Mansueto InstituteUniversityfor Urban Innovationof Chicago

EECampus Training the Next Generation of Leaders in Sustainable Urban Development

2021-2022 End of Year Report

Overview

Environmental Frontiers (EF) Campus brings together faculty, students, and staff to collaborate on innovative ideas to build a more sustainable future on the University of Chicago campus and beyond. Started in 2018, the program combines hands-on research, experiential learning, and an extensive mentorship network to create a rich opportunity for students to enhance their academic and professional capabilities, while providing Facilities Services and the university with practical and targeted deliverables in support of the university's Sustainability Plan. Using the University of Chicago campus as a case study, students are challenged to consider sustainability through data analysis and to evaluate interventions to improve energy efficiency, conservation, and overall environmental performance.

Students apply and are chosen annually to work on EF Campus. A graduate student leads undergraduate research assistants working in teams to analyze campus data, operational systems, and community behaviors and identify actionable recommendations that advance the university's sustainability goals. All projects are mentored by academic faculty members at the Mansueto Institute for Urban Innovation, the Center for Robust Decision-making on Climate and Energy Policy (RDCEP), and the Program on the Global Environment, and Facilities Services staff.

Faculty Leads



Elisabeth Moyer Associate Professor of Geophysical Sciences



Sabina Shaikh

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Director of the Program on Global Environment and Senior Lecturer in Environmental and Urban Studies in the College



Alison Anastasio Assistant Instructional Professor, Environmental and Urban Studies



Mansueto Institute for Urban Innovation

PROGRAM ON THE GLOBAL ENVIRONMENT





EFCampus Projects



In 2021-22, student research assistants built on earlier EFCampus research, by focusing on two areas for improving sustainability at the University of Chicago: the campus's laboratories and the campus tree ecosystem.

Labs Energy Analysis and User Engagement



Background

Labs are an important focus area for the University of Chicago to meet its goals of reducing greenhouse gas emissions 50% by 2030. The University of Chicago labs are only 10% of campus building area, but consume 38% of campus energy. An EFCampus team evaluated the energy performance of the University of Chicago laboratory buildings and developed tools and behavioral change campaigns to reduce excess energy use.

Process

In summer of 2021 and academic year 2021-2022, students created benchmark assessments of labs across the University of Chicago, measuring the energy use intensity of eight buildings on campus:

- Biopsychological Research Building
- William Eckhardt Research Center (ERC)
- Ellen and Melvin Gordon Center for Integrative Science (GCIS)
- Henry Hinds Laboratory for Geophysical Sciences
- Kent Chemical Laboratory

- **George Herbert Jones Laboratory** .
- **Michelson Center for Physics**
- **Searle Chemistry Laboratory**

Building on the analysis from the summer, the academic year research assistants focused on two pathways to specifically target lab improvement opportunities: an Excel-based laboratory design decision-making tool to explore the energy implications of lab equipment purchasing decisions and an action plan detailing a behavioral change campaign around fume hood usage.

Results

In five of the eight buildings, there are significant opportunities for energy savings: Michelson, Biopsychological, GCIS, ERC, and Searle. Fume hoods, cold storage, and lighting represent particularly important focus areas. Students proposed two pathways for energy savings in laboratories:

(1) A decision-making tool to inform principal investigators about the energy implications of lab equipment purchasing decisions, including fume hood specifications, types of cold storage, and lighting.



(2) A behavioral change campaign, including details on best practices, benchmarking from peer institutions, on-campus pilots, and a step-by-step outline of campaign implementation.



In spring 2022, EFCampus students worked with Facilities Services to launch the "<u>Shut the Sash</u>" contest to encourage energy savings by reducing energy at facilities that have chemical fume hoods. If fume hoods are left open all day, they can waste as much power as three and a half small houses, according to Jim Passolano, the director of design and construction of research facilities for the Physical Sciences Division, who led the Shut the Sash campaign. The building-wide competition awarded labs quarterly pizza and donut days for safe and efficient fume hood use. In one building, Searle, the Shut the Sash campaign and other energy saving measures led to its operating as a LEED Silver status building.

Student Research Assistants



Anika Bhat '23 Economics, academic year



Yunyan Mo '23 Geophysical Sciences and Economics, summer



Silvana Montagu '23 Environmental and Urban Studies, summer and academic year



Brianna Morales '21 Geographical Sciences and Environmental and Urban Studies, summer



Peyton Sandborn '23 Environmental Science and Economics, summer



Jasmina Scekic 22' Mathematics, academic year



Mark Siedentopf '23 Public Policy and Environmental & Urban Studies, academic year

Tree Ecosystem Services Analysis



Background

As of August 2021, the University of Chicago's 217-acre campus was home to 3,764 trees spanning 129 species, all maintained by Facilities Services. Trees support a broad set of environmental and health benefits, known as ecosystem services. This EF Campus initiative worked to identify best practices and generate quantitative processes to strategically use the campus tree inventory to drive toward the university's broader sustainability goals.



The life cycle of trees ecosystem services.

Process

Research assistants conducted a literature review of tree ecosystem services benefits, including detailing information across different tree species. Through this background research, students focused on tree species that provide the greatest benefits across environment dimensions including stormwater management, air temperature cooling, and trees best suited for the changing climate.

The research assistants applied their background research to build a detailed sustainability focused tree management analysis report that included succession planting recommendations.

The final core component of the research project included an outreach project focused on increasing awareness and building stronger connections with campus trees.

Results

The students completed a <u>campus forest analysis and recommendations report</u> (CFAR), a comprehensive guide to the tree and forest ecosystem of the University of Chicago, including information on how to increase sustainability for the future, and they made recommendations based on their findings. The CFAR report was composed of three main sections: ecosystem services, climate change, and succession planning.

Based on their findings, the research assistants created an Arbor Day Awareness and Engagement Plan to educate students and the university community on the tree ecosystem. The outreach project culminated in an Arbor Day Celebration on October 8, 2021. In addition to tree planting and campus tree tours, the research assistants created and led a scavenger hunt focusing on trees throughout the main quadrangle.

The Arbor Day Celebration helped the University of Chicago obtain Tree Campus Higher Education recognition from the Arbor Day Foundation. This recognition is awarded to campuses that meet five standards of effective tree stewardship and engagement, including Arbor Day observation.

Student Research Assistants



Chelsea Pauga '22 Harris School of Public Policy, Graduate Student Lead



Emily Nigro '23 Environmental Science, summer 2021



Hannah Richter '23 Environmental Science, summer 2021



Josephine Schall '24 Environmental Science, summer 2021



Alex Torres '23 Environmental Science, summer 2021

Students at the Arbor Day celebration in fall, 2021.



Conclusion

Throughout this year, students worked with other university actors to advance sustainability goals while conducting fulfilling, hands-on research. Through the study of tree ecosystems and campus laboratories, EFCampus research groups made meaningful steps towards sustainability, including reducing energy usage in fume hoods and celebrating Arbor Day with the university community. As we continue to expand the EFCampus program, students, faculty, and staff are working to help achieve the university's sustainability goals. The EFCampus program has an exciting future ahead. During summer 2022, research assistants will continue to work on laboratory energy conservation efforts.



Special Thanks

The EF Campus program would not be possible without the support, enthusiasm, and efforts of many partners. We are grateful to all of those who have dedicated their time to making the program a success.

Program Sponsors:

- Melina Hale, Vice Provost and William Rainey Harper Professor in Organismal Biology and Anatomy and the College
- Luis Bettencourt, Inaugural Director of the Mansueto Institute for Urban Innovation
- Alicia Berg, Assistant Vice President for Campus Planning + Sustainability

Project Mentors:

Labs

- Elisabeth Moyer, Associate Professor of Geophysical Sciences
- Adam D'Ambrosio, Senior Director, Energy Services and Sustainability, Facilities Services
- Sara Popenhagen, Sustainability Manager, Facilities Services
- Ryan Hoff, Campus Energy Manager, Facilities Services

Trees

- Alison Anastasio, Assistant Instructional Professor, Environmental and Urban Studies
- Kathleen Golomb, Project Manager, Planning and Design, Facilities Services

Graduate Student Project Leads

- Chelsea Pauga, '21 Master's of Public Policy, Harris School
- Jesse Altman, '22 Master's of Public Policy, Harris School

Strategic Advisors

- Brian Bozell, Energy & Utilities Manager, Facilities Services
- Anne Dodge, Executive Director, Mansueto Institute for Urban Innovation
- Alfredo Izguerra, Energy Engineer, Facilities Services
- Joseph Kanabrocki, Associate Vice President for Research Safety, Office of Research Safety
- Ozge Kocak Hemmat, Energy Engineer, Facilities Services
- Elaine Meyer, Content Specialist, Mansueto Institute for Urban Innovation
- Emily Padston, Executive Director, Center for Robust Decision-making on Climate and Energy Policy (RDCEP)
- James Passalano, Director of Design and Construction, Department of Physical Sciences
- Diana Petty, Associate Director, Mansueto Institute for Urban Innovation

Further Reading

Campus Forest Analysis and Recommendations

https://cpb-us-w2.wpmucdn.com/voices.uchicago.edu/dist/1/1010/files/2022/03/Campus-Forest-Analysis-2021.pdf

Lab User Engagement on Energy Savings Measures (2021)

https://cpb-us-w2.wpmucdn.com/voices.uchicago.edu/dist/1/1010/files/2022/03/EFCampus-Labs-Spring-Review_VF.pdf

University of Chicago Sustainability Plan

https://sustainability.uchicago.edu/sp/

"Campus as a Lab" RDCEP

https://www.rdcep.org/campus-as-a-lab









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