High Meadows Environmental Institute

SEPTEMBER 18, 2026

Summer of Learning Symposium



Summer of Learning Symposium

The High Meadows Environmental Institute (HMEI) is pleased to host the 19th 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 125 Princeton students from 16 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 2026, HMEI interns undertook research projects in Princeton University labs, and in field sites around the globe including assignments in Mozambique, Costa Rica, Italy, Brazil, South Africa, and more. Students contributed meaningfully to research advances and emerging scholarship, including projects focused on climate change, biodiversity and conservation, alternative energy, environmental policy, urban sustainability, 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: Kelsey Campbell '27 (left), Innocent Joseph '29 (center), and Sunny Zhao '29 (right) test water quality at The Watershed Institute in Hopewell Township, New Jersey.

Schedule of Presentations

8:45 - 10:15 A.M. **B331 BRIGER HALL**	Plants and Soils, pp. 3-4
8:45 - 10:45 A.M. **C201 BRIGER HALL**	Biodiversity and Conservation pp. 4-6
9:00 - 11:05 A.M. **C209 BRIGER HALL**	Resiliency and Sustainable Futures, pp. 6-8
9:25 - 11:10 A.M. **C264 BRIGER HALL**	New Energy Futures, pp. 8-10
10:45 - 12:45 P.M. **B231 BRIGER HALL**	Biodiversity and Conservation pp. 10-12
11:35 - 1:30 P.M. **C201 BRIGER HALL**	Climate and Environmental Science, pp. 13-14
11:50 - 1:35 P.M. **B331 BRIGER HALL**	Innovation and a New Energy Future, pp. 15-17
12:25 – 2:30 P.M. **C209 BRIGER HALL**	Water and the Environment, pp. 17-19
12:30 - 2:25 P.M. **C264 BRIGER HALL**	Oceans and the Environment, pp. 19-20

Plants and Soils

8:45 - 10:15 A.M.

MODERATOR: SATISH MYNENI, PROFESSOR OF GEOSCIENCES

Heavy Metal Accumulation in Blueberries

ZOE MCDOWELL '28, Chemical and Biological Engineering

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

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Microbial Community Assembly and Its Role in Plant Root Colonization

PETER RENGA '28, Molecular Biology

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

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Mapping Biocultural Vulnerability of Neglected and Understudied Crops

SEOYON KIM '29, Operations Research and Financial Engineering

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

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Effects of Competition and Rainfall on the Phenology of a California Annual Plant Community

EMMA COULTER '29, Ecology and Evolutionary Biology
AYA SURHEYAO '28, Ecology and Evolutionary Biology

Mentors: Jonathan Levine, J.N. Allison Professor in Environmental Studies, Professor of Ecology and Evolutionary Biology, Chair, Department of Ecology and Evolutionary Biology; Zach Gold, Graduate Student, Ecology and Evolutionary Biology; Diego Perez, Graduate Student, Ecology and Evolutionary Biology

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Insect Biodiversity Across Restored and Working Grasslands

EDALIX MARIN '27, Ecology and Evolutionary Biology
EMMA WRIGHT '29,Ecology and Evolutionary Biology

Mentors: Mitchell Serota, Scientist and Manager of Ecology, Duke Farms; Erin Treanore, Scientist and Manager of Agroecology, Duke Farms; Charles Barreca, Conservation Ecologist, Duke Farms; Virginia Osnato, Ecologist Coordinator, Duke Farms

Vegetation: A Link Between Carbon and Water Cycles
WUNNYURITI ZIBLIM '28, Civil and Environmental Engineering

Mentors: Daniele Peano, Scientist, Euro-Mediterranean Center on Climate Change (CMCC); Silvio Gualdi, Principal Scientist, CMCC, Head of Earth System Modelling and Data Assimilation Division (ESYDA)

How Do Soil Age and Climate Affect Rock Weathering and Carbon Storage?
DAVIANA MARIA RAMNAUTH '29, Chemical and Biological Engineering

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

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Breeding Okra (Abelmoschus esculentus) for Enhanced Seed Oil Content and Identification of Underlying Genetic Determinants
ISHANI BANSAL '29, Molecular Biology

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

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Biodiversity and Conservation

8:45 - 10:45 A.M.

MODERATOR: MARY C. STODDARD, PROFESSOR OF ECOLOGY AND EVOLUTIONARY BIOLOGY

Mpala Road-Based Animal Density Surveys and Elephant Diet Selectivity
LAUREN OWENS '27, Ecology and Evolutionary Biology

Mentors: Robert Pringle, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology; Megan Sullivan, Postdoctoral Research Associate, High Meadows Environmental Institute

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Computational Biology for Zebra and Baboon Conservation
JON DONG '29, Computer Science
WILSON MOYER '27, Mechanical and Aerospace Engineering
ANA MARIA PANTOJA ALFARO '28, Physics
CASPAR SMITH '29, Mechanical and Aerospace Engineering

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

Duke Farms Ecology Intern Team: Establishing Long Term Research Sites and Studies

ALANNAH BOUSQUET '29, Undeclared
DANIELLE BURKE '29, Ecology and Evolutionary Biology
CELESTE FLORES '29, Electrical and Computer Engineering
CHARLOTTE SUSSMAN '29, English

Mentors: Mitchell Serota, Scientist and Manager of Ecology, Duke Farms; Erin Treanore, Scientist and Manager of Agroecology, Duke Farms; Charles Barreca, Conservation Ecologist, Duke Farms; Virginia Osnato, Ecologist Coordinator, Duke Farms

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Host Switching by an Introduced Brood Parasite in California

ALEX RAYMOND FRIAS '28, Ecology and Evolutionary Biology

Mentors: Christina Riehl, Associate Professor of Ecology and Evolutionary Biology; Elisa Yang, Graduate Student, Ecology and Evolutionary Biology

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Exploring the Ocean's Nitrogen Cycle: Research in the Ward Lab

OTTILIE SYKES '27, Geosciences
ILIANA WISNIEWSKI '29, Civil and Environmental Engineering
AIMEE ZHOU '27, Ecology and Evolutionary Biology

Mentors: Bess Ward, William J. Sinclair Professor of Geosciences and the High Meadows Environmental Institute; Samantha Fortin, Postdoctoral Research Associate, Geosciences; Elizabeth Leon Palmero, Associate Research Scholar, Geosciences; Catherine Hexter, Graduate Student, Geosciences; Samantha Fortin, Postdoctural Research Associate, Geosciences; Amal Jayakumar, Senior Professional Specialist, Geosciences; Jenna Lee, Graduate Student, Geosciences; Moriah Kunes, Graduate Student, Geosciences

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Coastal Development, Communities, and Conservation in Costa Rica

JOAQUIN ACUNA GIRAULT '28, Comparative Literature
THEODORE KIM '27, History
JOE UGLIALORO '27, Princeton School of Public and International Affairs

Mentor: Christian J. Rivera, Assistant Professor, School for the Environment, UMass Boston

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Large Mammals Under Climate Change: Capturing and Monitoring Antelope in Gorongosa National Park, Mozambique

ALEXIA SANTIAGO '29, Ecology and Evolutionary Biology

Mentors: Robert Pringle, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology; Henry Gage, Graduate Student, Ecology and Evolutionary Biology

Multi-Predator Effects on Large Mammalian Herbivore Behavior in KwaZulu-Natal, South Africa

SANKALP GAUTAM '28, Ecology and Evolutionary Biology

Mentors: Robert Pringle, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology; Rory Wakeford, Graduate Student, Ecology and Evolutionary Biology

Resiliency and Sustainable Futures

9:00 - 11:05 A.M.

MODERATOR: SIMON LEVIN, JAMES S. MCDONNELL DISTINGUISHED UNIVERSITY PROFESSOR IN ECOLOGY AND EVOLUTIONARY BIOLOGY

Taming the Swarm: From Math Equations to Mosquito Control

ADITYA BISWAS '28, Mathematics

Mentors: Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology; Mallory Gaspard, Postdoctural Research Associate, Mechanical and Aerospace Engineering

Engineering Systems to Measure and Track Horizontal Gene Transfer

SUPRAJ GUNDA '27, Computer Science

CAROLINE JOHNSON '28, Chemical and Biological Engineering

Mentors: Josh Atkinson, Assistant Professor of Civil and Environmental Engineering and the Omenn-Darling Bioengineering Institute; Stacie Dressel, Graduate Student, Chemical and Biological Engineering

Emissions Quantification of Wastewater Treatment Plants and Data Centers

DARREN DU '29, Operations Research and Financial Engineering

BRIAN NGUYEN '27, Civil and Environmental Engineering

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

Electric Vehicle Adoption and Critical Mineral Requirements in India

ABDULKADIR HUSEIN '28, Electrical and Computer Engineering

Mentors: Anu Ramaswami, Sanjay Swani '87 Professor of India Studies, Professor of Civil and Environmental Engineering, the Princeton Institute for International and Regional Studies, and the High Meadows Environmental Institute, Director, M.S. Chadha Center for Contemporary Global India; Kirti Das, Professional Specialist, Civil and Environmental Engineering

Computational Design of Reductive Dehalogenases for Enhanced Solubility and Bioremediation

BRIAN ENG '28, Computer Science

Mentor: Josh Atkinson, Assistant Professor of Civil and Environmental Engineering and the Omenn-Darling Bioengineering Institute

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Modeling Epidemic Dynamics With Physics-Informed Neural Networks

KEVIN GUAN '27, Mathematics

Mentors: Divya Sharma, Assistant Professor of Mathematics and Statistics, York University; Jude Kong, Assistant Professor, University of Toronto

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Stories that Fund the Flow: Applying the Narrative Policy Framework to Water Rate Increases in California

AIDEN VILO '28, Princeton School of Public and International Affairs

Mentors: Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology, Elke Weber, Gerhard R. Andlinger Professor in Energy and the Environment, Professor of Psychology and the School of Public and International Affairs; Adam Wiechman, Postdoctoral Research Associate, High Meadows Environmental Institute

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Robotic Additive Manufacturing for Microclimate Resilience

JOSHUA (KIMYUNG) SONG '28, Electrical and Computer Engineering
MOYU YAMAGUCHI '27, Civil and Environmental Engineering

Mentors: Arash Adel, Assistant Professor of Architecture, Samuel Davies University Preceptor; Daniel Ruan, Graduate Student, Architecture; Roman Ibrahimov, Associate Professional Specialist, Architecture; Salma Mozaffari, Postdoctoral Research Associate, Civil and Environmental Engineering

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Robotics-Enabled Low-Carbon Construction

ALEX CHANG '27, Mechanical and Aerospace Engineering

Mentors: Arash Adel, Assistant Professor of Architecture, Samuel Davies University Preceptor; Daniel Ruan, Graduate Student, Architecture; Roman Ibrahimov, Associate Professional Specialist, Architecture; Salma Mozaffari, Postdoctoral Research Associate, Civil and Environmental Engineering

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Floor Plan Generation for Modular Architecture

HELLEN LUO '28, Computer Science

Mentors: Arash Adel, Assistant Professor of Architecture, Samuel Davies University Preceptor; Daniel Ruan, Graduate Student, Architecture

A Framework for Two-Way Collaboration in Robotic Construction Assembly

ASHLEY NOVAT '27, Electrical and Computer Engineering

Mentors: Arash Adel, Assistant Professor of Architecture, Samuel Davies University Preceptor; Daniel Ruan, Graduate Student, Architecture; Jutang Gao, Graduate Student, Architecture

New Energy Futures

9:25 - 11:10 A.M.

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

Net-Zero Brazil

JASON CHINITZ-MITAL '28, Mechanical and Aerospace Engineering

Mentors: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Carla Cavaliero, Assistant Professor, Department of Energy, State University of Campinas (UNICAMP); David Tsai, Project Manager, Instituto de Energia e Meio Ambiente (IEMA); Joon Moon, Postdoctural Research Associate, Andlinger Center for Energy and the Environment

NetZero Brazil @ UNICAMP

EDDIE KONG '27, Operations Research and Financial Engineering

Mentors: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Carla Cavaliero, Assistant Professor, Department of Energy, State University of Campinas (UNICAMP); David Tsai, Project Manager, Instituto de Energia e Meio Ambiente (IEMA)

Improving Cost Parameterization and Constraint Implementation for Macro-Energy Systems Modeling

CHINNY KWOK '29, Operations Research and Financial Engineering

Mentors: Jesse Jenkins, Associate Professor of Mechanical and Aerospace Engineering and the Andlinger Center for Energy and the Environment; Luca Bonaldo, Research Software Engineer II, Research Computing; Greg Schivley, Professional Specialist, Andlinger Center for Energy and the Environment

Mathematical Optimization for Large-Scale Energy Systems Planning: Benders Decomposition and Modeling to Generate Alternatives

LILLIAN WANG '29, Mathematics

Mentors: Jesse Jenkins, Associate Professor of Mechanical and Aerospace Engineering and the Andlinger Center for Energy and the Environment; Luca Bonaldo, Research Software Engineer II, Research Computing; Greg Schivley, Professional Specialist, Andlinger Center for Energy and the Environment; Anna X. Li, Graduate Student, Mechanical and Aerospace Engineering; Michael Lau, Graduate Student, Mechanical and Aerospace Engineering

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Net-Zero Korea

TAEHAN KIM '29, Electrical and Computer Engineering

Mentors: Wei Peng, Assistant Professor of Princeton School of Public and International Affairs; Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Haewon McJeon, Associate Professor, Graduate School of Green Growth and Sustainability, Korea Advanced Institute of Science and Technology (KAIST); Joon Moon, Postdoctural Research Associate, Andlinger Center for Energy and the Environment; Hanwoong Kim, Graduate Student, School of Public and International Affairs

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Modeling Brazil's Road to Net Zero

YOUSSEF ABDELKADER '27, Electrical and Computer Engineering

Mentors: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Carla Cavaliero, Assistant Professor, Department of Energy, State University of Campinas (UNICAMP); David Tsai, Project Manager, Instituto de Energia e Meio Ambiente (IEMA); Felipe Barcellos e Silva, Project Leader, (IEMA)

Developing an Air Pollution and Health Impact Assessment Model for Net-Zero Korea

YEHYUN HONG '28, Operations Research and Financial Engineering

Mentors: Wei Peng, Assistant Professor of Princeton School of Public and International Affairs; Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Haewon McJeon, Associate Professor, Graduate School of Green Growth and Sustainability, Korea Advanced Institute of Science and Technology (KAIST); Jinyu Shiwang, Graduate Student, Center for Policy Research on Energy and the Environment and School of Public and International Affairs; Sungeun (Rachel) Kim, Graduate Student, Korea Advanced Institute of Science and Technology (KAIST, IAM Group)

Net-Zero China - Specialized Yet Generalized: Building a Cross-Case Plotting Pipeline for MACRO Outputs

HEIDI HU '29, 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; Anna X. Li, Graduate Student, Mechanical and Aerospace Engineering

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Lime Sector Decarbonization Modeling

KEVIN SUN '27, Electrical and Computer Engineering

Mentors: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment; Adam Gross, Professional Specialist, Andlinger Center for Energy and the Environment

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Heating and Confinement in a Small, Clean Fusion Reactor

GAYOUNG CHOI '27, Physics

WESTON RICHARDS '28, Physics

Mentors: Samuel Cohen, Director, Program in Plasma Science and Technology, P.I., Magnetic Nozzle & FRC Experiments; Erik Gilson, Head, Discovery Plasma Science Department, Princeton Plasma Physics Laboratory; Liam David, Graduate Student, Princeton Program in Plasma Physics

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Biodiversity and Conservation

10:45 - 12:45 P.M.

MODERATOR: BRIDGETT VONHOLDT, PROFESSOR OF ECOLOGY AND EVOLUTIONARY BIOLOG

The Science of Specimens: Behind the Scenes in the Princeton Bird Collection

HANNAH ADAMS '29, Ecology and Evolutionary Biology

Mentors: Mary C. Stoddard, Professor of Ecology and Evolutionary Biology, Director, Center on Science and Technology; Anna Hiller, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Lazarena Lazarova, Collections Manager, Lab Technician and Outreach Coordinator, Ecology and Evolutionary Biology

The Relationship between Color, Nectar Concentration, and Broad-Tailed Hummingbird Visitation of Typical and Atypical Hummingbird Flowers

JENNY CHEN '29, Ecology and Evolutionary Biology
AMANDA HO '29, Ecology and Evolutionary Biology

Mentors: Mary C. Stoddard, Professor of Ecology and Evolutionary Biology, Director, Center on Science and Technology; Ben Hogan, Associate Research Scholar, Ecology and Evolutionary Biology; Sarah Solie, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Kristina Fialko, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Katja Kochvar, Graduate Student, Ecology and Evolutionary Biology

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What Is Missing?: Creating a Timeline of Past Abundance, Instances of Loss, and Stories of Recovery in New Jersey

KEYLAN HOWARD '29, Ecology and Evolutionary Biology
HAEON LEE '28, History

Mentors: Maria Kochis, Ecosystem Sciences Librarian, Princeton University Library

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Survival of the Fattest: A Long-term Study of Wild Yellow-bellied Marmots in the Western Rocky Mountains

ARIEL CHEN '28, Ecology and Evolutionary Biology
LAURA CATHERINE GREEN '29, Ecology and Evolutionary Biology

Mentors: Bridgett vonHoldt, Professor of Ecology and Evolutionary Biology; Dan Blumstein, Professor, Department of Ecology and Evolutionary Biology, University of California, Los Angeles; Katie Adler, Ph.D. Candidate & NSF Predoctoral Fellow, University of California, Los Angeles

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Marine Microplastic Transport and Collection in Surface Waves

ALESANDRO ALFARO '29, Mechanical and Aerospace Engineering
JESSIE JIANG '29, Mechanical and Aerospace Engineering

Mentors: Michelle DiBenedetto, Assistant Professor of Mechanical and Aerospace Engineering; Joanna Van Liew, Graduate Student, Mechanical and Aerospace Engineering

Forest Carbon Stock Monitoring at The Watershed Institute

MANDY DIEC '29, Civil and Environmental Engineering
TOVA JEAN-LOUIS '29, Civil and Environmental Engineering
BENEDICT KIPROTICH NGETICH '29, Electrical and Computer 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; Matteo Detto, Research Scholar, Ecology and Evolutionary Biology

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Correcting for Topography and Foliage Density in an Automated Radio Telemetry System

KADE JACKSON '28, Ecology and Evolutionary Biology

Mentors: Mary C. Stoddard, Professor of Ecology and Evolutionary Biology, Director, Center on Science and Technology; Ben Hogan, Associate Research Scholar, Ecology and Evolutionary Biology; Sarah Solie, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Kristina Fialko, Postdoctoral Research Associate, Ecology and Evolutionary Biology; Katja Kochvar, Graduate Student, Ecology and Evolutionary Biology

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Why So Aggressive? Exploring the Drivers of Early Larval Aggression in Heliconius erato demophoon

MARINA BAETA COOKSON '28, Ecology and Evolutionary Biology

Mentor: Owen McMillan, Staff Scientist, Molecular Genetics and Genomics, Evolutionary Biology, Biodiversity, Smithsonian Tropical Research Institute

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Eco-Evolutionary Dynamics in Diverse Communities

ADAM STERN '29, Ecology and Evolutionary Biology

Mentors: Jonathan Levine, J.N. Allison Professor in Environmental Studies, Professor of Ecology and Evolutionary Biology, Chair, Department of Ecology and Evolutionary Biology; Jamie Leonard, Graduate Student, Ecology and Evolutionary Biology

Climate and Environmental Science

11:35 - 1:30 P.M.

MODERATOR: CARLA STAVER, PROFESSOR OF ECOLOGY AND EVOLUTIONARY BIOLOGY

Glacial-Interglacial Changes in Carbon Dioxide – Evidence from the Polar Southern Ocean

ELENA WISNIEWSKI '29, Ecology and Evolutionary Biology

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

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Earth's First Animal-built Reefs - Mapping the Cambrian Explosion with Machine Learning

LOAPI MOKGATLHE '29, Mechanical and Aerospace Engineering
GRACE WANG '29, Computer Science

Mentors: Adam Maloof, Professor of Geosciences

Climate Change and Power System Resilience

MCKENNA CROCKER '28, Civil and Environmental Engineering

Mentors: Raghav Pant, Senior Research Associate, Environmental Change Institute, University of Oxford; Gabriele Villarini, Theodore Shelton Pitney Professor of Environmental Studies, Professor of Civil and Environmental Engineering and High Meadows Environmental Institute, Vice Dean, School of Engineering and Applied Sciences

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Trait Responses to Fire Frequency Gradients Across Eastern US Savannas and Forests

LUCIA GREENHOUSE '29, Civil and Environmental Engineering

Mentors: Carla Staver, Professor of Ecology and Evolutionary Biology; Marie Norwood, Graduate Student, Ecology and Evolutionary Biology

Preserving and Maintaining Agrobiodiversity through Culturally-meaningful Crops

SYLVIA KANG '28, Geosciences
KENDALL LLOYD '29, Electrical and Computer Engineering
ALEXANDRA MENTAS '29, Civil and Environmental Engineering
AMARACHI UCHE-EBOH '29, Civil and Environmental Engineering

Mentors: Tessa Desmond, Professional Specialist, Princeton School of Public and International Affairs; Gina Talt, Project Manager, Food Systems, Office of Sustainability; Michelle Nowak, Farm Manager, The Seed Farm

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Antarctic Climate Metric Reconstruction since 1800 using Data Assimilation and Ice Core Data

ADVIK ESWARAN '27, Geosciences

Mentor: Olivia Truax, Lecturer, University of Canterbury, School of Earth and Environment, Faculty of Science

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Analyzing Novel Vertebrate Microfossil Sites from the Triassic-aged Rocks of Texas

TANMAY NAIK '29, Undeclared

Mentors: Christopher Griffin, Assistant Professor of Geosciences; Will Reyes, Presidential Postdoctoral Research Fellow, Geosciences

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Fire-related Weather and Climate Change and Variability in Observations and Climate Models

KAITLYN AMANULLAH '28, Electrical and Computer Engineering

Mentors: Gabriel Vecchi, Knox Taylor Professor of Geosciences, Professor in the High Meadows Environmental Institute, Director, High Meadows Environmental Institute; Wenchang Yang, Professional Specialist, Geosciences

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Ensemble Forecast Uncertainty for Extreme Mediterranean Events

ARK BUNYAN '28, Computer Science

Mentors: Francesco Maicu, Scientist, Euro-Mediterranean Center on Climate Change (CMCC); Lucia Gualtieri, Scientist, CMCC

Energy Demand in Warming and Decarbonized Climates

KOSTA BOTEV '29, Operations Research and Financial Engineering

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

Innovation and a New Energy Future

11:50 – 1:35 P.M.

MODERATOR: BARRY RAND, PROFESSOR OF ELECTRICAL AND COMPUTER ENGINEERING AND THE ANDLINGER CENTER FOR ENERGY AND THE ENVIRONMENT

Engineering Yeast to Manufacture Bioplastic Monomers Using CO^2 Electrolysis

MARKO ALIMPIJEVIC '28, Chemical and Biological Engineering

Mentors: José Avalos, Associate Professor of Chemical and Biological Engineering and Bioengineering; Krishi Mantri, Graduate Student, Chemical and Biological Engineering

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Measuring the Vapor Field around a Condensing Drop

AMÉLIA YUEYAO CARNEIRO ZHU '28, Mechanical and Aerospace Engineering

Mentor: Chao Sun, Professor, Center for Combustion Energy, Department of Energy and Power Engineering, and Department of Engineering Mechanics, Tsinghua University

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Quantifying Community-Wide GHG Emissions Inventories and Future Projections in Accra, Ghana, Using Household Survey Data

BONNIE PENG '28, Electrical and Computer Engineering

Mentors: Anu Ramaswami, Sanjay Swani '87 Professor of India Studies, Professor of Civil and Environmental Engineering, the Princeton Institute for International and Regional Studies, and the High Meadows Environmental Institute, Director, M.S. Chadha Center for Contemporary Global India; Kirti Das, Professional Specialist, Civil and Environmental Engineering; Neha Agarwal, Graduate Student, Civil and Environmental Engineering

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Multi-Scale Modeling for Helium-3 Extraction from Lunar Regolith

MATTHEW RUPERTUS '29, Chemical and Biological Engineering
RYLEY ZHANG '29, Mechanical and Aerospace Engineering

Mentors: Jie Deng, Assistant Professor of Geosciences; Yihang Peng, Graduate Student, Geosciences; Donghao Zheng, Graduate Student, Geosciences

Sampling The Free Energy Surface for $Ca(HCO^3)$ System in Water Using DFT Data and a Machine-Learned Interatomic Potential
ANANYA SRI RAJA KALIDINDI '28, Mathematics

Mentors: Emily Carter, Senior Strategic Advisor and Associate Laboratory Director for Applied Materials and Sustainability Sciences at the Princeton Plasma Physics Laboratory, Gerhard R. Andlinger Professor in Energy and the Environment, Professor of Mechanical and Aerospace Engineering, the Andlinger Center for Energy and the Environment, and Applied and Computational Mathematics; Xuezhi Bian, Postdoctoral Research Associate, Chemistry

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Fine-Scale Modeling of Land Cover and Microclimate in Different Neighborhoods of Accra and Chennai: 0.5-250m
VINAY KARTHIK '29, Computer Science

Mentors: Anu Ramaswami, Sanjay Swani '87 Professor of India Studies, Professor of Civil and Environmental Engineering, the Princeton Institute for International and Regional Studies, and the High Meadows Environmental Institute, Director, M.S. Chadha Center for Contemporary Global India; Kirti Das, Professional Specialist, Civil and Environmental Engineering

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Toward Simultaneous Use of Transition Metal Dichalcogenide and Organic Semiconductors for Hybrid Systems
WAYNE CHEN '29, Electrical and Computer Engineering

Mentors: Barry Rand, Professor of Electrical and Computer Engineering and the Andlinger Center for Energy and the Environment, Acting Associate Director for Research, Andlinger Center for Energy and the Environment; Seamus Lowe, Graduate Student, Mechanical and Aerospace Engineering

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Manipulating Environmental Conditions to Examine A6 Activity and the Feammox Process
KAYLA BULLOCK '28, Molecular Biology

Mentors: Peter Jaffé, William L. Knapp '47 Professor of Civil Engineering, Professor of Civil and Environmental Engineering; Shan Huang, Professional Specialist, Civil and Environmental Engineering; Jinhee Park, Postdoctural Research Associate, Civil and Environmental Engineering

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Elucidating the Role of Surfactants in Bicarbonate Electrolysis
CLAIRE DEGUZMAN '27, Chemical and Biological Engineering

Mentors: Kelsey Hatzell, Associate Professor of Mechanical and Aerospace Engineering and the Andlinger Center for Energy and the Environment; Akriti Sarswat, Postdoctoral Research Associate, Andlinger Center for Energy and the Environment; Claudio Adrian Ruiz-Torres, Postdoctoral Fellow, Hatzell Lab

Fungi in a Salty World: Screening Strains to Valorize Seaweed Biomass

MALIK RESHEIDAT '27, Chemical and Biological Engineering

Mentors: José Avalos, Associate Professor of Chemical and Biological Engineering and Bioengineering; Sergio Garcia Echauri, Postdoctural Fellow, Avalos Research Group, Princeton University

Water and the Environment

12:25 - 2:30 P.M.

MODERATOR: HOWARD STONE, NEIL A. OMENN '68 UNIVERSITY PROFESSOR OF MECHANICAL AND AEROSPACE ENGINEERING

Enhancing Sustainable Energy Storage: Computational Modeling of Hydrogen Bubble Dynamics in Water Electrolysis

MICHAEL ARNWINE '28, Chemical and Biological Engineering

Mentor: Yannis Dimakopoulos, Professor of Chemical Engineering, University of Patras (ChemEngUP)

Engineers Without Borders: Bolivia Team

KAMAR HACHEM '27, Civil and Environmental Engineering
CALLISTO LIM '28, Undeclared
WILSON MOYER '27, Mechanical and Aerospace Engineering
OMER MUHAMMAD '28, Civil and Environmental Engineering
ALEXANDRE STEPHANT '28, Civil and Environmental Engineering
NESTOR SUAREZ '28, Mechanical and Aerospace 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; Scott Gregory, Senior Program Engineer, Engineers Without Borders, USA

Rheology Measurements and Computational Fluid Dynamics Simulations of Mud Mechanics

SALLY ANDERSON '29, Civil and Environmental Engineering
MAI TRAN '29, Chemical and Biological Engineering

Mentors: Ian Bourg, Associate Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute; Mitchell Jans, Graduate Student, Civil and Environmental Engineering

Prediction of 6PPD-Quinone Partitioning Constants Using Molecular Dynamics Simulations

CLARA SCHNEIDER '28, Chemistry
MAI TRAN '29, Chemical and Biological Engineering

Mentors: Ian Bourg, Associate Professor of Civil and Environmental Engineering and the High Meadows Environmental Institute; Mitchell Jans, Graduate Student, Civil and Environmental Engineering

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Body Size of Aquatic Species

LUCY CARLIN '28, Geosciences

Mentors: Curtis Deutsch, Professor of Geosciences and the High Meadows Environmental Institute; Yi Liu, Postdoctoral Research Associate, High Meadows Environmental Institute

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Microbial Controls on the Global Hydrogen Budget in a Hydrogen-based Economy

JANNATH JAMAL '29, Electrical and Computer Engineering

Mentors: Xinning Zhang, Associate Professor of Geosciences and the High Meadows Environmental Institute; Eunje Oh, Graduate Student, Geosciences; Shannon Haynes, Associate Professional Specialist, Geosciences

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Unique Healing Behavior of Punctured Viscoelastic Bubbles

EDWARD RODRIGUES '28, Mechanical and Aerospace Engineering

Mentors: Howard Stone, Neil A. Omenn '68 University Professor of Mechanical and Aerospace Engineering; Jonghyun Hwang, Graduate Student, Mechanical and Aerospace Engineering

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From Design to Implementation: Improving Irrigation Access in Carnachique, Peru

ALEXIS CRUZ '27, Civil and Environmental Engineering
YOLANDA VELIZ '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; Scott Gregory, Senior Program Engineer, Engineers Without Borders, USA

Evaluating New Jersey Water Quality with the StreamWatch Program

KELSEY CAMPBELL '27, Civil and Environmental Engineering
INNOCENT JOSEPH '29, Mathematics
JIAXING ZHAO '29, Operations Research and Financial Engineering

Mentors: Steve Tuorto, Director of Science and Stewardship, The Watershed Institute; Erin Stretz, Assistant Director of Science and Stewardship, The Watershed Institute; Jian Smith, Watershed Science and Lab Manager, The Watershed Institute

Oceans and the Environment

12:30 – 2:25 P.M.

MODERATOR: DANNY SIGMAN, DUSENBURY PROFESSOR OF GEOLOGICAL AND GEOPHYSICAL SCIENCES, PROFESSOR OF GEOSCIENCESGEOPHYSICAL SCIENCES, PROFESSOR OF GEOSCIENCES

The Physics of Sinking Ocean Particles

JEREMY DOMINGUEZ '28, Mechanical and Aerospace Engineering

Mentors: Curtis Deutsch, Professor of Geosciences and the High Meadows Environmental Institute; Yi Liu, Postdoctoral Research Associate, High Meadows Environmental Institute

Exploring the Relationship Between Ocean Circulation and Climate Change in the Late Cretaceous

ALEXIS GUNERA '29, Electrical and Computer Engineering
Xinning Zhang, Associate Professor of Geosciences and the High Meadows Environmental Institute; Eunje Oh, Graduate Student, Geosciences; Shannon Haynes, Associate Professional Specialist, Geosciences

Analysis of Polar Ocean Dynamics in a Changing Climate

MICHAEL FAN '28, Mathematics
EMMA HSIAO '28, Mechanical and Aerospace Engineering
JILLIAN KINGSLEY '27, Mechanical and Aerospace Engineering
Mentor: Channing Prend, Lecturer in Marine Science, School of Geosciences, University of Edinburgh

Probabilistic Analysis of Rogue Waves from Ocean Observations
ELLA KIM '29, Computer Science

Mentor: Galen Egan, Research Scholar and Lecturer, Geosciences

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Proxy Sensing of Extreme Winds Using Low-Cost Wave Buoy Observations
ANDREW NI '29, Computer Science

Mentor: Galen Egan, Research Scholar and Lecturer, Geosciences

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Reconstructing Ancient Seawater Lithium Isotope Composition Using Marine Halites and Dolostones
GWANPIL SON '29, Operations Research and Financial Engineering

Mentors: Elizabeth Niespolo, Assistant Professor of Geosciences; Mebrahtu Weldeghebriel, Postdoctoral Research Associate, Geosciences

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Ocean Biogeochemistry of the Ross Sea During Winter from BGC-Argo Floats
ARJUN SHETTY '27, Mechanical and Aerospace Engineering
VICTORIA SPRADLIN '28, Operations Research and Financial Engineering

Mentors: Alison Gray, Associate Professor of Physical Oceanography, University of Washington; Jannes Koelling, Acting Instructor of Physical Oceanography, University of Washington

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Laughing Gas, Serious Problem: Mapping the Ocean's Nitrous Oxide Emissions Using Machine Learning
NOAH ALTSCHULER '29, Chemical and Biological Engineering

Mentors: Laure Resplandy, Associate Professor of Geosciences and the High Meadows Environmental Institute; Yangyang Zhao, Postdoctoral Research Associate, High Meadows Environmental Institute

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Anthropogenic Drivers and Biogeochemical Processes in Ocean Modeling
ANAMIKA CHAKRABARTY '29, Civil and Environmental Engineering
GRACE DING '29, Computer Science
DAYEON KA '29, Electrical and Computer Engineering

Mentors: Laure Resplandy, Associate Professor of Geosciences and the High Meadows Environmental Institute; Fan Yang, Postdoctoral Research Associate, High Meadows Environmental Institute; YangYang Zhao, Postdoctoral Research Associate, High Meadows Environmental Institute

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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.

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