differences?

*Cartographic Research II, Thursday 10:40 AM–12:00 PM*

### Narrative Transportation in Cartography: The Potential to Be Lost in a Map Story

*Carolyn Fish, Samantha Ruth Brown, & Stuart Steidle-Nix, University of Orgeon*

Integrating maps with stories is often easier said than done. In this article, we draw inspiration from social psychology and affect theory to argue for the concept of narrative transportation. Narrative transportation is the extent to which a person becomes immersed in a story. Its strength stems from its ability to help open individuals to new information, considering narrative transportation may be useful for cartographers communicating politicized topics such as climate change, (settler) colonialism, environmental racism, and so on. Furthermore, we emphasize the importance of affect and emotion when thinking about communication because the map and text's affect and emotions experienced by the reader can greatly contribute to cognition.

*Cartographic Narratives, Thursday 10:40 AM–12:00 PM*

### National Geographic's 1:1 Million Ukraine: A Year at War Map

*Martin Gamache & Alex Tait, National Geographic Society*

The 2023 map of Ukraine at 1:1 million scale continues the National Geographic Society's tradition of depicting global, geopolitical conflicts. It introduces a new map policy note for southeastern Ukraine and illustrates National Geographic's de facto approach to cartographic depictions of territorial control. The map shows land cover, transportation, power plants, border crossings, and relief. It includes contextual notes that highlight key elements of the terrain and logistics. Lines show the estimated maximum extent of Russian advances, territorial claims, and the approximate frontline a calendar year after the full-scale invasion. We will discuss the map policy, data compilation, and design considerations that went into its creation.

*Design & Aesthetics II, Thursday 10:40 AM–12:00 PM*

### **Navigating the Transition: Insights from a Contributor and User Perspective on Paper-to-Digital Nautical Charts**

*Taylor Krabel, National Oceanic and Atmospheric Administration*

This presentation offers a distinct and informed viewpoint on the transition from paper to digital nautical charts. As a hydrographer and certified NOAA cartographer, the presenter possesses an in-depth understanding of the intricate ping-to-chart processes, actively contributing to the ongoing national mission of updating nautical charts and ensuring data accuracy. Concurrently, in the role as a bridge watch officer, it has highlighted both the challenges and intricacies of transitioning from traditional paper charts to digital vector products. Drawing from these experiences, this presentation will explore the nuances, obstacles, and lessons learned during the journey towards digital chart adoption.

*Retrospectives, Thursday 2:00 PM–3:40 PM*

### **The Past, Present, and Future of Stamen Maps**

*Alan McConchie, Stamen Design*

In 2011, Stamen Design launched three basemap styles built on OpenStreetMap data called Toner, Terrain, and Watercolor. Provided free for anyone on the internet to use, these basemaps became an essential and well-loved part of the open-source mapping ecosystem. After more than a decade, however, these maps were showing their age and Stamen began looking for new partners and updated methods to support and evolve these maps for the next decade and beyond. In this presentation, we will talk about our work in 2023 to rebuild and rehome these maps and share some of our thoughts on the past and future of open-source cartography.

*Open Source, Friday 2:00 PM–3:40 PM*

### **The Petrofuture: Road Maps to Climate Change**

*Jeffrey Linn, Conspiracy of Cartographers*

Although their time has mostly passed, the gas station road map is deeply ingrained in modern American culture. Once given out free with every tank of gas, they can evoke deep memories of adventure and travel. The nostalgia and imagery we've

come to associate with the American road trip are inseparable from these maps. These beloved bits of ephemera are also corporate propaganda. Emblazoned with bright corporate logos, they helped to expand car culture and fossil fuel dependency, the largest source of pollution and greenhouse gases on Earth. The Petrofuture series subverts this propaganda. Using vintage gas station road maps as a base, these works of parody show us the final outcomes of a warming world.

*Rethinking Map Conventions, Friday 2:00 PM–3:40 PM*

### **Polar DEMs: Mapping Terrain from Space and Releasing It to the Public**

*Jesse Bakker, Polar Geospatial Center*

The science (some would say magic) of photogrammetry can turn 2D satellite imagery into 3D digital elevation models (DEMs). Using high-resolution commercial imagery collected in stereo over the far ends of the earth, the Polar Geospatial Center has produced continent-scale 2-meter DEMs of the Arctic and Antarctica and released them to the public. This talk will provide an overview of how ArcticDEM and the Reference Elevation Model of Antarctica (REMA) were created to support polar

science, show how you can access them for free, and demonstrate some visualization techniques to integrate polar (or non-polar) DEMs into your maps.

*Terrain Representation, Thursday 2:00 PM–3:40 PM*

### **Post-Scarcity Web Mapping with Protomaps**

*Brandon Liu, Protomaps*

The Protomaps vector basemap is an open-source cartographic product designed for free reproduction and flexible customization. It synthesizes a few complementary technologies including a liberally licensed basemap schema based on Tilezen, the PMTiles file format for deploying tilesets, and the Planetiler Java library for fast, planet-scale generalization. Whole-earth, multiscale tilesets can be created from OSM, Natural Earth, and Overture by solo cartographers in hours and reproduced at zero marginal cost. When vector maps shift from a API-limited, usage-metered resource to a commodity, what new possibilities are there for vector web maps? What software tools and methods should emerge? And

what cartographic challenges remain to be tackled?

*Web & Mobile Cartography, Friday 4:00 PM–5:20 PM*

### **The Process Is the Product: How Mapping Prejudice Powers Community Racial Covenants Mapping**

*Michael Corey, University of Minnesota; Justin Schell, University of Michigan; Anne Bonds, University of Wisconsin–Milwaukee*

Mapping Prejudice uses critical cartography and advanced digital tools to map racial covenants. The project's new Deed Machine solves many problems that have long blocked large-scale covenant research. But as thousands of volunteers have taught us, the purpose is not to find as many covenants as possible, but to use community participation to drive reparative change. This core value, that the process is the product, has driven many decisions in the development of the Deed Machine, a tool designed not to automate people out of the loop, but to improve our volunteers' experience.

*Panel, Thursday 2:00 PM–3:40 PM*

## **Abstracts**

## **Pos–Pro**

### **Processing Historic Aerial Photographs of Pennsylvania for Discovery and Analysis**

*Nathan Piekielek, The Pennsylvania State University*

Historic aerial photographs in analog form provided the backbone of cartographic basemapping in the U.S. for decades. Today, numerous collections are preserved in archives, libraries, museums, and government offices. Recent large-scale digitization campaigns have begun to convert these analog collections into digital form. Prior research developed efficient computer-vision aided workflows to build digital indexes that enable geographic search and that georeference, mosaic, and orthorectify collections to contemporary standards for geospatial imagery layers. This presentation shares progress on an ongoing project to build a library of historic orthomosaics for the state of Pennsylvania for public access.

*Collections, Databases, & Resources I, Friday 9:00 AM–10:20 AM*

### **Producing a Map Series of Remote Alaskan Native Villages and Federal Lands**

*Mike Wissner, The Pew Charitable Trusts*

What happens when a GIScientist is tasked with creating a detailed map series of remote Alaskan Native communities? A lot of learning actually! This talk will outline the steps taken to create a map series of 15 remote Alaskan Native villages intended to provide geographic information around federal land ownership, public land orders, and the physical geography where people and families live and thrive. Taking a cartography-first approach helped shape the workflow, lose bad GIS-centric habits, and center the final audience from the very start. Ideally, my frustrations will inform your efficiencies. Everything from detail-oriented data management to batching your tasks by software can make for smoother and more enjoyable map production.

*Data Visualization, Friday 4:00 PM–5:20 PM*

### **Public Data Tools for Understanding Urban Property Ownership**

*Michael McCanless & Jacob Saindon, University of Kentucky*

Public data visualizations depicting property ownership have become increasingly important tools for assessing the impact of financial investment on cities. Notable projects from the San Francisco Bay Chronicle have mapped the ownership of property in the Bay Area, while others, such as Tenant Power by Eric Robsky Huntley, allow you to search your address and identify other properties owned by a shared landlord. Our presentation builds from this trend in developing a data visualization template that depicts foreclosures in Louisville, Kentucky between the years of 2016 and 2021. We process this data to show the geography of investment and discuss the promise and challenge of public data tools for understanding property ownership.

*Open Source, Friday 2:00 PM–3:40 PM*

### **Quantifying the Impact of Floods on Agriculture and Built-Up Areas in the Malawi Lowlands**

*Nelofar Qulizada*

This research utilizes a geographically generalizable heuristic to evaluate the impact of floodwater on agriculture and other land-use/land-cover (LULC) types. Flood extents are identified using Synthetic Aperture Radar (SAR) data from Sentinel-1, and depths are calculated using an elevation-based Floodwater Depth Estimation Tool (FwDET) algorithm. The framework is used here to determine the spatial organization of flood depth and the intersection with multiple LULC types in agriculture and built-up areas within the Malawi lowlands. Flood depths will be modeled at a 30-m spatial resolution using the NASADEM Digital Elevation Model. Google Earth Engine is being used to access and process geospatial data on the cloud, and the code used is open access to enhance the reproducibility of the work.

*Changing Landscapes, Thursday 4:00 PM–5:20 PM*



## Queer(ing) Cartography: What, For Whom, and Why?

Jack Swab, University of Kentucky

This presentation asks what a queer cartography beyond maps of queer spaces looks like. By moving from queer cartography to a queering of cartography, I outline potential areas of new inquiry, practices, and attitudes that can reshape the cartographic community. In the process, I show how cartography has a long, often unacknowledged, association with queerness and that cartography will always be a queer endeavor regardless of whether we acknowledge it or not. By committing to action and centering the queerness inherent to our practice, I argue that we can create a community that is both more open and accepting to current and future cartographers, while also being more relevant to the audiences we seek to connect to.

*Diversity, Equity, & Inclusion II: Queer Cartography, Friday 10:40 AM–12:00 PM*

## Query the Earth: Over One Billion OSM Features in an Easy-to-Use Schema

Jennings Anderson, Jonah Adkins, & Jacob Wasserman, Meta

The Earth Table is an open geospatial dataset maintained by Meta that combines the quality assurance and validation of the Daylight OpenStreetMap Distribution with other open geospatial data sources to create a single, one-stop-shop for more than one billion map features organized into an easy-to-use theme, class, and subclass schema. Over the past year, we have expanded the Earth Table to include precomputed polygon centerlines rendering labels, per-feature country codes, and more. We will show how Meta leverages this dataset to build our own maps and how anyone can access and use the Earth Table via Amazon's Registry of Open Data.

*Open Source, Friday 2:00 PM–3:40 PM*

## Re-Orienting the Map

Leland Brown

Relief inversion is an effect commonly seen with satellite imagery in the northern hemisphere due to the sunlight coming from the lower part of the image. This inhibits

our ability to properly distinguish ridges from canyons in mountainous areas. But thanks to the way satellite photographs are usually taken, an interesting (and perhaps controversial) solution presents itself, which can be applied consistently across northern and southern latitudes as well as the tropics. Be prepared to challenge one of the fundamental rules of most modern cartography. Is this a serious suggestion, or am I being tongue-in-cheek? You decide.

*Terrain Representation, Thursday 2:00 pm–3:40 pm*

## Rebuilding Natural Earth: A Public Preview of Version 6

Nathaniel V. Kelso, Kelso Cartography; Tom Patterson, U.S. 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. Hydrography serves as the foundation of this work, building up from coastline and interior drainages including tapering. Eighteen months later,

with countless hours from many volunteers, we are pleased to present a public preview of Natural Earth v6, including updated bathymetry, lakes, glaciers, and ice shelves. We will also review draft populated places and administrative boundary changes.

*PCD Afternoon Session II, 3:30 PM–5:10 PM*

## Reckoning With Our Origins: Our Founding Funders

*Christopher Van de Ven, University of the South*

The University of the South founded the Roberson Project...to investigate the University's historical entanglements with slavery, its legacies, and white supremacy. As part of that investigation was the Founding Funders project, which followed the money that was raised to found the university. In 1861, 295 persons pledged a massive fortune to fund a new university to serve the plantation states. The Founding Funders project researched those persons and how their wealth was invested in human property. The resulting interactive web map explores the supporters who provided the funds to establish the University of the South.

*Mapping Cultural Heritage, Friday 2:00 PM–3:40 PM*

## Reflections on Penn State's Embedded Geovisual Analytics Course: Travels to the European Union

*Fritz Kessler & Beth King, The Pennsylvania State University*

Twelve undergraduates from Penn State's College of Earth and Mineral Science joined eight graduate students enrolled in the Master of Geographic Information Science or Spatial Data Science program for a two-week mapping adventure to the European Union. Penn State students collaborated with international graduate students studying at the Vienna University of Technology to develop geographic visualizations that analyzed spatio-temporal patterns in global COVID-19 data. Outcomes included students presenting their analysis in an academic setting, developing cross-cultural connections between students, working in groups to analyze this data, and applying geovisual analytics methods to visualize patterns over space and time.

*Education, Thursday 4:00 PM–5:20 PM*

## Representing and Interpreting Essential Work Through a Regional Lens

*Joanna Merson, Alethea Steingisser, & Erik Steiner, University of Oregon*

The Pacific Northwest (PNW) Atlas of Essential Work—a collaboration with the UO Just Futures Institute—represents and interprets essential work through a regional digital storytelling atlas. The chapters in this growing web-based collection of work by scholars and students are bound by their connection to labor, justice, and the PNW. Through narrative, maps, photos, and interactive graphics, the stories make visible the hidden spaces of essential labor of vulnerable workers that help define this region, including prisoners deployed to fight forest fires in remote landscapes, home care workers supporting our aging population in private settings, and climate protestors occupying tactical positions along fossil fuel transport lines.

*Collections, Databases, & Resources I, Friday 9:00 AM–10:20 AM*

### The Return of Copperplate Maps

*David Kulbeth, Columbus Cartography*

Maps created during the 15th–19th centuries were often etched or engraved into copper plates. From pulp to print, Columbus Cartography shares how it uses these traditional intaglio printmaking techniques to produce handmade maps with the iconic antique copperplate look and feel.

*Historical Cartography, Thursday 9:00 AM–10:20 AM*

### Scaling Up Atlascope

*Ian Spangler, Boston Public Library*

This talk discusses scaling up Atlascope, the Leventhal Map & Education Center's (LMEC) digital tool for providing public access to 101 georeferenced urban atlases of the greater Boston area. Since its release, Atlascope has become a staple of LMEC's public-facing research and reference services, but it represents only a fraction of the towns and cities across Massachusetts. When we started adding new towns and cities in early 2023, we made the decision to rely on an open source, highly extensible, lightweight web georeferencing platform called Allmaps. Rather than a perfect solution for all use cases, Allmaps contains

various promises and challenges of interest to geographers, cartographers, and map librarians.

*Collections, Databases, & Resources II, Friday 10:40 AM–12:00 PM*

### Secure Political Claim: How Japanese Regulate Map Labeling on Southern Sakhalin Island (Karafuto)

*Zhaoxu Sui, University of Oregon*

Toponyms on maps are not always neutral terms describing places around the world. Often, these toponyms are used to imply certain cultural, political, or societal messages. In this presentation, I will introduce the Japanese practice of keeping place names on their maps of southern Sakhalin Island (Karafuto), where the de facto control is now Russian. I will discuss the use of toponyms for political purposes and how this problem can better guide us to investigate relationships between toponymy, power, and identity.

*Rethinking Map Conventions, Friday 2:00 PM–3:40 PM*

### Sites of Shame: Telling the Stories of Interned Japanese Americans Through Maps

*Eric Belsford & Kelsey Taylor, Stamen Design*

During World War II, over 125,000 individuals of Japanese ancestry, including two-thirds who were U.S. citizens, were unjustly detained without trial in the U.S. In 1996, Densho, a non-profit organization, started documenting their stories. In 2005, they launched the Sites of Shame project to map the locations of detention centers, exclusion zones, and the movement of the imprisoned population. This talk explores the collaboration between Stamen Design and Densho, focusing on updating the Sites of Shame project and our joint efforts in 2023 to create a detailed map of the Manzanar concentration camp.

*PCD Morning Session II, 10:45 AM–12:05 PM*

### Slicing OSA-UCS Color Space to Inspire Bivariate Color Scheme Design for Thematic Maps

*Cynthia Brewer, The Pennsylvania State University*

The Optical Society of America Uniform Color Scales (OSA-UCS) has an intriguing structure useful for designing

bivariate thematic map color schemes: a cuboctahedral geometry, giving seven cleavage planes and twelve equally distant neighbors for each color. UCS notation is L for lightness, j for yellow (jaune), and g for green. Holding j constant at zero slices from light to dark through greens and reds. An example diagonal slice is  $L+g=2$ , giving 56 sample colors ranging from light pink to dark green and flaring to blue-purples on one side and yellows on the other. Choosing nine colors for a 3x3-square bivariate map scheme from these complex cleavage planes provides cartographers with inspiring options, getting past RGB or CMY mixture sets.

*Cartographic Research I, Thursday 9:00 AM–10:20 AM*

### Slow Cartographies: Thoughts on a Slow Map Movement

*Jörn Seemann, Ball State University*

Maps are generally evaluated by their efficiency to convey messages and information without considering aspects of time and speed. How long does it take to read a map? How much time is put into mapmaking? The aim of this study is to make a plea for slow cartographies that are based on taking pleasure in maps on paper

and in digital format and that recognize the essentially humanistic value of these visual narratives, in analogy to the slow food movement that initiated in the 1980s. Examples from theory and practice are used to point out ways to decelerate mapping processes.

*Cartographic Research II, Thursday 10:40 AM–12:00 PM*

### Small Multiples as a Gallery of Possibilities

*Meghan Kelly, Syracuse University*

Recent work in feminist mapping has expanded our cartographic toolkit and introduced both new (and old) tools that illuminate and challenge systems of power and oppression. Here, I introduce the gallery of possibilities as a feminist mapping tool that rethinks or rettools small multiples, embracing multiplicity as an inherent element within the more conventional thematic mapping technique. I outline five core principles within the gallery of possibilities and illustrate the method with a case study—a workshop series on feminist map icons. In sum, I argue for the inclusion

and expansion of feminist mapping tools in everyday cartographic practice.

*Cartographic Research II, Thursday 10:40 AM–12:00 PM*

### Snowy Celebrations: Bending NWS Data for Frosty Festive Memories

*Dylan Moriarty, The Washington Post*

I'm dreaming of a snowy Christmas, though my memory tells me it's a coin flip whether those mornings began with mounds already on the ground or midday snowfall. This got me thinking, what if we could tell someone how many snowy holidays they experienced? Not with a time machine, but the closest approximate thing we have to it: National Weather Service (NWS) data. This will be a talk about abstraction in GIS data work and design, and the stubbornness that went into the Washington Post piece *How much snow your hometown gets for the holidays*.

*Data Visualization, Friday 4:00 PM–5:20 PM*

### **Soaring Above Pinnacles National Park: An Exercise in Oblique Mapping for Hiker Safety**

*Joe Milbrath, U.S. National Park Service*

This lightning talk presentation will explore the use of a 3D oblique view for the new Pinnacles National Park brochure map. The 3D view was selected to depict the steep elevational gradient from the park's valley floor to the rugged High Peaks after countless hikers misjudged the difficulty of their daily jaunts to spot the rare California condor. To further illustrate trail difficulty, the map borrows a technique widely used in ski area maps by delineating trails with green circles, blue squares, and black diamonds.

*Terrain Representation, Thursday 2:00 PM–3:40 PM*

### **Spatiotemporal Filtering of Tweets to Improve the Identification of Actionable Information for Emergency Management**

*Marcela Suárez, The Pennsylvania State University*

Social media's large data volumes and its spatial and semantic uncertainty hinder emergency responders' use of this data for assessing and responding to the local

impacts of events. This study evaluates the utility of applying spatiotemporal filters to Twitter data before analyzing their content for use in emergency response. The approach involves considering only the most critical stages of the disaster, hazards-related geographic information, and tweet content. Results confirm that spatiotemporal filtering of Twitter data before analyzing tweet content enhances identifying actionable information for emergency response, which will vary depending on the emergency responder.

*Hazards & Safety, Friday 10:40 AM–12:00 PM*

### **Spots and Dots: Building a Modern Web UI for Mapping Density with Gridded Proportional Symbols**

*Kristian Ekenes & Jeremy Bartley, Esri*

In his 1967 book, *Urban Atlas*, Richard Saul Wurman introduced an innovative cartographic style for mapping population density. The style is defined as a grid of concentric circles proportionally sized based on a numeric value. Wurman's graduate students described this symbology as spots and dots. This talk will summarize the engineering process that went into creating a user interface on the web that allows

anyone to create a visualization in this style in seconds, thus avoiding a formerly tedious and time-consuming process. We'll discuss the cartographic value of the style, its strengths and limitations, challenges in implementing it on the web, and how it compares to other forms of density visualizations.

*Web & Mobile Cartography, Friday 4:00 PM–5:20 PM*

### **Stay the Course: Leveraging Maritime Traffic Patterns to Predict Future Behavior**

*Christos Kastrisios, Sean Kohlbrenner, & Alexandros Troupiotis-Kapeliaris, The Center for Coastal and Ocean Mapping*

Sudden changes in a vessel's path are common, complicating efforts to predict future behavior. In this work, we leverage existing traffic to develop an algorithm that makes informed trajectory predictions. Our method begins with analyzing historical maritime traffic using AIS data from vessels in southern New England. This analysis culminates in creating representative trajectories of this data that are validated against nautical charts. The algorithm matches a given path to these trajectories and uses them to model their behavior.

This developing effort aims to reduce the cognitive load for mariners and support autonomous navigation efforts by predicting the probable movement of nearby vessels and their future waypoints.

*Hazards & Safety, Friday 10:40 AM–12:00 PM*

## Stitching the Earth

**Kate Leroux, onX Maps**

One of my hobbies is turning satellite images into embroidery. In this talk, I'll share my digital and physical tools, my process, and some examples of my finished work.

*PCD Afternoon Session I, 1:30 PM–3:15 PM*

## A Synesthete's Atlas: Performing Cartography

**Eric Theise**

Since April 2022, I've performed A Synesthete's Atlas in dozens of North American and European museums, galleries, and cinemas. I manipulate projected web maps in collaboration with improvising musicians as a form of expanded cinema, incorporating strategies from experimental film, the Light and Space movement, 1960's light shows, and visual poetry as I investigate perceptual pleasure/fatigue and

question mapping conventions. I'll present Carto-OSC, my assemblage of open-source libraries, data, protocols, and JavaScript that makes maps playable using a touch surface. I'll include excerpts of recent performances and entice you to attend Saturday evening's field trip with Pittsburgh flutist Theresa Abalos.

*Outside the Neatline: Maps in Any Medium, Thursday 4:00 PM–5:20 PM*

## Terrain for Flatlanders

**John Nelson, Esri**

Terrain representations like shaded relief, hachures, and contours occupy a tender and indulgent place in cartographers' hearts. But what about places that sport relatively smooth terrain? Do they miss out on all the fun? In this presentation I'll use, extend, wring, and coax terrain methods into revealing the ups and downs of even the smoothest landscapes. Terrain is a matter of perspective and even the flattest areas can benefit from the revelation of relief.

*PCD Afternoon Session II, 3:30 PM–5:10 PM*

## Thinking Beyond Critique

**Dave Smith, Rutgers University**

It is generally accepted that critique is an essential part of most, if not all, design fields. However, the term critique is often used to broadly describe a variety of semi-distinct types of interaction between the designer, the design product, and a third party. Understanding what type of interaction you are engaging in, and the expected role of each participant, is key to ensuring that interaction is productive and satisfying. I will identify and describe a handful of common critique and critique-adjacent interactions that relate to the design of maps and discuss why these distinctions are important.

*(De)Constructing Cartographic Norms, Friday 4:00 PM–5:20 PM*

## Thirty Years of Web Mapping: A Retrospective

**Brandon Plewe, Brigham Young University; Nathaniel V. Kelso, Kelso Cartography; Jeremy Bartley & Kristian Ekenes, Esri**

A lot has happened since the interactive web map was invented in June 1993. In such a rapidly changing technological field, it is helpful to look back and reflect on how we got here and where we are headed.

Panelists have had a wide variety of roles and experiences over these thirty years and will discuss the innovations, trends, mistakes, and players who have brought us to this moment. We also hope to have a fruitful discussion with the audience on what the future holds for the next thirty years of web mapping.

*Panel, Friday 2:00 PM–3:40 PM*

### **Those Maps Are Electric! Messing Around with Electronics in Cartography**

*Janice Kai Chen, The Washington Post*

Mark Monmonier's talk last year on electric orientation maps sparked an idea—can I learn to use electronics in my own mapmaking? I spent the last six months trying to find out. Come hear about my bumbles and hiccups along the way, and learn how to make your own electric map with circuit boards, R, and Python.

*Outside the Neatline: Maps in Any Medium, Thursday 4:00 PM–5:20 PM*

### **Tidying Up NPS Map Symbols**

*Alex Fries, U.S. National Park Service*

The pictographs and symbols found on National Park Service (NPS) maps and media are arguably as recognizable and iconic as the maps they appear in. Starting with a base set of recreation symbols provided to the NPS in 2006, we've since produced hundreds of additional custom symbols for use across all NPS media products. However, over the years various stylistic inconsistencies have developed between some of the custom symbols created by different NPS media groups. This talk will quickly go over examples of some of these inconsistencies, as well as the steps taken to rectify these issues and to create new standardization procedures meant to maximize consistency across the entire NPS symbol library as new symbols are developed in the future.

*Design & Aesthetics I, Thursday 9:00 AM–10:20 AM*

## **Abstracts**

## **Tho–Tru**

### **To Trust or Not to Trust Maps, That Is the Question**

*Timothy Prestby, The Pennsylvania State University*

An essential yet overlooked consideration in mapmaking is whether the intended reader trusts the map. Scholars have argued that maps are imbued with authority, objectivity, and realism that make them especially trustworthy, but limited research has explored the intersection of trust and cartography. In this talk, I survey cartographic research on trust to determine 1) what does trust mean in the context of mapping, 2) how researchers have studied trust in maps, and 3) what gaps of knowledge exist in our understanding of trust in cartography. In doing so, I will connect theory to practice by exploring the implications of this work for professionals and researchers.

*Ethics in Mapmaking, Thursday 2:00 PM–3:40 PM*

## **Towards a Journalistic Cartography Code of Ethics**

*Jake Steinberg*

Have you ever wanted to be more transparent about your mapping process? Ever thought your map could be harmful? Ever doubted a dataset's trustworthiness? Ever been unsure if your map is truthful? Cartographers who work in journalism think about these questions all the time. I present the results of my master's thesis, an interview study with 17 news cartographers on their recommendations for ethical map design and visual storytelling. I offer practical advice useful to any cartographer who aims to tell stories with maps.

*Ethics in Mapmaking, Thursday 2:00 PM–3:40 PM*

## **Towards a Web-Based, Multi-Resolution 3D Terrain Map of the Earth**

*Ondřej Procházka, Seznam.cz*

Web-based 3D mapping has become increasingly popular in recent years due to the widespread availability of WebGL, emergence of various software 3D mapping libraries, and ever-broadening array of

available high-resolution DEMs and satellite imagery. Using these powerful ingredients for cartographic ends comes with its own set of challenges, yet recent works attest to its potential. In this talk I will discuss and demonstrate one of the possible approaches to create a web-based, multi-resolution, interactive 3D terrain map of Earth based on open-source software and public domain data.

*Terrain Representation, Thursday 2:00 PM–3:40 PM*

## **Towards Nonlinear Narratives: Online Atlas Storytelling**

*Gareth Baldrice-Franklin, University of Wisconsin–Madison*

This research extends discussions of cartographic storytelling to online atlases, which I argue carry unique narrative capabilities due to the online medium. Storytelling has a dual nature within online atlases: individual maps can tell stories and these maps also coalesce into a larger story which may possess nonlinear qualities. To examine how a narrative online atlas could be designed, as well as how users might respond to this design, I created an original online atlas for use in a lower-level college course, and then held a series of focus group discussions with students and instructors. In

this presentation, I will present the results of these focus groups as well as takeaways for narrative atlas design.

*Cartographic Narratives, Thursday 10:40 AM–12:00 PM*

## **Uncharted Backcountry: A Bush Pilot's Exploration in Creating a Modern Backcountry Sectional** *Alex Polvi, Barbless Backcountry*

We'll embark on a journey into the world of backcountry aviation as a pilot sets out to create a modern backcountry sectional chart. Leveraging modern mapping tools, geospatial analysis, aviation software, and in-the-bush field work, the pilot maps uncharted regions of Mexico and the western U.S., sharing challenges and innovations found along the way.

*Data Visualization, Friday 4:00 PM–5:20 PM*



### Uniting the States with Telegraphs: Mapping America's First Digital Revolution

*Lauren Winkler, Lauren Winkler Cartography; Edmund Russell, Carnegie Mellon University*

One of the biggest problems facing the United States in the 19th century was uniting a vast nation. In 1800, the country hugged the Atlantic coast. By 1900, the country stretched from the Atlantic Ocean to the Pacific Ocean. As the nation was being pulled apart from north to south, the telegraph played a key role in uniting it from east to west, providing instantaneous communication across the country. To help us understand the process of uniting the states, we built the first digital map of a telegraph system, where you can scroll through time to see how modern technology helped build a transcontinental nation. We will show how we applied historical research and web cartography techniques to map America's first digital revolution.

*Historical Cartography, Thursday 9:00 AM–10:20 AM*

### Unsettled: Scars and Landscape

*Bethany Craig, University of Kentucky*

This project makes visible the blurriness of time, memory, and space of and on the body by combining qualitatively collected photographs and coordinates of bodily scars and GIS technology. The paper is a constellation of stories. A collision of place and space, harm, trauma, joy, tragedy, growth, past, present, and future. The work is drawn from the hope that bodies interacting within the material, virtual, and imaginary world will begin to interact differently. Kinder, gentler, more emphatically. With inquiring minds open to the stories embedded and carried with and through the body, which manifests as an object of ordering—simplistic in its form as we encounter them daily with little thought as to how they have come to be.

*(De)Constructing Cartographic Norms, Friday 4:00 PM–5:20 PM*

### Using Artificial Intelligence to Deal with the Hardest Part of a Mapping Project

*Michael McNeil, St. Tammany Parish Assessor's Office*

With the proliferation of generative artificial intelligence tools like OpenAI's ChatGPT and Google's Bard in the past year, cartographers, GIS professionals, and geospatial developers alike are wondering: how can these powerful new tools be used to JUST GET STARTED, ALREADY!?!? This presentation will demonstrate the power of ChatGPT in terms of dealing with data ETL, the often challenging first step of any mapping project.

*PCD Afternoon Session II, 3:30 PM–5:10 PM*

### Using Psychology to Make Better Maps

*Madeline Rouse, PlanetScape AI*

When it comes to mapmaking, understanding your audience is crucial. But can any of us actually understand how other people will read our maps? This presentation explores how cartographic design, psycholinguistics, and spatial cognition intersect to shape how people interpret and use maps. By examining the psychological

## Var—Why

factors that influence map perception, we can create maps that are not only visually compelling but also easy to use.

*Rethinking Map Conventions, Friday 2:00 PM–3:40 PM*

### **Vary Your Maps with Variable Fonts**

**Craig Williams, Esri**

Variable fonts are an exciting new(ish) type of font that enable users to customize variables of a font such as weight, width, slant, and even custom variations the font designer exposes. In this presentation, I'll introduce variable fonts, how the OpenType font variation technology behind them works, the benefits of using them, and examples you can start with today. I'll then show how they can be used in your cartographic workflow in mapping applications like ArcGIS Pro and graphic design applications like Adobe Illustrator and Inkscape.

*PCD Morning Session I, 9:00 AM–10:30 AM*

## Abstracts

### **Visualizing the Real-World Impact of Bitcoin's Energy Usage**

**Zach Levitt, The New York Times**

Bitcoin mines use an immense amount of electricity in their digital race for profit. An investigation from The New York Times found that 34 of the largest Bitcoin mines in the U.S. are using about as much electricity as three million U.S. homes and rely heavily on fossil fuel power. To convey the scale of these mines' impact to readers, we compared each mine's electricity usage to household electricity usage across the country. In this talk, we'll look at the open-source data analysis and visualization techniques behind this project that brought it to life for our audience on the web, on mobile devices, and in print.

*PCD Afternoon Session I, 1:30 PM–3:15 PM*

### **When Henry Silverstein Got Cold: Mapping Census Data to Uncover a Case of Fraud**

**Tammy Hepps, Homestead Hebrews**

Presenting a detective case that could only be cracked with maps: Why are there hundreds of fake people in the 1920 census of Homestead, Pennsylvania? While there

were many layers of clues in the fraudulent data, the most telling patterns could only be revealed by attempting to map the entirety of the faulty enumeration. The resulting geographic visualization (as well as the discovery of un-mappable data) reveals both the hidden narrative behind enumerator Henry Silverstein's illegal scheme and the reasons why his fraud went unnoticed for a century. This talk will conclude with reflections on how cartographic techniques can play a unique role in assessing the true reliability of historical census data.

*Retrospectives, Thursday 2:00 PM–3:40 PM*

### **Why 2024 Won't Be like 1984: Historic Maps As Contemporary Sources**

**Alexander Tarr, Worcester State University; Will Payne, Rutgers University**

In 1984, the City Graphics Company commissioned commercial artist Alice Bunny Carter to hand illustrate a detailed cartoon map of Massachusetts's booming high technology sector. The Massachusetts Technology map, based on the company's already successful promotional map of Silicon Valley, draws on a long history of comic art eschewing cartographic

conventions to illustrate a specific sense of place. In this talk, we argue that the map offers a compelling, though incomplete, visual archive for understanding how the region portrayed itself as a center of technological innovation. We show how we have used this historic map as a source for new, web-based maps visualizing how that geographic imaginary still shapes the contemporary landscape.

*Changing Landscapes, Thursday 4:00 PM–5:20 PM*

## NACIS Store

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](https://nacis.org/initiatives/nacis-apparel/submit-t-shirt-artwork) to make a map-tastic impact!

Swing by our conference shop table to snag the 2023 Pittsburgh 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!



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## Cover Art Credits

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Historic Pittsburgh (<https://historicpittsburgh.org/pittsburgh-maps>) provided access to historical maps in order as they appear from left to right. 1) Map of Pittsburgh 1835 prepared by Lewis Keyon, Map of Pittsburgh 1889 by Sanborn and GM Hopkins, 2) Map of Pittsburgh 1923 by Sanborn and GM Hopkins. The modern day map and elements unifying all 4 time periods were created using data from OpenStreetMap contributors (<https://openstreetmap.org/copyright>).

## Pittsburgh Public Transportation

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Pittsburgh is easy to navigate via public transportation. The Pittsburgh Regional Transit (PRT)—formerly Port Authority of Allegheny County—operates buses, the "T" (light rail system), and two incline trains.

Most trips require payment. Buses, inclines, and most T trips are \$2.75. The T has one exception: all travel beginning and ending north of the Monongahela River is free of charge.

To pay for rides, you can use the transit system's ConnectCard, a mobile app, or pay cash. ConnectCard or mobile app are your best options. Cash purchases are good for one ride, but card and mobile payments grant three hours of access, allowing no-cost transfers. Store cash value on your card for however much you think you'll need for the week, or purchase a 7-day pass for \$25.

**To/from the airport:** A ConnectCard vending machine is located near the public transportation stop at the airport, and there you can board the **28X Airport Flyer** bus to downtown Pittsburgh. Alight at the **Liberty Ave & Gateway #4** bus stop, then walk a short distance to the **Gateway** T stop. Take the **Red Line** towards **Outbound-South Hills Village**, to the **Station Square** stop, and walk to the hotel.

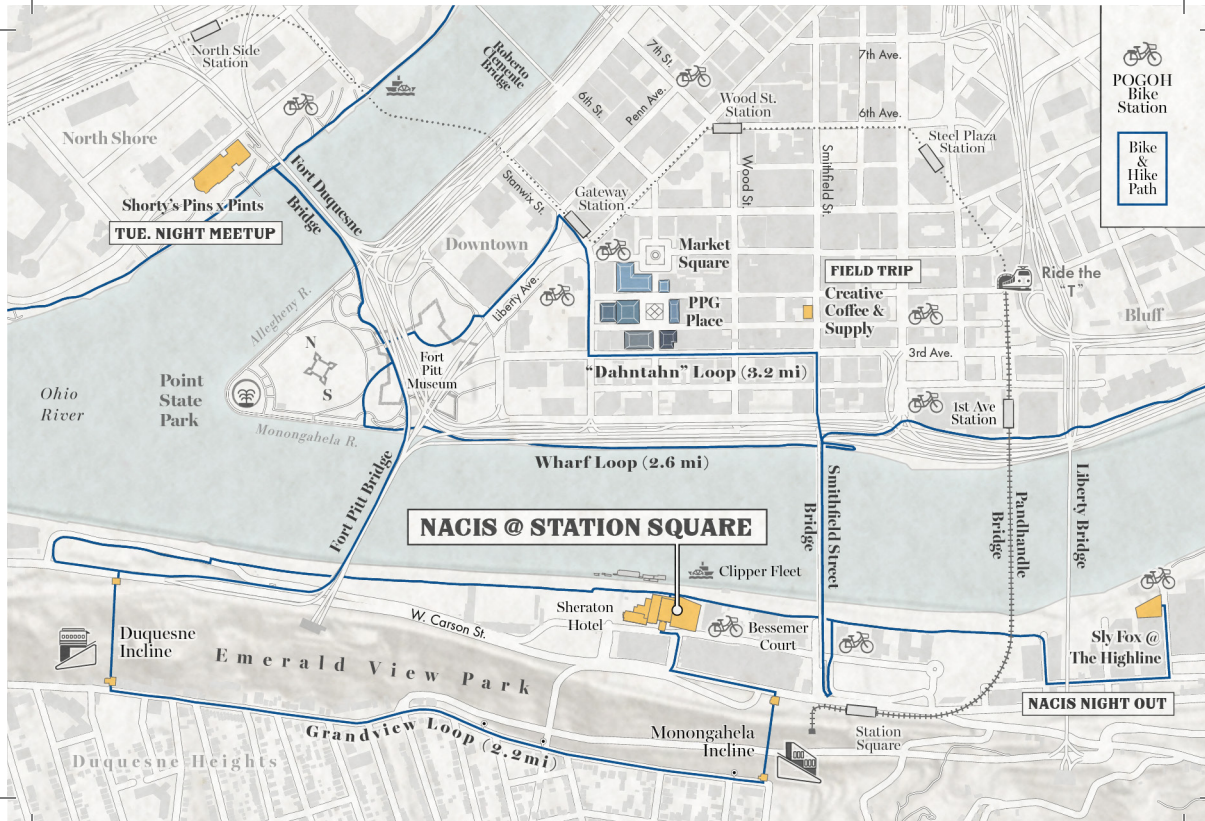
Mobile payments are made through the Ready2Ride or Transit apps. See <https://www.rideprt.org/fares-and-passes/mobileticket>.

To learn more about PRT's routes and fares, visit [www.rideprt.org](http://www.rideprt.org).

**Crossword Answers:** 1. Shepherd; 2. Duquesne; 3. Penguins; 4. Nice; 5. Carnegie; 6. Tacoma; 7. Milwaukee; 8. NACIS; 9. Warhol; 10. Pirates; 11. Glass; 12. Three; 13. Polio; 14. Heinz; 15. Czechoslovakia; 16. Emoticon; 17. Reinhard

## Sheraton Pittsburgh Hotel at Station Square





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Bike  
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Path