J Michael **Johnson**

Geographer | Data Scientist | Water Resources

Fort Collins, Colorado

jjohnson@lynker.com | mikejohnson51.github.io | MrXM9cgAAAAJ | mikejohnson51

As a geospatial data scientist my expertise lies in bridging data-intensive computational geography with water resources research through open-source software and data solutions. I lead the hydrofabric development and spatial data science efforts for NOAA's Next Generation Water Resources Modeling Framework and, with partners at the USGS, help spearhead a comprehensive suite of federal hydroinformatics products. Throughout my career, I have actively contributed to cutting-edge research, with a focus on publishing impactful findings and fostering collaborative relationships within the scientific community.

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
- Act as a key liaison between NOAA and external stakeholders, fostering partnerships and knowledge exchange.

Water Resources Data Scientist — *Aug 2020 - Sep 2023*

NOAA Office of Water Prediction

Remote

Hydrofabric Technical Director — *Sep 2022 - Present*

- Lead the development of foundational geospatial products essential to the Next Generation Water Modeling Framework.
- Foster collaboration with the USGS to construct federal software and data products crucial for advancing the NOAA and USGS Water Mission Areas.
- Collaborate closely with member universities of the CIROH (Cooperative Institute for Research to Operations in Hydrology) to facilitate the transition of research findings into operational hydrology practices.
- Direct a team dedicated to pioneering geospatial, machine learning, and cloud-based solutions tailored for open hydrologic science

Senior Data Scientist / Lead Hydrofabric Developer — *Aug 2020 - Present*

Research Coordinator — *2016*

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

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.

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 *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: 820 citations; 20 collaborators; 35 papers
h-index 12; **i-index** 14

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*.

James, C., & Johnson, M. (2024). Adaptive strategies for flood-prone areas. *EasyChair*.

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., **Johnson, J.**, Eyelade, D., & Watters, A. (2024). Geospatial hydrofabric-driven machine learning for channel bathymetry and hydraulics at continental scales. *WaterSciCon*, *n24*.

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*.

Narock, T., **Johnson, J.**, & Rad, A. (2023). Enhancing flood risk assessment through machine learning and open data. *EarthArXiv*.

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*.

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*.

Rogers, M., & Johnson, M. (2004). Developing the OPTAGON package to enable availability modelling of challenging gas production scenarios. *Safety and Reliability*, *24 (1), 16-22*.

Grants and Fellowships

I have personally solicited **$340,000** for research and development and been a core member of teams who have solicited **$19,359,519**.

Developing a Freshwater Digital Twin for the Dangermond Preserve — *2024*
The Nature Conservancy, Jack and Laura Dangermond Preserve — *PI, Author*

NOAA OWP Geospatial Services — *2023-2025*
NOAA Office of Water Prediction — *Lead Data Scientist, Co-author*

NOAA OWP Next Generation Water Resource Modeling Framework Development — *2022-2024*
NOAA Office of Water Prediction — *Lead Data Scientist, Co-author*

Increasing Environmental Data Access through a more robust federated data catalog and extending the climateR model to Python — *2023*
Earth Science Information Partners — *Lead Data Scientist, Co-author*

Machine Learning for Flood Risk Assessment — *2022*
Earth Science Information Partners — *Data Scientist*

The UFOKN: Delivering Flood Information to AnyOne, AnyTime, AnyWhere — *2020-2022*
National Science Foundation — *Lead Data Scientist, Co-author*

Convergence Accelerator Phase I (RAISE): The Urban Flooding Open Knowledge Network (UFOKN) — *2019-2020*
National Science Foundation — *Lead Data Scientist*

A National Water Model R Package: Improving access and application of model output — *2018-2019*
UCAR COMET — *Co-PI, Co-author*

FOSSFlood: The LivingFlood Application Built on Free Open Source Software — *2017-2018*
UCAR COMET — *Co-PI, Co-author*

Integrating farmers' adaptive behaviors in California's Central Valley to assess water and food security risks under climate change *2017-2018*

UCGHI Planetary Health Seed Grant *Co-PI, Co-author*

CUAHSI HydroInformatics Fellowship *2020-2021*

CUAHSI *PI, Author*

Jack and Laura Dangermond GIS Fellow in Residence *2019-2020*

Jack and Laura Dangermond *Graduate Student*

National Water Center Summer Institute *2016*

CUAHSI *Research Coordinator*

Disciplines Fellowship *2015-2016*

University of California Regents *Graduate Student*

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: 220 followers; 744 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*