

Sidhika Tripathee

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Research Interests

Predicting climate extremes and translating them into hazard and risk by integrating climate models, satellite remote sensing, and machine learning, with an emphasis on decision-relevant science for early warning and adaptation planning.

Education

Rice University August 2025 – June 2027 (expected)

- Candidate for Master of Science in Earth, Environmental and Planetary Sciences, 3.8 GPA
- Advisor: Dr. Sylvia Dee
- Relevant coursework: Coastal Hazards in a Changing Climate, Statistical Methods for Hydroclimate Extremes, Remote Sensing, Computer Vision, Paleoclimate

Swarthmore College September 2018 – May 2022

- Dual Bachelor of Arts degree in Computer Science and Environmental Studies, 3.7 GPA
- Relevant coursework: Machine Learning, Natural Language Processing, Linear Algebra, GIS, Data Structures and Algorithms, Algorithm Design, Environmental Issues in Native Communities

Research Experience

Graduate Research Assistant, *The Climate Lab, Rice University* August 2025 – Present

- Evaluate seven isotope-enabled GCMs from the Water Isotope Model Intercomparison Project (WisoMIP: iCAM5, iCAM6, ECHAM6-wiso, GISS-E2.1, IsoGSM3, LMDZ6, MIROC5-iso) against AIRS and MODIS satellite observations and ERA5 reanalysis, using vertical water vapor δD gradients as a tracer of shallow convective mixing between the boundary layer and free troposphere.

Undergraduate Researcher, *Swarthmore College, Department of Computer Science* January 2021 – May 2021

- Applied machine learning to identify the leading demographic and environmental predictors of local asthma rates across the US, highlighting the impact of trash incinerators and racial and class disparities in environmental health risk.
- Communicated findings through accessible GIS maps and a poster presentation to Computer Science faculty and community members.

Publications and Presentations

Conference Presentations

- **Tripathee, S.**, Sarkar, M., Agosta, C., Bailey, A., Bong, H., Cauquoin, A., Ding, Q., Fiorella, R. P., LeGrande, A. N., Okazaki, A., Werner, M., Yoshimura, K., Zhu, J., & Dee, S. (2026). Right Correlation, Wrong Physics: Isotopes Reveal Why GCMs Misrepresent Stratocumulus Cloud-Mixing Feedbacks. *Oral presentation*, PP13A-03, AGU Annual Meeting 2026, San Francisco, CA, 7 December.
- **Tripathee, S.** (2021). Machine learning analysis of demographic and environmental factors associated with local asthma rates in the US. *Poster presentation*, Swarthmore College Department of Computer Science, Swarthmore, PA.

Publications

- Welp, L., Konecky, B. L., Hutchings, J., Erhardt, A. M., . . . , **Tripathee, S.**, . . . , & Yu, Z. (submitted). Spatiotemporal variability of stable isotopes in winter storm precipitation revealed by a crowd-sourced effort. *Geoscience Data Journal*.
- **Tripathee, S.**, Sarkar, M., . . . , & Dee, S. Evaluating Vertical Mixing and Low Cloud Cover in Isotope-Enabled GCMs Using Satellite Water Vapor δD . In preparation.

Skills

Programming: Python, Julia, JavaScript, Java, C, C++, Swift, Ruby, HTML/CSS

Scientific Computing: xarray, netCDF, CDO/NCO, NumPy, Pandas, Matplotlib/Cartopy, HPC/SLURM, Jupyter

Machine Learning and Data Engineering: SHAP analysis, PyTorch, random forests, support vector machines, gradient boosting, CNNs, NLP, web scraping and data pipelines (Puppeteer)

Software and Infrastructure: Git, Linux, AWS, MongoDB, Node.js, React, Ruby on Rails, REST APIs

Languages: English, Nepali

Professional Experience

- Head of Engineering**, *The Generation Lab* September 2022 – July 2024
- Directed the company's front and backend technical design and infrastructure for data collection, client engagement, database systems, and special projects while maintaining security protocols.
 - Managed a team of 5 engineering and research associates and developed new AI and NLP methods for market research, including GPT-automated survey testing.
- Software Developer**, *The Generation Lab* September 2020 – May 2022
- Designed and implemented data scrapers to reach survey participants in under-surveyed demographics, increasing outreach by 150%.
 - Created a polling database with data visualization of youth perspectives on key social and political issues.
- Software Engineering Intern**, *Microsoft* May 2021 – August 2021
- Redesigned keyboard scrolling as gesture-based scrolling in open-source Chromium code, advancing scroll unification efforts and improving keypress metrics on Chromium-based Microsoft Edge by 72%.
- Explore Intern**, *Microsoft* May 2020 – August 2020
- Developed a JavaScript Eye Dropper API for Chromium browsers, landing it in production in Microsoft Edge Canary in week 10; scoped demand through customer interviews and competitive analysis.
- New Technologist Intern**, *Microsoft* June 2019 – August 2019
- Developed "Eco-," a task management app that incentivizes focused work through micro-donations to charities based on a user's phone screen time.

Teaching and Mentoring

- Student Instructor**, *Swarthmore College, Department of Computer Science* September 2021 – December 2021
- Designed the curriculum for and taught The Critical Theory of Technology, the first student-run course in the department, to 10 students across departments.
- Teaching Assistant**, *Swarthmore College, Department of Environmental Studies* September 2021 - December 2021
- Assisted and taught students farming techniques such as planting, weeding, plot prepping and harvesting
- Tutor**, *Swarthmore Dean's Tutor Program and self-employed* September 2019 – March 2021
- Tutored students one-on-one in college-level Computer Science (intro CS, computer systems, data structures and algorithms), Math, and English as a Second Language.

Service and Outreach

- Committee Member**, *EEPS Equity and Inclusion Committee, Rice University* September 2025 – Present
- Designed, administered, and presented to faculty a department-wide survey assessing graduate students' professional and personal needs and wellbeing.
 - Helped create a peer mentoring program for graduate students in the department.
- Volunteer**, *Rice Girl Scouts Climate Challenge* February 2026
- Mentored over 50 K-12 girls on climate science concepts, including climate modeling and paleontology, by leading them in interactive climate workshops.
- Sustainability Committee Member**, *Rice Graduate Student Association* September 2025 – Present
- Started a successful composting initiative for Rice Graduate Housing residents.
 - Fostered collaborations between undergraduate and graduate clubs to run a clothing mending workshop.
- Fellow**, *African Diaspora Earthcare Coalition* January 2022 – May 2022
- Worked with community elders to produce plant medicinal tinctures for residents of Chester, PA, a community facing significant health impacts from racialized disinvestment and pollutants from the largest trash incinerator in the US.
 - Conducted community outreach and education about plant medicine and environmental justice.
- Member**, *Advisory Council to the CS Department, Swarthmore College* September 2020 – May 2022
- Created a new peer mentorship matching program for underrepresented CS majors.
 - Worked with faculty to integrate ethics into intro-level CS courses.

Co-Founder, *Tech for Social Good, Swarthmore College*

December 2018 – May 2022

- Organized a speaker series panel on ethics and technology and led a team that built a website for Swarthmore Zero Waste using Ruby on Rails.

Honors and Awards

- QuestBridge Scholar, Swarthmore College
- The Philip and Roslyn Barbash, M.D. Scholarship, Swarthmore College
- Hannah A. Leedom Fellowship, Swarthmore College

2018 – 2022