

# J Michael Johnson

GEOGRAPHER | DATA SCIENTIST | WATER RESOURCES

Fort Collins, Colorado

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*As a geospatial data scientist, I bridge computational geography and water resources research through open-source software and cloud-native geospatial solutions. As NOAA's Geospatial Science and Technology Lead, I develop and disseminate foundational datasets that support research, operational forecasting, and decision-making across scales for NOAA's Next Generation Water Resources Modeling Framework and Flood Inundation Mapping programs. Beyond research, I mentor and teach future scientists as an affiliate at multiple universities and actively publish in peer-reviewed literature to advance the field.*

## Employment

### NOAA Office of Water Prediction

Remote

GEOSPATIAL SCIENCE AND TECHNOLOGY LEAD

Dec 2024 - Present

- Lead the development and management of the Hydrofabric Program at OWP, enabling multi-scale hydrologic, hydraulic, flood, and coastal modeling.
- Serve as the Federal Product Owner for key spatial data products supporting the Next Generation Water Resource Modeling Framework Prototype and National Water Model capabilities.
- Conceptualized, designed, and implemented a federal cloud-native spatial data service at [spatial.water.noaa.gov](https://spatial.water.noaa.gov), enhancing access to geospatial data.

### Colorado State University

Part-time

RESEARCH AFFILIATE/INSTRUCTOR

April 2024 - Present

- Collaborate with Environmental Science Program labs, researchers, and students
- Teach upper division and graduate courses
- Host data science interns at Lynker to support the Professional Science Masters Program

### Lynker

Fort Collins, Colorado

CHIEF DATA SCIENTIST

Sep 2023 - Dec 2024

- Recruit, retain, and mentor a diverse group of data scientists.
- Pursue business development strategies to secure funds for team retention and grow spatial data program.
- Develop and maintain novel geospatial software, data management solutions, workflows, and evaluations that have been published in peer review literature and used in enterprise NOAA & USGS solutions
- Design and maintain a cloud optimized data dissemination platform ([lynker-spatial.com](https://lynker-spatial.com)) that supports the Next Generation Water Resource Modeling Framework Prototype and Prediction Capabilities by serving >70,000 requests/month.
- Foster collaboration across federal, academic, and private agencies.

WATER RESOURCES DATA SCIENTIST

Aug 2020 - Sep 2023

- Support existing contracts and pursue growth in spatial data program.
- Recruited and built a geospatial staff of ten people.
- Trained and mentored new staff in open source geospatial software solutions.

### NOAA Office of Water Prediction (Contractor)

Remote

HYDROFABRIC TECHNICAL DIRECTOR

Sep 2022 - Dec 2024

- Lead the development of the Enterprise Hydrofabric solution to provide key inputs to support multi-scale hydrologic and hydraulic model development
- Led the Hydrofabric teams for both the Analysis & Prediction and Geo-Intelligence Divisions, applying effective project management strategies to successfully plan, execute, and complete scientific initiatives
- Foster collaboration with the USGS to construct federal software and data products crucial for advancing NOAA and USGS Water Mission Areas.
- Contributing author to international standards for hydrologic data, and novel approaches to support modeling, prediction, and evaluation.
- Regularly present OWP technical progress to agency leadership and the broader community through monthly updates, joint USGS-NOAA meetings, and at scientific conferences.

SENIOR DATA SCIENTIST / LEAD HYDROFABRIC DEVELOPER

Aug 2020 - Dec 2024

- Support NOAA mission of advancing hydrologic prediction capabilities through geospatial science.
- Prototyped a hydrofabric solution for the Next Generation Water Resource Modeling Framework.

RESEARCH COORDINATOR

2016

- Coordinated research activities and initiatives within the NOAA Summer Institute program.
- Facilitated collaboration between participants, mentors, and program organizers to ensure the smooth execution of research projects.
- Evaluated the effectiveness of research activities and contribute to the continuous improvement of the program.

## University of Alabama

AFFILIATE GRADUATE FACULTY

- Serve as member or co-chair on dissertation and thesis committees

Remote

Oct 2023 - Present

## Urban Flooding Open Knowledge Network

LEAD DATA SCIENTIST

- Co-authored successful proposals to NSF and served as an advocate for the team in the initial C-ACCEL program
- Developed and designed a cost effective, cloud native, building level, flood forecasting system for the United States using open source software.

Remote

Nov 2019 - Apr 2023

## UC Santa Barbara

INSTRUCTOR

- Designed and taught the first geoinformatics course for UC Santa Barbara using open source geospatial libraries.

Santa Barbara, California

Summer 2020, 2021

## Visiting Researcher

Amsterdam, Boulder, Tuscaloosa

- **Institute for Environmental Studies. Vrije Universiteit**, Amsterdam, Netherlands: June - July 2019; January - March 2018
- **Research Applications Laboratory. NCAR**, Boulder, Colorado: August - September 2018
- **NOAA National Water Center**. Tuscaloosa, Alabama: Summers of 2016, 2017

## Education

### University of California, Santa Barbara

SANTA BARBARA, CA

- **Advisor:** Dr. Keith C. Clarke
- **Committee:** Hugo Loaiciga, Kelly Caylor, David Blodgett
- **Title:** The Role of Spatial Data Science in Continental Scale Hydrology: Twelve Case Studies in Data Models, Data Structures, Modeling, and Evaluation

PhD in Geography

2021

### California Polytechnic State University

SAN LUIS OBISPO, CA

- Cum Laude
- Outstanding Senior Award: College of Liberal Arts
- **Minors:** (1) GIS for Agriculture (2) Water Science (Watershed Management) (3) Statistics (4) Economics (5) Environmental Studies

BS in Anthropology & Geography

2010 - 2015

## Publications

I actively contribute to the academic literature about the state of my field.

[G Google Scholar: 1039 citations; h-index 14; i-index 17](#)

- Narock, T., **Johnson, J.**, Singh-Mohudpur, J., & Rad, A. (2025). Building occupancy type classification and uncertainty estimation using machine learning and open data. *Environmental Data Science*, 4, e10.
- Fang, S., **Johnson, J.**, & Sankarasubramanian, A. (2024). Leveraging synthetic aperture radar (SAR) with the national water model (NWM) to improve above-normal flow prediction in ungauged basins. *Environmental Research Letters*, 19 (12), 124002.
- Fang, S., **Johnson, J.**, Yeghiazarian, L., & Sankarasubramanian, A. (2024). Improved national-scale above-normal flow prediction for gauged and ungauged basins using a spatio-temporal hierarchical model. *Water Resources Research*, 60 (1), e2023WR034557.
- Johnson, J.**, Afshari, S., & Rad, A. (2024). AHGestimation: An r package for computing robust, mass preserving hydraulic geometries and rating curves. *Journal of Open Source Software*, 9 (96), 6145.
- Johnson, J.**, Eyelade, D., Singh-Mohudpur, J., Rad, A., Coll, J., Spies, R., & .... (2024). Enhancing synthetic rating curve development through empirical roughness built for hydrofabric datasets. *ESS Open Archive*.
- Kim, D., **Johnson, J.**, Clarke, K., & McMillan, H. (2024). Untangling the impacts of land cover representation and resampling in distributed hydrological model predictions. *Environmental Modelling & Software*, 172, 105893.
- Rad, A. M., **Johnson, J.**, Ghahremani, Z., Coll, J., & Frazier, N. (2024). Enhancing river channel dimension estimation: A machine learning approach leveraging the national water model, hydrographic networks, and landscape characteristics. *Journal of Geophysical Research: Machine Learning and Computation*, 1 (4) ....
- Blodgett, D., & **Johnson, J.** (2023). Hydrologic modeling and river corridor applications of HY\_features concepts. *OGC Public Engineering Report*.
- Blodgett, D., **Johnson, J.**, & Andy, B. (2023). Generating a reference flow network with improved connectivity to

- support durable data integration and reproducibility in the coterminous US. *Environmental Modelling & Software*.
- Johnson, J.**, Blodgett, D., Clarke, K., & Pollak, J. (2023). Restructuring and serving web-accessible streamflow data from the NOAA national water model historic simulations. *Scientific Data*, 10 (1), 725.
- Johnson, J.**, Fang, S., Sankarasubramanian, A., Rad, A., Cunha, L. K. da, & .... (2023). Comprehensive analysis of the NOAA national water model: A call for heterogeneous formulations and diagnostic model selection. *Journal of Geophysical Research: Atmospheres*, 128 (24), e2023JD038534.
- Kohanpur, A., Saksena, S., Dey, S., **Johnson, J.**, Riasi, M., Yeghiazarian, L., & .... (2023). Urban flood modeling: Uncertainty quantification and physics-informed gaussian processes regression forecasting. *Water Resources Research*, 59 (3), e2022WR033939.
- Montello, D., Davis, R., **Johnson, J.**, & Chrastil, E. (2023). The symmetry and asymmetry of pedestrian route choice. *Journal of Environmental Psychology*, 102004.
- Rad, A., Abatzoglou, J., Fleishman, E., Mockrin, M., Radeloff, V., Pourmohamad, Y., Cattau, M., **Johnson, J.**, Higuera, P., Nauslar, N., & Sadegh, M. (2023). Social vulnerability of the people exposed to wildfires in US west coast states. *Science Advances*, 9 (38), eadh4615.
- Blodgett, D., & **Johnson, J.** (2022). nhdplusTools: Tools for accessing and working with the NHDPlus. *nhdplusTools: Tools for Accessing and Working with the NHDPlus*.
- Johnson, J.**, Narock, T., Singh-Mohudpur, J., Fils, D., Clarke, K., Saksena, S., & .... (2022). Knowledge graphs to support real-time flood impact evaluation. *AI Magazine*, 43 (1), 40-45.
- Johnson, J.**, & Clarke, K. (2021). An area preserving method for improved categorical raster resampling. *Cartography and Geographic Information Science*, 48 (4), 292-304.
- Blodgett, D., **Johnson, J.**, Sondheim, M., Wieczorek, M., & Frazier, N. (2020). Mainstems: A logical data model implementing mainstem and drainage basin feature types based on WaterML2 part 3: HY features concepts. *Environmental Modelling & Software*, 135, 104927.
- Clarke, K., & **Johnson, J.** (2020). Calibrating SLEUTH with big data: Projecting california's land use to 2100. *Computers, Environment and Urban Systems*, 83, 101525.
- Wens, M., Veldkamp, T., Mwangi, M., **Johnson, J.**, Lasage, R., Haer, T., & .... (2020). Simulating small-scale agricultural adaptation decisions in response to drought risk: An empirical agent-based model for semi-arid kenya. *Frontiers in Water*, 2, 15.
- Clarke, K., **Johnson, J.**, & Trainor, T. (2019). Contemporary american cartographic research: A review and prospective. *Cartography and Geographic Information Science*, 46 (3), 196-209.
- Johnson, J.**, & Clarke, K. (2019). climateR: An r package finding, subsetting, and retrieving geospatial data by AOI. <https://zenodo.org/records/10416587>.
- Johnson, J.**, Munasinghe, D., Eyelade, D., & Cohen, S. (2019). An integrated evaluation of the national water model (NWM) height above nearest drainage (HAND) flood mapping methodology. *Natural Hazards and Earth System Sciences (NHESS)*.
- Johnson, J.**, Wens, M., Zagaria, C., & Veldkamp, T. (2019). Integrating human behavior dynamics into drought risk assessment—a sociohydrologic, agent-based approach. *Wiley Interdisciplinary Reviews: Water*, e, e1345.
- De Cicco, L., Lorenz, D., Hirsch, R., Watkins, W., & **Johnson, J.** (2018). dataRetrieval: R packages for discovering and retrieving water data available from US federal hydrologic web services. *US Geological Survey, Reston, VA*, <https://doi.org/10.5066/P9X4L3GE>.
- Hinshaw, D., Faulconer, T., & Johnson, M. (2018). Survive and thrive in your job search: The team networking group process to your next job. *Abbott Press*.
- Johnson, J.**, Coll, J., Ruess, P., & Hastings, J. (2018). Challenges and opportunities for creating intelligent hazard alerts: The “FloodHippo” prototype. *JAWRA Journal of the American Water Resources Association*.
- Lo'aiciga, H., & **Johnson, J.** (2018). Infiltration on sloping terrain and its role on runoff generation and slope stability. *Journal of Hydrology*, 561, 584-597.
- Johnson, J.**, & Lo'aiciga, H. (2017). Coupled infiltration and kinematic-wave runoff simulation in slopes: Implications for slope stability. *Water*, 9 (5), 327.

## Grants and Fellowships

While a contractor, I personally solicited **\$340,000** for research and development and was a core member of teams who raised **\$19,359,519** in research funds

<b>Developing a Freshwater Digital Twin for the Dangermond Preserve</b>	2024
THE NATURE CONSERVANCY, JACK AND LAURA DANGERMOND PRESERVE	PI, Author
<b>NOAA OWP Geospatial Services</b>	2023-2025
NOAA OFFICE OF WATER PREDICTION	Lead Data Scientist, Co-author
<b>NOAA OWP Next Generation Water Resource Modeling Framework Development</b>	2022-2024
NOAA OFFICE OF WATER PREDICTION	Lead Data Scientist, Co-author
<b>Increasing Environmental Data Access through a more robust federated data catalog and extending the climateR model to Python</b>	2023
EARTH SCIENCE INFORMATION PARTNERS	Lead Data Scientist, Co-author
<b>Machine Learning for Flood Risk Assessment</b>	2022
EARTH SCIENCE INFORMATION PARTNERS	Data Scientist
<b>The UFOKN: Delivering Flood Information to AnyOne, AnyTime, AnyWhere</b>	2020-2022
NATIONAL SCIENCE FOUNDATION	Lead Data Scientist, Co-author
<b>Convergence Accelerator Phase I (RAISE): The Urban Flooding Open Knowledge Network (UFOKN)</b>	2019-2020
NATIONAL SCIENCE FOUNDATION	Lead Data Scientist
<b>A National Water Model R Package: Improving access and application of model output</b>	2018-2019
UCAR COMET	Co-PI, Co-author
<b>FOSSFlood: The LivingFlood Application Built on Free Open Source Software</b>	2017-2018
UCAR COMET	Co-PI, Co-author
<b>Integrating farmers' adaptive behaviors in California's Central Valley to assess water and food security risks under climate change</b>	2017-2018
UCGHI PLANETARY HEALTH SEED GRANT	Co-PI, Co-author
<b>CUAHSI HydroInformatics Fellowship</b>	2020-2021
CUAHSI	PI, Author
<b>Jack and Laura Dangermond GIS Fellow in Residence</b>	2019-2020
JACK AND LAURA DANGERMOND	Graduate Student
<b>National Water Center Summer Institute</b>	2016
CUAHSI	Research Coordinator
<b>Disciplines Fellowship</b>	2015-2016
UNIVERSITY OF CALIFORNIA REGENTS	Graduate Student

## Teaching experience

I have designed and taught lower division, upper division and graduate data science courses as a UCSB and CSU Lecturer. As a graduate student, I served as a teaching assistant for over 15 courses (700+ students), and have lead community workshops for national organizations.

### UNIVERSITY TEACHING

<b>Environmental Data Science Applications: Water Resources</b>	Fort Collins, CO
COLORADO STATE UNIVERSITY	2025
<ul style="list-style-type: none"> <li>Taught to address the growing need for data science in the Environmental Science profession.</li> <li>Open course content available <a href="#">here</a></li> </ul>	
<b>Quantative Reasoning for Environmental Science</b>	Fort Collins, CO
COLORADO STATE UNIVERSITY	2025
<ul style="list-style-type: none"> <li>Taught to address the growing need for data science in the Environmental Science profession.</li> <li>Open course content available <a href="#">here</a></li> </ul>	
<b>Introduction to Geoinformatics</b>	Santa Barbara, CA
UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CALIFORNIA	2021
<ul style="list-style-type: none"> <li>Independently developed and taught to address the growing need for data science in the GIS profession.</li> <li>Intended to become prerequisite course for the UCSB Geography Department and Masters in GIS Curriculum</li> <li>Open course content available <a href="#">here</a></li> </ul>	

## TEACHING ASSISTANT

### Remote Sensing of the Environment 2

DR. VENA CHU, ALANA AYASSE

2021, 2020

Upper-Division

### Living with Global Warming

DR. CATHERINE GAUTIER

2020, 2019, 2018, 2016

Lower-Division

### Conceptual Modeling and Programming for the Geo-Sciences

DR. KRZYSZTOF JANOWICZ

2020, 2019, 2017

Upper-Division and Graduate

### Remote Sensing of the Environment 1

DR. JOE MCFADDEN

2020

Upper-Division

### Remote Sensing of the Environment 3

DR. VENA CHU

2019

Upper-Division

### Maps and Spatial Reasoning

DR. WERNER KUHN, DR. KEITH CLARKE

2019, 2018, 2017

Lower-Division

### Cartographic Design and Geovisualization

DR. KEITH CLARKE

2018

Upper-Division

### Environmental Water Quality

DR. HUGO LOAICIGA

2017

Upper-Division

### Oceans and Atmosphere

DR. TIM DeVERIES

2016

Lower-Division

## WORKSHOPS

### Community Hydrofabric Development

CIROH TRAINING AND DEVELOPER'S CONFERENCE

May 2025

Workshop Lead

- Design and led workshops sharing how Ciroh members can contribute to the evolving hydrofabric effort

### End to End Hydrofabric Workflows

CIROH TRAINING AND DEVELOPER'S CONFERENCE

May 2024

Workshop Lead

- Design and led workshops sharing progress within the NOAA Enterprise Hydrofabric Solution

### Leveraging the NHGF and NextGen derived products for Research

NOAA 2023 SUMMER INSTITUTE

June 2023

Workshop Lead

### The NextGen Hydrofabric: What Is It, How to get it, and how to make your own?

CIROH TRAINING AND DEVELOPER'S CONFERENCE

May 2023

Workshop Lead

- Design and led 2 workshops exposing over 100 new developers to the available tools, data models, and dataset developed.

### Introduction to core hydrofabric services and concepts

NOAA 2022 SUMMER INSTITUTE

June 2022

Workshop Lead

### Working with Geospatial Hydrologic Data Using Web Services

INTERNET OF WATER

July 2022

Workshop Co-lead

### R and Python Tools for Geospatial Water Applications

AWRA 2022 GEOSPATIAL WATER TECHNOLOGY CONFERENCE

May 2022

Workshop Co-lead

## AWARD NOMINATIONS

### Nominated for UCSB GSA Excellence in Teaching by students

2020, 2019

### Nominated for UCSB Geography Excellence in Teaching by faculty member

2020, 2019

## Open Source Software

A primary output of my scientific work is open source software in personal, USGS and NOAA repositories. Much of my work is on our [OWP Spatial R-universe](#) or my personal [Github](#): [👤 244 followers](#); [★ 903 stars](#)

<b>AOI</b> FAST AND FLEXIBLE GEOCODING AND AOI CREATION.	Lead Developer
<b>climateR</b> INSTANT ACCESS TO GRIDDED AND OBSERVATION CLIMATE DATA.	Lead developer
<b>climateR-catalogs</b> A CONSISTENT FEDERATED DATA CATALOG FOR PROGRAMMATIC ACCESS.	Lead developer
<b>zonal</b> FAST, FLEXABLE SPATIAL DATA SUMMARIZATION.	Lead developer
<b>nwmTools</b> NATIONAL WATER MODEL STREAMFLOW ACCESS.	Lead developer
<b>DOI-USGS/nhdplusTools</b> MANIPULATING HYDROGRAPHIC DATA WITH THE NHDPLUS DATA MODEL.	Author
<b>DOI-USGS/dataRetrieval</b> R INTERFACE TO THE USGS DATA HOLDINGS.	Author
<b>NOAA-OWP/hydrofab</b> MANIPULATING THE HYDROGRAPHIC NETWORK FOR HYDROLOGIC MODELING.	Author
<b>NOAA-OWP/hydrofabric</b> GENERATING DATA PRODUCTS FOR CONTINENTAL SCALE HYDROLOGY	Lead Developer
<b>AHGestimation</b> ESTIMATING ROBUST, MASS CONSERVING AHG RELATIONSHIPS WITH CROSS SECTION HYDRUALICS AND GEOMETRY	Lead Developer

## Invited Presentations

<b>Data and Architectural Advances (and limits) towards improved local and large scale modeling</b> NATIONAL RESERVOIR DATA SYMPOSIUM	Feb 2024 Invited Talk
<b>Increasing Environmental Data Access: The ClimateR and ClimatePy Ecosystems</b> ESIP WINTER MEETING	Jan 2024 Plenary
<b>Primer on earth science data standards</b> ESIP WINTER MEETING	Jan 2024 Invited Talk
<b>The NOAA Next Generation Water Resource Modeling Framework Hydrofabric</b> AMS: BALTIMORE	Jan 2024 Conference Talk
<b>Current State of the NOAA NextGen Enterprise Hydrofabric System</b> AGU SAN FRANCISCO	Dec 2023 Conference Talk
<b>Integrated Hydro-Terrestrial Modeling 2.0</b> ICF GLOBAL HEADQUARTERS CONFERENCE CENTER <ul style="list-style-type: none"><li>• Workshops to advance community modeling and integrated water resources management.</li><li>• Nominated by NOAA to attend.</li></ul>	Oct 2023 Workshop
<b>Meeting Data Where it Lives the power of virtual access patterns</b> ESIP RANTS AND RAVES: INFORMATION TECHNOLOGY AND INTEROPERABILITY (IT&I) TECH DIVE <ul style="list-style-type: none"><li>• Exploring the underutilized potetnial of GDAL virtual access patterns in a 1 hour technical talk.</li></ul>	Mar 2023 Invited Talk
<b>The NOAA NextGen Water Resources Modeling Framework Hydrofabric: Version 1.0</b> AGU: CHICAGO	Dec 2022 Conference Talk
<b>Introducing a building level, continental scale, flood risk forecast system</b> AGU: CHICAGO	Dec 2022 Conference Talk

<b>NOAA USGS Quarterly Meetings</b> NOAA-USGS QUARTERLY MEETINGS <ul style="list-style-type: none"> <li>Briefed USGS and NOAA Leadership at Quartly Meeting.</li> <li>Represented ongoing NOAA USGS collaboration.</li> </ul>	Nov 2022 Invited Talk
<b>NOAA USGS Modeling Workshop</b> NATIONAL CONSERVATION TRAINING CENTER FACILITY <ul style="list-style-type: none"> <li>USGS/NOAA Programatic Level Setting</li> </ul>	Oct 2022 Stratigic Planning Workshop
<b>End-to-end Hydrofabric workflows for the NextGen Water Resources Modeling Framework</b> FRONTEIRS IN HYDROLOGY: PUERTO RICO	Jun 2022 Conference Talk
<b>Tools for Processing the NHDPlus into a Hydrofabric Suitable for Use in the NextGen National Water Model</b> AGU: NEW ORLEANS	Dec 2021 Conference Talk