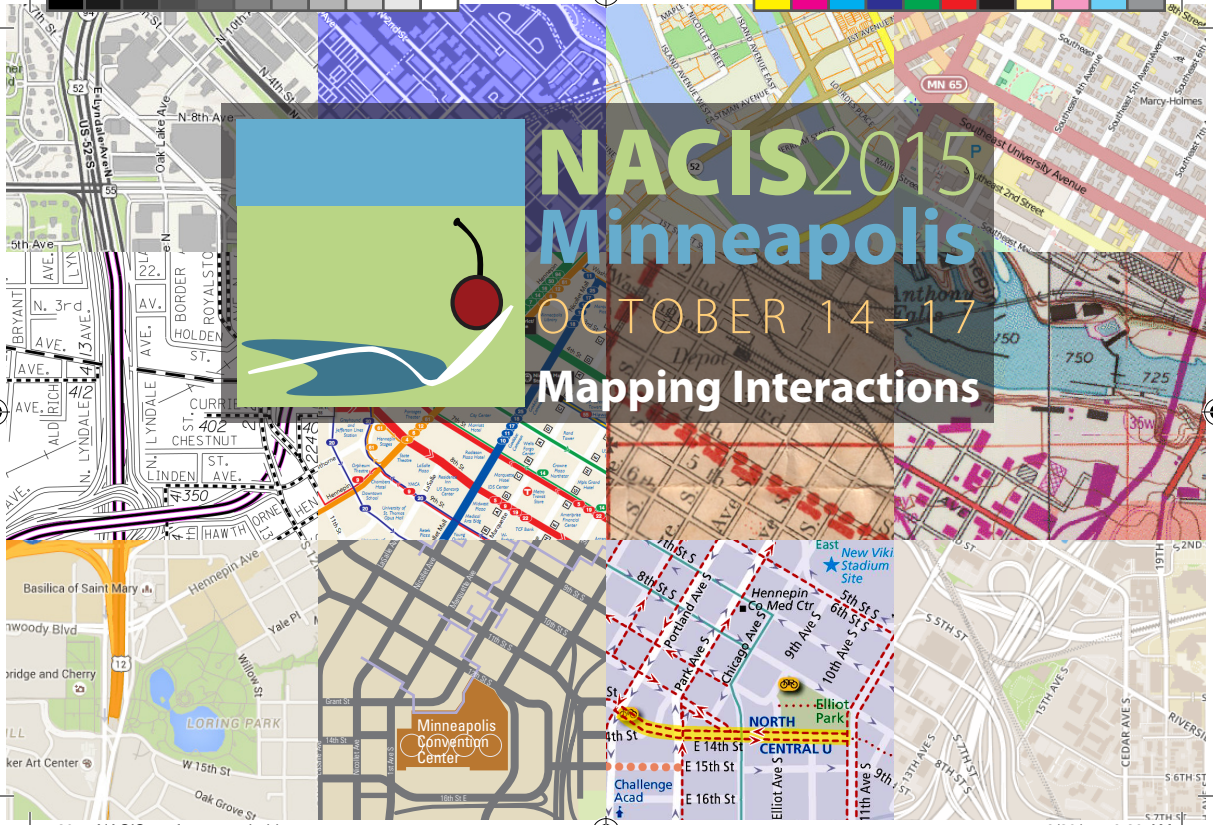

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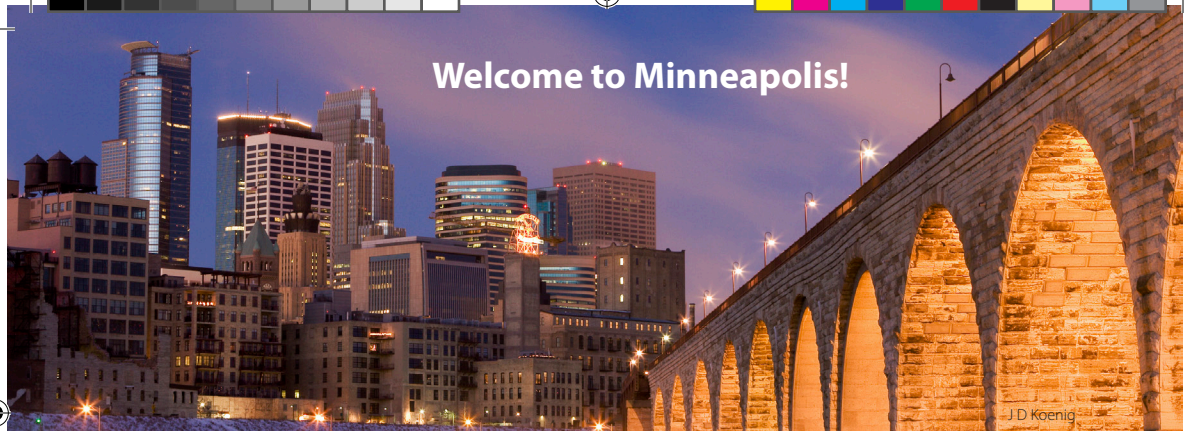

We are delighted to officially welcome you to Minneapolis for the 35th Annual Meeting of the North American Cartographic Information Society (NACIS). Thanks for coming and participating in our gathering of mapping enthusiasts. We have a full schedule of presentations and events to keep you busy. We hope that you are also able to find time to build relationships with new friends and to reconnect with old colleagues. Our friendly community is truly what makes our Annual Meeting a success and makes NACIS a vibrant organization.

Alex Tait, President

Mapping Interactions

As cartographers, we make maps of interactions between people and places, we build interactive maps, and we interact with other cartographers, clients, and designers. At NACIS 2015 we hope to get you excited about whatever flavor of mapping interactions is closest to your heart. We welcome you to my hometown of Minneapolis for four excellent days of mapping fun!

Amy Griffin, Vice President & Program Chair

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1	**Fulton Brewery** *Tap room & food trucks*	$
2	**Corner Coffee** *Coffee, breakfast & lunch*	$
3	**Darby's Pub and Grill** *Burger*	$$
4	**Moose & Sadie's** *Casual bistro*	$
5	**Dogwood Coffee Bar** *Third-wave coffee*	$
6	**Spoon and Stable** *Haute Midwestern*	$$$
7	**The Bachelor Farmer** *Scandinavian*	$$$
8	**Marvel Bar** *Mixology cocktail bar*	$$$
9	**Origami** *Japanese*	$$
10	**One on One Bicycle Studio** *Coffee*	$
11	**Runyon's** *Chicken wings*	$$
12	**112 Eatery** *American*	$$
13	**Saffron** *Mediterranean, vegetarian-friendly*	$$$
14	**Kieran's Irish Pub** *Irish pub*	$$
15	**O'Donovan's** *Irish pub*	$$
16	**The Saloon** *Gay bar & nightclub*	$
17	**Mackenzie** *Bar with free ping pong!*	$$
18	**Butcher & the Boar** *American craft food*	$$$
19	**Marin** *American*	$$$
20	**The Capital Grille** *Steak*	$$$$
21	**Union Rooftop / Bar & Grill** *American*	$$
22	**Fogo de Chão** *Steak*	$$$
23	**Oceanaire Seafood Room** *Seafood*	$$$
24	**Starbucks** *Coffee*	$
25	**Brit's Pub** *British pub food*	$$
26	**Vincent A Restaurant** *French*	$$$
27	**The Local** *Irish pub*	$$
28	**Barrio** *Mexican food, tequila flights*	$$
29	**Dunn Brothers Coffee** *Coffee*	$
30	**Panera Bread** *Sandwich*	$
31	**Hell's Kitchen** *Breakfast all day & more*	$$
32	**Angel Food Bakery** *Bakery, coffee*	$
33	**Ruth's Chris Steak House** *Steak*	$$$
34	**Keys at the Foshay** *American diner*	$$
35	**Hen House Eatery** *Breakfast all day*	$$
36	**Brasserie Zentral** *Central European*	$$$
37	**Foreign Legion** *Pizza & wine bar*	$$
38	**Mona Restaurant & Bar** *American bistro*	$$
39	**Normandy Kitchen** *American*	$$
40	**Dunn Brothers Coffee** *Coffee*	$
41	**Wilde Roast Cafe** *American, coffee*	$$
42	**Vic's** *American*	$$
43	**Alma** *Locally-sourced bistro (dinner only)*	$$$
44	**Caribou Coffee** *Coffee*	$
45	**Subway** *Sandwich*	$
46	**Crooked Pint Ale House** *American*	$$
47	**eagleBOLTbar** *Gay bar & grill*	$
48	**Zen Box Izakaya** *Japanese pub food*	$$
49	**Sawatdee** *Thai*	$$
50	**Kindee Thai** *Thai*	$$
51	**Spoonriver** *American bistro, locally sourced*	$$
52	**Sea Change** *Sustainable seafood*	$$$
53	**Level Five Cafe** *Regional*	$$
54	**Sanctuary** *New American*	$$$
55	**Izzy's Ice Cream Cafe** *Amazing ice cream*	$
56	**Day Block Brewing Company** *Brewpub*	$$
57	**Grumpy's Bar & Grill** *Burgers*	$
58	**Maxwell's** *Burgers*	$$
59	**Town Hall Brewery** *Restaurant & tap room*	$$
60	**Republic** *Craft beer-centered pub*	$$
61	**Chipotle Mexican Grill** *Mexican*	$
62	**Mango Factory** *Sushi, Asian fusion*	$$
63	**Jewel of India** *Indian*	$$
64	**Starbucks** *Coffee*	$
65	**Espresso Exposé** *Coffee*	$
66	**Bun Mi Sandwiches** *Banh mi sandwiches*	$
67	**Big 10** *Sports bar/American*	$
68	**Village Wok** *Chinese*	$$
69	**Abdul's Afandy** *Kebab*	$
70	**The Beacon Public House** *Gastropub*	$$
71	**Applebee's** *American*	$$
72	**Sally's Saloon** *Sports bar/American*	$$
73	**Little Szechuan** *Chinese*	$$
74	**My Burger** *Burger*	$
75	**Stub and Herbs** *Bar & grill*	$$
76	**Chipotle Mexican Grill** *Mexican*	$
77	**Punch Pizza** *Neapolitan pizza*	$$
78	**Dino's** *Greek*	$
79	**Bona** *Vietnamese*	$
80	**The Tea Garden** *Tea*	$
81	**Raising Canes** *Chicken*	$
82	**Hong Kong Noodle** *Chinese*	$$
83	**Caribou Coffee** *Coffee*	$
84	**Kowloon Restaurant** *Chinese*	$
85	**Buffalo Wild Wings** *Sports bar/American*	$$
86	**Playoffs Sports Lounge** *Burger*	$$

Places to Eat & Drink

See map on the following pages →

NORTH LOOP
NICOLLET ISLAND
ST ANTHONY MAIN
MILL DISTRICT
DOWNTOWN EAST
Aster Cafe
NACIS
Night Out
NACIS
The Depot Renaissance
Residence Inn
Target Field
Target Field Plaza
Target Center
Central Library
Cancer Survivors Park
Gateway Park
Father Hennepin Bluffs Park
Mill Ruins Park
Mill City Museum
Guthrie Theater
Gold Medal Park
First Avenue
City Hall
Government Plaza
Hennepin County Government Center
IDS Tower
Foshay Tower
Hyatt Place
U.S. Bank Stadium
(under construction)
Peavey Plaza
Orchestra Hall
UNIVERSITY OF ST. THOMAS
Minneapolis Campus
Warehouse District/ Hennepin Avenue
Nicollet Mall
Nicollet Mall pedestrians & bikes only
LOTS OF FOOD TRUCKS
(mostly lunch, no dinner)
METRO GREEN & BLUE LINES
Downtown East
Hennepin Avenue Bridge
3rd Avenue Bridge
Stone Arch Bridge
pedestrians & bikes only
Mississippi River
West River Pkwy
Washington Ave N
Hennepin Ave
Marquette Ave
Portland Ave
Park Ave
Chicago Ave
Washington Ave S
Central Ave SE
University Ave SE
Main St SE
Carew Dr
Kirby Puckett Pl
Hawthorne Ave
6th Ave N
4th St N
5th Ave N
2nd St N
1st St N
1st Ave N
2nd Ave N
3rd Ave N
5th St N
7th St N
10th St N
9th St N
6th St N
4th St N
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5th St S
6th St S
7th St S
8th St S
9th St S
10th St S
11th St S
12th St S
8th St N
3rd Ave S
4th Ave S
5th Ave S
2nd Ave S
Park Ave
10th Ave S
11th Ave S
12th Ave S
9th Ave S
3rd St SE
2nd St SE
6th Ave SE
394
35W

Places to Eat & Drink Near NACIS Venues

See index on preceding page

43 Restaurants	$	Under $10
44 Coffee & treats	$$	$11–$30
45 Fast food	$$$	$31–$60
46 Bars & pubs	$$$$	$61 or more

0 0.25 0.5 mile

0 0.5 km

This is by no means a comprehensive listing! For more restaurants, bars, and attractions Downtown and beyond, see the interactive map created by Maptime MSP members at ***bit.ly/nacis15****, or scan this QR code.*

Basemap data © OpenStreetMap contributors and City of Minneapolis

Conference at a Glance

Tue	**Tuesday Night Meet-Up Dinner at Punch Pizza** 210 E Hennepin		
Wed			
all day	**Geographic Data Collections Day** in Charles Frost Room		
all day	**Practical Cartography Day** in Great Hall		
7:30 pm	**Opening Session** in Great Hall *followed by* **Opening Reception and Map Gallery** in Depot Pavilion		
Thur	Charles Frost Room	Great Hall	Rock Island Room
9:00 am	**Dynamic Representation**	**Rethinking Web Cartography**	**Community Cartography**
10:30 am	**Mapping for Social Justice**	**Web Mapping in Education**	**Art in Cartography**
noon	**NACIS Lunch & Business Meeting** in Depot Pavilion		
2:00 pm	**Cartography in the Classroom**	**Elements of Design**	**Mapping Populations**
4:00 pm	**Community-Oriented Cartography**	**Movement and Networks**	**Supporting Navigation**
6:30 pm	**NACIS Night Out**		
Fri	Charles Frost Room	Great Hall	Rock Island Room
9:00 am	**Mapping the City**	**History and Theory**	**Literary Maps**
10:30 am	**Citizen Cartography**	**Terrain Representation**	**Advancing Map Production**
noon	**NACIS Lunch Bunch**		
2:00 pm	**Geographic Education**	**Workflows for Design**	**How to Hire or Be Hired**
4:00 pm	**Theoretical Frontiers**	**Mapping Change** (in Depot Pavilion)	**Storytelling with Maps**
6:00 pm	**Banquet** in Great Hall *followed by* **GeoDweeb Geopardy!**		
Sat			
8:30 am	**Landscape Design; Mapping in the Cloud workshops** at Univ of Minnesota		
1:30 pm	**Building and Sharing Historical Map Collections** in W.J. Quinn Room		
all day	**Gunpowder Mapping Workshop** at Univ of Wisconsin–River Falls or **Nice Ride Bike Tour** 10 am–1		

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Tuesday, October 13

6:00–8:00 pm
210 E Hennepin Ave
Tuesday Night Meet-Up Dinner at Punch Pizza
Organizer: Liz Puhl

Got in early? Looking for NACIS folk to hang out with? First time at the meeting and wondering who in the lobby is attending NACIS?

Join Minneapolis local Liz Puhl for tasty Neapolitan pizza a short walk across the river in Northeast Minneapolis. Meet at 6 pm in the lobby of the Depot Renaissance Hotel to walk over.

Tony Webster on Wikimedia Commons

6:00–8:00 pm
Soo Line Room
NACIS Board Meeting I
Moderator: Alex Tait

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9:00–11:30 am

Field trip to the John R. Borchert Map Library & the James Ford Bell Library at the University of Minnesota

Ryan Mattke, University of Minnesota Libraries

Meet in the lobby at 9 am sharp to travel via light rail to the field trip venue.

This field trip will highlight unique cartographic materials in both libraries. The Borchert Map Library houses an extensive collection of historical maps of Minnesota, the US, and Europe, as well as the Ames Library of South Asia maps, with some dating back to the late 1500s. The Bell Library contains many fascinating items, including a 1667 copy of the Theatrum Orbis Terrarum by Willem Janszoon Blaeu, a 1507 copy of Martin Waldsemüller's Globe Gores (the first map naming "America"), the 1602 Map of the Ten Thousand Countries of the Earth, by Matteo Ricci, portolan charts dating between 1424 and 1489, as well as works by Ptolemy, Münster, Mercator, and more.

noon–1:00 pm

Lunch on your own

at the University of Minnesota, before traveling back to the Depot Renaissance Hotel via light rail for the afternoon sessions.

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Geographic Data Collections Day

1:30–2:55 pm

Countermapping in Ojibwe Country
Jessie Conaway, University of Wisconsin–Madison

Deep Map: An Open Source Web Map Builder
Deanne Lundin, Penn State University

Creating and Disseminating GIS Data for the US and the World
David Van Riper, Jonathan Schroeder, Tracy Kugler, Minnesota Population Center

Geodata Coverage
Geoffrey A. Forbes, LAND INFO Worldwide Mapping

3:15–4:40 pm

The Polar Geospatial Center
Brad Herried, University of Minnesota

Challenges in Data Access and Quality Assessment of Greenhouse Gas Data Sets
Christopher Badurek, Drexel University

CIC Geospatial Data Discovery Project
Ryan Mattke, University of Minnesota Libraries

The Open Geoportal Dashboard Analytics and Metadata Toolkit
Patrick Florance, Tufts University

Geographic Data Collections Day Organizer: Abraham Parrish

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9:00–10:10 am

Taking Terrain to New Heights with ArcGIS
Kenneth Field, Esri
Patrick Kennelly, Long Island University CW Post

Redesigning Atlas Maps for Social Media
Alethea Steingisser, James Meacham, University of Oregon

MAPublisher at National Geographic
Matthew Chwastyk, National Geographic Society

A Quick Guide to US Dept. of Transportation Datasets
Justyna Goworowska, US Dept. of Transportation

10:30 am–noon

Manual Shaded Relief of the World and the Patterson Projection
Tom Patterson, US National Park Service
Bernhard Jenny, Oregon State University
Bojan Šavrič, Oregon State University

Designer as Cartographer
Amy Lee Walton, Mapbox

Collecting Data from the Crowd—A Leaflet and CartoDB-based Stack
Mike Foster, MIT

Dropchop
Sam Matthews, Code for America

Noon–1:30 pm

Lunch Depot Pavilion

1:30–2:55 pm

Practical and Impractical Uses of Terrain Data
Seth Fitzsimmons, Alan McConchie, Stamen Design

Mapping the Future Patagonia National Park
Ross Donihue, Marty Schnure, Maps for Good

ArcMap-to-Illustrator Workflows
Nicole Samu, Brenna L. Elrod, Oak Ridge National Laboratory

FixWikiMaps Project
Brian Davidson, DigitalGlobe
Alan McConchie, Stamen Design
Joshua Stevens, NASA Earth Observatory

Restyling Old & Cluttered Maps
Vanessa Knoppke-Wetzel, MacFadden

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Practical Cartography Day

3:15–4:40 pm

Terrain Data Sources Online
Paulo Raposo, Penn State University

A Matter of Perspective
Daniel P. Huffman, somethingaboutmaps

Cartography with Just QGIS
Emily Eros, American Red Cross

CartoCSS Essentials
Katie Kowalsky, Robert Roth, University of Wisconsin–Madison

Vector Cartography in ArcGIS
Craig Williams, Esri

Practical Cartography Day Organizers:
Rosemary Wardley, National Geographic Society;
Carolyn Fish, Penn State University

5:30–6:30 pm

Second Annual NACIS Fun Run and Walk

Organizer: Carl Sack

Meet at the NACIS registration desk

Doing it once just wasn't enough. You know you miss that feeling… heart pounding, pulse racing, sweat dripping… the burning thighs, the hormonal ecstasy… But the euphoria never lasts, and a year is a long time to wait. Soon, though—very soon—you'll get to do it again. Yes, it's almost time for another **NACIS Fun Run!** A jaunt through downtown Minneapolis, with its glittering skyline towering above the roaring falls of the nation's greatest river, is sure to get your heart pounding and provide just the excuse you need for that extra breakfast pastry the morning after… and, let's face it, each day of the rest of the conference.

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7:30–9:00pm
Great Hall
Opening Session
Welcome: Alex Tait, President of NACIS

Personal Story as Map
Brenda Laurel, Neogaian Interactive

As the daughter of a city planner, I spent a lot of my youth looking at maps. My dad would guide me through them with stories. "Here is where a black neighborhood was shattered by a freeway." When I was a foreign exchange student in St. Brieux, the mayor pointed at a map and said, "Here is Omaha Beach where the gun emplacements were 200 yards farther south because the Resistance member who was measuring the distance with the turn of her bicycle tires got a flat." Decades later a colleague showed me aerial photographs of the Southwest saying, "we think this is one of the the trade routes between the Ancient Pueblo and the Maya." A friend of mine who is a self-proclaimed "Antarctican" tells me that her community is starting to believe that personal story is the best way to communicate the science they study. In this talk, we'll look at stories of maps and maps of stories, thinking about new ways to design them.

9:00–11:30 pm
Depot Pavilion
Opening Reception

Print & Digital Map Gallery, The Tangible Map Exhibit, Student Map & Poster Competition
Organizer: Martha Bostwick; The Tangible Map Exhibit Organizers: Matt Dooley, Caroline Rose, Jake Coolidge

Don't miss this year's opening reception! In celebration of International Map Year (2015-2016; mapyear.org), we've got several innovations that will make it worth your while. In addition to printed maps designed by students and professionals, we've also got a display of the 2015 maps from the Barbara Petchenik Children's World Map Drawing Competition from the US and Canada, and a map art exhibition entitled *The Tangible Map Exhibit.*

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Map Gallery

This year's map gallery will also feature a new digital maps component that we're very excited about. Attendees will need to come armed with a QR code reader app on their phones or tablets. If you don't have a smartphone, find a friend!
You can download a QR code reader app for the iOS at
http://apple.co/1fEG2RZ
or for Android at
http://bit.ly/1KT3SgC

WE MAPS
INTERNATIONAL MAP YEAR 2015–2016

Map Gallery, Digital Maps

Napa Valley Winery Map and Trip Planner
David Heyman, Ben Sheesley, Andy Woodruff, Axis Maps

Australia's Vietnam War: Exploring the Combat Actions of the 1st Australian Task Force
Amy L. Griffin, Bob Hall, Andrew T. Ross, Peter Kimberley, Derrill de Heer, UNSW Canberra

The World is all Urban
Luc Guillemot, University of California Berkeley

Welcome to MSP!
Maptime MSP

Sea Level Rise in Sarasota Bay
David Retchless, Texas A&M University Galveston

Sheinar; Capital of the Six Cities Confederation
Brian Stoll, cartographersguild

Cleaner Air, Cleaner Bay— Communicating an Environmental Success Story through an Interactive Story Map
John Wolf and Andy Fitch, USGS; Megan Thynge and Lewis Linker, US EPA

Map Gallery, Print Maps

Selected Maps from the Textbook *Understanding World Regional Geography*
Martha Bostwick and Jesse Wickizer, Maps.com

Taking a Ride on the C&T
Doug Cain, City of Fort Collins

Duluth Map: Outdoor Recreation
Kate Carlson and Micaella Penning, University of Minnesota Duluth

Cascadia – A Great Green Land
Cascadia Institute & Neil Allen, Benchmark Maps

Carleton College Arboretum
Nat Case, INCase

Eating the Ohio River
Laurel L. Cornell, Indiana University

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Map Gallery

Trivariate Sea Ice Presence: July 16-31, 2007–2015
Mark Denil, US National Ice Center

Welcome to the San Juan Islands National Monument
Paul Fyfield, Jim Rounds, Mattye Walsworth, Bureau of Land Management

Emerald Ash Borer & Ash Tree Mapping: A Citizen Science Approach
Brandon Garman, Cleveland Metroparks

El Yunque National Forest Atlas
William Gould, Maya Quinones, Grizelle Gonzalez, and Pedro Rios, US Forest Service; Kathleen McGinley, USFS and North Carolina State University; Isabel Pares Ramos, Urbanica,

Sonoma County Outdoor Recreation
Tom Harrison, Tom Harrison Maps

Moosalamoo Recreation Area
Bill Hegman, Anna Cerf and Dan Barnes, Middlebury College

Historical Atlas of Maine
Michael Hermann, Purple Lizard Maps, Stephen Hornsby, University of Maine

Seeing History in Eroded and Fragmented Lands
Jeff Howarth, Middlebury College

Lakes Michigan and Superior
Daniel Huffman, somethingaboutmaps

Driftless
Daniel Huffman, somethingaboutmaps

Public Life Survey of the Mission District, San Francisco
Adrienne Hyder, San Francisco Planning Department, Robin Abad Ocubillo, Public Life Studies, and Public Life Study Volunteers

Round the World Race
Kris Johnson

New York Soviet Map
Mark Knapp, East View Geospatial

Minneapolis Soviet Map
Mark Knapp, East View Geospatial

Washington, DC Soviet Map
Mark Knapp, East View Geospatial

Planting for Pollinators
Jacqueline Therese Kovarik, Minnesota DNR

Custom Cartography of Frank Lloyd Wright Sites for UNESCO World Heritage Nomination
Bill P. Limpisathian, Cynthia A. Brewer, and Scott W. Perkins, Penn State University

Cartographic Design and the Representation of Wildlife Migration
James E. Meacham, Lauren C. Tierney, Alethea Y. Steingisser, and Riley D. Champine, University of Oregon

Farallon Islands
David Medeiros, Stanford University

Damage Analysis of the 2011 Great East Japan Earthquake: Tsunami and Human Impact Study
Akiki Nakamura, St. Mary's University of Minnesota

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Map Gallery

Mount Rushmore
Alex Tait, Tim Montenyohl, and Mark Rabenhorst, International Mapping

Chicago's Architectural Footprint
Aaron Taveras, Humboldt State University / Map Design Studio

Regional Characteristics of MSU Denver
Stella Todd, MSU Denver

Introductory Cartography: Infographics
Barbara Trapido-Lurie, Charlotte Adams, Mohamed Alhmoudi, Deborah Brown, Kenneth Brown, Ryan Hentzman, Jessica Jia, Leanardo Guedes Nevas, and Merey Yerdauletov, Arizona State University

Discovering Henry Huntington's Landholdings
Aldous Tsang, University of Redlands

The Yellow River Watershed
William A. Viglakis, Mapbox

10 Years of Quantitative Color Schemes
Travis White, University of Kansas

Pittsburgh's Bridges
Lauren Winkler, Todd Wilson, and Helen Wilson, Michael Baker International and Arcadia Publishing

Student Map and Poster Competition

Bay Area, California
Evan Applegate, University of Wisconsin–Madison

Greenway Location Model
Alexis Athlani, UNCG

Minonibiwan, MinoBimaadiziwin: Good Waters, Good Life
Jessie Conaway, University of Wisconsin–Madison & the Bad River Band of Lake Superior Ojibwe

Icebergs: From Fjord to Sea
Nicole D'Entremont, University of Oregon

Got Health Insurance?
Masami Glines, University of Wisconsin–Madison

Geovisualization of Mitigation Strategies for Pedestrian Evacuation for Near-Field Tsunami Hazards Along the Cascadia Subduction Zone
Shannon Grumbly and Tim Frazier, Binghamton University

Mapping an Epidemic: The Spread of the Mountain Pine Beetle in the American West
Christine Grummon, University of Oregon

Autism Insurance Coverage in the US
Katie Hardwick, University of Wisconsin–Madison

Subsidized Rental Housing Unit Density in Minneapolis-St. Paul Metropolitan Area
Lewei He, University of Minnesota–Twin Cities

The Meltdown
J. Michelle Hu, University of Wisconsin–Madison

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Map Gallery

World Cities Population Class
Thomas Jenkins, University of Arizona

Mapping Borders
Meghan Kelly, University of Wisconsin–Madison

3D Cartography for a Theater Production
Chad Lopez and Mark Kumler, University of Redlands

The Ice Age Trail
Christopher Morgan, University of Wisconsin–Madison

Imagining Jefferson
Connor Mullinix, Humboldt State University

Jefferson—Pondering the State of Mind
Connor Mullinix, Humboldt State University

Monsters of the United States
Chelsea Nestel, University of Wisconsin–Madison

Paranormal Madison
Chelsea Nestel, University of Wisconsin–Madison

LifeMapping
Dean Olsen, University of Wisconsin–Madison

Manila, NCR, Philippines
Joben Penuliar and Harrison Brooks, Humboldt State University

Photographically Inspired Cartography
Brad Peter, Michigan State University

Hydrological Deposition Modeling in a GIS
Gabriel Rousseau, Portland State University

North Cascades National Park
Gabriel Rousseau, Portland State University

Repossessing Cars: A Proactive Search
Vijay Sachdev and Fang Ren, University of Redlands

Nautical Chart of Halifax Harbour
Heather Smith, Centre of Geographic Sciences, Nova Scotia Community College

February 17
Alina Taalman, Duke University

The Popularity and Traffic Flow of B-Cycle Stations in Madison, Wisconsin
Joseph Tavano, University of Wisconsin–Madison

From Dred Scott to Mike Brown: How Systemic Racism Continues to Function in the St Louis Area
Dory Tuininga, University of Kansas

September 11th, 2001: Loss Felt by Many Cities
Kristen Vincent, University of Wisconsin–Madison

Blue is the New Gold: Analyzing the Effect of Land Value and Housing Value in Minneapolis
Soren Walljasper, University of Wisconsin–Madison

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Map Gallery

From Beans to Brew
William Westbury, University of Wisconsin–Madison

Skiing Scotland
Patrick T. Wood, Humboldt State University

Tangible Interactions: Special Exhibit

Tactile Map Symbols Across Three Media
Megen Brittell, Amy Lobben, Megan Lawrence, and Manny Garcia

Bad River
Jessie Conway

The Western Shore of Lake Michigan and Environs
Jake Coolidge

Terrestrial
Matt Dooley

Coming Together
Steven R. Holloway

Traces I and Traces II
Jeanne Kitzhaber

The New Portland Bridge Map
Nick Martinelli

Public Green/Areas Verdes Publicas
Lize Mogel

Bathymetric Book
Caroline Rose

Mohawk, Upper Hudson River, and Middle Hudson River Watersheds (New York State)
Lauren Rosenthal

2015 NACIS conf program.indd 17 9/30/15 9:39 AM

Thursday, October 15 9:00–10:10 am

Charles Frost Room

Dynamic Representation

Moderator: Anthony Robinson

Flow Maps
Kazimierz J. Zaniewski, University of Wisconsin–Oshkosh

Automatic Flow Map Creation Using a Force-Directed Layout
Daniel Stephen, Bernhard Jenny, Ritesh Sharma, and Eugene Zhang, Oregon State University; Ian Muehlenhaus, University of Wisconsin–Madison

Mapping and Analyzing Space-time Data: The Zebra Mussel Invasion
Aileen Buckley, Esri

Trivariate Climatological Mapping of Historical Sea Ice *(10 minute talk)*
Mark Denil, US National Ice Center

Great Hall

Rethinking Web Cartography

Moderator: Alethea Steingisser

Examining the Terminology of Modern Cartography
Michael P. Peterson, Rex G. Cammack, University of Nebraska Omaha

A Visual Search Task Comparing Zooming Metaphors
Ryan S. Mullins, Adam Fouse, Stacy Pfautz, and Chad A. Weiss, Aptima, Inc.; Krista Ehinger, Avigael Moed Aizenman, and Jeremy Wolfe, Visual Attention Lab, Brigham and Women's Hospital

A New Atlas of American History
Alan McConchie and Seth Fitzsimmons, Stamen Design

Beyond Paper: Ideas for Interactive Maps *(15 minute talk)*
Peter Liu, Mapbox

Rock Island Room

Community Mapping

Moderator: Maggie Smith

Mapping Neighborhoodness
Andy Woodruff, Axis Maps; Tim Wallace, University of Wisconsin–Madison

Mapping for Housing Justice in Bushwick, NYC
Chris Henrick and Gabriel Giardordoli, Parsons the New School for Design; Michael Mintz, Brigette Blood, North West Bushwick Community Group;

Dynamic Madison: Mapping as a Collective
Caroline Rose and Clare Trainor, University of Wisconsin–Madison

2015 NACIS conf program.indd 18 9/30/15 9:39 AM

Charles Frost Room

Mapping for Social Justice Workshop

Workshop Moderator: Tim Stallmann, Savas Labs

Some cartographers and data analysts work closely with communities to use maps for spatial justice—equitable determination over and production of space. Meanwhile, there are many in the mapping community who care about social change but don't know how to connect their work to real advocacy. This session creates a space to think through important questions around grassroots mapping and community cartography. Participants will share their work in grassroots mapping and counter-cartography. Then, as a group, we'll discuss the ethics of community-based work including questions of representation, authorship, race and class.

Great Hall

Web Mapping in Education

Moderator: Andy Woodruff

Open Web Mapping Technologies: How do we Teach this Stuff?
Carl Sack, University of Wisconsin–Madison

How to Teach an Old(ish) Cartography Professor New Tricks
Sally Hermansen, University of British Columbia

Interactive Map Design in Belize
Kate Carlson, University of Minnesota Duluth

Pedagogy for a Rapidly Changing GIS Landscape
Jim Thatcher and Britta Ricker, University of Washington Tacoma

Rock Island Room

Art in Cartography

Moderator: Nat Case

Women in American Pictorial Cartography
Judith Tyner, California State University, Long Beach

Francois Matthes's 1906 Topographical Map of the Grand Canyon
Nicholas Bauch, Stanford University

Remapping Spatial Sensibilities
Nick Lally, University of Wisconsin–Madison

Examining Artists' Use of Maps
D. K. B. Hoover, University of Wisconsin–Stevens Point

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Thursday, October 15 — 12:00 noon–2:00 pm

Depot Pavilion

Lunch & NACIS Annual Business Meeting

Moderators: Alex Tait, Amy Griffin

Lunch is provided for all conference attendees, NACIS members and non-members. This is also the official yearly members' business meeting; find out about the activities of your Society!

SEE YOU NEXT YEAR IN

COLORADO SPRINGS

OCTOBER 18-22, 2016

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Charles Frost Room

Cartographic Perspectives Special Session

Cartography in the Classroom: A Changing Landscape

Panel Moderator: Fritz Kessler; Panel Members: Kate Carlson, Stephanie Deitrick, Alison Feeny, Sally Hermansen, Joanna Merson

Some basics of cartographic instruction have remained relevant in today's mapping environment. However, adapting other recent developments such as social media, mobile mapping, and the Web into the cartographic classroom is on fertile ground. This panelists will reflect on how they have balanced teaching traditional precepts of cartographic principles while integrating new technologies into their classroom experience. Audience participation is encouraged.

Great Hall

Elements of Design

Moderator: Daniel Huffman

Type on Maps: All the Little Things that Actually Matter
Elaine Guidero, Penn State University

Web Map Symbols for the National Park Service
Jake Coolidge, Colorado State University / National Park Service

Visualizing Ten Years of Quantitative Color Schemes
Travis White and Terry Slocum, University of Kansas; Dave McDermott, Haskell Indian Nations University

Natural-Color Maps via Automated Coloring of Bivariate Grid Data
Jane Darbyshire and Bernhard Jenny, Oregon State University

Rock Island Room

Mapping Populations

Moderator: Mamata Akella

Debunking Highway Service Claims through Early 20th Century Population Distribution Reconstruction
Jenny Marie Johnson and James V. Whitacre, University of Illinois at Urbana-Champaign

Census Time Series Tables from NHGIS
Jonathan Schroeder, University of Minnesota

Census Mapping Mashup
Paul Hunt, University of Nebraska Omaha

A Dot Density Metaphor for Cartogram Construction
Barry J. Kronenfeld, Eastern Illinois University

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Thursday, October 15 4:00–5:00 pm

Charles Frost Room

Community-Oriented Cartography

Moderator: Alethea Steingisser

Maps Are Hard: Observations from Being Hired to Make Simple Web Maps
Patrick Hammons, Code for America

Starting Conversations f or More Accessible Maps
Mitch Schaps, Catholic Charities of Minneapolis and St. Paul; Alison Link, University of Minnesota; Kitty Hurley, State of Minnesota

Designing Together
(10 minute talk)
Nick Martinelli, TerraSeer

GIS for the People, By the People
(10 minute talk)
Sam Matthews, Code for America

Great Hall

Movement and Networks

Moderator: Daniel Huffman

Mapping Syrian Refugee Border Crossings: A Critical, Feminist Perspective
Meghan Kelly, University of Wisconsin–Madison

Transit Map Design
Dennis McClendon, Chicago CartoGraphics

Alt-Transport Movements of the 1890s
(10 minute talk)
Michael Leverett Dorn, Long Island University

Rock Island Room

Supporting Navigation

Moderator: Nathaniel Vaughn Kelso

QR Code Positioning and Navigation Integration
Rex Cammack and Paul Hunt, University of Nebraska Omaha

Designing an Experience: Maps, Signage, and the Tourist Path through Troy
Chelsea Nestel, University of Wisconsin–Madison

The Challenges of Using the Global Position System in Abu Dhabi *(10 minute talk)*
Amna Mohamed Saleh Alkaabi and UAE University

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5:30–6:30 pm
CP Editorial Board meeting

Meeting of the Board for *Cartographic Perspectives,* the journal of NACIS. Contact Patrick Kennelly with any questions about CP or the meeting. Meet in the lobby at 5:30 sharp!

6:30–10:30 pm
The Aster Cafe
125 Main Street SE
NACIS Night Out

Join us at The Aster Cafe for the annual Thursday night social gathering! Includes dinner and a drink. This year's menu includes vegetarian soup, salad, veggie or meat lasagna, and dessert. Cost at the door: $40 ($30 for those who pay when registering for conference).

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Friday, October 16 — 9:00–10:00 am

Charles Frost Room
Mapping the City
Moderator: Mamata Akella

UAEU Employees' Social Impact Assessment in Urban Development in Al Ain City
Naeema Alhosani, UAE University

Proposed Route for Public Transportation in River Falls
(10 minute talk)
Diego Nunes Valadares, University of Wisconsin–River Falls

Voting Patterns and the Geographic Distribution of "Cultural Markers" in Pittsburgh
(10 minute talk)
John Peter Preysner, University of Chicago

Dasymetric Tessellation
(10 minute talk)
Walter Kent Treichel, State of Minnesota

Great Hall
History and Theory in Cartography
Moderator: Robin Tolochko

Developing a Language for 3D Cartography
Ken Field, Esri / ICA

Big History, Little History: Cartography in the Twentieth Century
Mark Monmonier, Syracuse University

Of Crocodiles and Tea Garden Managers: Mapping Interactions of an Earlier Era
Leo Dillon, US Department of State

Rock Island Room
Literary Maps
Moderator: Pat Kennelly

The Cartographic Poetry of Lucia Maria Perillo
Adele J. Haft, Hunter College, CUNY

Cartography in Children's Literature
Victoria Johnson, USAID

Mapping Balzac's Paris
(10 minute talk)
Jennifer Reinke, University of Minnesota Libraries

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Charles Frost Room

Citizen Cartography

Moderator: Anthony Robinson

Am I Rent Stabilized?
Chris Henrick, Parsons The New School For Design

The Open Geoportal Cloud Federation
Patrick Florance, Tufts University

Displaying Change Data on a US Topo Map to Assist in Map Revision Decision Making
Andrew J. Stauffer, Kristin A. Fishburn, and Kristina H. Yamamoto, USGS

Mapping Local Spatial Fitness with Strava *(10 minute talk)*
Jonathan K. Nelson, Penn State University / Strava

Connecting Space, Place, and Emotion *(10 minute talk)*
Maureen McFarlane, Rebecca Krinke, and Kevin Dyke, University of Minnesota Libraries

Great Hall

Terrain Representation

Moderator: Pat Kennelly

3D vs. Conventional Volcanic Hazard Maps
Charles Preppernau and Bernhard Jenny, Oregon State University

Evaluating the Effectiveness of Illuminated and Shadowed Contour Lines
James Eynard and Bernhard Jenny, Oregon State University

Planning a Hike with Fifty Shades of Gray
Leland Brown, textureshading.com

Improving the Representation of Major Landforms in Analytical Relief Shading
Brooke E. Marston and Bernhard Jenny, Oregon State University

Rock Island Room

Advancing Map Production

Moderator: Hans van der Maarel

Improving ArcGIS Mapping Workflows with Adobe's Creative Cloud Applications
Clint Loveman and Sarah Bell, Esri

Drupalized Web Maps
Tim Stallmann, Savas Labs

Planning for Automated Labeling of US Routes with Multiple Shields and Names
Cynthia A. Brewer and Elaine M. Guidero, Penn State University; Kristin A. Fishburn, USGS

Cartography Driven Data Collection
Mamata Akella, CartoDB

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noon–2:00 pm
NACIS Lunch Bunch

Join other NACITES in small groups for lunch on the town, each group with a special guest! Sign up at the registration desk.

noon–2:00 pm
Soo Line
NACIS Board Meeting II

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Charles Frost Room

Geographic Education in a Modern World

Moderator: Lyzi Diamond, Mapbox

Panel Members: Matt Wilson, University of Kentucky; Ryan Cooper, Georgetown-Scott County Planning Commission; Katie Kowalsky, University of Wisconsin–Madison

The last ten years have seen a dramatic shift in geographic education, not just with the tools we teach, but also the types of instruction. These rapid and significant changes have inspired a wide range of thoughts and best practices from educators of all types: academic, online, and community-based. Come listen to a panel discussion from a few of these educators on how they view their role, how it's changed over time, and how they see it changing moving forward.

Great Hall

Workflows for Design

Moderator: Martha Bostwick

Benefits and Challenges of the Modern Web Mapping Paradigm
Kris Johnson, North Point Geographic Solutions

GIS-Ready Templates and Data for The National Map
Kristin A Fishburn and Andrew J Stauffer, US Geological Survey

Automagical Maps
Hans van der Maarel, Red Geographics

Workflow for the National Geographic World Atlas Mobile App
Steve Gifford, mousebird consulting; Rosemary Wardley, National Geographic Society

Rock Island Room

How to Hire or Be Hired

Moderator: Robin Tolochko, University of Wisconsin–Madison

Panel Members: Martin Gamache, National Geographic; Andrew Hill, CartoDB; Leo Dillon, State Department; Aileen Buckley, Esri; Sarah Cordivano, Azavea

This panel will bring together five professionals who have hired cartographers to discuss their hiring processes. What do people who hire cartographers look for? How do they assess if candidates meet the skills and qualifications that they are looking for? Would they do anything differently next time they go through the hiring process? What can educators do to prepare students for the job market? The format will include a set of prepared questions that each panelist will receive ahead of time.

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Friday, October 16 4:00–5:00 pm

Charles Frost Room

Theoretical Frontiers

Moderator: Mamata Akella

Psychophysics: Foundation for Map Design
George F. McCleary, Jr., University of Kansas

The Cartographic Discourse of Human Interactions: The Work of Gunnar Olsson
Christine Bush, ideaspeak.us

Telling Stories
Mark Denil, US National Ice Center

Depot Pavilion

Mapping Change

Moderator: Andy Woodruff

Chronological Map of Piracy in Colonial Spanish America, 1492–1718
Peter R. Galvin, Indiana University Southeast

Dynamic Cartography for a GL World
Nicki Dlugash, Mapbox

Creating New Instruments for Evaluating Cartographic Animations
Joanna Merson, Arizona State University

Rock Island Room

Storytelling with Maps

Moderator: Alex Tait

Introducing Web Mapping to Writing Studies and Journalism Classes
Micaella Penning, University of Minnesota Duluth

Map Design and Software Tools for an Interactive Touch Table Museum Exhibit
Henry Kaufman, Tactable; Aaron Carmisciano, Subluxed

GeoHumanities & Cartographic Expression
Kevin Dyke and Ryan Mattke, University of Minnesota Libraries

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6:00–8:30 pm
Great Hall
NACIS Banquet

entertained by Pecha Kucha talks

Maps as Visual Copy
Ian Muehlenhaus

U Got the Look: Fonts on Album Covers by Prince
Elaine Guidero

Street Name Themes
Dennis McClendon

The American Geographical Society Library: Beyond the Atlas Obscura Article
Marcy Bidney

Trust the Surveyor About As Far As You Can Throw Him
Nat Case

The Name Game: Mapping Toponyms
Leo Dillon

9:00–10:00 pm
Great Hall
GeoDweeb Geopardy!

Play GeoDweeb Geopardy! with Dennis McClendon channeling Art Fleming (the original Jeopardy! host). Form a team and test your geographic knowledge. Sign up at registration desk and remember at least one team member must be new to NACIS!

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8:30 am–5:00 pm

University of Wisconsin–River Falls

Meet in the hotel lobby at 8:30 am to travel via van to the workshop venue.

Gunpowder Mapping Workshop

Mathew Dooley, University of Wisconsin–River Falls

Join us for a hands-on, explosive workshop. We will begin in the GIS lab, using software, printers, and cutting tools to make paper stencils. In the afternoon, we will assemble and ignite our maps in an outdoor, fire-safe area. Fee includes transportation and all materials needed for the workshop. You take home your original maps and artwork! Bring your own lunch or go to one of many eateries nearby. Find out more at **gunpowdermappingworkshop.blogspot.com**.

10:00 am–1:00 pm

Meet in the hotel lobby at 10:00 am to walk together to the Nice Ride station.

Nice Ride Bike Trip

Nat Case, INCase, LLC

Spin your wheels with Nice Ride, the Minneapolis bike share, on a guided tour of Minneapolis maps and monuments.

8:30 am–noon

University of Minnesota, Rapson Hall 33

Meet in the hotel lobby at 8:30 am to travel via light rail to the workshop venue.

Mapping in the Cloud

Michael P. Peterson, University of Nebraska Omaha

Application Programming Interfaces (APIs) are function libraries that support a system of cloud-based map distribution. Many different mapping APIs have been written for the user-driven web. While the Google Maps API remains by far the most commonly used, a variety of other APIs have been introduced. The ease of mapping with APIs has resulted in all kinds of different maps, many showing information that has never been mapped before. This workshop examines the variety of mapping APIs and alternatives for data input. Files types to be examined include KML, FusionTables, GeoJSON, and TopoJSON. The workshop will also show how to map data from a MySQL database using a server-side scripting language called PHP. During the 3½ hour workshop, participants will create their own free cloud-based website to implement the examples.

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8:30 am–noon

University of Minnesota, Rapson Hall 47

Meet in the hotel lobby at 8:30 am to travel via light rail to the workshop venue.

Landscape Design: Learning Through Collaborative Geodesign Workshop

Bryan Runck, University of Minnesota

University of Minnesota researchers developed three geodesign applications to help stakeholders explore land-use decision making in various settings. The applications allow stakeholder groups to draw design scenarios on 55-inch touch-sensitive displays, receive real-time feedback on various parameters related to land use change (e.g., water quality, carbon sequestration, biodiversity, development suitability, and impacts), and discuss and revise plans until scenarios achieving the "best fit" among multiple criteria are realized. Through "hands-on" use of the system, workshop attendees will learn about the computer technology, the soft technology needed to engage stakeholders, and how to use an "adaptive design" process to engage multiple stakeholders.

1:30–4:30 pm

WJ Quinn Room

Building and Sharing Historical Map Collections

Greg Allord and Aileen Buckley, Esri

The maps in unexploited library drawers, inaccessible stocks of map publishers, under-utilized archives in museums, and even unexplored private collections could prove invaluable in providing views into the past if shared with wider audiences online. A good example is the USGS Historical Topographic Map Explorer, which provides access to almost 180,000 scanned maps through an interface that offers easy exploration, visual comparison, and speedy download of maps in the collection. Using this web app as an example, our workshop takes you step-by-step through a solution for converting map collections to a format that can be shared online. You'll learn how to scan, georeference, and build metadata for the maps; how to convert the scanned map images to image services; and how to create and use web maps in a web app that provides the user interface and functionality for useful and engaging online map exploration.

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Akella, Mamata, CartoDB
Cartography Driven Data Collection
Whether for print or web, as cartographers we strive to make maps that are both beautiful and informative. To make a map, we need data. To make a multi-scale map, we need data that can support a variety of scales and geographies. The majority of datasets available for map making are not collected with cartography in mind. The result is maps where every place is equal and visually the same. Intricacies of local knowledge, design considerations for urban vs. rural, and other important map details are lost. Over the past two years, NPMap has been developing a data collection system called Places. Information from Places is used in a variety of data-driven products—including cartographic ones. This talk covers how NPMap is infusing multi-scale and web cartography into its data at the time of collection, enabling it to improve its maps of national parks.
Advancing Map Production, Friday, 10:30–noon

Alhosani, Naeema, UAE University
UAEU Employees' Social Impact Assessment in Urban Development in Al Ain City
Changes in land use are thought of as being a primary factor through which humans modify their surroundings and lead to major landscape alterations. For example, land clearing for urban expansion is mostly associated with population growth, coupled with increased economic, agricultural, and industrial activities. Al Ain in the United Arab Emirates (UAE) has experienced rapid population growth and economic activity over the past two decades, due to the increased migrant workers, creating a particular spatial pattern. This research studies the socio-cultural impact of the international migrant workers on land use, and plans for mapping future development. Through a questionnaire process, the international staff of UAE University identified needed urban facilities and mapped the optimum spatial distribution to better accommodate the needs of the migrant community.
Mapping the City, Friday, 9:00–10:00

Alkaabi, Amna Mohamed Saleh and Naeema Alhosni, UAE University
The Challenges of Using the Global Positioning Systems in Abu Dhabi
This study focuses on the relationship between tourism and geography, by examining tourists who use GPS to arrive to their destination. Some tourists face problems with the use of GPS, such as slow connection and lack of familiarity with electronic devices, while tourists who use traditional maps take longer to reach their goal. Consequently, we created a simple device that provides the routes for major tourists destinations. We conducted a quantitative and qualitative study on 142 participants in the cities of Abu Dhabi and Al Ain. The results show that Abu Dhabi is the optimal place to implement the device, and we recommend the device as highly necessary for enhancing sustainability by providing the guidelines via SMS on phones instead of a paper map.
Supporting Navigation, Thursday, 4:00–5:00

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Badurek, Christopher, Drexel University
Challenges in Data Access and Quality Assessment of Greenhouse Gas Data Sets
Researchers and policymakers are increasingly interested in monitoring greenhouse gas point sources and mapping related atmospheric concentrations using these data. This presentation discusses challenges in acquiring greenhouse gas point source GIS data for the US and internationally, including discussion of related metadata and data quality issues. It also additionally covers challenges in acquisition and use of NASA GIS data sources for mapping atmospheric concentrations of greenhouse gases and the limits of linking these to ground sources. These issues represent a significant challenge for data curation and prospects for reuse and data provenance lineages.
Geographic Data Collections Day, Wednesday, 3:15–4:40

Bauch, Nicholas, Stanford University
Francois Matthes's 1906 Topographical Map of the Grand Canyon
Between 1902–1904 Francois Matthes led a team of mapmakers to create the first detailed topographical drawing of the Grand Canyon, using plane table technology to do so. In this presentation I offer the idea that a map cannot be a map without the process of transposition, a term from music that is the operation of moving a collection of notes up or down in pitch by a constant level. The act of transposing from the surface of the earth to the piece of paper is the mapping, the act itself bringing the two realities into a relationship. In the two years it took to move around the dense region and draw the intersecting lines for his map, Matthes embodied this process of map-making. The location of his body and the lines of sight he experienced were in fact the map as much as the piece of paper.
Art in Cartography, Thursday, 10:30–noon

Brewer, Cynthia A. and Elaine Guidero, Penn State University, and Kristin A. Fishburn, USGS
Planning for Automated Labeling of US Routes with Multiple Shields and Names
We are working toward fully automating labeling of USGS topographic maps, both US Topo 1:24,000 quadrangle PDFs and cached scales in The National Map Viewer. This presentation solicits opinions and guidance from the NACIS community on how to best handle US roads with multiple labels: multiple numbers in shields of various forms (interstate, state route, US route, county routes) plus words as names. Multiple shields for one road segment may be sprinkled along the line in an intermixed manner, enlarged to enclose multiple numbers, shingled, sequenced, offset, or ignored. Our goal is to arrive at an innovative solution that then guides improvements to labeling software programming.
Advancing Map Production, Friday, 10:30–noon

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Brown, Leland, textureshading.com
Planning a Hike with Fifty Shades of Gray
Elevation contours can be depicted using stepwise hypsometric tinting or shading, but the human eye can only perceive a limited number of separate shades on a map. By mimicking an optical illusion called the Mach Effect, we can generate the appearance of hundreds of graduated shades of gray, each clearly distinguishable. Using a high-resolution LiDAR-derived elevation model, this visualization technique helped me to plan a safe off-trail hiking route through extremely rugged wilderness in the southern California mountains. Example images will be presented, along with photos of the actual hike.
Terrain Mapping, Friday, 10:30–noon

Buckley, Aileen, Esri
Mapping and Analyzing Space-time Data: The Zebra Mussel Invasion
Dreissena polymorpha, commonly known as the zebra mussel, has earned a well-deserved reputation as an international dilemma and a national threat. This paper explores the invasive nature of this extremely detrimental species through visual and analytical analysis of its related space-time data. I used ArcGIS to visually explore the spread of zebra mussels. Then I performed spatial analysis to analyze patterns of spread over time. Standard deviational ellipses and mean center points gave clues to the extent and direction of spread. Grouping analysis helped determine in which years the patterns of spread were similar. Hex mapping and density mapping provided insights into hot spots with concentrations of sightings. With a more complete understanding of this devastating invasive species, I created story maps to educate the public about the havoc these mussels can wreak and how people can help to stop the invasion by taking precautionary measures.
Dynamic Representation, Thursday, 9:00–10:10

Bush, Christine, ideaspeak.us
The Cartographic Discourse of Human Interactions: The Work of Gunnar Olsson
Cartography is commonly reduced to the craft of mapmaking without a full appreciation for its legacy as an intellectual framework and cognitive practice that has had profound implications for endeavors beyond the geographical. Gunnar Olsson, author of ten books, is professor emeritus of geography at Uppsala University, Sweden. The International Encyclopedia of Human Geography (2009) describes his work as "a lifelong journey of self-conscious reevaluation" in which Olsson "has pursued his core theme of human interaction in search of its geographical essences." The culmination of this journey is an epic work, *Abysmal* (2007, Univ. of Chicago Press Books), that offers fascinating insights into the intersection of human reasoning and cartographic rhetoric. My overview of this work will invite cartographers to move beyond thinking about their work in increasingly technological terms and

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to also engage with the historical and philosophical discourses at play when we think, not about cartography, but cartographically.
Theoretical Frontiers, Friday, 4:00–5:00

Cammack, Rex, and Paul Hunt, University of Nebraska Omaha
QR Code Positioning and Navigation Integration
The methods used to locate oneself in an indoor environment have improved over recent years. Triangulation between Wi-Fi hubs is the most common method. In this research we investigate using QR code signage to aid in location-based navigation. In this case study the research team has saturated an indoor environment with QR code signs. The QR codes have embedded web app instructions and locational information. When a user scans the QR code it passes the embedded information to a navigation web app that will update the user's position within the web app. This locating method is a starting point for several supporting tasks within the navigation process. The first task is a proximity search task. Users will be able to find nearby information regarding objects and activities in the environment. The second location based task will be to use the QR code scan information to initiate a routing task to a desired location. The final QR code-initiated task is to filter the environment based on the type of QR code locations scanned. This will update the web app to highlight similar objects in the environment. The goal of this research is to develop a system that could be integrated into a mobile app with both thematic context and lower implementation cost.
Supporting Navigation, Thursday, 4:00–5:00

Carlson, Kate, University of Minnesota Duluth
Interactive Map Design in Belize
Through an experiential course design model, a group of undergraduate students traveled to Belize and created a collective interactive Story Map Journal (Esri) that documents topics on culture-cuisine-language and history, conservation-agriculture-deforestation and regional flora & fauna, to past and current issues in the protection of the Mayan way of life. Visits with local conservation groups and two Q'eqchi Maya homestays opened their minds to the protection of these resources and the subsistence livelihoods that depend on the land. This multimedia interactive mapping project provided an excellent opportunity to introduce geospatial technologies and concepts of spatial thinking to a diverse collection of students, many with limited geospatial knowledge. We brought 3 computers, cameras, spatial data, and GPS units. Relying on local Internet connections and informal learning spaces, students were able to individually reflect and collaborate on their experiences in small groups; Story Map Journals were constructed as these experiences unfolded.
Web Mapping in Education, Thursday, 10:30-noon

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Chwastyk, Matthew, National Geographic Society
MAPublisher at National Geographic
I will present on how MAPublisher is used to create maps for publication at National Geographic. I will talk through how the many features of the plugin help in many aspects of map editing and production.
Practical Cartography Day, Wednesday, 9:00–10:10

Conaway, Jessie, University of Wisconsin–Madison
Countermapping in Ojibwe Country
The Bad River watershed of northern Wisconsin is a natural boundary that encompasses both tribal and non-tribal communities which have mobilized around the protection of water against threats of mineral mining, climate change, and aquatic invasive species. The watershed provided a space for community-based research (CBR), shedding light on the importance of water quality to the integrity of the place. Countermapping, which is the use of western cartography tools for indigenous purposes (Peluso, 1995), illuminates Ojibwe spatial narratives as undercurrents of relationships to the homeland and the immense importance of water in Ojibwe culture. Participatory mapping that emphasizes cultural "storymapping" is appropriate for work in an indigenous community, as it engages collective leadership and modes of narrative communication. Participatory watershed mapping in the Bad River Ojibwe community involved elders and youth, and resulted in the multi-media Bad River Water & Culture Maps Project. The maps remain in the Bad River community as a durable product of CBR, for use in education, outreach, and policy efforts about water stewardship and sovereignty.
Geographic Data Collections Day, Wednesday, 1:30–2:55

Coolidge, Jake, Colorado State University / National Park Service
Web Map Symbols for the National Park Service
Clear, legible symbols are essential for any map depicting many features simultaneously. The National Park Service has a long tradition of building a coherent, visually related set of pictographic symbols that highlight a wide variety of visitor amenities and features within the system. This talk will focus in particular on the efforts of NPMap, the web mapping team for the NPS, to adapt these pictographic symbols for use in web maps. As we do so, we encounter new possibilities and challenges unique to this medium. Special design considerations and modifications have to be made to assure both legibility and visual balance with our basemaps, while providing map users with an immediate window into Places, our ever-improving geospatial database of NPS features. This presentation will provide an overview of our efforts to date, discuss upcoming design directions, and hopefully benefit any cartographer engaged in creating custom web map symbols.
Elements of Design, Thursday, 2:00–3:30

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Darbyshire, Jane, and Bernhard Jenny, Oregon State University

Natural-Color Maps via Automated Coloring of Bivariate Grid Data

The creation of natural-color maps requires many steps, a significant time investment, and fairly detailed digital land cover information, which makes this technique impossible to apply to global web maps at medium and large scales. This study takes the first step in automating the creation of medium- and large-scale natural-color web maps by presenting a coloring method based on two grid inputs. We introduce an algorithmic method and prototype software for creating large-scale web maps with this technique. The software allows map authors to interactively assign colors and design the appearance of the map in an automated way, and generates web map tiles at a global level for medium and large scales.

Elements of Design, Thursday, 2:00–3:30

Davidson, Brian, DigitalGlobe, Alan McConchie, Stamen Design, and Joshua Stevens, NASA Earth Observatory

FixWikiMaps Project

On Wikipedia, anyone is allowed to submit changes, updates, and graphics to any page on the site. Along with these graphics, there are a large number of maps and visualizations that are posted. Unfortunately, many of the maps are rarely updated again. To combat this problem, we created the FixWikiMaps Project, with the ultimate goal to correct, update, and beautify the maps on Wikipedia. To begin finding and fixing these maps, the FixWikiMaps Project has teamed up with NACIS to create MapLift, a week-long map-a-thon to upgrade existing Wikipedia maps and make new ones.

Practical Cartography Day, Wednesday, 1:30–2:55

Denil, Mark, US National Ice Center

Trivariate Climatological Mapping of Historical Sea Ice

For several years the question of how to map historical sea ice conditions has been nagging planners, navigators, and scientists. In 2015 the US National Ice Center (NIC) introduced a new set of data and map products to address the understandable envisioning of sea ice conditions over a given range of dates (say, the first 15 days of May 2015), and, optionally, through a given depth of time (the first 15 days of May 2007 through 2015). This talk will describe how the trivariate data sets are constructed from publicly available NIC Daily sea ice analysis data sets, and the development of the standard map products for the Arctic and Antarctic.

Dynamic Representation, Thursday, 9:00-10:10

Denil, Mark, US National Ice Center

Telling Stories

It seems, in just the last few years, to have become commonplace to say that that maps "tell stories," but what does this mean? What is a story, and what does it mean to tell a story? What is the role of a storyteller, and can a map fulfill that role? What is actually going on when someone believes that a map is

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telling them a story? And furthermore, what (and whose) stories are being told, and to whom? This talk will explore these questions and examine some maps that might be suspected of telling stories.
Theoretical Frontiers, Friday, 4:00–5:00

Dillon, Leo, US Department of State
Of Crocodiles and Tea Garden Managers: Mapping Interactions of an Earlier Era
Between the cartographic eras of "here be dragons" and "download the shapefile" was a time when mapmakers did whatever came to mind to mark the observations, uncertainties, or oddities of the geography they were trying to portray. Like commenting to a friend on the landscape, cartographers would add personal or observational touches in the body, the legends, or the margins of their maps. Sometimes informative, sometimes whimsical, but always revealing and interesting, this presentation looks at the fading use of textual description in cartography.
History and Theory in Cartography, Friday, 9:00–10:00

Dlugash, Nicki, Mapbox
Dynamic Cartography for a GL World
Maps that change in real time? Web maps rendered client-side are interactive on a whole new level—and seamless zooming, 360-degree rotation, and perspective views are just the beginning. When designing a map that incorporates dynamic style transitions or 3D geometry, new cartographic challenges abound. How do you dynamically change fill patterns? How do you place labels on a map with geometry that dynamically rotates, distorts, or gains another dimension? I'll discuss various challenges and possible solutions using examples of maps created with Mapbox GL for this game-changing world of client-side vector rendering.
Mapping Change, Friday, 4:00–5:00

Donihue, Ross, and Marty Schnure, Maps for Good
Mapping the Future Patagonia National Park
At Maps for Good, we think about a map not just as a tool for navigation, but as a canvas for telling a story. Come hear about our most recent project to make an interactive map of the Farallon Islands. While this refuge is managed by a public agency, it remains strictly off limits to the public due to the sensitivity, importance, and uniqueness of the ecosystem. We can't bring the public to the islands, but we want to bring the islands to the public with a rich interactive map. The talk will discuss our first expedition to the islands, our workflow, field data collection, and techniques for applying principles of print cartography to interactive maps.
Practical Cartography Day, Wednesday, 1:30–2:55

Dorn, Michael Leverett, Long Island University
Alt-Transport Movements of the 1890s
Tim Cresswell (*On the Move*), and Glen Norcliffe (*Ride to Modernity)* have directed the attention of mobilities researchers to social movements on behalf of non-dominant transit and trans-

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portation modalities. A cultural geographer by training, I propose to highlight early initiatives to improve travel and trade in Great Lakes region of Canada and the United States. Towards the end of the nineteenth century, wheelmen (and wheelwomen) on both sides of the border allied with canal interests to improve local and regional travel. Images to be featured in the talk include a tourist's guidebook published by the *Niagara Falls Advertiser* in 1899, and a "side path map" published by the New York State Division of the League of American Wheelmen a year later.
Movement and Networks, Thursday, 4:00–5:00

Dyke, Kevin, and Ryan Mattke, University of Minnesota Libraries
GeoHumanities & Cartographic Expression
Across the University of Minnesota Libraries system, several groups are working on projects that touch on different aspects of the GeoHumanities. The projects demonstrate the value of blending domain and technological expertise with the unique strengths of library staff. This blend facilitates deeper collaboration between the Libraries and faculty, students, and researchers and allows for alternate forms of cartographic expression. Examples include using scraped hip hop lyrics as a case study to produce a customized geoparser, working to create an online version of a map representing geographic areas associated with joy/pain, and geocoding addresses for YMCA locations in New York City from the 1880s to the present in order to visualize patterns in branch openings and closings over time, and working with faculty to enrich the learning experience in the classroom for students creating online exhibits using georeferenced maps as a backdrop for historical site locations.
Storytelling with Maps, Friday, 4:00–5:00

Eros, Emily, American Red Cross
Cartography with just QGIS
To produce quality maps for disaster situations, the American Cross constantly struggles to balance super-rapid deadlines with good cartographic design principles. We also believe in using free and open software as much as possible. Historically, we've struggled to make print-ready maps using just QGIS. The print composer is not at all intuitive, certain functionalities just weren't there, and exporting vector layers can be a huge headache. So until recently, we used QGIS to process our data and then performed all styling in Illustrator. This method works, but adds extra time and complexity that just isn't realistic in the aftermath of a major earthquake or typhoon. Over the past year, we've channeled our energy into figuring out tricks and processes for doing cartography entirely within QGIS. In this session, we'll show how to do some of our favorite styling effects without needing Adobe. We'll demonstrate how to make the print composer work. And we'll explain some of the limitations we're still experiencing.
Practical Cartography Day, Wednesday, 3:15–4:40

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Eynard, James, and Bernhard Jenny, Oregon State University

Evaluating the Effectiveness of Illuminated and Shadowed Contour Lines

The effectiveness of illuminated contour lines, where line width and color vary based on an angle of illumination, has not been fully examined as compared to conventional contour lines. Illuminated contour lines are not widely used in computer-based cartography because they are not included in most GIS and mapmaking software. Improvements to existing algorithms for creating illuminated and shadowed contour lines from digital elevation data are presented. A software package is made available to allow mapmakers to more easily make customized illuminated contour maps. A user study comparing illuminated contour lines to other relief representation techniques with 400 participants was conducted. The results indicate that map readers can interpret relative height differences between points better and quicker with illuminated contour lines than regular contour lines or shaded relief. These findings suggest that illuminated contour lines could be used more frequently for improved visualization of terrain and other surface data on maps.

Terrain Mapping, Friday, 10:30–noon

Field, Kenneth, Esri / ICA

Developing a Language for 3D Cartography

There's always existed a strained relationship between cartography and the portrayal of maps in 3D. Occlusions, changing scale, a static portrayal and fixed viewing position cause problems for map use and interpretation. This talk acknowledges these limitations using examples to illustrate and then asserts that its possible we've reached a point where 3D genuinely brings something useful to the cartographic canon. I'll present a range of examples of 3D cartography where the design of the content and user experience counter previous problems. Technology is now beginning to support useful 3D cartography and I'll assert it may be time to explore the opportunities with a fresh perspective...literally.

History and Theory in Cartography, Friday, 9:00–10:00

Field, Kenneth, Esri, and Patrick Kennelly, Long Island University CW Post

Taking Terrain to New Heights with ArcGIS

Ever wanted to go beyond default contour or hillshade representations of terrain and make something really stylish in ArcGIS? Yep, us, too. Now you can with our new suite of stunning terrain tools for ArcGIS for Desktop. This session will take a single DEM and explore alternative ways to showcase your terrain including beautiful new hillshades that mimic hand-drawn techniques as well as filled contours and illuminated contours. We'll also showcase artistic techniques such as hachures, shadow lines, and sky models as well as historic looking styles, 3D chromastereoscopic mapping and 3D choropleths. These techniques bring artistry to your maps using easy to use tools that we'll demonstrate and which support your print, 2D, and 3D web mapping.

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Practical Cartography Day, Wednesday, 9:00–10:10

Fishburn, Kristin A. and Andrew J. Stauffer, USGS

GIS-Ready Templates and Data for The National Map

The USGS National Geospatial Technical Operations Center (NGTOC) updated The National Map (TNM) Data Download capabilities in 2015. Eight themes of raster and vector datasets in different data formats and download footprints are available for download as pre-packaged, staged products. This year the NGTOC has also developed a TNM Style Template that is set up to emulate the layout, symbology, and labeling specifications of published US Topo Maps. The Template uses the US Topo Map 1:24,000-scale, 7.5-minute cell size and is intended to be downloaded along with the pre-staged TNM Integrated Vector Product. This product is also delivered in a 7.5-minute footprint and contains data from all TNM vector themes as well as linking to TNM imagery services. With minimal tailoring, the Template and Integrated Vector Product provide GIS-ready data in a map layout which can be easily modified by an end user with their own data, marginalia, and symbology.

Workflows for Design, Friday, 2:00–3:30

Fitzsimmons, Seth, and Alan McConchie, Stamen Design

Practical and Impractical Uses of Terrain Data

Stamen has been collecting, processing, and experimenting with worldwide digital elevation models (DEMs) for the past several months, supported by a grant from the Knight Foundation. The primary output of this is the Open Terrain project, which aims to collect resources on how to process and work with DEMs and their derivatives using open source tools: hillshades, slope and aspect maps, contours, and TINs (triangular irregular networks). In this talk, we'll explain the purpose of these artifacts and discuss how they can be used together for analytical purposes. We'll demonstrate a few techniques to easily incorporate these components into your maps. We'll also do a brief walk-through of our processing pipeline to demonstrate how it can be adapted for additional datasets, projections, and data types (e.g., aerial imagery). Finally, we'll explore some impractical uses of DEMs that we've experimented with purely for their aesthetic value.

Practical Cartography Day, Wednesday, 1:30–2:55

Florance, Patrick, Tufts University

The Open Geoportal Cloud Federation

The Open Geoportal (OGP) is a collaboratively developed, open source, federated web application to rapidly discover, preview, and retrieve, geospatial data from multiple repositories in a variety of formats and web service protocols. The new Open Geoportal 2.0 will be demonstrated as will the new OGP Suite of Federated Services: OGP Community, OGP Harvester, OGP Metadata Toolkit and OGP Dashboard Analytics.

Citizen Cartography, Friday, 10:30–noon

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Florance, Patrick, Tufts University
The Open Geoportal Dashboard Analytics and Metadata Toolkit
The Open Geoportal (OGP) community has developed two new components as part of its suite of tools. The OGP Dashboard provides interactive analytics to help curators better under federated or single collection composition (data types, data licensing, thematic and geographic coverage, etc.) as well as significant details on collection usage. The OGP Metadata Toolkit is a cloud-based, light weight metadata authoring/sharing environment built on the same code base as GeoNetwork. It provides rapid guided metadata authoring and sharing, employing controlled vocabularies and templates. Users can search, import, and export geospatial metadata in multiple formats from the OGP repository (Solr & GitHub). http://opengeoportal.org
Geographic Data Collections Day, Wednesday, 3:15–4:40

Forbes, Geoffrey A., LAND INFO
Worldwide Mapping Geodata Coverage
I will be discussing options for geodata coverage of the US and other countries, with special focus on recent releases, current, updated materials, and previously unavailable datasets. Data layers to be covered will include topographic mapping, aerial/satellite imagery, vector data, DEMs, and land use/land cover.
Geographic Data Collections Day, Wednesday, 1:30–2:55

Foster, Mike, MIT
Collecting Data from the Crowd—A Leaflet and CartoDB-based Stack
Collecting data from the crowd? This session details the creation of a crowd-sourced data collection application through the use of a handful of popular tools including: LeafletJS, HTML/PHP, and the CartoDB SQL API. In a fast-paced, approachable manner, we will discuss the creation of this application and the development of a set of complementary workshops designed to introduce non-coders and cartographers to web mapping techniques. The tools in the stack for this exercise are entirely free and open source, all you need to provide is the webhosting.
Practical Cartography Day, Wednesday, 10:30–noon

Galvin, Peter R., Indiana University Southeast
Chronological Map of Piracy in Colonial Spanish America, 1492–1718
This chronological map of Spanish America presents an animated, time-lapse analysis of the spatial development of piracy in the region. Beginning with the pre-Columbian setting, it charts natural factors, Spanish settlement and trade, and the subsequent incursions of French, Dutch, and British pirates. The mapping sequence was prepared using Microsoft PowerPoint. It demonstrates techniques the author uses in his introductory cartography class to teach basic and animated mapping skills using PowerPoint. Such maps can be used in their original form, allowing pauses for interactive links,

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and can also be converted into a video.
Mapping Change, Friday, 4:00–5:00

Gifford, Steve, mousebird consulting, and Rosemary Wardley, National Geographic Society
Workflow for the National Geographic World Atlas Mobile App
National Geographic recently re-launched its World Atlas app for iPhone and iPad. It was a big effort involving professionals from GIS, design, and software engineering. Older versions of the NGS World Atlas App used tiled images for the map. This is virtuously simple, but requires a lot of pixels to look sharp. In the new version we used a hybrid of image and vector data to both sharpen the visuals and cut down on data transport and storage. We'll discuss the workflow we used to go from GIS data through manual illustration to cloud based dissemination down to the app itself. Each step required a bit more data to flow through the system and uncovered interesting assumptions. One important goal was to minimize the custom processing steps, relying more on commercial tools and services. That was (mostly) successful and we'll detail the tools and services we used.
Workflows for Design, Friday, 2:00–3:30

Goworowska, Justyna, US Department of Transportation
A Quick Guide to US Department of Transportation Datasets
The US Department of Transportation provides data, much of which is spatial, on transportation infrastructure, passenger and freight movements, safety, and enforcement. The National Transportation Atlas Database (NTAD) is an annually updated spatial dataset of point, line, and polygon features. It includes multiple transportation-related features, from airports and bridges to highways and railways, as well as attribute information. This presentation will introduce users to the various datasets available through the US DOT and how to access them.
Practical Cartography Day, Wednesday, 9:00–10:10

Guidero, Elaine, Penn State University
Type on Maps: All the Little Things that Actually Matter
Type on maps: just slap on some Arial for your labels (Times New Roman italic for the rivers) and call it a day, right? Wrong! Find out what your choice of type actually says about you. Okay, maybe it doesn't say a whole lot about you, but typefaces are full of designed details (called "microaesthetics") that, together, make a graphic statement and influence the semantic effect, or "feel," of a map. In this session, I present the initial results of my dissertation project, an in-depth survey about cartographic typography intended to reveal similarities and differences between typefaces due to microaesthetics. I'll discuss the nature of microaesthetics, and how to look for them and take them into account when choosing typefaces.
Elements of Design, Thursday 2:00–3:30

Haft, Adele J., Hunter College, CUNY
The Cartographic Poetry of Lucia Maria Perillo
To celebrate its then-upcoming volumes

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on Renaissance cartography (3.1–2), The History of Cartography Project commissioned Lucia Perillo (1958–) to compose "The Carta Marina (1539)," based on the sea-monster-infested chart of the Swedish mapmaker/historian Olaus Magnus (2000). Earlier, the MacArthur Fellow had published "The Oldest Map with the Name America" (1997–1998), which refers to two rare maps by Martin Waldseemüller (1507, 1516) and to the title of a 1903 edition of his maps. Perillo's eight-part sequence—alternating between the German cartographer's endeavors to map "America" and her own attempts to piece together the fragments of what a "weird kid" did to "a little girl" in the woods near her childhood home—became the title piece of her award-winning 1999 collection. My paper examines Perillo's meditations on these icons of Renaissance cartography and their relation not only to modern science and popular culture, but to her life as a naturalist/academic stricken with MS.

 Literary Maps, Friday, 9:00–10:00

Hammons, Patrick, Code for America

Maps Are Hard: Observations from Being Hired to Make Simple Web Maps

Spurred on by both the proliferation of online, low-barrier-to-entry spatial tools as well as local education groups like Maptime, many non-GIS individuals and groups have been brought into the mapping world over the past four years. Although this represents a significant shift, there are further barriers of both pedagogy and interface, that coincide with, for example, nonprofits hiring GIS consultants to produce simple web maps. This talk seeks to open a discussion about ways forward in nonacademic cartographic education, drawing on the presenter's consulting experience with small, social-service focused nonprofits. Empowering such groups with the tools and confidence to do their own regular analysis work could bear fruits not only for the groups themselves, but for the lived experiences of the communities they serve.

Community-Oriented Cartography, Thursday, 4:00–5:00

Henrick, Chris, Parsons The New School For Design

Am I Rent Stabilized?

Am I Rent Stabilized is a web application that encourages New York City tenants to find out if their landlord may be illegally overcharging them for a rent stabilized apartment and if so, motivates them to take action. It is an attempt at using open data acquired through a Freedom of Information Act request as a prompt for civic action, rather than solely for visualization and analysis. The app asks the user to input their address and checks it against a database of properties that are likely to have rent stabilized apartments. From here the app recommends a course of action and informs the user of their nearest tenants' rights group so they may receive help. This presentation will discuss my development of the app and the geospatial technologies used to create it.

Citizen Cartography, Friday, 10:30–noon

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Henrick, Chris, and Gabriel Giardordoli, Parsons The New School for Design, Michael Mintz and Brigette Blood, North West Bushwick Community Group

Mapping for Housing Justice in Bushwick, NYC

The Bushwick Community Map is an interactive web-mapping project that provides local residents and community organizers with access to data relating to housing and urban planning of the Bushwick neighborhood in Brooklyn, NY. Its goal is to help track gentrification and prevent the displacement of longterm residents from illegitimate practices by landlords. This talk will provide an overview of the project's history as well as how open government data and open source web-mapping technology can be used to strengthen the tenants' rights movement and the work of anti-displacement activists.

Community Mapping, Thursday, 9:00–10:10

Hermansen, Sally, University of British Columbia

How to Teach an Old(ish) Cartography Professor New Tricks

For 15 years I have been teaching a course entitled "Advanced Cartography" to upper-year geography students. The course employs a combination of theoretical lectures, independent labs, and student-led discussions and culminates in a community-based research project. In recent years, I have introduced web mapping using Google Maps mashups and Tilemill, which in turn have imposed limits on the breadth of cartographic design while simplifying community-based research projects. This year, I have completely revised the course to reflect a "studio" based approach, incorporating web-based spatial data mining and munging, programming, and visualization through interactive and dynamic infographics as seen in the modern data journalism curriculum. This paper will reflect on the old and the new, the process, the team and the results thus far realized by this "cartographic overhaul" and its impact on curriculum and on the department as a whole.

Web Mapping in Education, Thursday, 10:30-noon

Herried, Brad, University of Minnesota

The Polar Geospatial Center

The Polar Geospatial Center provides mapping, GIS, and remote sensing support for researchers studying the polar regions. This talk describes the services provided by the center, including rapid imagery delivery and analysis, custom maps for logistical support, and GIS analysis. Learn about this unique center supporting a fascinating part of the world!

Geographic Data Collections Day, Wednesday, 3:15–4:40

Hoover, D. K. B., University of Wisconsin–Stevens Point

Examining Artists' Use of Maps

Visual artists use maps to represent their personal terrain or suggest shared geographies. They can conjure "mental maps" by using plats or charts as mnemonic devices to trigger recognition of experiences. Cartographic imagery

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can also be employed to highlight human scale in the physical world, social conventions of organization, vernacular forms of information, or real or imaginary evolution of place. In her book *The Map as Art: Contemporary Artists Explore Cartography,* Katharine Harmon states, "the artist/cartographer is the enabler, subverter, and documenter of experience." In this presentation I will explore the work of different artists who use maps and mapping and examine their motives. Whether the concept of map is incorporated to evoke a sense of place, to question notions of home, to deconstruct boundaries, or invent something new, my focus is on the artist's intention and the effects that has on perception of the work.
Art in Cartography, Thursday, 10:30–noon

Huffman, Daniel P., somethingaboutmaps
A Matter of Perspective
A walkthrough which covers some of the challenges & solutions in creating a map of Lake Michigan from an unusual perspective: one in which the circumference of the lake has been distorted into a straight line.
Practical Cartography Day, 3:15–4:40

Hunt, Paul, University of Nebraska Omaha
Census Mapping Mashup
US census data have been available in computer form since the 1970s. Recently, through open data initiatives, the Census Bureau has made it possible to access and analyze these data with simple web-based services. These tools allow for the access and retrieval of data on-the-fly. Cloud-based methods of mapping can then be used to display the data without downloading the census data. With the ability to access large amounts of data, custom web mapping applications can be developed using readily available APIs for both spatial and non-spatial data. This new method for requesting and processing data from the US Census Bureau is described, along with the development of an interface that allows user-defined requests and mapping of the census data.
Mapping Populations, Thursday, 2:00–3:30

Johnson, Jenny Marie, and James V. Whitacre, University of Illinois at Urbana-Champaign
Debunking Highway Service Claims through Early 20th Century Population Distribution Reconstruction
During the Good Roads Movement era, the National Highways Association promoted the creation of a National Highways network that would be built and maintained by the federal government. State maps were published illustrating the network and claiming improbable population service levels. Using 1910 census data, these inflated service estimates can be disproven using geometric and arithmetic techniques explored and developed to overcome the lack of era-appropriate—in particular, minor civil division—census geography.
Mapping Populations, Thursday, 2:00–3:30

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Johnson, Kris, North Point Geographic Solutions

Benefits and Challenges of the Modern Web Mapping Paradigm

The availability of geographic data and aerial imagery has increased in recent years, and has been logically paralleled by an increase with the general public's exposure to, and use of web-based maps. This sort of technological milieu is favorable for introducing map-based tasks into applications that can be made readily available to the general public, while simultaneously improving an organization's efficiency and workflows. By upgrading existing paper-based application workflows to digital, web-based ones, a number of benefits may be realized, however this digital transition can bring with it a new set of challenges for the non-technical end-user. This presentation will utilize a case study for transitioning a paper zoning permit application to a web application. We will focus on some of the favorable outcomes, as well as highlight a few of the remaining challenges that can occur when trying to meet both business and end-user needs.

Workflows for Design, Friday, 2:00–3:30

Johnson, Victoria, USAID

Cartography in Children's Literature

Beloved books like *The Phantom Tollbooth, The Hobbit* and *The Princess Bride* all feature engaging maps that serve as gateways to imaginary lands. "Here," say these maps, "leave your cares behind. You're in this other world now." From the Hundred-Acre Wood to the Land of Oz, maps have enchanted young readers and enhanced their reading experience. In this presentation, I will cover a selection of maps found in classic and popular children's literature, delve into their origin, design process, and impact on the story, then compare each map to examples of real-world cartography. (I will also cover a few unofficial/fan-created maps for books and series like *The Hunger Games).*

Literary Maps, Friday, 9:00–10:00

Kaufman, Henry, Tactable and Aaron Carmisciano, Subluxed

Map Design and Software Tools for an Interactive Touch Table Museum Exhibit

We created a 27-foot long multi-touch table exhibit about human rights violations around the world for the Canadian Museum for Human Rights. Mapping was an important component of the exhibit as it helped tell the stories. We used a non-conventional Dymaxion projection for the initial world view, so it can be viewed from either side of the table. Each event shows a regional map that highlights the area affected. The museum will extend the set of events covered, so we created a custom map-making application in C++ based on Cinder and ModestMaps, and custom map rendering tools in Python based on the open source tools Mapnik, ImageMagick, and data from NaturalEarthData.com. The tools enable the museum to create new bilingual regional maps as needed. We will discuss the design choices that we made in creating the maps, our custom

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rendering pipeline, and demo the tools. See **www.tactable.com/study-Table/** for visuals.
Storytelling with Maps, Friday, 4:00–5:00

Kelly, Meghan, University of Wisconsin–Madison
Mapping Syrian Refugee Border Crossings: A Critical, Feminist Perspective
UNHCR calls the ongoing Syrian conflict "the biggest humanitarian emergency of our era." Since 2011, violence has led to nearly 200,000 lives lost and over 3 million have fled across borders throughout the region. Western media has documented Syrian border crossing stories through riveting multimedia journalism. While the written and photographic reporting of Syrian stories uses captivating imagery and testimonials to convey the traumatic experiences of individuals, these experiences are limited in the accompanying maps. Many cartographic conventions silence the experiences of individual Syrians and negate emotions, perils, and geopolitical issues linked to borders. Through a critical feminist lens, I analyzed 86 maps published by Western sources and developed an alternative mapping technique that more accurately reflects the lived realities of six Syrian women. By rendering Syrian border experiences visible with cartography, my work enhances interaction between mapping, the public, and Syrian stories and gives Syrians a pronounced geographic voice.
Movement and Networks, Thursday, 4:00–5:00

Knoppke-Wetzel, Vanessa, MacFadden
Restyling Old & Cluttered Maps
Many of my humanitarian organization's map specs have not been restyled in more than ten years and have obvious needs of aesthetic overhaul, and thus can quickly and easily be changed from old to new. Nevertheless, some map style specs have continuously been problematic in their respective visual representations and design because of the amount of information required to be on a single map, combined with the sparse amount of extra time humanitarian aid cartographers can take to experiment and find better means of visual representation. However, I got lucky because as soon as I was employed I was tasked with the aesthetic overhaul of my department's map styles. This presentation goes through my restyling process, with explanations of what changes are needed for each respective map type, the various iterations, and ultimately, the final map styles and why they were (or were not) chosen.
Practical Cartography Day, Wednesday, 1:30–2:55

Kowalsky, Katie, and Robert Roth, University of Wisconsin–Madison
CartoCSS Essentials
While designing lab work for an advanced graphic design in cartography course, I've been exploring the often impractical, but fun, applications of CartoCSS using Mapbox Studio. Through the context of aesthetic mapping, we can learn the essentials of styling a basemap. I'll walk through var-

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ious tips and tricks to take your vector tileset to the next level.
Practical Cartography Day, Wednesday, 3:15–4:40

Kronenfeld, Barry J., Eastern Illinois University
A Dot Density Metaphor for Cartogram Construction
Cartograms have enjoyed growing popularity in recent years due to algorithmic construction tools. A mainstay of these tools is a transformation grid relating geographic space to cartogram space. Typically, a regular grid is constructed in geographic space, and this grid is stretched, compressed or otherwise deformed to create "cartogram space." This approach, however, leads to poor representation of small, densely populated regions—the very regions of interest to cartogram readers. More accurate results can be achieved by reversing the transformation grids. The reverse approach leads to a simple metaphor: grid nodes on the source map represent a constant number of people and can be likened to dots on a dot-density map. I will demonstrate user-friendly software for manual construction of cartograms using the reverse transformation. Examples of cartograms constructed using this software are shown that provide more accurate results than algorithmically produced cartograms, especially for small, densely populated regions.
Mapping Populations, Thursday, 2:00–3:30

Lally, Nick, University of Wisconsin–Madison
Remapping Spatial Sensibilities
In a number of recent articles, scholars have drawn connections between cartography and the visual arts. These connections are usually confined to questions of aesthetics and representation, eschewing larger conceptual and historical connections. In this paper, I deploy Jacques Rancière's concept of the "distribution of the sensible," which he uses to describe how art changes what we are able to perceive. Using a number of maps as examples, I use this concept to trace a history of cartography concerned with changing understandings of space. This periodization, I argue, suggests a path forward for cartographic work concerned with developing new spatial cognizance, or using Rancière's terms, redistributing what is spatially sensible. This path, informed by art theory, opens up exciting new possibilities for cartographic work to exist as an independent knowledge-producing practice, intersect with theories in human geography, respond to the current moment, and produce new representations of space.
Art in Cartography, Thursday, 10:30–noon

Liu, Peter, Mapbox
Beyond Paper: Ideas for Interactive Maps
When printed on paper, maps have been severely limited by their medium: two dimensions, frozen in content, space, and time. But even after a decade of digital maps online and in applications, we still use them in much the same way as centuries before: squinting closer or stepping back, looking left or

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right. Instead, let's harness the full potential of our new medium. By adding layers of motion and interactivity, we can turn maps into a starting point for exploration of vastly richer forms of information, and better anticipate needs of the user.
Rethinking Web Cartography, Thursday, 9:00–10:10

Loveman, Clint, and Sarah Bell, Esri
Improving ArcGIS Mapping Workflows with Adobe's Creative Cloud Applications
We understand that many cartographers use GIS applications together with Adobe products, for improved designs. We want to share some background on why map exports currently don't work the way you may expect. In addition, we'll share some future concepts we hope will help you with these interoperability workflows.
Advancing Map Production, Friday, 10:30–noon

Lundin, Deanne, Penn State University
Deep Map: An Open Source Web Map Builder
Deep Map is an open source web mapping application that collects—and connects—places and the people interested in them. Inspired by projects like Mapbox and CartoDB, Deep Map also aims to make web mapping easy so users can focus on content. Extending this to better integration of text, media, and other content, Deep Map will be a "place of places" where users develop their own projects using a rich user interface that makes an easy-to-configure layout into a place-centered exhibit or collaboration. With the addition of spatial analysis tools, custom layers, and tools for text analysis, Deep Map binds geographic data with text data. Using Leaflet and OSM data, DM is built with JavaScript open source solutions (Angular, Node, PostGIS) so developers will find it easy to contribute, extend, or fork.
Geographic Data Collections Day, Wednesday, 1:30–2:55

van der Maarel, Hans, Red Geographics
Automagical Maps
I am often called upon to make large volumes of utilitarian maps. They don't need to look pretty, but they do need to show the right information in the right way and there's hundreds, if not thousands, of them per project. This talk highlights my recent project combining the power of FME and MAPublisher.
Workflows for Design, Friday, 2:00–3:30

Marston, Brooke E., Oregon State University, and Bernhard Jenny, Oregon State University
Improving the Representation of Major Landforms in Analytical Relief Shading
Manual relief shading results in informative and visually pleasing representations of terrain, but it is time consuming and expensive to produce. Current analytical relief shading can be created quickly, but the resulting maps are not as aesthetically appealing and do not show landscape features in an explicit manner. This project introduces an automated digital method that pro-

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duces shaded relief with locally adjusted illumination directions to simulate the techniques and cartographic principles of manual relief shading. Ridgelines and valley lines are derived from a digital terrain model and used in a diffusion curve algorithm. The direction of illumination is adjusted based on the spatial orientation of ridgelines and valley lines. Similar to manual relief shading, major landforms and terrain structure are more clearly shown in the diffusion relief shading.
Terrain Mapping, Friday, 10:30–noon

Martinelli, Nick, TerraSeer
Designing Together
Let's talk about real-time collaboration online while designing web maps. Cartography is often a solitary exercise. But I am sure most of us would agree that our best work comes when we have regular and critical feedback. Those of us lucky enough to have spent time working in a cartography lab at a private or public shop have all benefited from spontaneous and thoughtful interactions with other cartographers. This presentation will focus on a tool that we are building that encourages real time interaction throughout the process of creating of web maps. We hope this will allow some of that spontaneous interaction to happen in an online environment. The project, we have been calling weMap, is mostly a selfish endeavor driven by the fact that I work remotely and crave real-time interaction with cartographic collaborators.
Community-Oriented Cartography, Thursday, 4:00–5:00

Matthews, Sam, Code for America
Dropchop
The Dropchop project (**github.com/cugos/dropchop**) is an in-browser GIS editor. Using Turf.js and Mapbox.js, users are able to upload their data to the website and execute spatial operations without downloading or installing a thing. I will demo the tool!
Practical Cartography Day, Wednesday, 10:30–noon

Matthews, Sam, Code for America
GIS for the People, By the People
A classic GIS is like ten thousand spoons when all you need is a knife. The spatial data world is filled with bulky and dense tools that offer more functionality than required, which clutters our experience and over complicates simple geospatial processes. With community-driven, open source tools such as geojson.io and Turf.js, we are seeing GIS become more modular and task oriented. This talk looks at combining these simple tools into a web-based geospatial analysis tool called Dropchop (**github.com/cugos/dropchop**) and how it has only been possible by gathering input from a community of users who cannot afford expensive enterprise GIS solutions.
Community-Oriented Cartography, Thursday, 4:00–5:00

Mattke, Ryan, University of Minnesota Libraries
CIC Geospatial Data Discovery Project
This project began in July 2015 and is a collaboration between eight CIC (Big Ten) institutions (through the CIC's Center for Library Initiatives) to launch

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a joint portal for geospatial data.
Geographic Data Collections Day, Wednesday, 3:15–4:40

McCleary, Jr., George F., University of Kansas
Psychophysics: Foundation for Map Design
It is really quite simple. The word psychophysics is not complex: in thirteen letters it combines two basic ideas, psychology ("the study of the mind and how it works") and physics ("the scientific study of the properties and interactions of matter and energy") … or combined (and rephrased), the study of how the mind deals with the properties and interactions of matter and energy. The mind "manages" sensations and perception and processes cognitions. There are stimuli, and there are responses. A simple example: there is a person … a map user … and there is a map. The map is a stimulus … it provides information. The person (using his/her mind) responds to the map. This is a behavioral thing: a stimulus-response relationship. Simple maps generate simpler responses than complex maps … and there are very few simple maps. Psychophysics provides a foundation for understanding and explaining the map-user relationship.
Theoretical Frontiers, Friday, 4:00–5:00

McClendon, Dennis, Chicago CartoGraphics
Transit Map Design
A look at how various designers—including me—have approached the special design challenges of maps showing public transportation networks.
Movement and Networks, Thursday, 4:00–5:00

McConchie, Alan, and Seth Fitzsimmons, Stamen Design
A New Atlas of American History
For the past year, Stamen Design has been working with the University of Richmond's Digital Scholarship Lab to build *The American Atlas*, a series of interactive maps of American history. In this presentation, we showcase the first four maps of the atlas, which cover the forced migration of enslaved people before the Civil War, migration across the Overland Trails to the West, the movement of people and goods through canals, and the immigration of people to the US from 1850 to today. We are focused on the richly dynamic capabilities of modern web maps to enable deep digital scholarship of this important historical dataset. The project uses D3 visualizations with cartography based on a combination of Leaflet and CartoCSS. We built all these components on the foundation of CartoDB, creating an extensible, public, open source framework that will support the continued development of future maps in the atlas.
Rethinking Web Cartography, Thursday, 9:00–10:10

McFarlane, Maureen, University of Minnesota Libraries, Rebecca Krinke, University of Minnesota, and Kevin Dyke, University of Minnesota Libraries
Connecting Space, Place, and Emotion
Our desire to connect stories and emotions to location has exploded on

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the web, from social media check-ins to Yelp reviews to Instagram food pictures, with maps providing innovative ways of provoking and exploring these narratives. This project began by asking passersby in several public places to identify where they encountered joy and pain in the Twin Cities and illustrate their histories on a large wooden map of Minneapolis–St. Paul. The engaged response to the map inspired an interactive web version of the project that utilizes the ArcGIS Javascript API as the basis for the application and Mapbox Studio for the custom-styled basemap. Visitors use an array of free-hand sketching tools to depict their joy or pain as anonymous spatial expressions. The result is a communal archive visualizing the locations that draw out strong emotions around the Twin Cities and the design decisions users associate with these experiences.

Citizen Cartography, Friday, 10:30–noon

Merson, Joanna, Arizona State University

Creating New Instruments for Evaluating Cartographic Animations

Animated maps are captivating, but traditional user studies often write them off as uninformative and distracting. I am seeking to identify the balance point. This presentation identifies common uses of animation in cartography to determine 1) how and why animated techniques are leveraged and 2) how they are evaluated. A critique will be presented to express strengths and limitations of traditional speed/accuracy style assessments. Then I will present the framework and preliminary results for a user study that supplements speed and accuracy with measures of engagement and memorability: the "understanding, engagement, recall" method.

Mapping Change, Friday, 4:00–5:00

Monmonier, Mark, Department of Geography, Syracuse University

Big History, Little History: Cartography in the Twentieth Century

Cartography in the Twentieth Century, a million-word encyclopedia recently issued as Volume Six of the *History of Cartography,* took over two decades to produce. This overview of its development examines briefly its relation to the series started by David Woodward and J. B. Harley, the conceptual basis of its table of contents, the roles of a prospectus and three NSF proposals in vetting the concept and securing financial support, the role of our board of advisors in fleshing out the contents and recruiting contributors, the role of the Madison office of the History of Cartography Project, and various problems encountered as editor of a reference work with 529 entries, written by over 300 contributors and cocontributors, and including 1,153 illustrations, 5,115 bibliographic references, and 61 tables. I also discuss briefly my preparation of Adventures in Academic Cartography,

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a personal sampling of five decades of change in mapping technology and cartographic institutions.
History and Theory in Cartography, Friday, 9:00–10:00

Mullins, Ryan S., Aptima, Inc., Krista Ehinger, Avigael Moed Aizenman, Brigham and Women's Hospital, Chad A Weiss, Aptima Inc., Jeremy Wolfe, Brigham and Women's Hospital, Adam Fouse, and Stacy Pfautz, Aptima Inc.

A Visual Search Task Comparing Zooming Metaphors

Geospatial analysts are seeking more immersive, context-aware interactions with data that emulate the experience of past analytic processes (e.g. light table and magnifier). We present the results from a pilot study, assessing the usability and utility of interactive zoom windows that were designed to emulate and extend the functionality of a tradition Loupe magnification lens in the digital environment. Twelve participants used two styles of zoom windows and a traditional slippy-map interface to identify, classify, and mark the location of buildings that were either damaged or destroyed during the 2010 Haiti Earthquake. Results show that zoom window interfaces perform at the same level as slippy-map interfaces in this simple task, with a single user on a small touch-enabled screen. Future work with these interfaces will evaluate their performance in complex and team tasks.
Rethinking Web Cartography, Thursday, 9:00–10:10

Nelson, Jonathan K., Penn State University/Strava

Mapping Local Spatial Fitness with Strava

Strava is a social fitness application that allows athletes to track and share rides, runs, and other activities via smartphones or GPS devices. Strava's Metro Division manages a big data service focused on providing "ground truth" on where individuals exercise. Millions of GPS-tracked activities are uploaded weekly from all over the world, resulting in billions of data points. The Division aggregates and analyzes these data to better understand how athletes interact with the outdoors, as well as to assess individuals' needs and preferences, provide optimal routing, and evaluate the structure of social fitness networks. Strava users interact with the application differently across place and space. Some users are entirely performance-driven, while others are largely commuters. Time of day further affects activity type. Thus, users benefit from different representations of their data. I will share my experiences in making sense of these unique user characteristics and designing relevant maps, visualizations, and user experiences.
Citizen Cartography, Friday, 10:30–noon

Nestel, Chelsea, University of Wisconsin–Madison

Maps, Signage, and the Tourist Path through Troy

The famous ancient city of Troy, located at Çanakkale, Turkey, is visited annually by about 500,000 people. However, many tourists report that their actual visit is a disappointment, not meeting their expectation of Troy as a place.

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Three research questions were formed to understand both the problems and opportunities presented by Troy: What are the dimensions of visitor experiences at a tourist site like Troy? What features should be considered in the design of informative and functional maps and signage that support these visitor experiences? What factors should be considered in the placement of signs and maps to improve visitor experiences? The results provide insight into the user experience design at any preserved site of cultural or historical significance, using Troy as a case study.
Supporting Navigation, Thursday, 4:00–5:00

Patterson, Tom, US National Park Service, Bernhard Jenny, Oregon State University, and Bojan Šavrič, Oregon State University
Manual Shaded Relief of the World and the Patterson projection
Tom Patterson has two new products that will interest practical cartographers. The Manual Shaded Relief of the World is background art for making small-scale maps of the world and continents, drawn in Photoshop with a Wacom tablet. It features generalized terrain without the busy textures typically found on small-scale digital relief. The manual relief registers with Natural Earth 1:50 million-scale vector data. It is available as a grayscale GeoTIFF (10,800 × 5,400 pixels) in the Geographic projection. The Patterson projection is a cylindrical projection derived from the Miller 1. From the Equator to latitude 55 degrees, the Patterson is nearly identical to the Miller. However, high latitudes on the Patterson are less exaggerated than on the Miller. The result is a relatively compact world map with familiar continental shapes. Both of these products were used to make a world political map that is in the public domain.
Practical Cartography Day, Wednesday, 10:30–noon

Penning, Micaella, University of Minnesota Duluth
Introducing Web Mapping to Writing Studies and Journalism Classes
Mapping and Geographic Information Systems (GIS) are increasingly recognized as a beneficial component of education in the Liberal Arts. The Geospatial Analysis Center at the University of Minnesota Duluth is fostering collaborations with classes across the University, particularly in the fields of writing studies and journalism. Through presentations, demonstrations, and hands-on tutorials, students are learning to harness the power of web mapping using ArcGIS Online. Students with no prior cartographic experience create media-rich story maps, analyze and visualize quantitative and qualitative data, and learn about real-world examples of how GIS and web mapping is being utilized by professionals in their field. They are

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introduced to both the idea of telling a story with a map, and visualizing data through mapping to find a potential story.
Storytelling with Maps, Friday, 4:00–5:00

Peterson, Michael P., and Rex G. Cammack, University of Nebraska Omaha

Examining the Terminology of Modern Cartography

Any new technology is inevitably accompanied by new jargon. The new terms are important to describe new concepts but are also a way to differentiate the groups of people who use them. The creation and acceptance of new terms is often a struggle of competing interests. The term "slippy," for example, to describe multi-scale pannable (MSP) maps has gained some acceptance. Although memorable, the term seems to trivialize what is perhaps the most important development in online mapping. The wide variety of terms related to online maps are examined that have become part of our language, including terms like "online maps" to more clearly define the new developments related to maps.
Rethinking Web Cartography, Thursday, 9:00–10:10

Preppernau, Charles, Oregon State University, and Bernhard Jenny, Oregon State University

3D vs. Conventional Volcanic Hazard Maps

Volcanic hazard maps are used as public outreach and education tools, but can be challenging for those not trained in map use or geology. We present the results of a user study evaluating the relative effectiveness of four map designs in showing the speed and extent of lahars, a dangerous, fast, and relatively lesser-known volcanic hazard. The study tested combinations of two binary design variables; 2D contours vs. 3D perspective for terrain representation, and point markers vs. isochrones for lahar travel time. We found that users preferred and performed best with the 3D isochrone map.
Terrain Mapping, Friday, 10:30–noon

Preysner, John Peter, The University of Chicago

Voting Patterns and the Geographic Distribution of "Cultural Markers" in Pittsburgh

The American political landscape has become a hyper-competitive world in which electoral success is built on the back of powerful data analytics. It is of great importance to campaign strategists to understand the spatial distribution of likely liberal or conservative voters. Towards this end, the goal of this project was to determine an answer to the following spatial question: Is there a relationship between the geographical distribution of select commercial establishments and religious institutions and ideological voting tendencies among the adjacent populace? To examine this question, select "cultural markers" were isolated for study in the Pittsburgh MSA, an area chosen due to its competitive nature in the 2012 presidential election. "Cultural markers" were selected as the result of their institutional stance on same-sex marriage. The liberal

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"markers" selected were Whole Foods Market and the Unitarian Universalist Association and the conservative "markers" selected were Chick-fil-A and the Presbyterian Church in America.
Mapping the City, Friday, 9:00–10:00

Raposo, Paulo, Penn State University
Terrain Data Sources Online
Terrain data for almost of all of the Earth is freely available online in different formats and resolutions. This presentation will review some sources and portals to these data, many of which are related to NASA, the USGS, and the Ministry of Economy, Trade and Industry of Japan (METI). Also, the talk will briefly describe how to generate DEMs from publicly-available LiDAR LAS files using the open source GIS SAGA.
Practical Cartography Day, Wednesday, 3:15–4:40

Reinke, Jennifer, University of Minnesota
Mapping Balzac's Paris
Paris was the cultural capital of the 19th century. Popular French novelist Honoré de Balzac wrote a compilation of short literary works entitled *The Human Comedy,* using realism and ethically ambivalent characters to depict the complexities and capricious state of Parisian society during the Bourbon Restoration period of 1814–1830. Balzac's characters often shared a romantic notion of the capital and yearned to join high society. As a means to be part of the elite, they relocate from impoverished to exuberant city quarters in efforts to conform to aristocratic norms and flaunt their newly obtained statuses. The objective of this project was to map the movements of the transient lifestyles of Balzac's main characters in three novels: Eugène Rastignac in *Father Goriot,* Lucien de Rebempré in *Lost Illusions: A Distinguished Provincial at Paris,* and Raphaël de Valentin in *The Magic Skin,* which reflect the author's personal struggles and experiences surviving tumultuous Paris.
Literary Maps, Friday, 9:00–10:00

Rose, Caroline, and Clare Trainor, University of Wisconsin–Madison
Dynamic Madison: Mapping as a Collective
What is the city of Madison, Wisconsin? How do we map the multiplicity of Madisonian experiences? As part of a university class, we approached these questions as an "editorial collective" of eight research groups. Each research group was tasked with creating a critical essay and accompanying map based on diverse interactions with the city. Half of the students had never made a map before, but were now challenged to think cartographically about place. In our presentation, we examine the outcomes of this experience from a few different perspectives. We consider how cartography can portray disparate experiences of place. We also address the challenges and rewards of asking novice mapmakers to incorporate cartography into their critical thinking about place. Other authors, all of UW–Madison: Doug Adams, Lucy Argent, Michael Arnsteen, Clara Dockter, Corinne Ehrfurth, Hannah Friedrich, Hallah

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Ghanem, Greta Hippensteel, Megan Howell, Kyle Hulse, Erik Kramer, Wan-Jun Lu, Andrea Lyke, Chelsea Nestel, Veronica Plum, Caitlin Quintenz, A.J. Rohn, Colton Schara, Griffin Schauer, Molly Schumacher, Laura Szymanski, Adrienne Tracy, Kelsi Wallander, and Keith Woodward.
Community Mapping, Thursday, 9:00–10:10

Sack, Carl, University of Wisconsin-Madison
Open Web Mapping Technologies: How Do We Teach this Stuff?
First there were paper maps made with drafting equipment. Then there were digital maps made with ArcGIS, Illustrator, Photoshop, and Flash. Now we are making maps designed for the Web using open-source standards and technologies. In this rapidly changing tool ecosystem, cartography instructors need to teach not only today's tools, but the skills needed to adapt to tomorrow's. At UW-Madison, we have developed a web mapping laboratory curriculum based on scaffolded instruction, wherein students' current understanding is assessed, they are given authentic learning experiences and support needed to move beyond their current skill set, and finally required to apply their skills to real-world collaboration. During the fall of 2014, we conducted student surveys and observation logging to evaluate the successes, challenges, and stress points in the curriculum. This presentation will discuss our pedagogy, its outcomes thus far, and how we will apply what we have learned to the next iteration.
Web Mapping in Education, Thursday, 10:30–noon

Samu, Nicole, and Brenna L. Elrod, Oak Ridge National Laboratory
ArcMap-to-Illustrator Workflows
This paper provides a high-level summary of ArcMap-to-Adobe Illustrator workflows adopted by the National Hydropower Asset Assessment Program at the Oak Ridge National Laboratory for generating multiple national and regional maps to support US hydropower research on asset management, resource assessment, and environmental barrier analysis. Several general methods that have been useful for the creation of national and regional hydropower maps will be introduced and compared. Collectively, the goal of this paper is to provide ArcMap-to-Illustrator map production methods that others may benefit from and to spur follow-on discussion and action on ways to improve these methods and overcome some common cartographic production challenges.
Practical Cartography Day, Wednesday, 1:30–2:55

Schaps, Mitch, Catholic Charities of Minneapolis and St. Paul, Alison Link, University of Minnesota, Kitty Hurley, State of Minnesota
Starting Conversations for More Accessible Maps
In today's age, there can often be a disconnect between the message an analyst wants to deliver with a map or app, and the perception users will have of it. Cartographers' choices can sometimes cause a map's message to

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be misconstrued or lost completely to different groups of users. We're a group of GIS enthusiasts who have initiated conversations about map accessibility in different spaces—at work, in the classroom, and at community technology events. We'll share a set of map accessibility guidelines that emerged at a civic hackathon, and that we're continually working on refining and bringing into community conversations. This presentation isn't a checklist; instead, it's a starting point to help stimulate ongoing conversations around map accessibility. We'll share our stories and provide some resources and strategies for incorporating accessibility conversations into your day-to-day work.
Community-Oriented Cartography, Thursday, 4:00–5:00

Schroeder, Jonathan, University of Minnesota
Census Time Series Tables from NHGIS
The National Historical Geographic Information System (**www.nhgis.org**) provides free online access to summary tables and GIS boundary files for US censuses from 1790 to the present. In recent years, NHGIS has begun releasing time series tables, which link together comparable statistics from multiple censuses in customized downloadable bundles. There are now thousands of time series available, organized into hundreds of tables, covering statistics from the 1970–2010 censuses and the 2012 American Community Survey. New tables released this year provide 2000 and 2010 statistics for 2010 census areas, using an advanced areal interpolation method to refine 2000 estimates where boundaries changed between censuses. I provide an overview of current and planned NHGIS time series features, focusing on ways time series tables can simplify and augment census mapping endeavors.
Mapping Populations, Thursday, 2:00–3:30

Stallmann, Tim, Savas Labs
Drupalized Web Maps
Drupal, a widely used open-source CMS, can be a great choice to build map-centered web apps. In a roller-coaster 20 minutes, we'll: blitz through some of the mapping packages for Drupal, build a simple web map app using Drupal + Leaflet, talk about what you get "for free" by using Drupal (and why not to use it), and show off some projects we've built in Drupal, including a Civil Rights history map.
Advancing Map Production, Friday, 10:30–noon

Stauffer, Andrew J., Kristin A. Fishburn, and Kristina H. Yamamoto, USGS
Displaying Change Data on a US Topo Map to Assist in Map Revision Decision Making
The US Geological Survey is evaluating vector-based change detection tools and processes to help reduce costs associated with maintaining 1:24,000-scale topo maps. When a feature changes, the current instance of that feature is compared to the same feature at the time it was last published in a map. The degree and significance of change is quantified across datasets within each map footprint. A map can then be scheduled

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for revision if the total change found exceeds a predetermined threshold. This process can improve map currency while focusing resources on updating map products that require revision. We will provide an overview of our change detection workflow and how change data are displayed on a topo map to aid in making internal revision and republication decisions.
Citizen Cartography, Friday, 10:30–noon

Steingisser, Alethea, and James Meacham, University of Oregon
Redesigning Atlas Maps for Social Media
In partnership with the Wyoming Migration Initiative, the UO Info-Graphics Lab is repurposing cartographic products created for the print atlas, the *Atlas of Wildlife Migration: Wyoming's Ungulates* for social media outreach. The social media maps deliver timely stories about migrations and biological research that reflect live fieldwork and satellite data collection while also building a strong social media following. This short talk will explore the design choices we considered regarding long- versus short-term publication life, map purpose, and publication method used when redesigning these maps for social media.
Practical Cartography Day, Wednesday, 9:00–10:10

Stephen, Daniel, Bernard Jenny, Ritesh Sharma, and Eugene Zhang, Oregon State University; and Ian Muehlenhaus, University of Wisconsin–Madison
Automatic Flow Map Creation Using a Force-Directed Layout
Creating attractive and easy to read origin-destination flow maps is a time-consuming process, because there are no automatic methods that apply the variety of cartographic principles needed for an effective flow map layout. We present an algorithmic method for quickly creating flow maps that is able to apply several of the most important cartographic principles. Starting with flows drawn as Bézier curves between pairs of nodes, the shapes of the flows are adjusted using a force-directed layout method, where each flow exerts repelling forces on neighboring flows. The forces are tuned to improve readability through a reduction of overlap between flows and to prevent flows from passing through unrelated nodes, while maintaining the smooth shape of the Bézier curves. This method creates flow maps with reduced overlap between flows and nodes in a short time.
Dynamic Representation, Thursday, 9:00–10:10

Thatcher, Jim and Britta Ricker, University of Washington Tacoma
Pedagogy for a Rapidly Changing GIS Landscape
As humans and natural processes continuously shape and reshape surfaces of the Earth, there remains a perpetual need to document these changes through cartographic and geospatial technologies. As surface processes of the Earth continuously change, so too does the technology with which we visualize, analyze, and understand it. For example, the ubiquity of location-aware technologies has profoundly altered the public's expectations for mapping prod-

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ucts. In turn, these expectations and technologies have simultaneously affected the technical expertise expected of GIS and cartographic professionals. Professionals are now expected to have the skills to both inventory and communicate spatial information through a vast and changing array of digital, spatial media; whereas traditional education often kept programming and spatial information separate, this can no longer be the case. Here we pose two interrelated questions: First, as educators, how do we best prepare students for an industry that is constantly evolving? Second, how do we provide the groundwork for a spatially informed education, while not overwhelming students with the array of technologies at work? To answer these questions, we draw from the experiences of 12 National Science Foundation CyberGIS Fellows who met regularly throughout the 2014–2015 year. Grappling with the "cutting edge" of what GIS and cartography meant, these fellows discussed, developed, and shared teaching materials. From these experiences, we propose a non-hierarchical system of geospatial education ordered around student outcomes, rather than previous experience.
Web Mapping in Education, Thursday, 10:30–noon

Treichel, Walter Kent, State of Minnesota
Dasymetric Tessellation
Statewide mapping of Minnesota townships and cities leaves some small areas difficult to see or analyze. One possible solution to this is to implement a tessellation, which allows for increasing the size of smaller areas while maintaining overall topology and shape. Once the tessellation was complete, it provided an opportunity to apply a dasymetric process, in this case US Census population by Census block, to identify only those cells with data. This additional step overcame some of the limitations inherent in choropleth maps and allowed for a more detailed areal interpretation.
Mapping the City, Friday, 9:00–10:00

Tyner, Judith, California State University, Long Beach
Women in American Pictorial Cartography
Pictorial maps have existed from the earliest days of mapping, but became very popular in the early 20th century and remain so. However until recently there was little serious study of these maps and the people who made them. Most of the literature focuses on some well-known men, but women were involved in making pictorial maps from early days. This paper is a discussion of the nature and history of pictorial maps with a focus on women cartographers and their contributions.
Art in Cartography, Thursday, 10:30–noon

Valadares, Diego Nunes, University of Wisconsin–River Falls
Proposed Route for Public Transportation in River Falls
The objective of this study was to propose a route for public transportation connecting the city of River Falls, Wis., with larger cities

nearby. I used Esri ArcMap software and the Network Analyst extension to try to solve the problem of public transportation in River Falls, which has none inside the city limits or connecting it to neighboring cities.
Mapping the City, Friday, 9:00–10:00

Van Riper, David, Jonathan Schroeder, and Tracy Kugler, Minnesota Population Center
Creating and Disseminating GIS Data for the US and the World
The Minnesota Population Center creates and disseminates GIS data delineating historical and contemporary administrative and statistical units for most countries of the world. This talk describes the MPC GIS data collection, including the National Historical Geographic Information System (NHGIS), Terra Populus, and IPUMS-USA, and the production process we have developed over the last 14 years.
Geographic Data Collections Day, Wednesday, 1:30–2:55

Walton, Amy Lee, Mapbox
Designer as Cartographer
This talk will be an overview / comparison of the basic tenants of graphic design with those of cartography. Including example applications of these principles, for work and play, as completed web maps with accompanying printed versions. This talk focuses more on principles and practices of great map design over technology, but will also touch on these concepts extended from web to print using open source tools such as Mapbox Studio and vector tiles.
Practical Cartography Day, Wednesday, 10:30–noon

White, Travis, and Terry Slocum, University of Kansas, Dave McDermott, Haskell Indian Nations University
Visualizing Ten Years of Quantitative Color Schemes
This presentation reports on color usage in quantitative thematic mapping, drawing examples from eight geographical journals over a ten-year period. We systematically reviewed over 400 maps to assess the quality and appropriateness of their respective color schemes, and to identify any persistent or emerging trends. Notably, we found that color hue and lightness have supplanted all other visual variables as the principal method of representing quantitative data on thematic maps. This presentation visualizes many of the trends and key findings from our review, emphasizing the specific color schemes used to represent classed quantitative data. We will also discuss our procedures for cataloging, evaluating, and visualizing each scheme.
Elements of Design, Thursday, 2:00–3:30

Williams, Craig, Esri
Vector Cartography in ArcGIS
ArcGIS has a variety of options for vector cartography. I'll give an overview of recent enhancements to ArcGIS Online and ArcGIS Pro. Finally, I'll explain and show vector tiles in the ArcGIS platform and how they can be leveraged for your mapping applications in the desktop, web, and mobile platforms.
Practical Cartography Day, Wednesday, 3:15–4:40

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Woodruff, Andy, Axis Maps, Tim Wallace, University of Wisconsin–Madison

Mapping Neighborhoodness

Neighborhoods offer a rich, cultural texture to urban landscapes the world over. Some have hard, physical boundaries, like a river or an overpass. Others seem to taper off. Bureaucrats and realtors may have official boundaries for neighborhoods, but what do they know? Bostonography asked citizens to draw their own, collective neighborhood map. The results have been expectedly fuzzy but surprisingly engaging and fun. We'll show how it was done, the maps it enabled, and lessons we learned from working with crowdsourced data.

Community Mapping, Thursday, 9:00–10:10

Zaniewski, Kazimierz J., University of Wisconsin–Oshkosh

Flow Maps

Flow maps are considered the best ways of showing interaction between two or more places. However, there are at least two major issues related to the design and production of these maps. The amount of information that can be shown on some types of flow maps is limited, and a very few software programs have the capabilities of generating such maps. The first shortcoming can be addressed by certain types of proportional symbol maps, the second by having access to three less known (and relatively cheap or free) mapping packages. This paper presents a series of flow maps showing various types of spatial interaction (airline traffic, inter-state migrations, and road traffic) and alternative ways of displaying similar information.

Dynamic Representation, Thursday, 9:00–10:10

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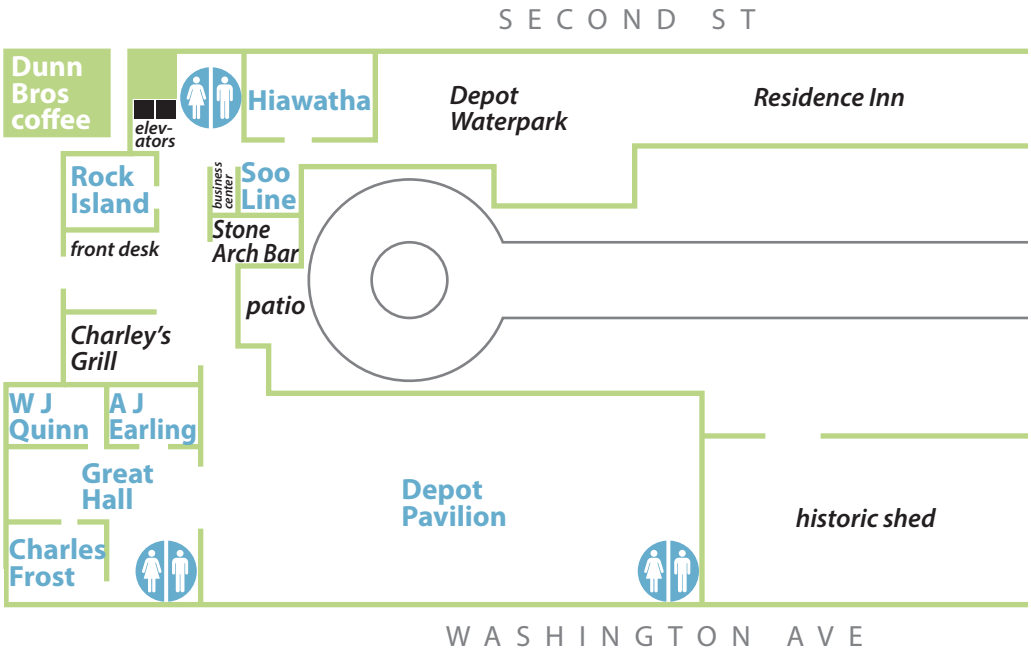
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