

# 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

CHIEF DATA SCIENTIST/ POD LEAD

Fort Collins, Colorado

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 management 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

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 Google Scholar: 381 citations;  20 collaborators;  19 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*.

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. *Available 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**.

|  |                                   |
|--|-----------------------------------|
| <b>NOAA OWP Geospatial Services</b>  | \$8,000,000                       |
| NOAA OFFICE OF WATER PREDICTION  | 2023-2025                         |
| <b>NOAA OWP Next Generation Water Resource Modeling Framework Development</b>  | \$7,300,000                       |
| NOAA OFFICE OF WATER PREDICTION  | 2022-2024                         |
| <b>Increasing Environmental Data Access through a more robust federated data catalog and extending the climateR model to Python</b>        | \$6,000                           |
| EARTH SCIENCE INFORMATION PARTNERS   | 2023                              |
| <b>Machine Learning for Flood Risk Assessment</b>  | \$20,000                          |
| EARTH SCIENCE INFORMATION PARTNERS   | 2022                              |
| <b>The UFOKN: Delivering Flood Information to AnyOne, AnyTime, AnyWhere</b>  | \$2,853,561 (Subaward: \$240,000) |
| NATIONAL SCIENCE FOUNDATION  | 2020-2022                         |
| <b>Convergence Accelerator Phase I (RAISE): The Urban Flooding Open Knowledge Network (UFOKN)</b>  | \$1,027,958 (Subaward: \$100,000) |
| NATIONAL SCIENCE FOUNDATION  | 2019-2020                         |
| <b>A National Water Model R Package: Improving access and application of model output</b>  | \$15,000                          |
| UCAR COMET   | 2018-2019                         |
| <b>FOSSFlood: The LivingFlood Application Built on Free Open Source Software</b>   | \$5,000                           |
| UCAR COMET   | 2017-2018                         |
| <b>Integrating farmers' adaptive behaviors in California's Central Valley to assess water and food security risks under climate change</b> | \$10,000                          |
| UCGHI PLANETARY HEALTH SEED GRANT  | 2017-2018                         |
| <b>CUAHSI HydroInformatics Fellowship</b>  | \$5,000                           |
| CUAHSI   | 2020-2021                         |
| <b>Jack and Laura Dangermond GIS Fellow in Residence</b>   | \$5,000                           |
| JACK AND LAURA DANGERMOND  | 2019-2020                         |
| <b>National Water Center Summer Institute</b>  | \$15,000                          |
| CUAHSI   | 2016                              |
| <b>Disciplines Fellowship</b>  | \$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

|  |                   |
|--|-------------------|
| <b>Introduction to Geoinformatics</b>  | Santa Barbara, CA |
| UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CALIFORNIA  | 2021              |
| <ul style="list-style-type: none"> <li>Independently developed and taught to address the growing need for data science in the GIS profession.</li> <li>Intended to become prerequisite course for the UCSB Geography Department and Masters in GIS Curriculum</li> <li>Open course content available here</li> </ul> |                   |

### TEACHING ASSISTANT

|  |                |
|--|----------------|
| <b>Remote Sensing of the Environment 2</b> | 2021, 2020     |
| DR. VENA CHU, ALANA AYASSE                 | 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:  178 followers;  537 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

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### Current State of the NOAA NextGen Enterprise Hydrofabric System

*Dec 2023 (Tenative)*

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

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