

# Dr. J Michael Johnson

GEOGRAPHER | DATA SCIENTIST | WATER RESOURCES

Fort Collins, Colorado

✉ jjohnson@lynker.com | 🏠 mikejohnson51.github.io | 📧 MrXM9cgAAAAJ | 📷 mikejohnson51

I am a **geospatial data scientist** leading the **hydrofabric development for NOAA's Next Generation National Water Model** along with collaborative federal efforts (USGS/NOAA) to define a national suite of hydroinformatic's products. I seek to bridge **data-intensive computational geography** with **water resources research** to design open-source software and data solutions to ease community access to big geospatial data. I still am actively publishing research and am eager to facilitate and grow research collaborations.

## Employment

### Lynker

Fort Collins, Colorado

CHIEF DATA SCIENTIST/ POD LEAD

Sep 2023 - Present

- Lead spatial data development for the NOAA Office of Water Prediction
- Support local and state level consulting projects related to water resource management and hazard mitigation
- Recruit, retain, and mentor a strong and diverse group of data scientists

WATER RESOURCES DATA SCIENTIST

Aug 2020 - Sep 2023

### NOAA Office of Water Prediction

Remote

HYDROFABRIC TECHNICAL DIRECTOR

Sep 2022 - Present

- Develop foundational geospatial products to support the Next Generation Water Modeling Framework
- Collaborate with the USGS to build a suite of federal software and data products to support the NOAA and USGS Water Mission Areas
- Work with the CIROH member universities to support 'research to operations' hydrology
- Lead a team developing novel machine learning, geospatial, and cloud based solutions for open hydrologic science

SENIOR DATA SCIENTIST @ NWS / LEAD HYDROFABRIC DEVELOPER

Aug 2020 - Present

### University of Alabama

Remote

GRADUATE FACULTY (AFFILIATE)

Oct 2023 - Present

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

### Urban Flooding Open Knowledge Network

Remote

LEAD DATA SCIENTIST (INDEPENDENT CONTRACTOR)

Nov 2019 - Apr 2023

- 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 Continental United States.

### UC Santa Barbara

Santa Barbara, California

LECTURER - GEOGRAPHY DEPARTMENT

Summer 2020, 2021

- Designed and taught the first geoinformatics course for UC Santa Barbara.

### NOAA Office of Water Prediction

Tuscaloosa, Alabama

RESEARCH COORDINATOR

2016

- Led students towards the successful execution of projects related to the National Water Model Research Fellowship

### Visiting Researcher

Amsterdam, Boulder, Tuscaloosa

2016 - 2018

- **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

PhD in Geography

SANTA BARBARA, CA

2021

- **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

- 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

## Publications

 Google Scholar: 494 citations;  20 collaborators;  23 papers  
 h-index 10;  i-index 12

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.

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.

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.

**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.

Blodgett, D., & **Johnson, J.** (2018). nhdplusTools: Tools for accessing and working with the NHDPlus. *Available from <https://Code.Usgs.Gov/Water/nhdplusTools>*.

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>.

**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

I have personally solicited **\$451,000** for research and development and been a core member of teams who have solicited **\$19,292,519**.

<b>NOAA OWP Geospatial Services</b>	\$8,000,000
NOAA OFFICE OF WATER PREDICTION	2023-2025
<b>NOAA OWP Next Generation Water Resource Modeling Framework Development</b>	\$7,300,000
NOAA OFFICE OF WATER PREDICTION	2022-2024
<b>Increasing Environmental Data Access through a more robust federated data catalog and extending the climateR model to Python</b>	\$6,000
EARTH SCIENCE INFORMATION PARTNERS	2023
<b>Machine Learning for Flood Risk Assessment</b>	\$20,000
EARTH SCIENCE INFORMATION PARTNERS	2022
<b>The UFOKN: Delivering Flood Information to AnyOne, AnyTime, AnyWhere</b>	\$2,853,561 (Subaward: \$240,000)
NATIONAL SCIENCE FOUNDATION	2020-2022
<b>Convergence Accelerator Phase I (RAISE): The Urban Flooding Open Knowledge Network (UFOKN)</b>	\$1,027,958 (Subaward: \$100,000)
NATIONAL SCIENCE FOUNDATION	2019-2020
<b>A National Water Model R Package: Improving access and application of model output</b>	\$15,000
UCAR COMET	2018-2019
<b>FOSSFlood: The LivingFlood Application Built on Free Open Source Software</b>	\$5,000
UCAR COMET	2017-2018
<b>Integrating farmers’ adaptive behaviors in California’s Central Valley to assess water and food security risks under climate change</b>	\$10,000
UCGHI PLANETARY HEALTH SEED GRANT	2017-2018
<b>CUAHSI HydroInformatics Fellowship</b>	\$5,000
CUAHSI	2020-2021
<b>Jack and Laura Dangermond GIS Fellow in Residence</b>	\$5,000
JACK AND LAURA DANGERMOND	2019-2020
<b>National Water Center Summer Institute</b>	\$15,000
CUAHSI	2016

## Teaching experience

I designed an upper division spatial data science course as a UCSB Lecturer, was a teaching assistant for over 15 courses (700+ students), and have lead community workshops for national organizations.

### UNIVERSITY TEACHING

#### Introduction to Geoinformatics

UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CALIFORNIA

Santa Barbara, CA

2021

- Independently developed and taught to address the growing need for data science in the GIS profession.
- Intended to become prerequisite course for the UCSB Geography Department and Masters in GIS Curriculum
- Open course content available here

### 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

#### 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

## Open Source Software

A primary output of my scientific work is open source software in personal, USGS and NOAA repositories.

 Github:  189 followers;  694 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>DOI-USGS/hyRefactor</b>	
MANIPULATING THE NHDPLUS 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>The ClimateR and ClimatePy Ecosystems</b>	Jan 2024
ESIP WINTER MEETING	Plenary
<b>Primer on earth science data standards</b>	Jan 2024
ESIP WINTER MEETING	Tech Talk
<b>The NOAA Next Generation Water Resource Modeling Framework Hydrofabric</b>	Jan 2024
AMS: BALTIMORE	Conference Talk
<b>Current State of the NOAA NextGen Enterprise Hydrofabric System</b>	Dec 2023
AGU SAN FRANCISCO	Conference Talk
<b>Integrated Hydro-Terrestrial Modeling 2.0</b>	Oct 2023
ICF GLOBAL HEADQUARTERS CONFERENCE CENTER	Workshop
<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>	
<b>Meeting Data Where it Lives the power of virtual access patterns</b>	Mar 2023
ESIP RANTS AND RAVES: INFORMATION TECHNOLOGY AND INTEROPERABILITY (IT&I) TECH DIVE	Tech Talk
<ul style="list-style-type: none"> <li>Exploring the underutilized potetnial of GDAL virtual access patterns in a 1 hour technical talk.</li> </ul>	
<b>The NOAA NextGen Water Resources Modeling Framework Hydrofabric: Version 1.0</b>	Dec 2022
AGU: CHICAGO	Conference Talk
<b>Introducing a building level, continental scale, flood risk forecast system</b>	Dec 2022
AGU: CHICAGO	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 Tech 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