High Meadows Environmental Institute

SEPTEMBER 12, 2025

# Summer of Learning Symposium



# Summer of Learning Symposium

The High Meadows Environmental Institute (HMEI) is pleased to host the 18th annual Summer of Learning Symposium — the culminating event for students who participated in HMEI's Environmental Internship Program this past summer. The internship program provides a unique opportunity for students to complement their academic course of study with hands-on work and is designed to enrich students' perspectives and preparation as leaders. This year's symposium celebrates the 104 Princeton students from 17 academic departments who worked with University faculty, researchers from other scientific enterprises, government agencies, and not-for-profit organizations focused on projects that address pressing environmental challenges.

The symposium provides an interactive forum for students to recognize and celebrate each other's work and contributions, exchange perspectives, develop a shared mission, and consider practical, achievable paths toward a healthier and more sustainable planet.

In 2025, HMEI interns undertook research projects in Princeton University labs, and in field sites around the globe including assignments in Mozambique, Australia, Italy, the Phillipines, and the Artic Circle. Students contributed meaningfully to research advances and emerging scholarship, including projects focused on climate change, biodiversity and conservation, alternative energy, environmental policy, urban resilience, and water.

We extend congratulations to the students and appreciation to those faculty, colleagues, friends, and community partners who made this year's internship program and Summer of Learning Symposium possible.

*Front Cover: Mailynn Nguyen '28 (left) and postdoc Dr. Julia Wilcots examine archaeocyathid fossils in South Australia.*

# Schedule of Presentations

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| **9:30 AM – 11:25 AM**<br>**C209 BRIGER HALL** | Extreme Weather and Impacts, pp. 3-5 |
| **9:50 AM – 12:00 PM**<br>**C201 BRIGER HALL** | Water and the Environment, pp. 6-8 |
| **10:05 AM – 12:10 PM**<br>**B231 BRIGER HALL** | Water, Plants and Soils, pp. 9-11 |
| **12:00 PM – 2:15 PM**<br>**B331 BRIGER HALL** | Biodiversity and Conservation, pp. 12-14 |
| **1:00 PM – 2:50 PM**<br>**B231 BRIGER HALL** | Oceans and Atmosphere, pp. 15-17 |
| **1:05 PM – 3:10 PM**<br>**C209 BRIGER HALL** | Environmental Policy and Sustainable Solutions, pp. 18-20 |
| **1:05 PM – 3:25 PM**<br>**C201 BRIGER HALL** | Innovation and a New Energy Future, pp. 21-23 |

# Extreme Weather and Impacts

9:30 AM – 11:25 AM

**MODERATOR:** ADAM MALOOF, PROFESSOR OF GEOSCIENCES

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## *Weaker Arctic Amplification during $CO_2$ Removal from a Future $CO_2$ Abundant State*

**KHANG TRAN '28**, Physics

**Mentors:** Gabriel Vecchi, Knox Taylor Professor of Geosciences, Professor in the High Meadows Environmental Institute; Ivan Mitevski, Postdoctoral Research Associate, Geosciences

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## *Thermodynamic Influence on Anvil Cloud Response to Stratospheric Aerosol Injection*

**SKYLER CHAN '28**, Electrical and Computer Engineering

**Mentors:** Gabriel Vecchi, Knox Taylor Professor of Geosciences, Professor in the High Meadows Environmental Institute; Haozhe He; Postdoctoral Research Associate, High Meadows Environmental Institute

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## *Quantifying the Precipitation Changes of the East Asian Monsoon*

**CHRISTINA LI '28**, East Asian Studies

**Mentors:** Daniel Sigman, Dusenbury Professor of Geological and Geophysical Sciences, Professor of Geosciences; Mingzhe Damon Dai, Ph.D. Candidate, Geosciences

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## *Error and Uncertainty in Real-Time Tropical Cyclone Hazard Forecasting*

**ELI LEBEAU '27**, Computer Science

**Mentors:** Ning Lin, Professor of Civil and Environmental Engineering; Christine Blackshaw, Ph.D. Candidate, Civil and Environmental Engineering; Manuel Linsenmeier, Postdoctoral Research Associate, High Meadows Environmental Institute

*Real-Time Forecasting System for Hurricane Hazards and Risk*

**NANCY DAI '28**, Operations Research and Financial Engineering

**Mentor:** Ning Lin, Professor of Civil and Environmental Engineering

*User Demand for Hurricane Forecasts*

**SAMUEL ESPINO '27**, Geosciences

**Mentors:** Michael Oppenheimer, Albert G. Milbank Professor of Geosciences and International Affairs and the High Meadows Environmental Institute; Manuel Linsenmeier, Postdoctoral Research Associate, High Meadows Environmental Institute

*Role of the Diurnal Cycle on Tropical Cyclone Genesis and Intensification*

**ERIN YOO '26**, Physics

**Mentors:** Gabriel Vecchi, Knox Taylor Professor of Geosciences, Professor in the High Meadows Environmental Institute; Gabriel Rios, Ph.D. Candidate, Atmospheric and Oceanic Sciences

*Troll Station Snowfall Retrieval*

**ADVIK ESWARAN '27**, Geosciences

**Mentor:** Ryan Neely III, Associate Professor of Observational Atmospheric Science, University of Leeds

*Quantitative Approaches to the Interglacial Cryogenian & Cambrian Explosion*

**PATRICK HAMILL '28**, Undeclared
**MAILYNN NGUYEN '28**, Mathematics

**Mentors:** Adam Maloof, Professor of Geosciences; Julia Wilcots, Postdoctoral Research Associate, Geosciences, Presidential Postdoctoral Research Fellow

## *Machine Learning and Earth Observation for Resilience to Weather Extremes in the Mediterranean*

**ANGEL LI '27**, Computer Science
**CHINMAYA SARAN '28**, Computer Science

**Mentors:** Marcello Miglietta, Research Director, The Institute of Atmospheric Sciences and Climate (CNR-ISAC); Giulia Panegrossi, Senior Research Scientist, CNR-ISAC; Leo Pio D'Adderio, Postdoctoral Research Associate, CNR-ISAC; Stefano Sebastianelli, IT Remote Sensing Specialist, CNR-ISAC

# Water and the Environment

9:50 AM – 12:00 PM

**MODERATOR:** GABRIELE VILLARINI, PROFESSOR OF CIVIL AND ENVIRONMENTAL ENGINEERING AND THE HIGH MEADOWS ENVIRONMENTAL INSTITUTE, VICE DEAN, SCHOOL OF ENGINEERING AND APPLIED SCIENCE

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## *Engineers Without Borders: Nyabohanse, Kenya Water Project*

**ANDREI FLORIAN '28**, Computer Science
**CADE HEMOND '28**, Chemical and Biological Engineering
**SOPHIA MILLER '26**, Chemical and Biological Engineering
**ELISE TAYLOR '27**, Civil and Environmental Engineering

**Mentors:** Amilcare Porporato, Thomas J. Wu '94 Professor of Civil and Environmental Engineering, Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute, Faculty Advisor, Engineers without Borders (EWB), Princeton University Chapter; Roger Price, Responsible Engineer in Charge (REIC), EWB; Moses Sikuku Wakwabubi, Travel Mentor and Engineer, EWB

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## *Enriching Bacteria for Degradation of Forever Chemicals in Sediment and Water*

**BRIAN NGUYEN '27**, Civil and Environmental Engineering
**JUSTIN YANG '27**, Civil and Environmental Engineering

**Mentors:** Peter Jaffé, William L. Knapp '47 Professor of Civil Engineering, Professor of Civil and Environmental Engineering; Chiara Smorada, Ph.D. Candidate, Civil and Environmental Engineering; Camila Llerena-Olivera, Ph.D. Candidate, Civil and Environmental Engineering

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## *The Role of Land Cover and Climate Indicators on Streamflow Decline in Central Italy*

**COURTNEY HARRISON '26**, Civil and Environmental Engineering
**JOHNNY LEADINGHAM '26**, Mechanical and Aerospace Engineering

**Mentor:** Christian Massari, Senior Researcher, Research Institute for Geo-Hydrological Protection (CNR-IRPI)

## *Seasonal Tropical Cyclone Forecasting*

**JOY JIANG '28**, Operations Research and Financial Engineering
**TIMOTHY SIM '26**, Computer Science

**Mentor:** Gabriele Villarini, Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute, Vice Dean, School of Engineering and Applied Science

## *High-Resolution Groundwater Pumping Estimation in New Jersey Using a Three-Stage Machine Learning Ensemble*

**YOUSEF KASSEM '27**, Computer Science

**Mentors:** Reed Maxwell, William and Edna Macaleer Professor of Engineering and Applied Science, Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute; Lisa Gallagher, Professional Specialist, Civil and Environmental Engineering; Yueling Ma, Postdoctoral Research Associate, High Meadows Environmental Institute

## *PFAS in Water: Experimentation and Simulation*

**AYLIN IDROVO '28**, Chemical and Biological Engineering
**FIONNUALA MOORE '27**, Chemistry

**Mentors:** Ian Bourg, Associate Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute; Caridad Estrada Cardona, Ph.D. Candidate, Civil and Environmental Engineering

## *Surface Water Microplastic Contamination and Collection Strategies*

**NICHOLAS AKEY '28**, Mechanical and Aerospace Engineering
**ARJUN SHETTY '27**, Mechanical and Aerospace Engineering

**Mentor:** Michelle DiBenedetto, Assistant Professor of Mechanical and Aerospace Engineering

## *StreamWatch Water Quality Monitoring*

**LILLIAN RAPHAEL '28**, Mechanical and Aerospace Engineering
**RILEY SAMPLES '28**, Mechanical and Aerospace Engineering
**FIONA WOLTER '28**, Ecology and Evolutionary Biology

**Mentors:** Erin Stretz, Assistant Director of Science, The Watershed Institute; Jian Smith, StreamWatch Program Coordinator, The Watershed Institute; Steve Tuorto, Director of Science & Stewardship, The Watershed Institute

# Water, Plants and Soils

10:05 AM – 12:10 PM

**MODERATOR:** C. JESSICA METCALF, PROFESSOR OF ECOLOGY AND EVOLUTIONARY BIOLOGY AND PUBLIC AFFAIRS

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## *Disease Dynamics Across Elevation*

**LUCY CARLIN '28**, Undeclared
**MCKENNA CROCKER '28**, Civil and Environmental Engineering

**Mentors:** C. Jessica Metcalf, Professor of Ecology and Evolutionary Biology and Public Affairs; Amanda Gibson, Associate Professor of Biology, University of Virginia; Juliana Jiranek, Ph.D. Candidate, University of Virginia

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## *U-Th Burial Dating of Avian Eggshells at Archaeological Sites*

**KELSEY CAMPBELL '27**, Civil and Environmental Engineering
**ADRIANA GAITAN '27**, Civil and Environmental Engineering

**Mentors:** Elizabeth Niespolo, Assistant Professor of Geosciences; Noe-Heon Kim, Ph.D. Candidate, Geosciences; Alliya Akhtar, Postdoctoral Research Associate, Geosciences

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## *Dirt-Dwelling Hydrogen Eaters: Microbial Controls on the Global Hydrogen Budget in a Hydrogen-Based Economy*

**COLLIN GUEDEL '26**, Geosciences

**Mentors:** Xinning Zhang, Associate Professor of Geosciences and the High Meadows Environmental Institute; Qianhui Qin, Postdoctoral Research Associate, High Meadows Environmental Institute

## *Terrafarming and Enhanced $CO_2$ Sequestration in Soils*

**JOAQUÍN ACUÑA GIRAULT '28**, Chemical and Biological Engineering

**Mentors:** Satish Myneni, Professor of Geosciences; Jianshu Duan, Postdoctoral Research Associate, Geosciences

## *Modeling the Effects of Network Structure on Nutrient Transport in Arbuscular Mycorrhizal Fungi*

**SOPHIE KHAN '28**, Mechanical and Aerospace Engineering

**Mentors:** Howard Stone, Neil A. Omenn '68 University Professor of Mechanical and Aerospace Engineering; Filipe Henrique, Postdoctoral Research Associate, Mechanical and Aerospace Engineering

## *Carbon Balances in Urban Metabolism Systems*

**JOHN "EMMETT" SOUDER '27**, Operations Research and Financial Engineering
**TAMYCA TUNIS '27**, Civil and Environmental Engineering

**Mentors:** Benedetto Rugani, Researcher, National Research Council of Italy (CNR); Gabriele Guidolotti, Researcher, CNR

## *Breeding Okra to Improve Seed Oil Content and Identify Related Genetic Markers*

**JAY GEORGES '27**, Chemical and Biological Engineering

**Mentors:** Jonathan Conway, Assistant Professor of Chemical and Biological Engineering; Chao Liao, Postdoctoral Research Associate, Chemical and Biological Engineering

## *Designing Synthetic Microbial Communities to Alleviate Drought Stress in Plants*

**SARINA WEN '27**, Chemical and Biological Engineering

**Mentors:** Jonathan Conway, Assistant Professor of Chemical and Biological Engineering; Ella Gunady, Ph.D. Candidate, Chemical and Biological Engineering; Ting Jiang, Associate Research Scholar, Chemical and Biological Engineering

## *Understanding Mechanisms of Microbial Colonization of Crop Plants for Sustainable Agriculture*

**MICHAEL ARNWINE '28**, Chemical and Biological Engineering

**Mentors:** Jonathan Conway, Assistant Professor of Chemical and Biological Engineering; Samuel Eastman, Postdoctoral Research Associate, Chemical and Biological Engineering

## *Mechanisms of Shrubification in a Changing Arctic*

**HANNAH FLOYD '27**, Ecology and Evolutionary Biology
**ERIK LUIJENDIJK '27**, Ecology and Evolutionary Biology

**Mentors:** Jonathan Levine, J.N. Allison Professor in Environmental Studies, Professor of Ecology and Evolutionary Biology; Ruby An, Ph.D. Candidate, Ecology and Evolutionary Biology

# Biodiversity and Conservation

12:00 PM – 2:15 PM

**MODERATOR:** JONATHAN LEVINE, J.N. ALLISON PROFESSOR IN ENVIRONMENTAL STUDIES, PROFESSOR OF ECOLOGY AND EVOLUTIONARY BIOLOGY

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## *Modeling Wolf Pack Hunting and More*

**MELODY CUI '27**, Computer Science
**HELLEN DING '27**, Economics

**Mentors:** Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology; Talia Borofsky, Postdoctoral Research Associate, High Meadows Environmental Institute

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## *The Urban Aquatic Wildlife Trade*

**ARIEL CHEN '28**, Undeclared
**RILEY PAN '28**, Mathematics

**Mentors:** Agustín Fuentes, Professor of Anthropology; Christian Rivera, Postdoctoral Research Associate, High Meadows Environmental Institute

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## *Rewilding Mice: Naturalizing the Experimental Experience of "Model Mammals" for Immunology and Beyond*

**JENNY HUA '27**, Ecology and Evolutionary Biology
**CHLOE LI '27**, Ecology and Evolutionary Biology

**Mentors:** Andrea Graham, Professor of Ecology and Evolutionary Biology; David Chang von Oordt, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Yoon Chang, Ph.D. Candidate, Ecology and Evolutionary Biology

## *Host-Symbiont Interactions Across a Sociality Continuum: Insights from Bees and Nematodes*

**DOONYA KHAN '27**, Neuroscience
**SHAILA MAN '28**, Princeton School of Public and International Affairs

**Mentors:** Andrea Graham, Professor of Ecology and Evolutionary Biology; Charlotte Knopp, Ph.D. Candidate, Ecology and Evolutionary Biology

## *The Drivers of Habitat Use in Spiral-Horned Antelope: Predation, Nutrition, and Temperature in Gorongosa National Park*

**SAM MILLER '26**, Ecology and Evolutionary Biology
**ADRIANA SHIELDS '27**, Ecology and Evolutionary Biology

**Mentors:** Rob Pringle, Professor of Ecology and Evolutionary Biology; Henry Gage, Ph.D. Candidate, Ecology and Evolutionary Biology; Hallie Walker Brown, Postdoctoral Research Associate, Ecology and Evolutionary Biology

## *How Rapid Evolution Affects Species Coexistence*

**PHILIP KENT EICHELZER IV '27**, Ecology and Evolutionary Biology
**SANKALP GAUTAM '28**, Ecology and Evolutionary Biology

**Mentors:** Jonathan Levine, J.N. Allison Professor in Environmental Studies, Professor of Ecology and Evolutionary Biology; Jamie Leonard, Ph.D. Candidate, Ecology and Evolutionary Biology

## *HummerFlowerWatch: Broad-tailed Hummingbird Migration, Floral Abundance, and Climate Change in the Rocky Mountains*

**MARINA BAETA COOKSON '28**, Ecology and Evolutionary Biology
**ANA MARIA PANTOJA ALFARO '28**, Physics

**Mentors:** Mary C. Stoddard, Professor of Ecology and Evolutionary Biology; Benedict Hogan, Associate Research Scholar, Ecology and Evolutionary Biology; Kristina Fialko, Postdoctoral Research Associate, Ecology and Evolutionary Biology

## *Long-Term Climate and Behavioral Change in a Wild Yellow-Bellied Marmot Population in the Rocky Mountains*

**HANNAH MULLIGAN '27**, Economics
**PEI XIAO WU '28**, Operations Research and Financial Engineering

**Mentors:** Dan Blumstein, Professor, Ecology and Evolutionary Biology, University of California, Los Angeles (UCLA); Bridgett vonHoldt, Professor of Ecology and Evolutionary Biology; Julien Martin, Associate Professor, University of Ottawa; Taylor Bastian, Ph.D. Candidate, Ecology and Evolutionary Biology, UCLA; Katie Adler, Ph.D. Candidate, Ecology and Evolutionary Biology, UCLA; Augustin Birot, Postdoctoral Research Associate, Biology, University of Ottawa

## *The Chase Equation: Dynamics of Lion Predation and Zebra Evasion*

**ALEX RAYMOND FRIAS '28**, Ecology and Evolutionary Biology

**Mentors:** Daniel Rubenstein, Class of 1877 Professor of Zoology, Emeritus, Professor of Ecology and Evolutionary Biology, Emeritus, Senior Scholar; Isla Duporge, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Craig Marshall, Professional Specialist, Center on Science & Technology

# Oceans and Atmosphere

1:00 PM – 2:50 PM

**MODERATOR:** BESS WARD, WILLIAM J. SINCLAIR PROFESSOR OF GEOSCIENCES AND THE HIGH MEADOWS ENVIRONMENTAL INSTITUTE

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## *Nitrous Oxide in the North Atlantic: Aboard the Research Vessel Endeavor*

**DARREN McKEOGH '28**, Geosciences
**OTTILIE SYKES '27**, Geosciences
**MOLLY THACKER '28**, Geosciences

**Mentors:** Bess Ward, William J. Sinclair Professor of Geosciences and the High Meadows Environmental Institute; Amal Jayakumar, Senior Professional Specialist, Geosciences; Elizabeth Leon Palmero, Associate Research Scholar, Geosciences; Catherine Hexter, Ph.D. Candidate, Geosciences

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## *Messinian Salinity Crisis*

**ELVIS GJELAJ '28**, Electrical and Computer Engineering

**Mentors:** Daniel Sigman, Dusenbury Professor of Geological and Geophysical Sciences, Professor of Geosciences; Udara Amarathunga, Postdoctoral Research Fellow, Geosciences

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## *Surface Nutrient Supply and Consumption of the Antarctic Marine Margin in Warm Periods in the Past*

**RACHEL CHEN '28**, Civil and Environmental Engineering

**Mentors:** Daniel Sigman, Dusenbury Professor of Geological and Geophysical Sciences, Professor of Geosciences; Ellen Ai, Postdoctoral Research Fellow, Geosciences

## *Open Ocean Seaweed Mariculture*

**JESSICA CURRAN '28**, Civil and Environmental Engineering

**Mentors:** Daniel Sigman, Dusenbury Professor of Geological and Geophysical Sciences, Professor of Geosciences; Lingkun Guo, Ph.D. Candidate, Geosciences; Tanya Marshall, Postdoctoral Research Associate, Geosciences

## *Microplastics Scavenging by Rising Bubbles*

**KARINA LAD '28**, Physics

**Mentors:** Luc Deike, Associate Professor of Mechanical and Aerospace Engineering and the High Meadows Environmental Institute; Tristan Aurégan, Postdoctoral Research Associate, Mechanical and Aerospace Engineering; Megan Mazzatenta, Ph.D. Candidate, Mechanical and Aerospace Engineering

## *Metabolic Response of Marine Coral Species from Climate Change*

**AMIRA MUSTAFA '28**, Ecology and Evolutionary Biology

**Mentors:** Curtis Deutsch, Professor of Geosciences and the High Meadows Environmental Institute; Noelle Lucey, Associate Research Scholar, High Meadows Environmental Institute

## *Clam Cancer & Cell Cultures: A Survey of Bivalve Transmissible Neoplasia in the Gulf of Maine*

**ROSE HABIB '27**, Ecology and Evolutionary Biology

**Mentor:** David Fields, Senior Research Scientist, Bigelow Laboratory for Ocean Sciences

## *Investigating the Role of Tropical Cyclones on Inland City Precipitation Patterns in a Warming Climate*

**LAAHINI ADDAGATLA '28**, Computer Science

**Mentors:** Gabriel Vecchi, Knox Taylor Professor of Geosciences, Professor in the High Meadows Environmental Institute; Gabriel Rios, Ph.D. Candidate, Atmospheric and Oceanic Sciences

## *Diagnosing Drivers and Feedback of the Atmospheric Dynamics and Tropical-like Cyclones on the Southern European Seas with a Regional Coupled Ocean-atmospheric Model*

**LUCÍA ACHUCARRO '26**, Civil and Environmental Engineering

**Mentors:** Francesco Maicu, Senior Researcher, Euro-Mediterranean Center on Climate Change (CMCC); Enrico Scoccimarro, Senior Scientist, CMCC; Silvio Gualdi, Principal Scientist, CMCC; Emanuela Clementi, Scientist, Division Director of Regional Ocean Forecasting Systems (ROFS), CMCC

# Environmental Policy and Sustainable Solutions

1:05 PM – 3:10 PM

**MODERATOR:** ELIE BOU-ZEID, PROFESSOR OF CIVIL AND ENVIRONMENTAL ENGINEERING

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### *Characterizing RDase Activity in Shewanella oneidensis MR-1 for PFOA Degradation*

**BRIAN ENG '28**, Computer Science

**Mentors:** Joshua Atkinson, Assistant Professor of Civil and Environmental Engineering and the Omenn-Darling Bioengineering Institute; Kayla Aksan, Ph.D. Candidate, Civil and Environmental Engineering

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### *Designing and Characterizing Protein Switch Biosensors: Detecting Contaminants with Bacteria*

**ANGELICA SHE '26**, Civil and Environmental Engineering

**Mentors:** Joshua Atkinson, Assistant Professor of Civil and Environmental Engineering and the Omenn-Darling Bioengineering Institute; Yves Louiseau—Marchand, Visiting Researcher, Paris-Saclay University

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### *High-Throughput Detection of PFAS Breakdown & Biomining of Critical Minerals*

**ASHLEY JIMENEZ '28**, Chemical and Biological Engineering

**Mentors:** José Avalos, Associate Professor of Chemical and Biological Engineering and Bioengineering; Mansha Seth Pasricha, Associate Research Scholar, Chemical and Biological Engineering

## *Deep Image Prior for High-Resolution Flood Mapping*

**NATHAN KANG '28**, Computer Science

**Mentors:** Reed Maxwell, William and Edna Macaleer Professor of Engineering and Applied Science, Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute; George Artavanis, Research Software Engineer II, Research Computing; Xiao Xia Liang, Postdoctoral Research Associate, Civil and Environmental Engineering; Mia Peeples, Ph.D. Candidate, Civil and Environmental Engineering; Marie Joe Sawma, Ph.D. Candidate, Civil and Environmental Engineering

## *Web-Based Interface for India Air Pollution*

**THOMAS ZHANG '28**, Electrical and Computer Engineering

**Mentors:** Denise Mauzerall, William S. Tod Professor of Civil and Environmental Engineering and Public and International Affairs; Yuanyu Xie, Associate Research Scholar, Princeton School of Public and International Affairs

## *Developing a Web-Based Interface for Monitoring Wildfire Smoke and Surface Air Pollution in the United States*

**HASSAN KHAN '27**, Computer Science

**Mentors:** Denise Mauzerall, William S. Tod Professor of Civil and Environmental Engineering and Public and International Affairs; Yuanyu Xie, Associate Research Scholar, Princeton School of Public and International Affairs

## *Agriculture to Architecture: Straw Building Prototype*

**BROOKLYN FRASER '27**, English
**JOYCE KIM '28**, Architecture
**VIVI LU '26**, Architecture
**MOYU YAMAGUCHI '27**, Civil and Environmental Engineering

**Mentors:** Paul Lewis, Professor of Architecture; Jocelyn Beausire, Senior Research Specialist, Architecture; Patricia Hazle, Designer, LTL Architects

## *Hydrodynamic Performance of Sustainable Hybrid Bridge-Barriers under Regular Wave Forcing*

**MADISON CLARK '27**, Mechanical and Aerospace Engineering
**JOHN CURETON '26**, Civil and Environmental Engineering

**Mentors:** Maria Garlock, Daniel Tsui Professor in Engineering, Professor of Civil and Environmental Engineering; Patrick (Zhaoyang) Song, Ph.D. Candidate, Civil and Environmental Engineering; Krisna Pawitan, Postdoctoral Research Associate, Civil and Environmental Engineering

## *Building for Biodiversity*

**TOM BILLINGTON '26**, Civil and Environmental Engineering
**JULIANNE SOMAR '26**, Architecture

**Mentors:** Sigrid Adriaenssens, Professor of Civil and Environmental Engineering; Ruta Stankeviciute, Postdoctoral Research Associate, Civil and Environmental Engineering; Amir Mahdiyar, Associate Research Scholar, Civil and Environmental Engineering

## *Sustainable Farming to Reduce $N_2O$ Emissions*

**ANGELINA DIPAOLA '28**, Electrical and Computer Engineering

**Mentors:** Mark Zondlo, Professor of Civil and Environmental Engineering; Lars Wendt, Research Manager, Princeton Materials Institute

# Innovation and a New Energy Future

1:05 PM – 3:25 PM

**MODERATOR:** ERIC LARSON, SENIOR RESEARCH ENGINEER, ANDLINGER CENTER FOR ENERGY AND THE ENVIRONMENT

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## *Speeding Up Decarbonization: Policy Support Tools to De-Bottleneck the Energy Transition*

**ESHAN ANKULKAR '27**, Operations Research and Financial Engineering

**Mentors:** Chris Greig, Theodora D. '78 & William H. Walton III '74 Senior Research Scientist, Andlinger Center for Energy and the Environment; Dominic Davis, Associate Research Scholar, Andlinger Center for Energy and the Environment

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## *Plasma Regeneration of Carbon Capture Materials*

**CARSON REPINS '27**, Chemical and Biological Engineering

**Mentors:** Claire White, Professor of Civil and Environmental Engineering and the Andlinger Center for Energy and the Environment; Matthew Pekarcik, Ph.D. Candidate, Chemical and Biological Engineering

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## *Characterization of Ridge QCLs Using LIV and FTIR*

**NICOLAS FENG '28**, Electrical and Computer Engineering
**MINLI GUO '28**, Electrical and Computer Engineering

**Mentor:** Claire Gmachl, Eugene Higgins Professor of Electrical and Computer Engineering

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## *Fabrication and Characterization of Titanium Nitride / Silicon Nitride Quantum Wells*

**JOSHUA NANYARO '27**, Electrical and Computer Engineering

**Mentors:** Claire Gmachl, Eugene Higgins Professor of Electrical and Computer Engineering; Lodovico Rossi, Ph.D. Candidate, Electrical & Computer Engineering

## *Carbon Dioxide Sequestration into Stable Mineralized Carbonates*

**CLAIRE DeGUZMAN '27**, Chemical and Biological Engineering

**Mentors:** Bruce Koel, Professor of Chemical and Biological Engineering, Emeritus; Hengfei Gu, Postdoctoral Research Associate, Chemical and Biological Engineering; Yiteng Zheng, Associate Research Scholar, Chemical and Biological Engineering

## *Electrocatalysis using 2D Materials for $CO_2$ and $N_2$ Reduction Reactions*

**CHRISTOPHER LI '26**, Civil and Environmental Engineering

**Mentors:** Bruce Koel, Professor of Chemical and Biological Engineering, Emeritus; Hengfei Gu, Postdoctoral Research Associate, Chemical and Biological Engineering; Yiteng Zheng, Associate Research Scholar, Chemical and Biological Engineering

## *An Analysis of Calcined Low- and Medium-Grade Clays in Sustainable Cements*

**CALLISTO LIM '28**, Civil and Environmental Engineering
**ABIGAIL ZHANG '28**, Mechanical and Aerospace Engineering

**Mentors:** Claire White, Professor of Civil and Environmental Engineering and the Andlinger Center for Energy and the Environment; Abdelrahman Hamdan, Postdoctoral Research Associate, Andlinger Center for Energy and the Environment

## *Small Clean Fusion Reactors*

**JONAH JOHNSON '27**, Physics
**ANDREW RYAN '26**, Chemical and Biological Engineering
**MADELYN SMOYER '27**, Mechanical and Aerospace Engineering

**Mentors:** Sam Cohen, Director, Program in Plasma Science and Technology; Bruce Berlinger, Exp/Heating Advanced Technician, Engineering, Princeton Plasma Physics Lab; Liam David, Ph.D. Candidate, Astrophysical Sciences, Plasma Physics Laboratory

## *Energy Systems and Analysis: Net-Zero Brazil & China*

**CYRUS ROSENBERG '28**, Electrical and Computer Engineering
**SERENA ZHANG '28**, Operations Research and Financial Engineering
**EDISON ZHU '28**, Operations Research and Financial Engineering

**Mentors:** Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Hongxi Luo, Associate Research Scholar, Andlinger Center for Energy and the Environment; Joon Moon, Postdoctoral Research Associate, Andlinger Center for Energy and the Environment

## *Wastewater Silver Concentration: Visualizing Pollutant Variability Across California*

**KIELE TRAINOR '28**, Civil and Environmental Engineering

**Mentors:** Z. Jason Ren, Professor of Civil and Environmental Engineering and the Andlinger Center for Energy and the Environment; Emily Mayo, Ph.D. Candidate, Civil and Environmental Engineering

*The information in this document was up to date at the time of printing.*
*For the latest information, visit environment.princeton.edu*

# About HMEI

The High Meadows Environmental Institute (HMEI) at Princeton University advances understanding of the Earth as a complex system influenced by human activities, and informs solutions to local and global challenges by conducting groundbreaking research across disciplines and by preparing future leaders in diverse fields to impact a world increasingly shaped by climate change.

Founded in 1994 as the Princeton Environmental Institute, HMEI was renamed in 2020 in recognition of a transformative gift from the High Meadows Foundation, a philanthropic organization co-founded by Judy and Carl Ferenbach III, a member of the Class of 1964, in support of environmental research and educational initiatives through HMEI.

HMEI functions as a vibrant central resource for faculty, postdocs, students, alumni, and others with interest in environmental topics and research. More than 140 members of the Princeton faculty, representing 30 academic disciplines, are active with HMEI and contribute to research and teaching activities that encompass scientific, technical, policy, and human dimensions of environmental issues.

HMEI serves as a center for environmental education, research and dialogue including such offerings as undergraduate and graduate teaching programs, interdisciplinary research centers and initiatives, and public events addressing a range of environmental topics.

# Acknowledgements

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- High Meadows Environmental Institute Fund
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- John H.T. Wilson ’56 and Sandra W. Wilson W’56 Fund in HMEI
- Amanda ’00 and Zac Zeitlin

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