

JULIAN SPERGEL, PhD

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Hydrology modeler and data analyst with a background in physics-based models, satellite imagery processing, ‘Big Data’ geospatial information analysis, and interpolation of ‘messy’ field data. Experienced in flood and drought risk assessment and in breaking down complex analytical problems into simple, easily presentable solutions.

PROFESSIONAL EXPERIENCE

Hydrology Modeler

Aug 2022 – Present

Environmental Protection Division, Georgia Department of Natural Resources | Atlanta, GA

Use geophysical modeling and data analysis to assess water-use, drought, flood, and groundwater risks and translate results into planning and policy decisions.

- Produced and implemented models to analyze the sensitivity of the Floridan Aquifer to saltwater intrusion in the Savannah/Hilton Head area. Results were incorporated into groundwater planning policy in southeast Georgia as part of the Coastal Sound Science Initiative and later served as the basis for a Savannah groundwater pump relocation study.
- Modeled over-bank river flooding in northern Georgia to assess river-bank erosion risk and stormwater damage, informing water discharge and culvert construction.
- Analyzed paleoclimate and historic climate datasets to compare modern drought intensity and duration with pre-industrial conditions and earlier periods of climate fluctuation.
- Processed and interpolated field survey data and modeled river habitats under drought conditions using 3D physics-based modeling (HEC-RAS). Results informed Habitat Conservation Plans for freshwater mussels in the Apalachicola-Chattahoochee-Flint Basin and the DroughtSWAP program for agricultural water use under drought conditions.
- Conducted safe-yield analyses for withdrawal permits, including 7Q10 calculations from aggregated stream data and downstream-impact analysis using GAEPD’s proprietary water-supply network model (OASIS BEAM).
- Worked as a detailee to the Georgia Emergency Management Agency, managing data collection on damage and outages and coordinating generator and water-pump delivery during extreme weather events.

Doctoral Researcher

Aug 2016 – Feb 2022

Lamont-Doherty Earth Observatory, Columbia University | New York, NY

Combined historic climate data, satellite imagery analysis, and surface-hydrology modeling to quantify surface meltwater flood inundation.

- Produced forecast maps of surface melt hydrology in Antarctica, an emergent field of climate science, by processing and analyzing REMA, a novel hundreds-of-GB altimetry dataset using cluster-distributed data processing.
- Created physical simulations of past Antarctic surface-melt flooding in MATLAB using surface topography and air-temperature inputs.
- Designed a new method for batch-processing hundreds of optical images to extract water depth and freeze-through rate using thermal modeling and optical light attenuation.
- Authored and co-authored multiple publications and presented research at scientific conferences and workshops.

EDUCATION

PhD, Earth and Environmental Sciences — Columbia University, New York, NY | 2016–2022

Dissertation: Modeling and remote sensing of meltwater drainage on Antarctic ice shelves.
doi:10.7916/swetz-dp81

BS, Geophysical Sciences — University of Chicago, Chicago, IL | 2012–2016

TECHNICAL SKILLS

Modeling & analysis: Geospatial and hydrological modeling; satellite imagery processing; spatial data ETL; large geospatial datasets; sensor-data quality control and extrapolation.

Hydrology/Hydraulics: HEC-RAS, RESSim, OASIS BEAM.

Programming & GIS: Python (Advanced); MATLAB (Advanced); ArcGIS (Advanced); QGIS (Advanced).

Visualization: Microsoft Office, MATLAB plotting, Matplotlib.

SELECTED PUBLICATIONS & PRESENTATIONS

Full list: www.julianspergel.com/publications-and-presentations/

- J.J. Spergel, Feng Jiang, Johmar Haye, Wei Zeng. “Coastal Permitting Strategy, Coastal Pilot Study, and Water Loss Audit.” Georgia Association of Water Professionals, Savannah, GA, July 15, 2025.
- J.J. Spergel. “Lower Flint River Basin Habitat Conservation Plan: Inundation Models of Low-Flow in HEC-RAS.” Georgia Water Resources Conference, Albany, GA, March 25, 2025.
- J.J. Spergel. “Developing Technical Capability for the Update of Coastal Permitting Strategy.” GA Coastal Council, November 19, 2024.J.J. Spergel, J. Kingslake, T. Creyts, J.M. Van Wessem, H.A. Fricker (2021). “Surface meltwater drainage and ponding on Amery Ice Shelf, East Antarctica, 1973–2019.” Journal of Glaciology, 1–14. doi:10.1017/jog.2021.46.