PEI Summer of Learning Symposium

October 6, 2017
Campus Club
Welcome to the 10th annual Summer of Learning Symposium! This is the culminating event for 88 Princeton undergraduates whose summer experiences focused on scientific, technical, policy, and human dimensions of global environmental challenges in climate and energy, sustainable development, resource conservation, biological diversity, and ecological health around the world.

This summer, participating students traveled to destinations in the United States and 12 foreign nations on assignments with faculty-led research projects, academic institutions, NGOs, and government and community service enterprises. As interns, the students engaged in research, outreach, policy analysis, communications, and other practical work experiences. The internship program and the assignments enrich students’ perspectives and prepare them as leaders.

The Summer of Learning Symposium is an opportunity to celebrate the contributions of individual students, exchange perspectives, develop a shared mission, and consider practical, achievable solutions to the world’s most pressing environmental challenges.

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

**Policy and Resilience (pp. 5-6)**
*Location: Prospect Room (First Floor)*

- 9:00 - 9:15 am  Registration and Breakfast
- 9:15 - 11:50 am  Presentations
- 11:50 - 1:00 pm  Group Lunch

**Biodiversity and Conservation (pp. 7-8)**
*Location: Library (Second Floor)*

- 9:15 - 09:30 am  Registration and Breakfast
- 9:30 - 12:10 pm  Presentations
- 12:10 - 01:00 pm  Group Lunch

**Water, Soil, and Human Health (p. 9)**
*Location: Den (Ground Floor)*

- 10:00 - 10:15 am  Registration and Breakfast
- 10:15 - 11:50 am  Presentations
- 11:50 - 1:00 pm  Group Lunch
Schedule of Afternoon Presentations

**Alternative Energy (pp. 10-11)**  
*Location: Library (Second Floor)*

- 12:15 - 1:00 pm  Registration and Lunch
- 1:00 - 3:15 pm  Presentations

**Climate and Oceans (pp. 12-13)**  
*Location: Prospect Room (First Floor)*

- 12:15 - 1:00 pm  Registration and Lunch
- 1:00 - 04:20 pm  Presentations
Policy and Resilience (9:15 am - 11:50 am)

**Moderator:** Elie Bou-Zeid, Associate Professor of Civil and Environmental Engineering; Director, Program in Environmental Engineering and Water Resources

1. **Promoting Algae Growth with Photoreactors**  
   Eseiwi Aifuwa *(Class of 2019, Chemical and Biological Engineering)*  
   Adviser: José Avalos, Assistant Professor, Chemical and Biological Engineering

2. **Clean Energy Intern**  
   Olivia Grah *(Class of 2019, Undecided)*  
   Adviser: Rory Christian, Environmental Defense Fund

3. **Educational Graphic Design and Communications Internship for Yellowstone National Park Sustainability**  
   Nicholas Ruybalid *(Class of 2018, English)*  
   Adviser: Kevin Amende, Montana State University

4. **Princeton University Resilient Cities Lab**  
   Hanna Endale *(Class of 2019, Civil and Environmental Engineering)*  
   Stuart Pomeroy *(Class of 2018, Woodrow Wilson School of Public and International Affairs)*  
   Adviser: Maria Garlock, Professor, Civil and Environmental Engineering

5. **Advanced Generation and Storage Technologies for a Deeply Decarbonized Power**  
   Stephanie Ward *(Class of 2019, Operations Research and Financial Engineering)*  
   Adviser: Tom Kreutz, Energy Systems Modeler, Andlinger Center for Energy and the Environment

6. **Visualizing the Potential for Negative GHG Emissions in the U.S.**  
   Erin McCabe *(Class of 2018, Geosciences)*  
   Adviser: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment

7. **Protecting China’s Cities and Nature through Energy Management and Wildlife Litigation**  
   Christina Sue *(Class of 2019, Chemical and Biological Engineering)*  
   Adviser: Alvin Lin, Natural Resources Defense Council
8. Using Machine Learning to Ensure Clean Air Act Compliance: Optimizing EPA’s Inspection Strategy
   Benjamin Laufer (Class of 2019, Operations Research and Financial Engineering)
   Adviser: Daniel Teitelbaum, Environmental Protection Agency

9. The Batture Ritual: An Intimate Look at the Macro- and Micro-Economies of the Mississippi River
   Angélica Vielma (Class of 2018, Art and Archaeology)
   Adviser: Jeffrey Whetstone, Professor, Lewis Center for the Arts

10. Housing and Home Design in Kigali
     Zachariah DeGiulio (Class of 2018, Civil and Environmental Engineering)
     Adviser: Christina Benimana, MASS Design Group

11. Geophysical Studies of Princeton and Beyond
     Elijah Ash (Class of 2019, Geosciences)
     Lauren Von Berg (Class of 2020, Geosciences)
     Adviser: Jessica Irving, Assistant Professor, Geosciences

12. Design Research, Collaboration and Education for Regional Planning and Resilience
     Felicia Jiang (Class of 2018, Civil and Environmental Engineering)
     Noshin Kahn (Class of 2019, Architecture)
     Amber Lin (Class of 2019, Civil and Environmental Engineering)
     Matthew Maldonado (Class of 2018, Architecture)
     Advisers: Paul Lewis, Professor, Architecture; Guy Nordenson, Professor, Architecture

GROUP LUNCH
Biodiversity and Conservation (9:30 am - 12:10 pm)

**Moderator:** Daniel Rubenstein, Professor of Ecology and Evolutionary Biology; Director, Program in Environmental Studies

1. **Testing the Roles of Deccan Volcanism vs Chicxulub Impact in the KPG Mass Extinction**  
   Ayame Whitfield (*Class of 2020, Geosciences*)  
   Adviser: Gerta Keller, Professor, Geosciences

2. **Effects of El Nino Rainfall Patterns on the Population Dynamics of a Tropical Forest Bird**  
   Luke Carabbia (*Class of 2019, Ecology and Evolutionary Biology*)  
   Zachariah Smart (*Class of 2020, Ecology and Evolutionary Biology*)  
   Adviser: Christina Riehl, Assistant Professor, Ecology and Evolutionary Biology

3. **Fish Ecology from Ear Bones (Otoliths) Past and Present**  
   Keo Chan (*Class of 2018, Geosciences*)  
   Adviser: Bess Ward, Professor, Geosciences

4. **Coral Reef Nutrient Cycling: A Stable Isotope of the Bermuda Reefs**  
   Tiffany Pham (*Class of 2020, Undecided*)  
   Adviser: Daniel Sigman, Professor, Geosciences

5. **Technology Innovations for Addressing Fishery Management Issues**  
   Stephen Morin (*Class of 2018, Woodrow Wilson School of International and Public Affairs*)  
   Adviser: Rod Fujita, Environmental Defense Fund

   Megan Demmel (*Class of 2019, Ecology and Evolutionary Biology*)  
   Adviser: Corina Tarnita, Assistant Professor, Ecology and Evolutionary Biology

7. **Plant Defenses in an African Savanna: Do herbivores make plants more thorny?**  
   Anna Marsh (*Class of 2020, Architecture*)  
   Advisers: Robert Pringle, Assistant Professor, Ecology and Evolutionary Biology; Tyler Coverdale, Ph.D. Candidate, Ecology and Evolutionary Biology
8. **Plant-Herbivore Interactions at the Scale of the African Continent**  
   Azwad Iqbal (*Class of 2019, Ecology and Evolutionary Biology*)  
   Ciara Nutter (*Class of 2018, Ecology and Evolutionary Biology*)  
   Advisers: Robert Pringle, Assistant Professor, Ecology and Evolutionary Biology; Johan Pansu, Postdoctoral Research Associate, Ecology and Evolutionary Biology

9. **Parasite Levels in Zebras and Co-Occurring Domesticated Donkeys**  
   Lindsay Martinez (*Class of 2019, Ecology and Evolutionary Biology*)  
   Madison Spinelli (*Class of 2020, Undecided*)  
   Adviser: Daniel Rubenstein, Professor, Ecology and Evolutionary Biology

10. **Teaching Assistants for Conservation Clubs**  
    Kathryn Didion (*Class of 2019, English*)  
    Erin Redding (*Class of 2019, Woodrow Wilson School of Public and International Affairs*)  
    Adviser: Daniel Rubenstein, Professor, Ecology and Evolutionary Biology

11. **Impact of Grazing Regimes on Rangeland Quality and Wildlife and Livestock Use**  
    Nadeem Demian (*Class of 2019, Ecology and Evolutionary Biology*)  
    Adviser: Daniel Rubenstein, Professor, Ecology and Evolutionary Biology

12. **Drones, Drones Everywhere: New Tools for High Definition Rangeland Assessment**  
    Daniel Petticord (*Class of 2019, Ecology and Evolutionary Biology*)  
    Adviser: Daniel Rubenstein, Professor, Ecology and Evolutionary Biology

13. **The Ecocritical Exhibition**  
    Katie Pratt-Thompson (*Class of 2018, Art and Archaeology*)  
    Adviser: Karl Kusserow, Curator of American Art, Art Museum

**GROUP LUNCH**
**Moderator:** Tullis Onstott, Professor of Geosciences

1. **Lead in the Human Environment: A No-Cost Monitoring Program for Trenton, NJ**  
   Young Joo Choi *(Class of 2020, Undecided)*  
   Elizabeth Everett Stanley *(Class of 2018, Chemical and Biological Engineering)*  
   Hinako Kawabe *(Class of 2019, Chemical and Biological Engineering)*  
   Adviser: John Higgins, Assistant Professor, Geosciences

2. **Environmental Impact of Natural Gas Pipelines on Water Quality**  
   Alexander Byrnes *(Class of 2018, Chemical and Biological Engineering)*  
   Keeley Walsh *(Class of 2019, Undecided)*  
   Adviser: Tullis Onstott, Professor, Geosciences

3. **Engineers Without Borders, Dominican Republic**  
   Alexander Bechtold *(Class of 2020, Undecided)*  
   Ailyn Brizo *(Class of 2018, Civil and Environmental Engineering)*  
   Nicholas Callegari *(Class of 2020, Undecided)*  
   Samuel Miller *(Class of 2018, Electrical Engineering)*  
   Eric Qiu *(Class of 2018, Chemical and Biological Engineering)*  
   Adviser: Peter Jaffe, Professor, Civil and Environmental Engineering

4. **Experimental Studies of Diffusiophoresis with Environmental Applications**  
   Mrudhula Baskaran *(Class of 2019, Mechanical and Aerospace Engineering)*  
   Adviser: Howard Stone, Professor, Mechanical and Aerospace Engineering

5. **Engineers Without Borders, Peru**  
   Sofia Bisogno *(Class of 2020, Civil and Environmental Engineering)*  
   Susannah Crowell *(Class of 2018, Mechanical and Aerospace Engineering)*  
   Camille Heubner *(Class of 2020, Civil and Environmental Engineering)*  
   Nicholas Johnson *(Class of 2020, Chemical and Biological Engineering)*  
   Jiayang Li *(Class of 2019, Computer Science)*  
   Lydia Watt *(Class of 2018, Civil and Environmental Engineering)*  
   Adviser: Peter Jaffe, Professor, Civil and Environmental Engineering

6. **Potassium Homeostasis in Eukaryotes: Insights from Potassium Isotopes**  
   Kayla Dobies *(Class of 2020, Neuroscience)*  
   Adviser: John Higgins, Assistant Professor, Geosciences

**GROUP LUNCH**
Alternative Energy (1:00 pm - 3:15 pm)

Moderator: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment

1. **Financial, Electrical, and Thermal Modeling of High Rate Recharging Vehicles**
   Hamza Mahmood *(Class of 2020, Computer Science)*
   Selina Pi *(Class of 2019, Operations Research and Financial Engineering)*
   Harjot Sidhu *(Class of 2019, Electrical Engineering)*
   Bertha Wang *(Class of 2018, Mechanical and Aerospace Engineering)*
   Adviser: Eric Materniak, Lightening Energy

2. **Characterization of a New Electrolyte for Mg-Ion Batteries**
   Anushka Dasgupta *(Class of 2019, Chemical and Biological Engineering)*
   Adviser: Craig Arnold, Professor, Mechanical and Aerospace Engineering

3. **Clean Small Fusion Reactors**
   Gabriel Gaitan *(Class of 2019 Physics)*
   Hassaan Khan *(Class of 2020, Undecided)*
   Fred Zheng *(Class of 2019, Mechanical and Aerospace Engineering)*
   Adviser: Samuel Cohen, Princeton Plasma Physics Laboratory

4. **Lithium Vapor Box Divertor**
   Robert Cohen *(Class of 2019, Mechanical and Aerospace Engineering)*
   Adviser: Robert Goldston, Professor, Astrophysical Sciences

5. **Surface Properties of Tungsten for Plasma Interactions**
   Hamna Khurram *(Class of 2020, Computer Science)*
   Adviser: Bruce Koel, Professor, Chemical and Biological Engineering

6. **Low Net-Carbon Emission Biomass-Based Transportation Scenarios in the U.S.**
   Marissa Webber *(Class of 2018, Civil and Environmental Engineering)*
   Adviser: Eric Larson, Senior Research Engineer, Andlinger Center for Energy and the Environment

7. **Activity of Cobalt Phosphides as Catalysts for the Hydrogen Evolution Reaction**
   Stephen Wong *(Class of 2019, Chemical and Biological Engineering)*
   Adviser: Bruce Koel, Professor, Chemical and Biological Engineering
8. Heat Exchange Elements in a Model Urban Streetscape
June Ho Park (Class of 2020, Operations Research and Financial Engineering)
Adviser: Alexander Smits, Professor, Mechanical and Aerospace Engineering
Climate and Oceans (1:00 pm - 4:20 pm)

Moderator: Satish Myneni, Professor of Geosciences

1. Variability in Oxygen Minimum Zones
   Stephen Carlson (Class of 2019, Ecology and Evolutionary Biology)
   Katherine Xiao (Class of 2020, Computer Science)
   Adviser: Laure Resplandy, Assistant Professor, Geosciences

2. Extreme Climates in Tropical Coral Reefs
   Nicole Rinaldi (Class of 2018, Geosciences)
   Advisers: Keith Rodgers, Research Scholar, Atmospheric and Oceanic Science; Sarah Schlunegger, Ph.D. Candidate, Atmospheric and Oceanic Sciences

3. Impact of Climate on North Atlantic Tropical Cyclone Tracks
   Tess Jacobson (Class of 2019, Physics)
   Adviser: Gabriel Vecchi, Professor, Geosciences

4. Wind Driven Oscillations of Signs and Billboards
   Nick Chen (Class of 2020, Mechanical and Aerospace Engineering)
   Adviser: Alexander Smits, Professor, Mechanical and Aerospace Engineering

5. Surface Heat and Carbon Flux in the Southern Ocean
   Kimberly Peterson (Class of 2019, Geosciences)
   Advisers: Jorge Sarmiento, Professor, Geosciences; Haidi Chen, Postdoctoral Research Associate, Atmospheric and Oceanic Science

6. Bubbles in a Turbulent Environment
   Eric Dogariu (Class of 2020, Electrical Engineering)
   Francis Ogoke (Class of 2019, Chemical and Biological Engineering)
   Adviser: Luc Deike, Assistant Professor, Mechanical and Aerospace Engineering

7. Who is Oxidizing All the Earth’s Atmospheric CH4?
   Calvin Rusley (Class of 2020, Undecided)
   Adviser: Tullis Onstott, Professor, Geosciences

8. Nitrogen Acquisition by Marine Phytoplankton
   Elaine Zhou (Class of 2020, Ecology and Evolutionary Biology)
   Adviser: Bess Ward, Professor, Geosciences
9. **Investigating Alternative Nitrogen Fixation**  
   Kelly Van Baalen *(Class of 2019, Molecular Biology)*  
   Adviser: François Morel, Professor, Geosciences; Xinning Zhang, Assistant Professor, Geosciences

10. **CORAL: COral Reef Airborne Laboratory**  
    Kate Woolford *(Class of 2019, Chemical and Biological Engineering)*  
    Adviser: Eric Hochberg, Bermuda Institute of Ocean Sciences

11. **Calibrating Climate Records with 16 Million Year Old Volcanic Rocks, NW USA**  
    Kyle Duffey *(Class of 2019, Geosciences)*  
    Adviser: Blair Schoene, Associate Professor, Geosciences

12. **Fifty Shades of Blue: Using Seawater Chemistry to Study Paleoclimate**  
    Liam O’Connor *(Class of 2020, Geosciences)*  
    Adviser: Adam Maloof, Associate Professor, Geosciences

13. **Impacts of Sealevel Rise on the Release of Halomethanes from Coastal Systems**  
    Sisi Peng *(Class of 2019, Geosciences)*  
    Marah Sakkal *(Class of 2020, Undecided)*  
    Adviser: Satish Myneni, Professor, Geosciences

14. **How do Carbonates Record Sea Level and Seawater Chemistry**  
    Emily Geyman *(Class of 2019, Geosciences)*  
    Adviser: Adam Maloof, Associate Professor, Geosciences

15. **Model Based Evaluation of Bubble Injection in Air-Sea Gas Exchange Parametrizations**  
    Rebecca Barber *(Class of 2020, Computer Science)*  
    Advisers: Jorge Sarmiento, Professor, Geosciences; Seth Bushinsky, Post-doctoral Research Associate, Atmospheric and Oceanic Sciences

16. **GPS Meteorology at Princeton University: A Case Study**  
    James Tralie *(Class of 2019, Geosciences)*  
    Adviser: Jessica Irving, Assistant Professor, Geosciences

17. **Dynamics of the Restoration of an African Savanna**  
    Maria Stahl *(Class of 2020, Ecology and Evolutionary Biology)*  
    Adviser: Robert Pringle, Assistant Professor, Ecology and Evolutionary Biology
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