

JESSICA BESNIER

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EDUCATION

University of Virginia, School of Engineering and Applied Science

August 2021- 2025 (expected)

PhD Student in Civil and Environmental Engineering

Charlottesville, VA

GPA: 3.9/4.0

- Graduate certificate in Cyber-Physical Systems
- Master of Engineering in Environmental Water Resources
- Hydrosense research group: satellite-based hydrological remote sensing for hydrological events

James Madison University

August 2017-May 2021

Bachelor of Science in Engineering, ABET Accredited

Harrisonburg, VA

GPA: 3.68/4 (Cum Laude)

- Minors in Spanish, Math, and Honors Interdisciplinary Studies with an Area of Emphasis in Leadership
- Study Abroad in Salamanca, Spain: Summer 2019

SKILLS & ABILITIES

- Python
- ArcGIS
- Remote sensing
- Cyber-Physical Systems
- Machine Learning
- Project Management
- Leadership
- Public Speaking
- Tutoring
- Proficient in Adobe Photoshop and Premiere
- Advanced in Spanish
- Videography and Photography
- Global Fluency

AWARDS

- Virginia Space Grant Consortium Fellowship (awarded April 2023)
- National Science Foundation Graduate Research Fellowship Program Recipient (Awarded April 2023)
- Michael E. Frelich Data Visualization Grand Prize Winner (Awarded Fall 2022)
- People's Choice Award, University of Virginia Engineering Research Symposium (Awarded March 2022)
- National Science Foundation Research Traineeship (NSF NRT) Fellowship, Program Participant, Cyber-Physical Systems (Awarded Fall 2021)

RESEARCH EXPERIENCE

Understanding the Inniscarra reservoir fluctuations to predict downstream flooding through hydrological modeling

5/2023 – Current

Primary Researcher

Cork, Ireland

- Developing SWAT and ML models to predict downstream river discharge in order to improve flood prediction
- Works with an international team to solve problem in Co Cork, Ireland
- Spent Summer 2023 in Co Cork working on this project
- Drafting Paper and abstract submitted to AGU Fall Meeting 2023
- Co-Authors: Christian O'Leary, Conor Lynch, Bidroha Basu, Susan McKeever, Venkataraman Lakshmi

Using GRACE TWS to predict reservoir height in the Upper Parana River Basin

6/2022 – Current

Primary Researcher

Charlottesville, VA

- Using remotely sensed data to create and evaluate different Machine Learning models to predict and analyze reservoir operation in Brazil giving insight into water resources in the area
- Started this project during an internship with NASA Goddard Space Flight Center
- Abstract submitted to AGU Fall Meeting 2023
- Co-Authors: Augusto Getirana, Nishan Biswas, and Venkataraman Lakshmi

The Current Drought in La Plata River Basin

7/2021 – Current

Primary Researcher

Charlottesville, VA

- Using remote sensing hydrology, I am modeling the current drought using GLDAS (Global Land Data Assimilation System) and SMAP (Soil Moisture Active Passive) by using hydrological modeling techniques on python

- Paper in the Revision Process with Journal of Hydrology: Regional Studies
- Presented work and subsequent findings at the American Geophysical Union's Fall Meeting in 2021 in New Orleans, LA and 2022 in Chicago, IL
- Advisor: Venkataraman Lakshmi
Co-Authors: Venkataraman Lakshmi, Augusto Getirana, Hiroko Beaudoin

James Madison University, Department of Engineering

9/2018 – 12/2019

Student Researcher, Bio-Inspired Design

Harrisonburg, VA

- Conducted research on Bio-Inspired Design Teaching Methods under Dr. Jaqueline Nagel
- Presented findings at Mid-Atlantic Undergraduate Research Conference in March 2019 at Virginia Tech
- Published paper in 2019
- Authors: Jacquelyn Kay Nagel, Ramana Pidaparti, Christopher Stewart Rose, Elizabeth Marie Tafoya, Prabakaran Graceraj Ponnusamy, Tyler Jeffrey Wahl, and Jordan Claire Capelle

TEACHING EXPERIENCE

Private Tutoring

8/2018 – Current

- Tutors' chemistry, physics, geology, and Spanish to high school and college-aged students

Madison Engineering Leadership Development Program

3/2020 – 5/2021

- Work on developing leadership skills and lead first-year engineering students through their first semester at JMU
- Served as a TA for ENGR 100 for first-year students in the engineering program

INTERNSHIP EXPERIENCE

NASA Goddard Space Flight Center

6/2022 – 8/2022

Earth Science and NRO Intern

Remote- Charlottesville, VA

- Worked on a project with Dr. Augusto Gentiana that utilizes the Gravity Recovery and Climate Experiment (GRACE) along with altimetry data in the Parana Basin in Brazil to predict reservoir level height to estimate freshwater during hydrologic extremes and for energy production

Schreiber Foods

5/2020 – 8/2020

Operations and Production Management Intern

Shippensburg, PA

- Managed projects aimed to improve wastewater conditions that looked at the following: pH, total flow, total suspended solids, and foreign materials
- Collaborated with partners and analyzed data to complete a project that targeted product loss
- Identified opportunities that saved the plant money, were better for the environment and created a better work environment while utilizing Lean Six Sigma tools

PROJECT EXPERIENCE

NASA DEVELOP National Program

1/2023 – 3/2023

Team member

Charlottesville, VA

- Collaborate with another student in the InVEST Urban Flood Model UVA Team
- Work to recode the model to be able to predict flooded areas over a watershed
- Implemented and ran model over various locations in the United States
- Nominated for DEVELOPer of the Term

Building Sustainable Latrines in Tanzania

9/2019 – 5/2021

Member of the Shelter and Ventilation Sub-Team

Harrisonburg, VA

- Work in a nine-person team to solve the problem of bacterial water contamination in Ifakara, Tanzania
- Collaborate with stakeholders in Tanzania for needs assessment
- Research materials, airflow, and ventilation to provide the best design of the shelter and overall latrine

PUBLICATIONS AND PRESENTATIONS

Lakshmi, V., Le, M., Goffin, B. D., **Besnier, J.**, Pham, H., Do, H., Fang, B., Mohammed, I. N., & Bolten, J. D. (2023). Regional analysis of the 2015–16 Lower Mekong River basin drought using NASA satellite observations. *Journal of Hydrology: Regional Studies*, 46, 101362. <https://doi.org/10.1016/j.ejrh.2023.101362>

Besnier, J., Getirana, A., Biswas, N., and Lakshmi, V.: Satellite gravimetry helps monitor the operation of large reservoirs, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-2110, <https://doi.org/10.5194/egusphere-egu23-2110>, 2023.

Besnier, J., Getirana, A., Kato-Beaudoing, H. K., & Lakshmi, V. V. (2022, December). Characterizing the 2019-2021 Drought in La Plata River Basin with GLDAS and SMAP. In Fall Meeting 2022. AGU.

Besnier, J., Biswas, N. K., Getirana, A., & Lakshmi, V. V. (2022, December). Satellite gravimetry helps monitor the operation of large reservoirs. In Fall Meeting 2022. AGU.

Besnier, J., Getirana, A., Lakshmi, V., Beaudoing, H. (2021) “Drought and Flood Modeling Using Remote Sensing in the La Plata River Basin from 2006-2021.” Presentation at AGU Fall 2021 New Orleans, LA. Session NH44A *Remote Sensing: Monitoring, Prediction, and Hazard Mitigation of Hydroclimatic Extreme Events*.

Besnier, J. (2021) “The correlation between poverty, water quality, community health, and education in Guatemala and Tanzania.” Poster at the James Madison University Honor’s Symposium.

Besnier, Jessica R., "The correlation between poverty, water quality, community health, and education in Guatemala and Tanzania" (2021). Senior Honors Projects, 2020-current. 127. <https://commons.lib.jmu.edu/honors202029/127>

Nagel, J. K. S., Pidaparti, R. M., Rose, C., Tafoya, E., Ponnusamy, P. G., Wahl, T. S., **Besnier, J.**, & Capelle, J. (2020). Board 113: Evidence-based Resources that Scaffold Students in Performing Bio-inspired Design. 2019 ASEE Annual Conference & Exposition Proceedings. <https://doi.org/10.18260/1-2--32193>

Nagel, J. K., Tafoya, E. M., Wahl, T. J., **Besnier, J.** Capelle, J. C. (2018) “Evidence-based Resources that Scaffold Students in Performing Bio-inspired Design.” Poster at the Mid-Atlantic Undergraduate Research Conference, Virginia Tech.