Dr. J Michael **Johnson**

Geographer | Data Scientist | Water Resources

Fort Collins, Colorado

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*I am a **geospatial 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** to design new data products and develop open-source software to ease community access to big geospatial data.*

Employment

Lynker
Fort Collins, Colorado

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

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

- Lead 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, document, and publish foundational geospatial products to support version 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, geospatial, and cloud based solutions of more open and skilled science

Lead Hydrofabric Developer — **Aug 2020 - Sep 2022**

Urban Flooding Open Knowledge Network
Remote

Lead Data Scientist (Independent Contractor) — **Nov 2019 - Apr 2023**

- Co-authored 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 — **Summer 2020, 2021**

- Designed and taught the first programming based GIS course for UC Santa Barbara in R.

NOAA Office of Water Prediction
Tuscaloosa, AL

Research Coordinator — **2016**

- Led 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, 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: 402 citations; 20 collaborators; 20 papers
h-index 10; **i-index** 10

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*.

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., 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*.

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

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: 181 followers; 667 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**

FHGestimation

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

Invited Presentations

Current State of the NOAA NextGen Enterprise Hydrofabric System

Dec 2023 (Tenative)

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 **Tech 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 **Tech 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**