J Michael **Johnson**

GEOGRAPHER | DATA SCIENTIST | WATER RESOURCES

Fort Collins, Colorado

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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: 800 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: 219 followers; ★ 742 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 S<small>AN</small> F<small>RANSISCO</small>   *Conference Talk*

Integrated Hydro-Terrestrial Modeling 2.0   *Oct 2023*

ICF G<small>LOBAL</small> H<small>EADQUARTERS</small> C<small>ONFERENCE</small> C<small>ENTER</small>   *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 R<small>ANTS AND</small> R<small>AVES</small>: I<small>NFORMATION</small> T<small>ECHNOLOGY AND</small> I<small>NTEROPERABILITY</small> (IT&I) T<small>ECH</small> D<small>IVE</small>   *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: C<small>HICAGO</small>   *Conference Talk*

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

AGU: C<small>HICAGO</small>   *Conference Talk*

NOAA USGS Quarterly Meetings   *Nov 2022*

NOAA-USGS Q<small>UARTERLY</small> M<small>EETINGS</small>   *Invited Talk*

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

NOAA USGS Modeling Workshop   *Oct 2022*

N<small>ATIONAL</small> C<small>ONSERVATION</small> T<small>RAINING</small> C<small>ENTER</small> F<small>ACILITY</small>   *Stratigic Planning Workshop*

- USGS/NOAA Programatic Level Setting

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

F<small>RONTEIRS IN</small> H<small>YDROLOGY</small>: P<small>UERTO</small> R<small>ICO</small>   *Conference Talk*

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

AGU: N<small>EW</small> O<small>RLEANS</small>   *Conference Talk*