



News from the

Department of Environmental Science

Volume 14, Issue 2

Spring 2023

Interesting Nature Facts:

- ★ The Canada wildfires turned NY skies yellow because wildfire smoke blocks shorter wavelengths, allowing longer wavelengths such as yellow to pass through!

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Congratulations Seniors!

The spring semester flew by! We are excited to share more information with you about our NEW field course to Bermuda that was taught this semester, along with more information about our E(SP)² program, the UN 2023 Water Conference side session, 20 years of Senior Seminar poster sessions, and student experiences!



Seniors, faculty and staff at the senior lunch.

E(SP)² Program Spring Break Trip



The E(SP)² program's goal is to prepare the next generation of diverse leaders in Environmental Science. As part of the program, students took the course "A Day in the Life of a New York Scientist" taught by professors Brian Mailloux and Logan Brenner. Over spring break, students made multiple visits to New York labs to learn about the different methodologies used by scientists and participate hands-on with data collection.

E(SP)² students on a hike with Brian Mailloux and Batoul Saad.

Day 1: Students traveled from Barnard to a snowy Black Rock Forest. They took a sediment core from a lake and a tree core in Black Rock Forest! Then, students looked at tree rings under a microscope and learned how to find the age of a tree and growth rates over time.

Students coring in the Upper Reservoir at Black Rock Forest.





Students extracting sediment and tree cores with the help of Brian Mailloux, Logan Brenner, and Terryanne Maenza-Gmelch.



Students learning about Black Rock Forest's biodiversity and how to navigate trail maps.

Day 2: Terryanne Maenza-Gmelch led the first hike which highlighted Black Rock Forest's biodiversity. The students then mapped out their own path and hiked up to Black Rock Mountain!

E(SP)2 Program Spring Break Trip Cont.

Day 3: Students traveled to Lamont-Doherty Earth Observatory. With the help of alumnae Clara Chang '15 and Celeste Pallone '19, students analyzed their Black Rock Forest sediment cores under the X-ray fluorescence core scanner and learned about the deep sea core collection in Lamont-Doherty's Core Repository. Students also practiced picking foraminifera and identifying their species.



E(SP)² students working in the labs at Lamont-Doherty.

Day 4: Students retrieved wastewater from Barnard dormitory and academic buildings with Professor Brian Mailloux and plumber Oliver Rose to analyze the microbiology. With the help of Professor JJ Miranda, students extracted the RNA and analyzed for COVID-19 and flu.



E(SP)² students prepping samples for extraction.

New Field Course to Bermuda

This spring we were excited to teach our new field course - Bermuda: Case Studies in Environmental Sustainability. The course, taught by Martin Stute and Terryanne Maenza-Gmelch focuses on understanding the ecology, geology, hydrology, and sustainability of Bermuda. These key topics were then further explored in the context of environmental change brought on by issues such as climate change, invasive species, disease, and development. The Department of Earth and Environmental Sciences at Columbia offers Barnard and Columbia students two field courses that are focused more on geology. However, over the years students have increased their interest in sustainability. This new field course was created to fill the missing gap in the curriculum.



Students and faculty in the Bermuda: Case Studies in Environmental Sustainability course.



For five days over spring break, students visited various locations in Bermuda and were hosted by the Bermuda Institute of Ocean Sciences (BIOS). Students dove deeper into topics prepared by lectures before the trip. The class toured Amara Farms to gain insight on the island's agricultural industry.

Students in Amara farm learning about the local crops of Bermuda.

Students also visited the Crystal Caves, Spittal Pond Nature Reserve, the beach, and mangroves. Students learned about energy use in Bermuda and were able to enjoy the crystal clear blue water and see fish while snorkeling! The class was also invited to the U.S. Consulate General in Bermuda to engage with international business leaders and education stakeholders.



The class was invited by U.S. Consul General Karen Grissette to a reception at her home.

New Field Course to Bermuda Cont.

The class interacted with Bermudian scientists while on the island. Students met with alumna Jeane Nikolai, the Bermuda Government's Director of Energy, who shared information about Bermuda's energy production and infrastructure. Students also met with BIOS environmental chemist Andrew Peters to learn more about Bermuda's environment.



Final presentation post session for the Bermuda: Case Studies in Sustainability field course.

The final project for this course was a Bermuda case study in environmental sustainability. The students' independent research projects were inspired by their new deeper understanding of Bermuda and were presented in a poster session open to the public. We hope to continue offering this course every two years.



Students had a great time snorkeling in Bermuda.



A class visit to the Walsingham Caves of Bermuda.



Students learning about fossil fuel use in Bermuda.

Italy — Field Geology

Columbia Professors Sidney Hemming and Steve Goldstein led a group of Barnard and Columbia juniors and seniors in the field course focusing on the Apennine Mountains of central Italy. Similarly to our Bermuda field course, students first spend the beginning of the semester preparing for the big trip by discussing key topics: K-Pg boundary, Mediterranean tectonics, and Milankovitch Cycles. Students learned how to interpret the evolution of paleo-environments from sediment lithologies and fossils. Students visited different geological outcrops, saw evaporite deposits on a beach near Ancona and present day spatial sinkhole evidence of the 2016/2017 seismic sequence of earthquakes.



Students sitting on (in) the K-Pg boundary.

Bangladesh — Sustainable Development Workshop

Over Spring Break, three of our students traveled to Bangladesh as part of the SDEV 3550 class taught by Professor Mike Steckler to learn



Barnard seniors at the Dhaka University Earth Observatory in Bangladesh.

more about the sustainable development issues of communities living near the world's largest river delta consisting of Ganges, Brahmaputra, and Meghna rivers. They also explored some of Bangladesh's historic sites such as Rabindranath Tagore, National Martyr's Monument, and 60 Dome Mosque. The integral part of the trip consisted of students spending five nights on the MV Kokilmoni in the world's largest mangrove forest: Sundarbans. Throughout the trip, students collaborated with Dhaka University Department of Geology graduate students and professors.

Learn more about their trip from Mike Steckler's series of [blog posts](#).

UN2023 Water Conference: "Water You Waiting For?"

"Many people think the water crisis is limited to the global south. But this is a worldwide problem affecting everyone." - Brian Mailloux

We hosted a side session for the UN 2023 Water Conference with experts from around the globe. The discussion, titled "Water You Waiting For?" focused on international water challenges and connected with hubs from Nairobi, São Paulo, Delft, and Zurich. The session discussed the water mining project which is a water-smart management system for a circular economy and society.



The trans-continental forum hosted at Barnard.

Alumnae Spotlight: Hayley Willner '22

Through Scientists in the Park, Hayley Willner ('22) has been working in Joshua Tree National Park as a Science Communication Fellow! Hayley communicates to park visitors climate change impacts on Joshua Tree National Park. Hayley also participates in field research and long-term species monitoring. If you would like to be featured email Batoul (bsaad@barnard.edu).



Hayley educating park visitors.

DIS Copenhagen Denmark—Study Abroad

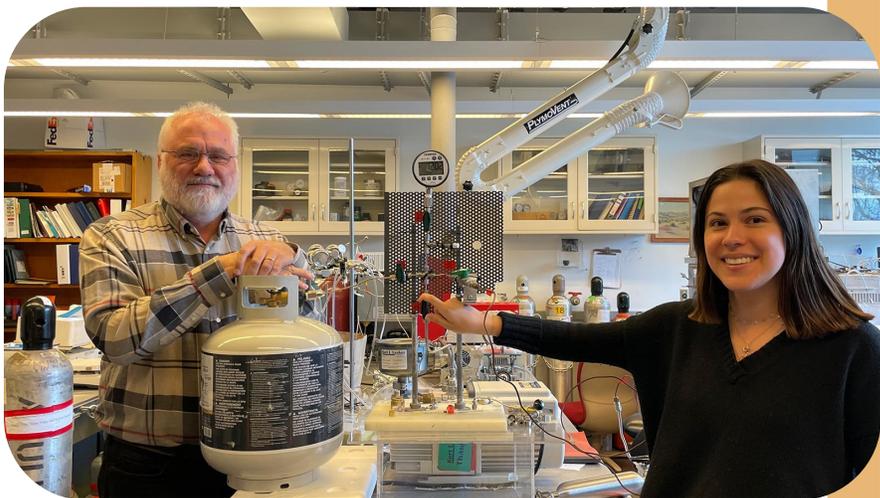
Grace Tulinsky '24 studied abroad in DIS Copenhagen, Denmark! Grace and her classmates took a week long trip to Greenland to learn about the role Greenland plays as a place rich in opportunities to study past climate changes, as well as a place particularly sensitive and vulnerable to the effects of modern climatic changes.



Pictured are students hiking by Russell Glacier, Point 660.

Grace Brown '23 Carbon Sequestration Project

For Grace Brown's senior thesis project, she worked with Professor Martin Stute on a carbon mineralization project. They examined how fast reactions occur between CO₂ and rocks in the subsurface. Read more about their research [here](#).



Grace Brown '23 and Professor Martin Stute.

The Summer Research Institute 2023 is in full swing!

Professor Logan Brenner's SRI team has been working on paleoclimate projects using foraminifera, oysters, and barnacles. The students visited the LDEO field station in Piermont, NY to collect sediment samples to study foraminifera, metals, and organic matter content. Students also collected barnacles for an exploratory project and water samples to study enterococcus and E. coli. The objective is to learn about the impact of anthropogenic activities on the benthic ecosystem.



Logan Brenner's SRI team collecting sediment and water samples, and barnacles at the LDEO field station.

Million Trees Project

Professor Elizabeth Cook's ongoing Million Trees project focuses on gathering tree data on the [MillionTreesNYC](#) initiative which began in 2007. The MillionTreesNYC initiative is a tree-planting campaign in New York City aimed at increasing the urban forest across the five boroughs to create a greener and healthier city. Undoubtedly trees help create a healthier city by shading and cooling neighborhoods and purifying air and water. NYC achieved its goal of planting a million trees, but not every planting site did well. Through SRI last summer, Isabel Kwass-Mason '24 and Giselle Silla '24 collected annual data on tree growth, survivorship and herbaceous ground cover and explored possible explanations, such as surrounding land cover, flooding, heat, and pollution, for current and future success of the afforestation sites.

Read more about the project and results in the published article [“In the City, a Million Trees Take Root.”](#)



Isabel Kwass-Mason and Giselle Silla conducted fieldwork at New York City's Fort Totten Park examining tree growth and survivorship, and invasive species' growth in 10 long-term study plots related to MillionTreesNYC planting sites.

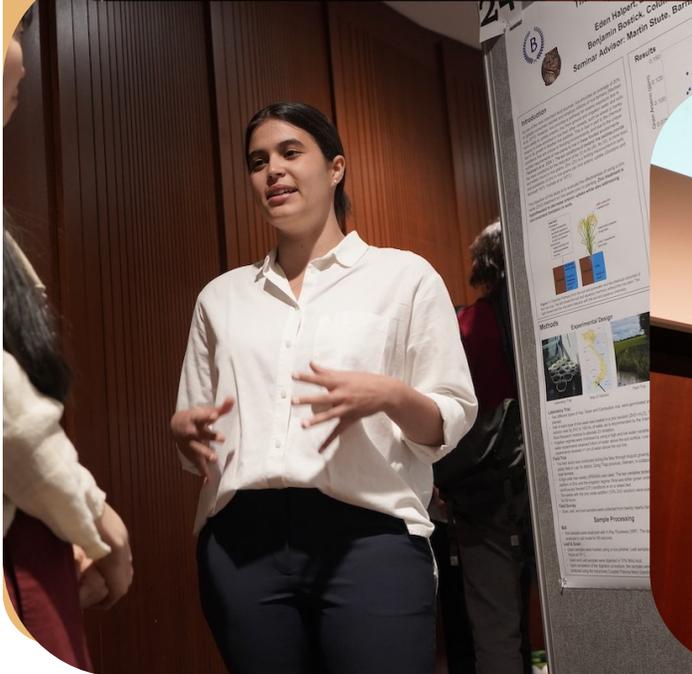
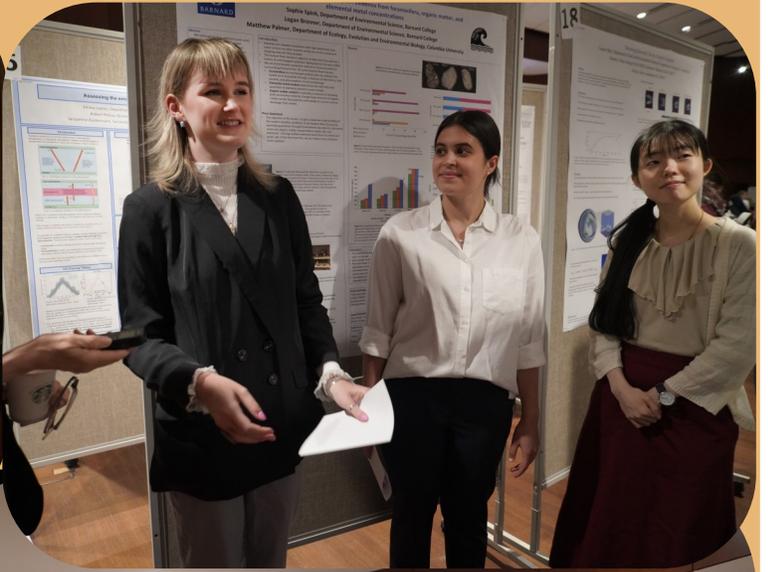
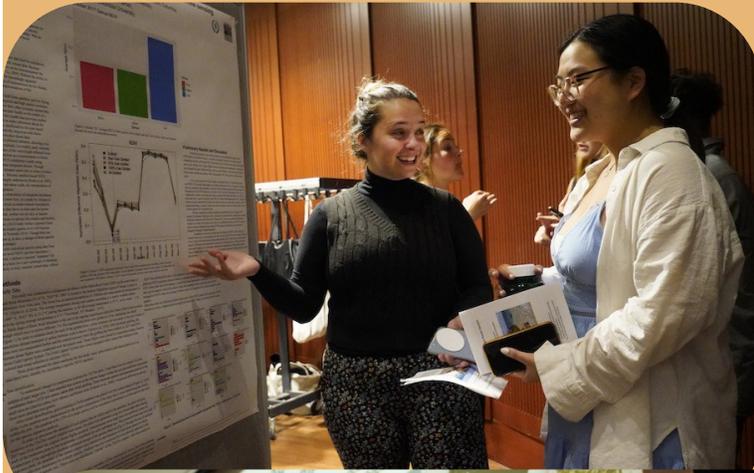
The Senior Seminar Poster Session Turns 20!

This year marked 20 years of our annual senior seminar poster session! Prior to 1995, there was no official thesis class. Peter Bower and Joe Liddicoat mentored students in the research seminar where students presented their research at the end of the semester. In 1993, Jim Simpson and James Hays first taught the Senior Seminar class for Columbia students. When Stephanie Pfirman joined the department in 1993, she began discussing with Jim Simpson and James Hays how to structure the Barnard program. They decided to band together and offer the Senior Seminar course to all environmental majors to ensure all graduating students gained analytical research experience. By 1994, the course was co-taught and co-offered between Barnard and Columbia. In 1996, Martin Stute joined the faculty teaching this course and has taught it alongside other faculty members ever since. Over the years, there have been ~900 theses submitted! The poster sessions began in 2003, making it 20 years of Senior Seminar poster sessions. Read more [here](#).



20 Years of Senior Seminar Poster Session Invitations.

Senior Seminar Poster Presentations



Spring 2023 Senior Theses



<https://envsci.barnard.edu/>

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Environmental
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Bartels, Cassandra: Glacial Calcium-Carbonate Preservation Patterns in the Northeast Pacific Ocean

Boemio, Mia: Genera-level Variation in NDVI: Detecting Forest Compositional Change with Remote Sensing

Brown, Grace: Groundwater Ages in the Samail Ophiolite, Oman, as a Constraint on Low-Temperature Peridotite Alteration Rates

Caparros-Janto, Abigail: Measuring Carbon Dioxide & Methane in Exhaled Human Breath and the Potential Contribution to GHG Emission Estimation

Chow, Ava: Gender: Perception and Use of Parks in New York City

Chowdhury, Maanal: Building a Water Treatment Reactor Cell to Mitigate Arsenic Groundwater Contamination in Pine Ridge Reservation, South Dakota Using Iron Oxides.

Deng, Hui Ping: Developing Novel Methods for Isolating and Identifying Microplastics and Nanoplastics in New York City's Waterways

Everard, Jenna: Refining the Nature and Timing of Erosion Below the "Great Unconformity"

Halpert, Eden: The Role of Zinc in Limiting Arsenic Uptake of Rice Grains

Holloway, Rebecca: Sampling Device Design for Dissolved Gasses at In-situ Pressure: pCH₄ Insights in New York Brackish-Tidal Marsh

Kahme, Lauren: Beating the Urban Heat: Challenges of Extreme Heat Planning and Community-Led Response in New York City

Mahar, Isabelle: Metal and Non-metal Contamination Measured in Pulverized Eastern Oyster (*Crassostrea virginica*) Shells Near Superfund Sites

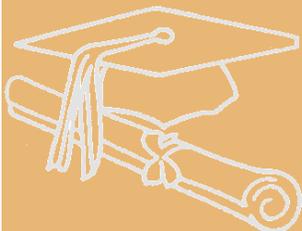
Mol, Eveline: Climate Resilience and the MTA: Through the Lens of Justice

Nesci, Izzy: Balancing Socio-Economic Development Goals and Coping with Climate Impacts: Lessons from Historically Marginalized Communities in NYC

Perloff, Zoe: Zombies in My Backyard? New Species Within Ophiocordyceps

Spring 2023 Senior Theses Cont.

Environmental Science
BARNARD
Alumnae



Ren, Ellen: HYPER-local Heat: A Neighborhood and Microclimate Analysis of 2019 Heat Waves in NYC

Roy, Noyna: Barriers to Uptake of Rooftop Solar in Singapore

Spink, Sophie: Benthic Pollution at Piermont Pier, NY: Evidence from foraminifera, organic matter, and elemental metal concentrations

Stecher, Bryn: Assessing the Impact of Decarbonization Scenarios on Wind Energy Potential in the United States

Stone, Emily: Changes in the Southern Hemisphere Westerly Winds Since the Early Eemian Reconstructed Using D/H Ratios of Sedimentary n-Alkanes

Tarabein, Leila: Examining Ice-Rafted Detritus from The Last Glacial Termination in Iceberg Alley, Antarctica

Vatakis, Sophia: Corporate Sustainability in Agriculture: Fact or Farce?

Wang, Silu: Exploring Variation in Potassium Isotope Ratios of Human Urine

Warden, Alice: Glauconite Geochronology Revisited at the Single Pellet Scale

Wellington, Delaney: Recording Individually Experienced Heat Stress During a Heat Wave in Northern Manhattan

Yokote, Anna: Militarization, Aquatic Ecologies, and Indigenous Sovereignty in Okinawa

Zucker, Grace: How Can We Best Utilize Cost-Efficient Remote Air Sensors to Quantify Exposure to Los Angeles Pollution? A Spatial Analysis

Congratulations to the Class of 2022!





*Our graduates make great employees!
Feel free to let us know anytime you have
an opening in your workplace or post
directly onto the “Barnard College
Environmental Science Alums” LinkedIn
Group*



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If you are interested in directly supporting our students' research projects please contact:
annualgiving@barnard.edu

From the Archives



An Environmental Science class, circa 1980

Do you have photos we can add to our collection?

Email them with a brief description to bsaad@barnard.edu

1. Kluger, Jeffrey. "Why Wildfire Smoke Turns the Sky Yellow." Time, June 8, 2023. <https://time.com/6285889/wildfire-smoke-yellow-sky/#:~:text=Particles%20of%20smoke%20are%20larger,orange%20and%20yellow%2C%20to%20us.>