

EDUCATION

- Scripps Institution of Oceanography, UC San Diego** La Jolla, CA
Institute of Geophysics and Planetary Physics 2021 - Summer 2026
Ph.D. in Earth Science (in progress)
Advisor: Matthias Morzfeld
- Scripps Institution of Oceanography, UC San Diego** La Jolla, CA
Institute of Geophysics and Planetary Physics 2021 - 2023
M.Sc. in Earth Science
- Lehigh University** Bethlehem, PA
B.S. in Mathematics, *with highest honors* 2017–2020
Minors in Computer Science and Environmental Studies

POSITIONS

- Scripps Institution of Oceanography, UC San Diego** La Jolla, CA
Institute of Geophysics and Planetary Physics Summer 2021 - present
Graduate Research Assistant
- Iterative ensemble methods for estimating parameters from time-averaged data
 - Feature-based data assimilation for cloud microphysics
- Argonne National Laboratory** Lemont, IL
Student Research Participant in the Mathematics and Computer Science Division Spring 2021
- Exploiting Automatic Differentiation in a Pythonic Multiple Doppler Radar Wind Retrieval Package
- Michigan State University** East Lansing, MI
SURIEM REU Summer 2020
- The Scattering Transform on Graphs

PUBLICATIONS

In Preparation / Preprints

- Davenport, E. H., Madan, J. V., **Gjini, R.**, Brzenski, J., Ho, N., Hsu, T.-Y., Liang, Y., Liu, Z., Manivannan, V., Pham, E., Vutukuru, R., Williams, A. I. L., Yang, Z., Yu, R., Lutsko, N. J., Hoyer, S., & Watson-Parris, D. (2026). JCM v1.0: A Differentiable, Intermediate-Complexity Atmospheric Model. *EGUsphere*, 2026, 1–20. <https://doi.org/10.5194/egusphere-2025-6266>
- Gjini, R.**, Morzfeld, M., Dunbar, O. R. A., & Schneider, T. (2025). The Ensemble Kalman Inversion Race. <https://arxiv.org/abs/2511.15853>
- Gjini, R.**, Morzfeld, M., Glassmeier, F., & Feingold, G. (2026). Limits of Simplicity: Feature-Based Calibration of Predator-Prey Models for Open-Cell Stratocumulus [to be submitted and available upon request].

Accepted / Published

- Clancy, R. J., Menickelly, M., Hückelheim, J., Hovland, P., Nalluri, P., & **Gjini, R.** (2022). TROPHY: Trust Region Optimization Using a Precision Hierarchy. *International Conference on Computational Science: Springer International Publishing*, 445–459.
- Jackson, R., **Gjini, R.**, Narayanan, S. H. K., Menickelly, M., Hovland, P., Hückelheim, J., & Collis, S. (2022). Improving PyDDA’s Atmospheric Wind Retrievals Using Automatic Differentiation and Augmented Lagrangian methods. *2022 Proceedings of the 21st Python in Science Conference*, 210–216.

Outreach Articles

- Gjini, R.** (2023). Stratocumulus Clouds and Predator-Prey Dynamics. *SIAM News Blog*.
<https://sinews.siam.org/Details-Page/stratocumulus-clouds-and-predator-prey-dynamics>

PRESENTATIONS

Invited

1. The Ensemble Kalman Inversion Race, *U.S. Association of Computational Mechanics (USACM) Energy and Earth Systems Technical Thrust Area*, (February 2026).
2. Derivative-Free, Ensemble-Based Optimization for Inverse Problems with Time-Averaged Data and Chaotic Dynamics, *Centre for Mathematics of Planet Earth at the University of Reading*, (May 2025).
3. Mapping Meteorological Conditions to Predator Prey Dynamics, *Learning the Earth with Artificial Intelligence (LEAP) and NASA Goddard Institute for Space Studies at Columbia University in the City of New York*, (June 2023).
4. Automatic Differentiation and Optimization in a Pythonic Direct Data Assimilation Framework for Wind Retrievals, *Center for Western Weather and Water Extremes*, (October 2022).

Oral

1. Derivative-Free, Ensemble-Based Optimization for Inverse Problems with Time-Averaged Data and Chaotic Dynamics, *20th International EnKF Workshop*, (June 2025).
2. Connecting Large-Eddy Simulations of Stratocumulus Clouds to Predator-Prey Dynamics Via Feature Based Inversions, *Southern California Applied Mathematics Symposium (SOCAMS)*, (April 2024).
3. Connecting Large-Eddy Simulations of Stratocumulus Clouds to Predator-Prey Dynamics Via Feature Based Inversions, *SIAM Conference on Uncertainty Quantification (UQ24)*, (February 2024).
4. Mapping Meteorological Conditions to Predator-Prey Dynamics, *SIAM Conference on Computational Science and Engineering (CSE23)*, (March 2023).
5. Automatic Differentiation and Optimization in a Pythonic Direct Data Assimilation Framework for Wind Retrievals, *International Conference on Continuous Optimization (ICCOPT)*, (July 2022).

Poster

1. Ensemble-Based Optimization Methods for Estimating Parameters from Time-Averaged Data, *Collaborative Research Center (CRC) International Summer School*, (September 2024).
2. Mapping Meteorological Conditions to Predator-Prey Dynamics, *American Geophysical Union (AGU) Annual Meeting*, (December 2023).
3. Mapping Meteorological Conditions to Predator-Prey Dynamics, *Scientific Machine Learning Symposium at UCSD*, (March 2023).

4. Graph Scattering Transform, *Joint Mathematics Meetings in the MAA Undergraduate Student Poster Session*, (2021).
5. Graph Scattering Transform, *Shenandoah Undergraduate Mathematics and Statistics Conference*, (2020).

PROFESSIONAL ACTIVITIES

Conference/Session Chair

- SIAM Conference on Uncertainty Quantification (UQ26) March 2026
Minisymposium: Numerical UQ Methods for Earth Science
- SIAM Conference on Computational Science and Engineering (CSE23) March 2023
Minisymposium: Understanding Cloud Physics Using Stochastic, Dynamical, and Data-Driven Modeling
- International Conference of Continuous Optimization (ICCOPT) July 2022
Computational Science and Engineering Applications of Automatic Differentiation and Optimization

Committees

- CaCAO (Chaos Computation Analysis and Optimization) Organizing Committee January 2023 - Present
Scripps Institution of Oceanography
- Computing Committee September 2023 - Present
Scripps Institution of Oceanography
- Community Anti-Bullying and Anti-Harassment (CAB) Task Force September 2022 - 2024
Scripps Institution of Oceanography

Mentoring

- Geosciences Education and Mentorship Support (GEMS) Mentor September 2022 - 2025
Ruby and Sapphire track mentor
- Scripps Student Mentor September 2022 - 2025
Scripps Institution of Oceanography

TEACHING

- **Instructor and Teaching Assistant** during SIO's Python for Earth Science Software Workshop Aug. 2025
Introduction to Python programming
- **Teaching Assistant** volunteer at the Institute for Pure and Applied Mathematics Fall 2024
Practicum for Undergraduate MATHematicians (PUMA) in Inverse Problems and Data Assimilation
- **Teaching Assistant** at UC San Diego Fall 2024
Climate Change and Society (SIO 25)
- **Instructor** during SIO's Summer Math Workshop Aug. 2022, Aug. 2023
Introduction to linear algebra
Introduction to probability and statistics
- **Grading Assistant** at Lehigh University Fall 2018 - Fall 2020
Design and Analysis of Algorithms (CSE 340)
Discrete Structures and Algorithms (CSE 140)
Linear Methods (MATH 205)

SKILLS AND EXPERTISE

- **Programming Languages:** Python, Julia, MATLAB, R, Java
- **Technology:** High-performance computing, Git, Unix Shell, Vim, LaTeX, Beamer, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Keynote

SCHOLARSHIPS AND AWARDS

- Rising Stars in Computational and Data Sciences 2026 attendee 2026
- Student Travel Award for the SIAM Conference on Uncertainty Quantification 2024, 2026
- Scripps Institution of Oceanography (SIO) Department Student Award 2023, 2025
- Outstanding Student Presentation Award from the 2023 American Geophysical Union Annual Meeting 2023
- Student Travel Award for the SIAM Conference on Computational Science and Engineering 2023
- Geosciences of the Earth, Oceans and Planets (GEO) Program Winter 2022 Scripps Fellowship 2022
- Contribution to Student Life Award (from Lehigh University) 2020