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Environmental

STUDIES & SCIENCES

Greetings From the Director

Hello ESS students, affiliates, alumni, family, and friends! As we transition to a new year, and I reflect on the past one, the word that keeps popping into my head to describe this period is "change". The past year saw us transitioning away from the pandemic period that defined college life for so many of us, and we have changed both as people and an as an institution. We have adopted new ways of learning, teaching, and interacting; most good, some bad, and all of it still a work in progress. One thing is certain: it is difficult to imagine navigating these changes without being part of the amazing collective of students, faculty, and staff we call ESS. There is literally not a more supportive and collegial group to be found anywhere.

Change is best word to describe the natural world as well. ESS has always been about environmental change and solutions to environmental problems, but the speed and intensity at which those changes can arrive was on full display in the past year. The western US has faced unprecedented drought that has enflamed the wars over dwindling water supplies in the Colorado River Basin and devasted western forests due to insect outbreaks, transitioning from mega-fires to the newly coined term giga-fires, which are mega-fires burning together. Before the smoke had even cleared, we were hearing about atmospheric rivers and massive flooding. As I write this, there are photos and videos of people skiing in a foot of snow in the hills of Malibu and Santa Barbara. Indeed, I often joke that I can teach my classes by simply opening the NY Times or Washington Post home page on any given morning and having the material just jump out at me. There is eerily too much truth in that statement, and it only underscores the importance of the work we do in ESS. One encouraging sign is the increasing recognition of who is most in harm's way or most affected by these changes, which is why we continue to incorporate aspects of environmental and social justice into all our teaching and much of our research.

Despite the challenges posed by these changes, we are encouraged by what is unchanged and will be obvious in the pages of this newsletter: our student and faculty accomplishments continue to be impressive and impactful. The US National Science Foundation's Research

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Experience for Undergraduates (REU) program is highly competitive. This past year we had a record 5 students participate in REU programs ranging from climate change impacts and solutions to wetland function and prairie restoration. A total of 35 ESS students had summer experiences as either interns or research assistants, including 23 doing research directly with an ESS faculty member. Our students also continue to have amazing study abroad experiences across the globe and drive positive changes across campus through sustainability initiatives and senior capstone projects.

From the faculty side, Kris Covey, who is highlighted on page 2 of the newsletter, continues to the grow The Soil Inventory Project (TSIP), which he founded in 2019. This research and entrepreneurial endeavor has provided dozens of students with experiences in the world of soil carbon measurement and accounting, where science meets climate change policy and economics. This past year, Kris had 11 current ESS students and 3 ESS alums working across the country in experiences that will be invaluable as they move into their professional careers. Karen Kellogg also continued as part of the National Renewable Energy Laboratory's (NREL) Visiting Faculty Program. This past summer she brought 3 ESS students to Colorado with her while participating in research on wind energy development in the US, which is yet another career-building experience of our students.

Please take in all our successes and achievements over the past year. We hope 2022 was a great year for all of you as well and that 2023 is even better. Two more changes are coming to ESS in 2023, one we look forward to and the other we dread. Faculty member Nurcan Atalan Helicke will return after a one-year research sabbatical working on projects both local and in her home nation of Turkey. It will be great for all of us to have her back. However, with sorrow we will be saying goodbye to visiting faculty member Lowery Parker, who has

become a beloved colleague and teacher. We wish her well knowing she will always be part our ESS family.



Kurt in Acadia National Park last summer

Faculty Profile: Kris Covey



A lot of Assistant Professor Kris Covey's time at Skidmore has been spent "trying to find the easiest way to get geolocated dirt in a bag." This may sound like a strange task to most people, but it is a problem that Kris has been passionate about solving since 2015. "Dirt in a bag" is an oversimplification, of course; in reality, Kris is collecting geospatial soil carbon data as

part of his non-profit organization, The Soil Inventory Project, or TSIP (TEE-sip), which he founded in 2019 with Dr. Bruno Basso from Michigan State University. Agricultural soil is part of the largest terrestrial carbon pool on earth, and Kris is helping to build a database of scalable field data to quantify and support climate-smart farm practices.

Kris grew up in Queensbury NY, 15 minutes north of campus. After earning a physics degree at SUNY Potsdam, he became a self-described "professional bum" for a few years, working in a range of jobs from whitewater kayaking and carpentry to teaching science in middle school and high school to working on GE's clean-up of PCBs from the Hudson River. He then got accepted to the Yale School of Forestry and Environmental Studies, where he earned a Master's degree in Forestry followed by a Ph.D. After working at Yale as a post-doc and then in a faculty appointment, he came to Skidmore in 2018 as a visiting professor, then got a tenure-track position in 2021.

At Skidmore, Kris teaches classes that explore terrestrial ecosystem management and its impact on climate. From ES 207 "Regenerative Environmental Systems" to ES 252D "Managing Environmental Change" to ES 352D "Wicked Environmental Problems," Kris's fieldintensive courses challenge students in the lab and in the field to wrestle with real environmental issues. Kris has high expectations for how his students approach their work, and believes "if you are afraid of failure, then you're limiting what you are able to accomplish." He also encourages students to zoom out from their own behaviors to think about what is happening around them, and focus their energy on system-level changes linked to policy.

Kris sees his research and the associated student research opportunities as an extension of his teaching. Last summer alone, TSIP provided internships to 14 students in locations across the country, including Texas, Colorado, and California. With strong backers like Vice President Al Gore and the National Renewable Energy Lab, TSIP has quickly become a national leader in soil carbon data collection. Last year, TSIP received a \$20 million USDA Climate Commodities grant, some of which will stay at Skidmore to allow more students to get involved with this meaningful, hands-on research.

Kris is happy to have found his "dream job" at a liberal arts college close to home, where he says "teaching is valuable and a valued part of the job", and we are looking forward to his continued contributions to the ESS Program.

Faculty Highlights

Associate Professor Karen Kellogg was admitted to the U.S. Department of Energy's (DOE) Visiting Faculty Program for a second summer and received funding to engage three students, Jonathan Ramirez '25, Jackson Smith '24, and Claire Wolgast '24, to work with the National Renewable Energy Lab (NREL) on the barriers to wind energy implementation. The team delivered a major research presentation to NREL's Integrated Applications Center and the National Wind Technology Center in Boulder, CO. Karen was also invited to attend the DOE's Equitable Deployment and Demonstration Workshop focused on the barriers to equitable implementation of clean energy technologies. Karen published two papers with student co-collaborators in 2022. She published "The impact of state level residential building code stringency on energy consumption in the United States" with Nicol La Cumbre-Gibbs '20 in Energy & Buildings and "Living machines as a possible treatment for ibuprofen in wastewater" with Jon Chidekel '22 and Lisa Quimby of Skidmore's Analytical Interdisciplinary Laboratory in the journal Solutions. Karen also joined the master planning committee at Merck Forest and Farmland Center (many of you will likely remember field trips to this beautiful place).

Associate Professor **Nurcan Atalan-Helicke** contributed to the *Radical Fiber: Threads Connecting Art and Science* exhibit at the Tang. She crocheted scientifically accurate coral reefs for the exhibit and experimented with using plastic waste as yarn. She also facilitated a workshop on sustainable fiber at the Tang Museum, and brought students in both ES 223 Human Rights and Development and ES 100 Environmental Concerns in Perspective to work with the exhibit. She contributed to the multi-year and multi-country Agroheritage Project (Turkey, Bulgaria, Greece, Serbia) as a guest lecturer. She worked

closely with the Sustainability Office, Food Systems Initiative interns, capstone students, and Pitney Meadows Community Farm to learn their insights and experience on greenhouses, composting, and food waste. Last summer, she worked with ESS minor Liana Heath '23 to develop recommendations for farmland conservation. She published a paper with Sam Blumenthal '22, Taylor Goodell '22, Siddharth Nizamuddin '22, and Lauren Winkler '22 in the journal *Agriculture and Human Values*, based on their capstone research examining the responses of food assistance organizations to the COVID-19 pandemic in the Capital District Region. She completed a month of field work in Turkey studying conservation and sustainable utilization of wheat

landraces. She is also working on a book, *Ancient Wheats: Modern Revival*, that examines models and actors reviving the wheat landraces domesticated about 10,000 years ago in Turkey.

Corals from the Radical Fiber exhibit at the Tang



Senior Lecturer **Anne Ernst** gave a public talk on plastics organized by the Saratoga County League of Women Voters last May. She is helping to organize the upcoming Sustainability Fair co-hosted by Skidmore College and Sustainable Saratoga, which will be held on campus this April 16.

Faculty Highlights (cont.)

Associate Professor **Kurt Smemo** continued his research on soil fungal control on carbon and nutrient cycling in Adirondack Forests. He published 2 papers with colleagues at Indiana and Michigan State University: "Temporal soil enzyme patterns provide new insights into the nutrient economy of acidic hardwood forests" in the journal *Biogeochemistry* and "Arbuscular mycorrhizal tree communities have greater soil fungal diversity and relative abundances of saprotrophs and pathogens than ectomycorrhizal tree communities" in *Applied and Environmental Microbiology*. Kurt also continued developing long-term research in monitoring plots for the Northwoods, including



developing protocols for quantifying damage from spongy moth outbreaks, along with faculty collaborators Kris Covey and Charlie Bettigole and students Maggie Carmody '25, Mya Carter '25, and Johanna Steensma '25. He continues to serve on the boards of Wilton Wildlife Preserve and Park and the new Graphite Range Community Forest that will connect to the Skidmore lands.

Visiting Assistant Professor **Lowery Parker** had a blast this past year. Alongside student editors Madison McCluskey '24 and Emme Tissue '23, she helped 8 Environmental Justice students get case studies published in the online EJ Atlas. Lowery also attended the 2022 Agriculture, Food, and Human Values Society (AFHVS) Annual Conference in Athens, GA, focused on cultivating connections and exploring entry points into sustainable food systems. Last summer, Lowery worked with Paige Karl and Finn Weber to investigate issues of equity and justice in US soil carbon markets, creating a database of these emerging markets and potential barriers to entry. She also supervised recent graduates Emily Chase '22 and Julia Danielsen '22 during their construction of a hoop house on Skidmore's campus. She is now preparing to teach a new course called Radical Hope in Turbulent Times, a creative exploration of "hope" as a renewable and essential resource necessary for creating a better future.

Assistant Professor A.J. Schneller taught a new Scribner Seminar last fall called Environmental Advocacy Bootcamp: A Toolbox for Saving the World. Students in this ACE course designed and implemented advocacy campaigns focused on fashion industry workers, Indigenous rights, and protections for sustainable agriculture, pollinators, endangered species, and the Great Lakes of NY and MI. They had workshops and discussions with activists from local organizations and published Op-Eds and Letters to the Editor, including 'Restore the Shore' in the Niagara Frontier (Dec. 5, 2022) by Mason Montante and Meredith Georger; 'Save Western Wolves' in the Queens Chronicle (Oct. 27, 2022) by Brandon Guaman; 'Urge Lawmakers to Back Farm to School Bill' in The Sun Chronicle (Oct. 11, 2022) by Michaela Kablik; and 'National Parks to Natives' in the Boston Herald (Oct. 17, 2022) by Lily Hudner. A.J. published "Environmental Justice is Exhausting: Five Decades of Air Pollution and Community Organizing at Ezra Prentice Homes in Albany, New York." in the journal Local Environment: The International Journal of Justice and Sustainability. This paper was published with co-authors Haja Bah '21, Sophia Livecchi '21, and Saima Hannan (Albany College of Pharmacy & Health Sciences) and colleague Dr. Stacy Pettigrew (Albany College of Pharmacy and Health Sciences & Co-Founder of the RADIX Ecological Sustainability Center) based on their capstone research.

Assistant Professor **Kris Covey** continued his research on soil carbon, engaging many ESS students in research both during the semester and over the summer. His non-profit, TSIP (The Soil Inventory Project), was awarded a \$20 million Climate Commodities grant from the USDA that will go toward continuing soil carbon research as well as developing a system where anyone can test their soil carbon at home. He hired recent grads Eliana Colzani '22 and Morgan McClure '22 as post-graduate fellows well as post-doctoral fellow Kelsey Jensen to help expand this research.

Fall Fun!

What better way to celebrate the fall in upstate New York than to have an apple-themed study break! Students, staff, and faculty all gathered to play some disc golf on the quad and enjoy all variety of seasonal apple fare: apples, apple cider, and cider doughnuts from Saratoga Apple in Schuylerville (where many of you may have picked your own apples!). With Covid restrictions lifting, we hope to return to our fall hikes in the upcoming years, but our mini apple fest provided a welcome study break at the halfway point of the semester.



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Student Awards and Accomplishments

Many of our students successfully applied for competitive funds to pursue their interests and apply their academic learning to real-world challenges over the summer. 5 ESS students were awarded funding from Skidmore to pursue internships, 7 students received Federal awards to do summer research, and 23 students were funded through various other programs and sources to conduct summer research with Skidmore faculty.

Skidmore Funding

Isabel Ryen '24, Environmental Studies major



Isabel was awarded a SEE-Beyond Award to work with the conservation nonprofit, Gunpowder Riverkeeper, in Monkton MD. She worked on a variety of projects, from helping the executive director write letters to County officials fighting a proposed bill that would promote increased development, to ground-

truthing satellite data from the Smithsonian Environmental Research Center, to collecting water samples along the river to measure *E. coli* levels. She also got to learn donor-management software and meet with local stakeholders.

Madison McCluskey '24, Environmental Studies major

Madison got SEE-Beyond funding to work at the Regional Environmental Council, a non-profit food justice organization in Worcester MA. There, she led groups projects with 40 Worcester teens. Along with farm work and field trips, she also attended youth employment conferences led by the Worcester Community Action Council, to help teens develop the necessary skills to find and keep jobs. Her team was awarded a grant from the EPA to restore urban gardens for the purpose of carbon sequestration.



Jane Schreibman '24, Environmental Studies major

Jane got funding from the ESS Summer Internship Award to work at

the Hellar Landsveit sheep farm in Iceland. Her main jobs included tending to the large sheep stable and caring for the 13 lambs that were either triplets (sheep can only raise 2 lambs at a time) or whose mothers died during childbirth. After visiting Iceland earlier on vacation, Jane was thrilled to get to return: "I am so fortunate to explore my interest in farming and I am filled with so much joy!"



Annie Kiernan '24, Environmental Studies major

Annie won the Ken Frierich '90 Social Entrepreneurship Award to work as a farm intern for Handsome Cock Farm in Saratoga. She did farm chores, barn work, ran a booth to sell eggs and merchandise at 2 farmer's markets in Lake George and Saratoga, managed inventory of products, and assisted with marketing strategies. The farm donates all profits to local animal charities, so Annie got to help choose these organizations each



month. "I'm thrilled to have the opportunity to work on a small farm that is also a nonprofit, as it combines two of my main career interests."

Katie Lienert '23, Environmental Studies major



National Grid Internship

Jess Shulman '23 worked as an intern for National Grid on their community and customer management team. She got to plan and track volunteer events, including constructing raised beds for a community garden, attending energy equipment conferences, and tabling at festivals. Katie received a CDC Student Experience Fund (SEF) award to continue researching food justice and sustainable agriculture efforts in the Capital Region. She also worked at Old Tavern Farm, located on Saratoga Lake. The farm focuses on wine and flower farming, and Katie got to help them grow and build their business on a local level.



Federal Funding

Maris Lau '24, Environmental Studies major

Long-term Ecological Research Sites (LTERs) are research sites established by the National Science Foundation to address questions that cannot be resolved by short-term observations or experiments.

Maris spent the summer working at the Trout Lake LTER at the University of Wisconsin Madison. This multi-decade project seeks to understand the ecology of lakes in relation to relevant atmospheric, geochemical, landscape, and human processes. Maris worked with 5 other crew members at the field station to sample 28 lakes for water chemistry, course woody habitat, and macrophyte community composition.



Chloe Faehndrich '23, Environmental Science major

The Science Undergraduate Laboratory Internships (SULI) program encourages undergrads to pursue STEM careers by providing research experiences at Department of Energy (DOE) laboratories.



Chloe worked at Oak Ridge National Labs, a DOE lab in Tennessee. She joined a team of researchers investigating how greenhouse gas emissions from hydropower reservoirs contribute to the greenhouse gas budget in the atmosphere. Greenhouse gases are simultaneously being stored in and released from reservoirs, and it appears as though past studies have not accounted for all the ways

these gases can be released. This is important information for us to have when considering how these fluxes are contributing to atmospheric warming.

NSF REU

The Research Experience for Undergraduates (REU) program supports active research participation by undergrads in areas of research funded by the NSF. Students on the program generally participate in 10 weeks of research at a host institution. Skidmore ESS students had a banner year, with 5 students getting selected.

Apple Alvarez '24, Environmental Science major

Apple worked at RIT's program focused on human-dominated wetland ecosystems. She did research on the direct and indirect impacts of glyphosate on wetland soil function, looking at carbon fluxes in soil, and investigated invertebrate species richness and abundance to correlate how herbicide use can impact both these organisms and their relationship to one another. She also learned how to use an Infrared Gas Analyzer (IRGA) by LICOR to measure CO2 rates from soil samples. She took samples from 2 different wetlands and compared controlled plots to treated (9-months post-spray) plots.



Phoenix LaFlamme-Howe '24, Environmental Science major

Phoenix also worked at RIT's REU program, but focused on a different research project. They investigated how the Emerald ash borer affects vegetation composition in forested wetlands. They



determined that the emerald ash borer is causing significant changes to the canopy cover in areas that have lots of dead ash trees. In addition, red maple trees are moving into the plots where ash trees once stood, creating lower diversity in those wetlands.

Olivia Hunt '23, Environmental Science major

Olivia worked at Washington State University, with their atmospheric chemistry and climate change REU. She worked on a team of researchers looking into enhancing the biogas output of anaerobic digestion of dairy manure. In the lab, she helped with every stage of research, from preparing the digesters to running samples of collected biogas. She also attended



various professional development seminars on topics from coding in R to building a resume. She took classes on systems thinking and systems dynamics, then used that to design a model of anaerobic digestion in STELLA, a program for system dynamics modeling.

Johanna Steensma '24, Environmental Science major

Johanna worked at the Echinacea Project in West Central Minnesota, a collaboration of Chicago Botanic Garden and University of Minnesota. Native Prairies are very rare in Minnesota, and this project

has been focused on ecology and evolution in fragmented prairie habitat since 1995. Johanna worked with a team researching the biology, conservation, and restoration of these environments by studying both prairie remnants and planted experimental plots. The project focuses on the model organism of *Echinacea angustifolia* (purple coneflower), a common native prairie plant. Johanna also worked with another plant, *Asclepius viridis* (green milkweed), to see how it reacts to prescribed burns.



Katherine Almquist '24, Environmental Science major

Katherine worked on Drawdown Scholars REU, a collaboration between Project Drawdown and Penn State University to research solutions to climate change. Katherine worked in an electrical engineering lab, helping to simulate and build antennas for tracking pollinators, specifically honeybees, to determine how they are affected



by climate change. She did countless readings on antennas, radar, and honeybees, and studied how to replicate the frequency needed for the transmitter through simulation software on the computer. She also got to catch bees and help put transmitters on them, which included creating a procedure to ensure the transponders stayed attached to the bees.

Student Awards and Accomplishments (continued)

In summer 2022, 23 ESS students engaged in research with Skidmore professors, a record number. Sixteen of them were funded through Skidmore's Faculty Student Summer Research Program, which provides students with an opportunity to spent part of the summer working with faculty on original research. Four other ESS students worked on a faculty-student collaborative project funded by the Thoreau Foundation, and another three students were funded through a Federal grant from the National Renewable Energy Lab.

Soil organic carbon

Several groups of students worked with ESS Professor Kris Covey on his ongoing TSIP program. TSIP, or The Soil Inventory Project, is a growing database of soil carbon levels that farmers can use to inform decisions on using sustainable agricultural practices. It relies on field methods, remote sensing technology, and biophysical modeling. The idea behind the data collection is to create a market for stored carbon, which would incentivize farmers to incorporate these regenerative agricultural practices.

Environmental Science students **Sam Haas '24, Kaitlin Katirachi '24**, and **Rachel Olson '23** worked at G Bar C Ranch, a 3000-acre cattle ranch in Rosston Texas. They did a number of ranch tasks, from dividing up larger grazing lands into smaller rotational grazing plots using electric fences to helping the ranch managers move the cattle each day. After ranch tasks, they spent their time fighting through brambles and

climbing down cliffs to find TSIP soil sample locations at depths ranging from 15 to 90 cm. They took 350 soil samples at each depth across the ranch to help create carbon density baselines as well as identify the effect of different grazing patterns and regenerative ranching techniques on soil carbon.







Environmental Science students Ben Frank'24 and Abbi Brown '23 spent the summer at the National Renewable Energy Lab in Golden CO, where they did research on the use of agrivoltaics (using the space under solar panels for agriculture). They did field work at two agrivoltaic sites: one large site near Boulder and a small new research site on the NREL

campus. Additionally, they conducted a soil carbon inventory in partnership with TSIP at over 30 photovoltaic solar sites across Colorado.





Environmental Science students **Scott Flintstone '24, Emily Healy '25,** and **Sophia Rubien '22,** with help from post-grad fellows **Eliana Colzani '22** and **Morgan McClure '22,** spent their summer sampling soil at TomKat Ranch in Pescadero, CA. They took samples to compare carbon content in four treatments across the ranch: goat grazing, burn, compost addition, and a restoration area. In addition to carbon distribution, they looked into developing quick, low-cost bulk-

density methods. They tested using a measuring stick for height, millet for volume, and then drying each sample and weighing it for density

calculations. We also compared different labs and techniques by splitting all of their samples to be sent to three different labs for total carbon dry combustion measures.



Environmental Science students Liam Gislason '24 and Sophia Rubien '22 collected soil samples for TSIP at Breathe Deep farm in Claverack, NY, and at other farms in the Hudson Valley owned by Armonia, an investment company focused on regeneration projects in the food and agriculture industry. They worked with ESS grad Amity Wilson '22, who is interning for Armonia. She is researching and developing impact metrics relating to regenerative agriculture, and also helping the farm with soil sampling and analysis to maintain their ROC (Regenerative Organic Certified) certification.



Environmental Science student **Emme Tissue '23** and ESS minor **Jordan Kohomban '23** worked at Caney Forks Farm in TN, continuing to assess the farm's regenerative practices through soil carbon monitoring. Their summer sampling will allow the farm to track changes that have happened in the past 3 years. Emme and Jordan also surveyed 1,541 young chestnut trees on the property to track growth and health, and got to help out with the farm's livestock and veggie teams, from harvesting tomatoes to trimming sheep hooves!



ENVIRONMENTAL STUDIES AND SCIENCES PROGRAM

North Woods Forest dynamics

Environmental Science students Maggie Carmody '24 and Mya Carter '24 worked with ESS professors Kurt Smemo and Kris Covey and GIS Director Charlie Bettigole to map forest processes in Skidmore's North Woods. From Maggie: "In the midst of a mass defoliation event here on campus, we've been bringing together GIS and forestry tools to understand the impact of the spongy moth on northern hardwood forests... Primarily, we've been taking tree surveys. Additionally, we've been setting up new equipment for highprecision laser-offset measurements in



the field. Using some sweet new equipment, we're mapping trees in the North Woods with accuracy down to the centimeter!"

Renewable energy

Environmental Studies students **Jackson Smith '24** and **Jonathan Ramirez '25** and Environmental Science student **Claire Wolgast '24** conducted research with ESS Professor Karen Kellogg, through the National Renewable Energy Laboratory (NREL)'s Visiting Faculty Program. The team continued research Karen did last summer with another group of students through NREL. They complemented national data with a state-wide analysis of NY State to assess 1) the attitudes of



wind-energy neighbors (i.e., those within 8 km of a wind turbine); 2) the relative preference for wind turbines compared to more centralized power plants and other types of renewable energy a similar distance away; and 3) the ways issues of energy equity influence attitudes and preferences. The summer culminated with the team traveling to Bolder, CO to tour the NREL facilities and present their research to a broad audience of people from NREL's Integrated Applications Center and the National Wind Technology Center.



US soil carbon markets with Visiting Assistant Professor Lowery Parker. They built an extensive stakeholder database of private, voluntary carbon trading programs as well as corporate programs focused on incentivizing healthy soils. They also conducted stakeholder interviews, then used the data to refine interview protocols for future research. Their findings will be used in future peer-reviewed publications to help farmers understand these complex markets.

Environmental Studies majors **Emily Chase '22** and **Julia Danielsen '22** also worked with Lowery to build a hoop house on campus, a continuation of their ESS



capstone research with fellow recent grad Lily Feldman '22. The new hoop house, which was partially funded by



the Thoreau Foundation, will provide a space for community learning on campus and also help the college's sustainability goals, as all produce grown in the hoop house will be served in the Dining Hall.

Chloe Faehndrich '23 and Olivia Hunt '23 were both awarded Travel to Present funds during the fall semester. Chloe attended the Global Lakes Environmental Observation Network (GLEON) conference held in Lake George, where she presented her research from her summer work at Oak Ridge National Labs. Olivia attended an NY6 conference at Colgate University to give a poster on research she conducted as part of an independent study during her semester in Iceland. **Christina Lindstrom '22** was awarded a President's Award for Leadership and Service. These awards are presented each year to members of the Skidmore staff, faculty, and student body who have embraced the educational mission and cooperative spirit of the College through their exemplary commitment to personal excellence, campus pride, and service to our campus community. The awards are intended to highlight and celebrate the wide range of contributions by individuals and groups to the quality of campus life.



Atmospheric chemistry

Sustainable food systems

Environmental Studies majors **Paige Karl '23** and **Finn Weber '23** were funded by the Thoreau Foundation to investigate issues of equity and justice in

Environmental Science student Emily Davis '23 continued her research in Chemistry Professor Juan Navea's atmospheric chemistry lab this past summer, studying the oxidation of fatty acids in the presence of environmental photosensitizers. In particular, she is looking at the photooxidation of sea spray aerosols. Her results will help determine the interaction between aerosols and the atmosphere, and therefore better predict the climate impact of atmospheric particulate matter.



Study Abroad

With the world opening back up again in the aftermath of the pandemic shut-down, ESS students were happy to return to global travel. 28 of our majors and minors studied abroad this past year, as part of 20 different programs, covering the globe from Iceland to Chile, Bhutan to Australia, gaining a new perspective on global environmental issues and solutions.



Olivia Hunt '23 went to Iceland with SIT. "It was absolutely amazing, I got to travel all over the country with my group and go in nearly every hot spring Iceland offers! I got to walk in a glacier, participate in a cross-country ski race, see the northern lights, travel to the Arctic Circle, live with the largest colony of puffins in the world, and make some really fantastic friends!"



Brae Tebo '24 spent the fall with MSID Thailand. "I really loved my time in Thailand, my favorite part was getting to hike in Doi Inthanon National Park and being at the homestays." Finn Weber '23 went on the College Year in Athens Program. "Studying in Greece gave me a greater perspective and understanding of the world, and allowed me to become a more informed student. I was able to continue my academic and athletic interests while immersing myself in Greek culture."



Mya Carter '24 went to Turks and Caicos with SFS. "My time spent on South Caicos was truly a once-in-a-lifetime experience. The fieldwork intensive curriculum allowed me to fully immerse myself in my academics and gain in-depth knowledge on marine life."





Rachel Olson '23 traveled with the SFS Chile program, including "lots of hiking, field work, and meeting wonderful people! One of my favorite memories was a five-day backpacking trip through Torres del Paine National Park where I got to hike over mountain passes and glaciers."

Chloe Faehndrich '23 went to the Galapagos Islands with IES, "one of the best decisions I have ever made. I had the opportunity to fully immerse myself in marine research through snorkeling and scuba diving with my classes at least every other week. We swam with sharks, sea lions, turtles, iguanas, manta rays, dolphins, penguins, etc. I could not have asked for a better experience abroad!"





April Cook '24 studied at the University of Queensland in Australia. "As someone who hasn't had the ability to travel much before, researching topics like mangrove and eucalypt forests, damselfish populations and coral complexity in the Great Barrier Reef, and even Dugong and sting ray populations in Moreton Bay, was such an amazing once-in-a-lifetime experience. My favorite memory from the trip was snorkeling with sea turtles and eagle rays (but seeing koalas and kangaroos was pretty cool too). "

Alumni spotlight



Rafaela Iturralde'18 is the Executive Administrator of the Amazon Sacred Headwaters Initiative (ASHI) and the Hub Coordinator of the Global Alliance for the Rights of Nature (GARN). She is pictured on the left with her colleague, Domingo Peas, an Achuar Leader from the Ecuadorian Amazon and spokesperson of the initiative. After graduation, Rafa established a Youth

Hub for GARN, teaching and empowering youth around the world to be advocates of the Rights of Nature Movement. She then went on to work as the Latin America Organizer at Waterkeeper Alliance, where she realized that her passion and her heart were in the Amazon Rainforest, working alongside Indigenous Earth defenders. Most recently, she left WKA to join the Amazon Sacred Headwaters Initiative, an Indigenous lead program aimed to permanently protect 86 million acres of the Ecuadorian and Peruvian Amazon from extractive activities, like oil drilling and mining. As part of her multi-dimensional role at ASHI, she focuses on fundraising, organizing international agendas for traveling delegations, translating and interpreting when needed, and building a bridge between the global and local/regional teams. Rafa is based in NYC but her jobs require her to travel to Ecuador, Peru, and conferences around the globe. Sarah Whateley '09 is a Water Resource Scientist at The Nature Conservancy in Albany NY, where she has worked since 2016 to address water management challenges at the intersection of society and the environment. Shortly after graduating from Skidmore, Sarah started work on an M.S. followed by a PhD in Civil and Environmental Engineering from the University of Massachusetts Amherst, and completed her studies



in 2016. Working with TNC, she brings a unique perspective to her work in conservation, applying her knowledge of humanhydrologic systems and analytical methods for improving the use of data in decision-making to help empower communities around the world to make informed water resource decisions in a changing and uncertain future climate. Her expertise has played a critical role in developing innovative solutions to support institutions, communities, and businesses engaging in constructive dialogue and collective action to resolve interconnected water challenges. "My Skidmore education and the inspiring, supportive faculty have given me a uniquely broad and thorough interdisciplinary background that prepared me to succeed in graduate school in a Department of Civil and Environmental Engineering and beyond."

Speakers

ESS Keynote Lecture: Carolyn Finney. The N Word: Nature, Revised (An Imagined Conversation with John Muir)

Carolyn Finney, Ph.D. and Artist-in-Residence at Middlebury College, came to Skidmore this past October to perform her "work in progress" entitled *The N Word: Nature, Revisited (An Imagined Conversation with John Muir)* for the ESS Keynote. Dr. Finney is a storyteller, author, and cultural geographer who is deeply interested in issues related to identity, difference, creativity, and resilience. The aim of her work is to develop greater cultural competency within environmental organizations and institutions, challenge media outlets on their representation of difference, and increase awareness of how privilege shapes who gets to speak to environmental issues and determine policy and action.

Dr. Finney's performance was based on a premise: what if she took John Muir's book, *A Thousand-Mile Walk to the Gulf*, and re-wrote it from a Black woman's perspective. She imagined *A Thousand-Mile Walk was Rough* under the fictional name Sojourner Washington Douglass, as an

illustration of life's increased dangers for a Black woman, and then imagined the response she might get from John Muir in a conversation with him.

Throughout the performance, Dr. Finney told stories of her childhood, showed photographs, and quoted poetry. "What sayeth a woman who lies in green pastures not her own?", she asked at one point, quoting from a poem she wrote about her childhood. She said her dad, after returning from the Korean War, couldn't get a job in the South where he was from because of his race, so her family moved to Westchester County in 1957, where her dad worked as a caretaker for a private home. Carolyn and her brothers grew up in an all-White neighborhood, where she developed a deep appreciation of the land her dad tended but also grew in her awareness of racial injustices. An increased focus on racial injustice in 2020 brought an increased interest in Black perspectives, so Dr. Finney has used this as an opportunity to answer the question "who's story counts?" as she develops her performance.

In addition to her evening performance, Dr. Finney also visited ES 223 Environmental Justice, where students in the class had the opportunity to discuss the performance in more depth and connect her talk to their class discussions and readings.



Sustainability Initiatives

A Summer of Building

Last academic year, **Emily Chase '22, Julia Danielsen '22, and Lily Feldman '22**, secured funding to build a hoop house on campus as part of their ESS Capstone "The Hope of a Hoop House: A Sustainability Pilot Project on Skidmore College's Campus" (more on p. 7). Emily and Julia staved on campus as summer researchers to build the

structure, hammering support posts by hand 4' into the ground, installing purlins to form the "hoop" roof, sawing the end walls, etc. They planted the first round of crops. tomatoes, eggplants, and peppers, which yielded 85 lbs of produce this fall. Garden Manager, Von Richardson '25, and Summer North Woods Stewards, Aylish Flahaven '23 and Forrest Levey '23, worked alongside Emily and Julia, in between garden and trail projects. In July, the Stewards planned and built a new bridge on the Spirit trail.



EcoMore Team Evolves

Our peer-to-peer volunteer program "EcoMore", piloted and launched by **Christina Lindstrom '22**, has evolved into a paid role within the Sustainability Office. This Fall, **Margot Kelly '25**, EcoMore Manager, led the volunteer team and prepared and recruited 10 EcoMore Team Members to lead sustainability engagement efforts for the spring. The team hosts EcoBrick work parties, where attendees stuff clean snack and chip wrappers into plastic water bottles until the bottles are solid. These EcoBricks will be used to construct a bookshelf. At the

suggestion of EcoMore team members, the group will also design programming to address ecoanxiety, the worry and fear of present and future climate catastrophe, and organize events for Earth Month in April.



Sustainability Month in October

This Fall, the Sustainability Office hosted its first Sustainability Month, with outdoor campus installations and a variety of events. Interns **Maggie Carmody '24, Isabella Figlioli '24, Olivia Hunt '23, Margot Kelly '25, Forrest Levy '23**, and **Emme Tissue '23** painted markers of Zankel's geothermal well bores with volunteers and constructed a Trash Trapezoid, a silhouette representing the volume of the 2500lbs of waste generated each day on campus. Our North Woods Steward, **Stella Piasecki '23**, led trail walks and boardwalk build days to replace the dilapidated structure on the north end of the orange trail.





Maggie Carmody '24, Margot Kelly '25, Olivia Hunt '23, and Emme Tissue '23 stand inside their Trash Trapezoid.

Compost Team Launches Collection in ResHalls

The residential compost program in the apartments began in 2010, and it continues strong, with about 6,000 lbs of compost collected from the apartments each year. After a smooth pilot in partnership with EAC's **Samantha Claussen '23** and our Sustainability Intern **Isabella Figlioli '24** in the spring, Compost Managers



Tori Adams '24, Lisle Jamison '24, and **Lena Bruursema '23** expanded compost collection to the nine ResHalls this fall. One community compost bin is hosted in the first floor of each ResHall, and it's emptied by the compost managers once a week. The team collected a total of 3,400lbs of compost this fall with the help of their new steed, an electric bike!

Senior Capstone Projects 2022

Jonathan Chidekel, Roger Mercado & Liam Whalen Northwoods: An Interdisciplinary Data Collection System

Skidmore College's Northwoods creates a unique space for interdisciplinary data collection and research collaboration but lacks a unified system. We established an 8-plot network modeled after the Smithsonian "ForestGEO" network to aid in long-term data collection. Half-hectare plots were selected to create a fair representation of the Northwoods while allowing for unique ecosystem comparisons. Trees in each plot were geolocated and basic data collected. These plots create an opportunity for future data collection and comparable datasets.



Senior Capstone Projects 2022 (continued)

Eliana Colzani & Morgan McClure Behind the Wine: Soil Carbon Sequestration on Vineyards in Northern California



With increased attention on the potential of soil carbon sequestration for environmental and economic benefits, we studied which variables influence soil carbon distribution on vineyards. Seven weeks of field work provided us with a robust dataset with 2000+ soil samples, including an experimental trial of regenerative practices. Both

fine and large-scale drivers of carbon and the effects of sample aggregation will help inform future sample design and management decisions.

Esther Namulondo & Jade Bacherman Seedlings of Solidarity: Developing Relationships for Cross-Cultural Knowledge Transfer

We created a strategic implementation plan for a medicinal seed garden at Pitney Meadows Community Farm. We referred to Kayes et al. (2005) Seven Stages to guide our research. Stage Three required more time to gather and discuss information from indigenous knowledge givers. The hope is that a medicinal garden will allow indigenous groups in the region to highlight traditional storytelling practices and cultural traditions which remain essential for thinking about seed and food sovereignty under the conditions of climate colonialism.

Justice Benjamin & James Grayson Pipe Dreams: Surveying Culverts in the Name of Climate Change

Climate scientists predict an increase in the intensity and unpredictability of heavy precipitation events in the Northeast region of the US, and evaluating culvert infrastructure is vital for understanding their future resilience. We examined culverts within the Loughberry Lake watershed based on riverroad crossings. Results were analyzed to determine potential threats and current capacity in the system.



Kibibi Kwakye Davis, Anna de Carvalho, and Harsh Vaish Cultivating Accessibility: Diversifying Community Engagement for Pitney Meadows Community Farm

We researched addressing food security by expanding ideas of accessibility for urban farms concerned with reaching marginalized groups in their communities. Using a literature review, a community survey, and semi-structured interviews with urban farms in the Capital Region, we considered how to increase overall community benefit from urban agriculture (UA). We developed 13 recommendations for Pitney Meadows Community Farm (PMCF) that will have relevance to a larger set of urban farms in the US.

Justine Bolling, Brook Heston & Grace Howard Tapping into Education: Sweetening Skidmore College's Experiential Curriculum

Maple syrup is an educational tool with a connection to history and culture. To foster this, we investigated the feasibility of implementing a maple sugaring program rooted in environmental education at Skidmore College. We propose a program that includes an



educational space for Skidmore and Saratoga community members. Skidmore faces certain institutional limitations, but this feasibility study indicates the potential for the future implementation of this program.

Sarah Gordon, Emma Jones & Tyler Lamport A Budding Industry: The Opportunities and Limitations of Hemp in New York State

Hemp (*Cannabis sativa*) can be used for different purposes. After falling into oblivion, hemp cultivation is expanding, both in the U.S. and NY, as a result of legal changes. It is a sustainable crop that will enhance the livelihood of farmers, and farmers are particularly connected to the CBD markets, where the essential oils of hemp are extracted and used in alternative medicine to treat ailments from seizures to insomnia.

Christina Lindstrom, Megan Martino, Jessica Plotnick & Kieran Yater

Renew for Who? Farmers' Perceptions of Renewable Energy This study explores small-scale livestock farmers' perceptions of renewable energy in New York's Capital Region. Interview with farmers highlighted financial benefits as the main reason for farmers' investment in renewable energy. Our research indicates renewable energy is more accessible to large-scale farms, which raises the question of which farmers are benefitting from renewable energy and how renewables can become more accessible to farmers who want to invest.

Emily Chase, Julia Danielsen, & Lily Feldman The Hope of a Hoop House: Feasibility Studies of Capital

Investments on Farms in the Northeast We investigated the feasibility of a high tunnel structure on Skidmore College's campus by studying local produce farms in the Northeastern US. A high tunnel is a type of temporary greenhouse that extends the growing season through winters. We argue that the structure encourages environmental awareness, has the potential to be economically profitable, and increases the potential for social resources such as learning and community building.



Maria Hoffman, Sophia Rubien, Sylvana Szuhay & Amity Wilson What's the Dirt on Dairy? A Soil Carbon Inventory on Organic, Grass-Fed Dairy Farms in New York State

We investigated the relationship between soil organic carbon sequestration and farm management practices on grass-fed organic dairy farms in NYS. 344 samples were collected using a drill and auger system at depths 0-15 and 15-30 cm. Our results had higher percentages of total carbon than predicted values, although other results were inconclusive. We suggest further research and the implementation of a more intensive sampling methodology to generate more reliable results.

ESS in Action



Two years after Covid foiled their graduation plans, the Class of 2020 returned in June for a weekend Commencement celebration.



ES 105 students spent the semester exploring the local watershed, from the frozen lake to the marshy spring wetlands, to investigate water quality.





Students in ES 252D Landscape Dynamics headed to Gore Mountain to characterize forest patterns.





ES 206 Environmental Engineering and the Science of Sustainability used local field sites to collect data for their studies.



The senior Capstone class started the fall ready to research some "classic environmental" problems and solutions.



How do you move a 600-pound tool chest from a truck bed to a science lab? A little MacGyver, a little Wile E. Coyote, and a lot of muscle! Come by to check out the ESS tool shed on the second floor of the new CIS!



ES 100 students identified and located sustainability initiatives on campus, including the BikeMore program and the community garden.



ES 305 Environmental Education students led local preschoolers in garden-themed lessons.



ESS students Jonathan Ramirez '25, Jackson Smith '24, Ben Frank '24, Abbi Brown '23, and Claire Wolgast '24 all met up in Golden, CO at the National Renewable Energy Lab.