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** through open-source software and novel data solutions. I still am actively publishing research and am eager to facilitate and grow collaborations.*

Employment

Lynker
Fort Collins, Colorado

Chief Data Scientist/ Pod Lead — *Sep 2023 - Present*

- Lead spatial data development for the NOAA Office of Water Prediciton
- Support local and state level consulting projects related to water resource managment 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 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

California Polytechnic State University *BS in Anthropology & Geography*

San Luis Obispo, CA *2010 - 2015*

- 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: 517 citations; 20 collaborators; 27 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*.

Blodgett, D., & Johnson, M. (2022). nhdplusTools: Tools for accessing and working with the NHDPlus. *nhdplusTools: Tools for Accessing and Working with the NHDPlus.*

Cunha, L., Jennings, K., Ogden, F., Mizukami, N., **Johnson, J.**, Liu, Y., Wu, W., & …. (2022). A preliminary evaluation of hydrologic model formulations in the next generation water resources modeling framework. *Frontiers in Hydrology*, *2022, 215-06*.

Jennings, K., Cunha, L., Wu, W., Wood, A., Mizukami, N., Garrett, J., **Johnson, J.**, Peckham, S., Frazier, N., Bartel, R., Aggett, G., Williamson, M., Flowers, T., & Ogden, F. (2022). Improving snow process representation in the national water model with the next generation water resources modeling framework. *Frontiers in Hydrology*, *2022, 142-01A*.

Johnson, J., Gibbs, R., Jennings, K., Cunha, L. K. da, Flowers, T., & …. (2022). End-to-end hydrofabric workflows for the NextGen water resources modeling framework. *Frontiers in Hydrology*, *2022, 142-03*.

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*.

Mizukami, N., Wlostowski, A., Wood, A., Jennings, K., Cunha, L., Frazier, N., Wu, W., **Johnson, J.**, Ogden, F., & Flowers, T. (2022). River routing capability in the next generation water resources model framework: Heterogeneous routing schemes and data assimilation. *Frontiers in Hydrology*, *2022, 148-03*.

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*.

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**.

NOAA OWP Geospatial Services — *$8,000,000*
NOAA Office of Water Prediction — *2023-2025*

NOAA OWP Next Generation Water Resource Modeling Framework Development — *$7,300,000*
NOAA Office of Water Prediction — *2022-2024*

Increasing Environmental Data Access through a more robust federated data catalog and extending the climateR model to Python — *$20,000*
Earth Science Information Partners — *2023*

Machine Learning for Flood Risk Assessment — *$6,000*
Earth Science Information Partners — *2022*

The UFOKN: Delivering Flood Information to AnyOne, AnyTime, AnyWhere — *$2,853,561 (Subaward: $240,000)*
National Science Foundation — *2020-2022*

Convergence Accelerator Phase I (RAISE): The Urban Flooding Open Knowledge Network (UFOKN) — *$1,027,958 (Subaward: $100,000)*
National Science Foundation — *2019-2020*

A National Water Model R Package: Improving access and application of model output — *$15,000*
UCAR COMET — *2018-2019*

FOSSFlood: The LivingFlood Application Built on Free Open Source Software *$5,000*

UCAR COMET *2017-2018*

Integrating farmers' adaptive behaviors in California's Central Valley to assess water and food security risks under climate change *$10,000*

UCGHI Planetary Health Seed Grant *2017-2018*

CUAHSI HydroInformatics Fellowship *$5,000*

CUAHSI *2020-2021*

Jack and Laura Dangermond GIS Fellow in Residence *$5,000*

Jack and Laura Dangermond *2019-2020*

National Water Center Summer Institute *$15,000*

CUAHSI *2016*

Disciplines Fellowship *$30,000*

University of California Regents *2015-2016*

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 *Santa Barbara, CA*

University of California, Santa Barbara, California *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 *2021, 2020*

Dr. Vena Chu, Alana Ayasse *Upper-Division*

Living with Global Warming *2020, 2019, 2018, 2016*

Dr. Catherine Gautier *Lower-Division*

Conceptual Modeling and Programming for the Geo-Sciences *2020, 2019, 2017*

Dr. Krzysztof Janowicz *Upper-Division and Graduate*

Remote Sensing of the Environment 1 *2020*

Dr. Joe McFadden *Upper-Division*

Remote Sensing of the Environment 3 *2019*

Dr. Vena Chu *Upper-Division*

Maps and Spatial Reasoning *2019, 2018, 2017*

Dr. Werner Kuhn, Dr. Keith Clarke *Lower-Division*

Cartographic Design and Geovisualization *2018*

Dr. Keith Clarke *Upper-Division*

Environmental Water Quality *2017*

Dr. Hugo Loaiciga *Upper-Division*

Oceans and Atmosphere *2016*

Dr. Tim DeVeries *Lower-Division*

Workshops

Leveraging the NHGF and NextGen derived products for Research *June 2023*

NOAA 2023 Summer Institute *Workshop Lead*

The NextGen Hydrofabric: What Is It, How to get it, and how to make your own? *May 2023*

CIROH Training and Developer's conference *Workshop Lead*

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

Introduction to core hydrofabric services and concepts *June 2022*

NOAA 2022 Summer Institute *Workshop Lead*

Working with Geospatial Hydrologic Data Using Web Services *July 2022*

Internet of Water *Workshop Co-lead*

R and Python Tools for Geospatial Water Applications *May 2022*

AWRA 2022 Geospatial Water Technology Conference *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.

Github: 198 followers; 709 stars

AOI

Fast and flexible geocoding and AOI creation. *Lead Developer*

climateR

Instant access to gridded and observation climate data. *Lead developer*

climateR-catalogs

A consistent federated data catalog for programmatic access. *Lead developer*

zonal

Fast, flexable spatial data summarization. *Lead developer*

nwmTools

National Water Model Streamflow access. *Lead developer*

DOI-USGS/nhdplusTools

Manipulating hydrographic data with the NHDPlus data model. *Author*

DOI-USGS/dataRetrieval

R Interface to the USGS data holdings. *Author*

DOI-USGS/hyRefactor

Manipulating the NHDPlus Network for Hydrologic Modeling. *Author*

NOAA-OWP/hydrofabric

Generating data products for continental scale hydrology *Lead Developer*

AHGestimation

Estimating robust, mass conserving AHG relationships with cross section hydrualics and geometry *Lead Developer*

Invited Presentations

Data and Architectural Advances (and limits) towards improved local and large scale modeling *Feb 2024*

National Reservoir Data Symposium *Invited Talk*

Increasing Environmental Data Access: The ClimateR and ClimatePy Ecosystems *Jan 2024*

ESIP Winter Meeting *Plenary*

Primer on earth science data standards *Jan 2024*

ESIP Winter Meeting *Invited Talk*

The NOAA Next Generation Water Resource Modeling Framework Hydrofabric *Jan 2024*

AMS: Baltimore *Conference Talk*

Current State of the NOAA NextGen Enterprise Hydrofabric System *Dec 2023*

AGU San Fransisco *Conference Talk*

Integrated Hydro-Terrestrial Modeling 2.0 *Oct 2023*

ICF Global Headquarters Conference Center *Workshop*

- Workshops to advance community modeling and integrated water resources management.
- Nominated by NOAA to attend.

Meeting Data Where it Lives the power of virtual access patterns *Mar 2023*

ESIP Rants and Raves: Information Technology and Interoperability (IT&I) Tech Dive *Invited Talk*

- Exploring the underutilized potetnial of GDAL virtual access patterns in a 1 hour technical talk.

The NOAA NextGen Water Resources Modeling Framework Hydrofabric: Version 1.0 *Dec 2022*

AGU: Chicago *Conference Talk*

Introducing a building level, continental scale, flood risk forecast system *Dec 2022*

AGU: Chicago *Conference Talk*

NOAA USGS Quarterly Meetings *Nov 2022*

NOAA-USGS Quarterly Meetings *Invited Talk*

- Briefed USGS and NOAA Leadership at Quartly Meeting.
- Represented ongoing NOAA USGS collaboration.

NOAA USGS Modeling Workshop *Oct 2022*

National Conservation Training Center Facility *Stratigic Planning Workshop*

- USGS/NOAA Programatic Level Setting

End-to-end Hydrofabric workflows for the NextGen Water Resources Modeling Framework *Jun 2022*

Fronteirs in Hydrology: Puerto Rico *Conference Talk*

Tools for Processing the NHDPlus into a Hydrofabric Suitable for Use in the NextGen National Water Model *Dec 2021*

AGU: New Orleans *Conference Talk*