Department of Geography University of Wisconsin-Madison

jknelson3@wisc.edu geography.wisc.edu/gis/

AREAS OF SPECIALIZATION

I am an educator and researcher in geographic information science & technology, specializing in cartography, geovisual analytics, and human-centered design with applications in environmental science, fitness & health, politics, socioeconomics, transportation, and urban planning. My motivation as a scholar is to contribute to bridging the analytical divide between experts in spatial data science and individuals not trained in the discipline but who seek to understand and make informed decisions based on spatial data.

POSITIONS

1 001110110	
2023-	Director, GIS Professional Programs Department of Geography, University of Wisconsin-Madison
2022-	Assistant Professor of Geographic Information Science & Technology Department of Geography, University of Wisconsin-Madison
2022-2023	Associate Director, GIS Professional Programs Department of Geography, University of Wisconsin-Madison
2021-2022	Director, Center for Environmental Informatics Earth and Environmental Systems Institute, Penn State University
2020-2022	Assistant Research Professor Department of Geography, Penn State University
2018-2020	Geographic Information Scientist Asset Management Bureau, Vermont Agency of Transportation
2015-2018	User Experience (UX) Designer Strava Metro
2014-2015	Trainee in Big Data Social Science NSF IGERT, Penn State University
2013-2013	Cartographer Gould Center, Department of Geography, Penn State University
2012-2013	Cartographer National Geographic Society
2011-2012	GIS Technician Earth Data Analysis Center, University of New Mexico

EDUCATION

2019 Ph.D., Geography (with minor in Social Data Analytics)

Penn State University

Dissertation: Role of Cartography, Design & Visualization in Making Personal

Movement Data More Accessible, Legible, Valuable

2015 M.S., Geography

Penn State University

Thesis: Characterizing relationships between data aggregation and spatial scale: exploratory analysis of the Modifiable Areal Unit Problem

2012 B.S., Geography

University of New Mexico

Honors Thesis: Jim Crow Alive and Well in U.S. Marijuana Law Enforcement

GRANTS & FUNDED RESEARCH PROJECTS

- Williams, J.W. (PI), Goring, S.J. (Co-PI), & **Nelson, J.K. (Co-PI)**. "Collaborative Research: Strengthening Global Biodiversity Research by Building Informatics Capacity for Ancient Environmental DNA." *National Science Foundation*. (Award #2332567: \$923,098)
- Williams, J.W. (PI), Goring, S.J. (Co-PI), & **Nelson, J.K. (Co-PI)**. "Collaborative Research: Sustained Resources: Neotoma: Advancing Earth Science Contributions to Global Change Research via Growth of Well-Curated Open Paleodata." *National Science Foundation*. (Award #2410961: \$1,397,115)
- 2024-2025 **Nelson, J.K. (PI)**. "Leveraging Maps and Personal Data Visualization to Advance Understanding of Human-Pet-Environment Interactions." *UW-Madison Department of Geography Blaicher Research Fellowship*. (\$47,121)
- 2024-2025 **Nelson, J.K. (PI)**. "Raster-to-Vector Heat Maps: Multiscale Visualization Approach to Mapping and Interacting with Big Geospatial Data." *Wisconsin Alumni Research Foundation*. (\$47,121)
- 2020-2024 **Nelson, J.K. (PI)**, Stryker, M. (Co-PI), & Miller, D. (Former PI). "Collaborative Research: Neotoma Paleoecology Database, a Multi-Proxy, International, Community-Curated Data Resource for Global Change Research." *National Science Foundation*. (Award #1948229: \$197,225)
- 2022-2023 Imhoff, K. (PI), DeWolf, E., **Nelson, J.K. (Co-PI)**, Crawford, S. (Co-PI), & Person, A. (Co-PI). "Continued Deployment of Prediction Models for Fusarium Head Blight." *U.S. Wheat & Barley Scab Initiative*. (Award #FY22-MG-005: \$61,438)
- 2020-2023 **Nelson, J.K. (PI)**, Bills, B. (Co-PI), Miller, D. (Former PI), & Graham, R. (Former PI). "Collaborative Research: Neotoma Paleoecology Database, Community-led Cyberinfrastructure for Global Change Research." *National Science Foundation*. (Award #1550755: \$305,320)
- 2020-2022 Muth, A. (PI), **Nelson, J.K. (Co-PI)**, & Stryker, M. (Co-PI). "Stewardship Mapping for PA Forest Landowners." *Pennsylvania Department of Conservation and Natural Resources*. (\$31,508)

JOURNAL ARTICLES

- * student conducting research under my supervision
 - **Nelson, J.K.**, Blois, J., Goring, S.J., Williams, J.W. & Dominguez, S. (2024). "User-centered design and evaluation of the Neotoma paleoecology open software ecosystem." *International Journal of Digital Earth*, *17* (1).
 - **Nelson, J.K.** (2023). "Cartography & geovisual analytics in personal contexts: designing for the data creator." *International Journal of Cartography*, 9 (2): 210-230.

- Lacey, L. M.* & Nelson, J.K. (2023). "Using geovisual analytics to enrich conservation science: a review of interactive visualization of wildlife and environmental spatial data across ecosystems." *International Journal of Cartography*, 9 (2): 286-318.
- Wilson, D., Alshaabi, T., Van Oort, C.M., Zhang, X., **Nelson, J.K.** & Wshah, S. (2022). "Object Tracking and Geo-Localization from Street Images." *Remote Sensing 14* (11): 25-75.
- **Nelson, J.K.** & MacEachren, A.M. (2020). "User-centered Design and Evaluation of a Geovisualization Application Leveraging Aggregated Quantified-Self Data." *Cartographic Perspectives 96* (1): 7-31.
- Almutairy, F., Alshaabi, T., Nelson, J.K. & Wshah, S. (2019). "ARTS: Automotive Repository of Traffic Signs for the United States." *IEEE Transactions on Intelligent Transportation Systems* 22 (1): 457-465.
- **Nelson, J.K.** & Shih, P.C. (2017). "CompanionViz: Mediated platform for gauging canine health and enhancing human–pet interactions." *International Journal of Human-Computer Studies* 98 (1): 169-178.
- **Nelson, J.K.** & Brewer, C.A. (2017). "Evaluating data stability in aggregation structures across spatial scales: revisiting the modifiable areal unit problem." *Cartography and Geographic Information Science* 44 (1): 35-50.
- **Nelson, J.K.**, Quinn, S., Swedberg, B., Chu, W. & MacEachren, A.M. (2015). "Geovisual Analytics Approach to Exploring Public Political Discourse in Twitter." *ISPRS International Journal of Geo Information 4* (1): 337-366.
- Robinson, A.C. & **Nelson**, **J.K**. (2015). "Evaluating Maps in a Massive Open Online Course." *Cartographic Perspectives 80* (1): 6-17.

REFEREED CONFERENCE & WORKSHOP PROCEEDINGS

- Nelson, J.K., Limpisathian, P.W. & Roth, R.E. (2024). "Developing a Robust Cartography Curriculum to Train the Professional Cartographer." EduVis: Workshop on Visualization Education, Literacy, and Activities, IEEE VIS 2024. Florida, USA, October 13-18.
- **Nelson, J.K.** (2023). "Visualizing Scalar Effects of Urban Data Aggregation." *CityVis: 5th Workshop on Urban Data Visualization, IEEE VIS 2023*. Melbourne, Vic, October 22-27.
- Nelson, J.K. (2019). "Cartography of the Quantified-Self: making sense of large-scale bicycling behavior patterns in urban planning contexts." CityVis: 2nd Workshop on Urban Data Visualization, IEEE VIS 2019. Vancouver, BC, October 20-25.
- Nelson, J.K. & Robinson, A.C. (2015). "Understanding Map Design in the Context of a Massive Open Online Course in Cartography." 27th International Cartographic Conference. Rio de Janeiro, Brazil, August 23-28.
- **Nelson, J.K.** (2014). "Characterizing relationships between data aggregation and spatial scale: exploratory analysis of the Modifiable Areal Unit Problem." *Eighth International Conference on Geographic Information Science*. Vienna, Austria, September 23-26.

REFEREED BOOK CHAPTERS

• **Nelson, J.K.** (2024). "Vector-to-Raster and Raster-to-Vector Conversions." *The Geographic Information Science & Technology Body of Knowledge*, John P. Wilson (Ed.) (**invited**)

TECHNICAL WHITE PAPERS

Savelyev, A., MacEachren, A.M., Pezanowski, S., Karimzadeh, M., Luo, W., Nelson, J.K. & Robinson, A.C. (2014). Report on New Methods for Representing and Interacting with Qualitative Geographic Information, Stage 2: Task Group 4 Message-Focused Use Case. Report to U.S. Army Engineer Research and Development Center (ERDC) Geospatial Research Laboratory. GeoVISTA Center, Penn State.

PRESENTATIONS & POSTERS

- Nelson, J.K. (2024). "[a cartographer's life] is but a dream design squiggle." Invited guest presentation for Geography 421: Map Design & Geovisualization. University of New Mexico Department of Geography. Albuquerque, NM, November 13.
- Chen, Y. (presenter) & Nelson, J.K. (2024). "Raster-to-Vector Heat Maps: Multiscale Visualization Approach to Mapping and Interacting with Big Geospatial Data." Presentation for Annual Meeting of the North American Cartographic Information Society. Tacoma, WA, October 16-19.
- Nelson, J.K. (2023). "Visualizing Scalar Effects of Urban Data Aggregation." Poster for IEEE VIS 2023. Melbourne, Vic, October 22-27.
- Goring, S.J. (presenter), Dominguez, S., Blois, J.L., Crawford, S., Nelson, J.K. & Williams, J.W. (2023). "Neotoma's Adventures in Cloudbank: Cloud Transitions to Support Data Infrastructure." Presentation for *Annual Meeting of the Geologic Society of America*. Pittsburgh, PA, October 13-15.
- Dominguez, S. (presenter), Goring, S.J., Williams, J.W., Blois, J.L., Nelson, J.K. & Crawford, S. (2023). "Establishing FAIR Data Resources as Key Elements in Data Science Approaches." Presentation for XXI Inqua Congress 2023. Rome, Italy, July 13-20.
- **Nelson, J.K**. (2023). "NeotomaDB Usability/Utility Assessment: where we're at & directions for future development." Presentation for *Neotoma All Hands Workshop 2023*. Virtual, April 17-21.
- **Nelson, J.K**. (co-presenter) & George, A. (co-presenter) (2023). "Neotoma Explorer and Range Mapper: Interactive Maps as Tools for Paleo Community Building and Data Discovery." Invited Presentation for *UW-Madison's 2023 Research Bazaar*. Madison, WI, February 22-23.
- Dominguez, S. (presenter), Nelson, J.K., Goring, S.J., Blois, J.L., Clyne, J., Crawford, S. & Williams, J.W. (2022). "Interactive Computational Modules for Reproducible Research Training." Presentation for American Geophysical Union Fall Meeting 2022. Chicago, IL, December 12-16.
- Goring, S.J. (presenter), Dominguez, S., Blois, J.L., Crawford, S., Nelson, J.K., Thomer, A. & Williams, J.W. (2022). "Advancing Interdisciplinary Global Change Science Through Linked Research Services in the Neotoma Paleoecology Database." Presentation for American Geophysical Union Fall Meeting 2022. Chicago, IL, December 12-16.
- **Nelson, J.K**. (2019). "Cartography of the Quantified-Self: making sense of large-scale bicycling behavior patterns." Poster for *IEEE VIS 2019*. Vancouver, BC, October 20-25.
- **Nelson, J.K.** (co-presenter) & Devaney, B. (co-presenter) (2016). "Innovative Technology: Improving Bicycling, Walking and Transit." Panel Presentation for *2016 Moving Together Conference*. Boston, MA, September 29.
- Nelson, J.K. (2015). "Mapping Local Spatial Fitness with Strava." Presentation for Annual Meeting of the North American Cartographic Information Society. Minneapolis, MN, October 13-17.
- **Nelson, J.K.** (presenter), Quinn, S., Swedberg, B., Chu, W., Houchen, M., Bodnar, T. & MacEachren, A.M. (2015). "SPoTvis: Geovisualization Tool for Exploring Spatial Patterns in

- Public Political Discourse." Poster for *BDSS IGERT Research Poster Session*. Penn State University, State College, PA, April 10.
- Nelson, J.K. (presenter), Quinn, S., Swedberg, B., Chu, W., Houchen, M., Bodnar, T. & MacEachren, A.M. (2014). "SPoTvis: A Geovisual Analytics Tool for Discovering Multi-Scale Spatial Patterns in Tweets Surrounding the 2013 US Government Shutdown." Presentation for Annual Meeting of the North American Cartographic Information Society. Pittsburgh, PA, October 8-11.
- **Nelson J.K.** (2014). "2014 Tour de France Wall Map." Poster for *Annual Meeting of the North American Cartographic Information Society*. Pittsburgh, PA, October 8-11.
- Nelson, J.K. (presenter) & Brewer, C.A. (2014). "Exploring Across-Scale Relationships in Spatially Aggregated Data: Informing the Modifiable Areal Unit Problem." Poster for Annual Meeting of the North American Cartographic Information Society. Pittsburgh, PA, October 8-11.

PUBLISHED MAPS & SOFTWARE

- Nelson, J. K., Anderson, M., Bills, B., Stryker, M., Crawford, S., Blois, J., Goring, S.J. & Williams, J.W. (2023). "NeotomaDB Explorer v1.2.0." Available at: https://apps.neotomadb.org/explorer.
- Nelson, J.K. (2013). "Seattle Citywide Skatepark Plan." In: Making Urban Politics Go Away: The role of legally mandated planning processes in occluding city-level power (Dr. J.N. Carr). Invited, peer reviewed book chapter for *Urban Politics: Critical Approaches*. Sage.
- **Nelson, J.K.**, Gibbons, D., Ibinson, J. & Wardley, R. (2013). "Appalachian Trail." National Geographic Maps. Washington, D.C.
- **Nelson, J.K.** (2013). "Plate Tectonics" (p. 44); "Continental Drift" (p. 54); "A Typical Trek" (p.62-63); "Life and Death on Everest" (p. 205). In: *The Call of Everest* (Conrad Anker). National Geographic Society. Washington, D.C.
- **Nelson, J.K.**, Gibbons, D., Ibinson, J. & Wardley, R. (2013). "Texas Hill Country Destination Map Guide." National Geographic Maps. Washington, D.C.
- **Nelson**, **J.K**. (2012). "Reconstructing Amelia Earhart's Flightpath." In: *National Geographic Magazine: Exploring History*. National Geographic Magazine Collector's Edition Winter 2012. Washington, D.C.
- Nelson, J.K. (2012). "Oaxaca, Mexico." In: Revealing Artifacts: Archaeological Replicas, Art, and Cultural Production in Oaxaca, Mexico (Dr. R.L. Brulotte). University of Texas Press. Austin, TX.
- **Nelson, J.K.** (2011). "Map of the World, Circa 2525." In: *Mutant Hunter: Legends of the Fallout* (Stephen R. Cox).

TEACHING

* implements significant changes to an existing course

Instructor of Record

2022- Department of Geography, University of Wisconsin-Madison

Geography 575: Interactive Cartography & Geovisualization (one semester)

Geography 778: **Practicum in GIS Development** (three semesters) Geography 970: **Seminar in Geovisual Analytics**** (one semester)

^{**} indicates new course development

2018-2022 Department of Geography, Penn State University

Geography 160: Mapping Our Changing World (one semester) Geography 467: Applied Cartographic Design* (one semester) Geography 486: Cartography & Visualization (three semesters)

Geography 580: **Geovisual Analytics**** (four semesters)

Teaching Assistant

2013-2014 Department of Geography, Penn State University

Geography 123: **Geography of the Developing World** (one semester)

Geography 364: **Spatial Analysis** (one semester)

Massive Open Online Course: Maps and the Geospatial Revolution (one semester)

ADVISING

Research Graduate Programs

- Yanbing Chen¹, Master's in Cartography & GIS, UW-Madison (in progress)
- Yuhan Ji², PhD in Geography, UW-Madison (in progress)
- Nuzhat Tabassum Nawshin², PhD in Geography, UW-Madison (in progress)
- Alton Hipps¹, Master's in Cartography & GIS, UW-Madison (in progress)

Professional Graduate Programs

- Michael Adduci¹, Master's in Cartography & GIS, *Participatory Treasure Reporting Web Application in England and Wales*, UW-Madison (2023)
- Trever Bruhn¹, Master's in Cartography & GIS, Fire Pre-Plan Collector/Visualizer Web App, UW-Madison (2023)
- Cherie Bryant¹, Master's in Cartography & GIS, Interactive Webmap of Leon County Development 2009-2022, UW-Madison (2023)
- Luke Chamberlain¹, Master's in Cartography & GIS, *Madison Metro Sustainability Guide*, UW-Madison (2023)
- Kuang-Cheng Cheng¹, Master's in Cartography & GIS, Yearly Ridership Data Visualization and Analysis for the Taipei Metro System, UW-Madison (2023)
- Michael Connolly¹, Master's in Cartography & GIS, Interactive Story Map and Chart for a Cultural Landscape Study, UW-Madison (2023)
- Alejandro Gomez¹, Master's in Cartography & GIS, Los Angeles Tree Web Map, UW-Madison (2023)
- Max Guo¹, Master's in Cartography & GIS, Canadian National Capital Region Flood Observation System, UW-Madison (2023)
- Mingrui Huang¹, Master's in Cartography & GIS, Web Map of Cold War-Era Air Defense Sites in the United States: "SAM 1960", UW-Madison (2023)
- Mallory Johnson¹, Master's in Cartography & GIS, CosMap: Interactive map of indoor/outdoor cosplay photoshoot locations, UW-Madison (2023)
- Jeffrey Kalar¹, Master's in Cartography & GIS, *Public Land Survey System Field Note Collection*, UW-Madison (2023)
- Aspen Neville¹, Master's in Cartography & GIS, Calculating and Viewing Consequence of Failure Scores for Pipelines Through an Interactive Web Map Application, UW-Madison (2023)

¹ advisor, ² committee member

- Nimita Shery¹, Master's in Cartography & GIS, *Public Dataset Finder*, UW-Madison (2023)
- Nyla Thursday¹, Master's in Cartography & GIS, Wisconsin County Health Rankings Explore, UW-Madison r (2023)
- Andrew Winchell¹, Master's in Cartography & GIS, Web Application of Historical and Active Flights in the US, UW-Madison (2023)
- Danielle Wyenberg¹, Master's in Cartography & GIS, Garden Planner Web Map, UW-Madison (2023)
- Aileen Clarke¹, Master's in Cartography & GIS, Traffic Fatalities in Washington DC, UW-Madison (2022)
- John Deloretta¹, Master's in Cartography & GIS, Watershed Study at Blue Marsh Lake for Blue-Green Algae Prevention, UW-Madison (2022)
- Daniel Easter¹, Master's in Cartography & GIS, Faster Feathering: Efficient and simple feathered edges in ArcGIS Pro, UW-Madison (2022)
- Kray Freestone¹, Master's in Cartography & GIS, Census Find, UW-Madison (2022)
- Benjamin Gryski¹, Master's in Cartography & GIS, Web-based Dashboard for Al Events and Power Outage Data, UW-Madison (2022)
- Michael Hasinoff¹, Master's in Cartography & GIS, Identification of Mapped, Yet No Longer Existing Unincorporated Communities (Phantoms) In Wisconsin, UW-Madison (2022)
- Joseph Inskeep¹, Master's in Cartography & GIS, *The Wildland Urban Interface: and how to be prepared for wildfire*, UW-Madison (2022)
- Jenna Johnson¹, Master's in Cartography & GIS, Maryland Wildlife Explorer Application, UW-Madison (2022)
- David Kwong¹, Master's in Cartography & GIS, Congestion Pricing in New York City, UW-Madison (2022)
- Gengkui Liu¹, Master's in Cartography & GIS, Trajectory Data Visualization, UW-Madison (2022)
- Thomas MacAvoy², Master's in GIS, *Geomorphologic Changes of St. Augustine Inlet 1589-2022*, Penn State (2022)
- Patrick McPartlan¹, Master's in Cartography & GIS, *Illinois Drainage Districts Map*, UW-Madison (2022)
- Mark Rednour², Master's in GIS, *Augmented Reality as a Geospatial Enabler for ISR*, Penn State (2022)
- Joseph Rosnow¹, Master's in Cartography & GIS, 10 Years of Wisconsin Water Use, UW-Madison (2022)
- Eli Samuelson¹, Master's in Cartography & GIS, St. Louis Metro Bus Redesign, UW-Madison (2022)
- Alissa Stark¹, Master's in Cartography & GIS, Development of a Google Earth Engine Application for Change Detection and Trend Analysis, UW-Madison (2022)

Directed Studies Projects

- Ramakrishna Raju, Dane County Land Cover Land Use Map Puzzle, UW-Madison (2023)
- Sid Ramavajjala, OSMnxElevation, UW-Madison (2023)

SERVICE

Conference Committees

- Member, International Scientific Program Committee, 31st International Cartographic Conference (2023)
- Member, International Scientific Program Committee, 4th CityVis Workshop (2022)

Peer Review

- Annals of the American Association of Geographers
- Applied Computing and Geosciences
- Cartography and Geographic Information Science
- International Journal of Geo-Information
- Journal of Geography in Higher Education
- Journal of Location Based Services
- Journal of Maps
- Nature Cities
- Political Geography
- Review of Regional Research
- Springer Nature
- Sustainability
- The Geography Teacher
- The Professional Geographer

Professional Service

- Project Champion & Sponsor, "Detection and Mapping of Roadside Assets from Roadway Images." Grant awarded to the University of Vermont from the Vermont Agency of Transportation. (2018-2020)
- Project Champion & Sponsor, "Radio Frequency Identification (RFID) Technology for Transportation Signage Management." Grant awarded to the University of Vermont from the Vermont Agency of Transportation. (2018-2020)

University & Department Service

- Chair, UW-Madison GIS Professional Programs Geography 370 Curriculum Redesign Committee (2024)
- Member, UW-Madison 2024 Geospatial Summit Planning Committee (2024)
- Chair, UW-Madison GISPP Graduate Program Manager Search Committee (2024)
- Chair, UW-Madison GISPP Communications Specialist Search Committee (2023)
- Chair, UW-Madison GIS Professional Programs Geography 572 Curriculum Redesign Committee (2023)
- Chair, UW-Madison GIS Professional Programs Esri User Conference Planning Committee (2023-)
- Member, UW-Madison GIS Professional Programs Geography 576 Curriculum Redesign Committee (2022-2023)
- Member, UW-Madison GIS Professional Programs Oversight Committee (2022-)
- Member, UW-Madison Geography Undergraduate Studies Committee (2022-)
- Member, UW-Madison Cartography Lab Creative Director Search Committee (2022)
- Chair, Penn State Online Geospatial Education Website Redesign Committee (2021)

AWARDS

- 2024 UW-Madison Department of Geography Whitbeck Award to support open access publishing fees.
- 2023 UW-Madison Office of the Vice Chancellor for Research (OVCR) International Travel Award to participate in the IEEE VIS Conference, Melbourne, Australia, October 2023.
- 2019 Vermont Agency of Transportation International Travel Award to participate in the IEEE VIS Conference, Vancouver, Canada, October 2019.
- 2015 Penn State Department of Geography E. Willard Miller Award for best cartographic entry.
- 2014-2015 NSF Integrative Graduate Education and Research Traineeship (IGERT) in Social Data Analytics.
- 2014 North American Cartographic Information Society (NACIS) Travel Award to participate in the NACIS Conference, Pittsburgh, Pennsylvania, October 2014.
- 2014 Penn State Department of Geography Gould Center Travel Award to participate in the NACIS Conference, Pittsburgh, Pennsylvania, October 2014.
- 2014 Penn State Department of Geography GeoVISTA Center Travel Award to participate in the GIScience Conference, Vienna, Austria, September 2014.
- 2014 Penn State Department of Geography E. Willard Miller Award for best written entry.

AFFILIATIONS

Center for Climatic Research, Nelson Institute for Environmental Studies, UW-Madison

PROFESSIONAL ASSOCIATIONS

- Association of American Geographers
- Cartography and Geographic Information Society
- North American Cartographic Society