

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 (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 Prediction
- Support local and state level consulting projects related to water resource management 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

- 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**.

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| 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

CUAHSI

\$15,000

2016

Disciplines Fellowship

UNIVERSITY OF CALIFORNIA REGENTS

\$30,000

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

UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CALIFORNIA

Santa Barbara, CA

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

DR. VENA CHU, ALANA AYASSE

2021, 2020

Upper-Division

Living with Global Warming

DR. CATHERINE GAUTIER

2020, 2019, 2018, 2016

Lower-Division

Conceptual Modeling and Programming for the Geo-Sciences

DR. KRZYSZTOF JANOWICZ

2020, 2019, 2017

Upper-Division and Graduate

Remote Sensing of the Environment 1

DR. JOE MCFADDEN

2020

Upper-Division

Remote Sensing of the Environment 3

DR. VENA CHU

2019

Upper-Division

Maps and Spatial Reasoning

DR. WERNER KUHN, DR. KEITH CLARKE

2019, 2018, 2017

Lower-Division

Cartographic Design and Geovisualization

DR. KEITH CLARKE

2018

Upper-Division

Environmental Water Quality

DR. HUGO LOAICIGA

2017

Upper-Division

Oceans and Atmosphere

DR. TIM DEVERIES

2016

Lower-Division

WORKSHOPS

Leveraging the NHGF and NextGen derived products for Research

NOAA 2023 SUMMER INSTITUTE

June 2023

Workshop Lead

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

CIROH TRAINING AND DEVELOPER'S CONFERENCE

May 2023

Workshop Lead

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

Introduction to core hydrofabric services and concepts

NOAA 2022 SUMMER INSTITUTE

June 2022

Workshop Lead

Working with Geospatial Hydrologic Data Using Web Services

INTERNET OF WATER

July 2022

Workshop Co-lead

R and Python Tools for Geospatial Water Applications

AWRA 2022 GEOSPATIAL WATER TECHNOLOGY CONFERENCE

May 2022

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, FLEXIBLE 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 FRANCISCO

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.

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| The NOAA NextGen Water Resources Modeling Framework Hydrofabric: Version 1.0 AGU: CHICAGO | Dec 2022 Conference Talk |
| Introducing a building level, continental scale, flood risk forecast system AGU: CHICAGO | Dec 2022 Conference Talk |
| NOAA USGS Quarterly Meetings NOAA-USGS QUARTERLY MEETINGS <ul style="list-style-type: none"> Briefed USGS and NOAA Leadership at Quartly Meeting. Represented ongoing NOAA USGS collaboration. | Nov 2022 Invited Talk |
| NOAA USGS Modeling Workshop NATIONAL CONSERVATION TRAINING CENTER FACILITY <ul style="list-style-type: none"> USGS/NOAA Programatic Level Setting | Oct 2022 Stratigic Planning Workshop |
| End-to-end Hydrofabric workflows for the NextGen Water Resources Modeling Framework FRONTEIRS IN HYDROLOGY: PUERTO RICO | Jun 2022 Conference Talk |
| Tools for Processing the NHDPlus into a Hydrofabric Suitable for Use in the NextGen National Water Model AGU: NEW ORLEANS | Dec 2021 Conference Talk |