Dr. J Michael **Johnson**

Data Scientist | Geographer | Water Resources

Fort Collins, Colorado

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*I am a **water resource data scientist** leading the **hydrofabric development for NOAA's Next Generation National Water Model** along with collaborative federal efforts to define a national suite of hydroinformatic data products. I seek to bridge **data-intensive computational geography** with **water resources research** and develop open-source software to ease community access to big data and design new data products.*

Employment

Lynker
Fort Collins, Colorado

Data Scientist
August 2020 - Present

- Lead the spatial data development for the NOAA NextGen Water Resource Modeling Framework
- Contribute to 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

NOAA Office of Water Prediction
Remote

Hydrofabric Technical Director
Sep 2022 - Present

- Develop the foundational geospatial data to support verson 4 of the National Water Model
- Collaborate with the USGS to build a suite of tools and data products supporting the National Hydrologic Geospatial Fabric
- Lead a team developing novel Machine learning, geospaial, and cloud based solutions of more open and skilled science

Urban Flooding Open Knowledge Network
Remote

Lead Data Scientist
Sep 2019 - Apr 2023

- Co-authored two successful proposals to NSF and acted 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.

Geography Department
UC Santa Barbara

Lecturer
2021

- Designed and taught the first programming based GIS course for UCSB in R.

NOAA Office of Water Prediction
Tuscaloosa, AL

Course Coordinator
2016

- Lead students towards the successful execution of projects related to the National Water Model Research Fellow
- Worked at the National Water Center in advancement of the National Water Model

Visiting Researcher

Graduate Student

- **Institute for Environmental Studies**. Vrije Universiteit, Amsterdam: 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

PhD in Geography
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
San Luis Obispo, CA

BS in Anthropology & Geography, Cum Laude
2010 - 2015

- Recipient of the Outstanding Senior Award
- **Minors**: **(1)** GIS for Agriculture **(2)** Water Science (Watershed Management) **(3)** Statistics **(4)** Economics **(5)** Environmental Studies

Publications

Google Scholar: 375 citations; 20 collaborators; 22 papers
h-index 9; **i-index** 8

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*.

Fang, S., **Johnson, J.**, Yeghiazarian, L., & Sankarasubramanian, A. (2023). Improved national-scale flood prediction for gauged and ungauged basins using a spatio-temporal hierarchical model. *Authorea Preprints*.

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*.

Johnson, J., Coll, J., Clarke, K., Afshari, S., Saksena, S., & Yeghiazarian, L. (2022). Determining feature based hydraulic geometry and rating curves using a physically based, computationally efficient framework. *Preprints*.

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., 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. *Avaiable 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., Coll, J., Cohen, S., Nelson, J., Ogden, F., Praskievicz, S., & …. (2017). National water center innovators program summer institute report 2017. *Consortium of Universities for the Advancement of Hydrologic Science, Inc.*

Johnson, J., & Lo'aiciga, H. (2017). Coupled infiltration and kinematic-wave runoff simulation in slopes: Implications for slope stability. *Water*, *9 (5), 327*.

Coll, J., **Johnson, J.**, & Ruess, P. (2016). Radar measurement and flow modeling: methods. *NATIONAL WATER CENTER INNOVATORS PROGRAM SUMMER INSTITUTE REPORT*, *2016 4, 7*.

Johnson, J., Ruess, P., & Coll, J. (2016). OPERA–operational platform for emergency response and awareness: Reimagining disaster alerts. *NATIONAL WATER CENTER INNOVATORS PROGRAM SUMMER INSTITUTE REPORT*, *2016 4, 97*.

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 — *$6,000*
Earth Science Information Partners — *2023*

Machine Learning for Flood Risk Assessment — *$20,000*
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

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*

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

Github: 178 followers; 525 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*

Select Invited Workshops and Presentations

Current State of the NOAA NextGen Enterprise Hydrofabric System — *Dec 2023 (Tenative)*

AGU San Fransisco — *Conference Talk*

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

Fronteirs in Hydrology: Puerto Rico — *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.

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

AGU Chicago — *Conference Talk*

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 — *Tech Talk*

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

NOAA USGS Modeling Workshop — *Oct 2022*

National Conservation Training Center Facility — *Stratigic Planning Workshop*

- USGS/NOAA Programatic Level Setting

NOAA-USGS Quarterly Meetings — *Nov 2022*

NOAA-USGS Quarterly Meetings — *Tech Talk*

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

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

AGU Chicago — *Conference Talk*

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

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

AGU: New Orleans — *Conference Talk*