



INTRODUCING
LOYOLA UNIVERSITY CHICAGO'S NEWLY ESTABLISHED
**SCHOOL OF ENVIRONMENTAL
SUSTAINABILITY**



EXERCISING

RESILIENCE

LAUNCHING THE NEW SCHOOL OF ENVIRONMENTAL
SUSTAINABILITY DURING COVID-19



LOYOLA
UNIVERSITY CHICAGO

2019–2020 ACADEMIC YEAR

The advisory board, staff, and faculty lists reflect positions held during the 2019–2020 academic year.

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The advisory board provides professional guidance to the dean on the direction of SES—informing curricula, programs, goals, and objectives, as well as evaluating accomplishments and financially supporting SES programs including the Climate Change Conference.

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Bio-Based Technologies

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Invasive Species Ecology

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Global Sustainability Management

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Research Associate
Invasive Species Ecology

ANDREW MONKS, MS
Research Associate and Instructor
Invasive Species Ecology



DEAR FRIENDS AND COLLEAGUES:

We chose the monarch for this year's annual report cover because it epitomizes resilience and appears to be thriving during this pandemic. We, too, are thriving in a way. Though we've spent much of this year pivoting to an online environment and adjusting our operations (as you'll see in this annual report), we also have some big news to celebrate.

Loyola University Chicago has recently expanded its commitment to the environment by promoting the IES to school status: the School of Environmental Sustainability (SES). **Loyola University Chicago is the first Jesuit University worldwide to launch a flagship School of Environmental Sustainability.** Amidst uncertain times, Loyola has chosen to invest in caring for our common home and stabilizing our youth's future by developing the University's eleventh school.

At Loyola, 52 percent of incoming freshman choose us, in part, for our commitment to the environment. We are consistently ranked in the top 5 percent of green campuses in this country and were named to The Princeton Review's Green College Honor Roll this year. Loyola has made an ambitious pledge to be a carbon neutral university by 2025. Now I'm thrilled to say that our University has taken the next step in this journey by naming the new School of Environmental Sustainability. As a school, we will hire new faculty to advance knowledge and action on environmental health equity, sustainable economics and governance systems, and innovations in sustainability and renewable energy.

Ecological resilience refers to the ability of ecosystems to recover their organizational processes and structures following a disturbance. COVID-19 can be thought of as an ecological disturbance for humans, which has forced us to

think creatively, abandon our traditional routines, and adapt to functioning in a more isolated existence. It is providing us an opportunity to think about how, post pandemic, we might capitalize on those new work habits that are more environmentally efficient such as sharing more cloud-based files, eliminating hard-copy files, and reducing our transportation footprints by working remotely.

The faculty and staff of the new School of Environmental Sustainability are taking advantage of our new school status to develop a new organizational structure that will maximize interdisciplinary research collaborations around big issues such as environmental toxicology and health equity, sustainable economic and governance systems, ecosystem resilience, and clean energy. We encourage our students to help solve some of the most vexing problems of today's environmental crisis by seeing the problems through the different perspectives of the multiple stakeholders involved. Issues like biodiversity loss, climate change, and renewable energy will only be tackled through a deep understanding of the multiple disciplinary angles combined with compassion for those most highly impacted. Delivering a holistic knowledge with an eye toward the most marginalized among us is what we strive for as a School.

With gratitude and enthusiasm,

NANCY C. TUCHMAN, PHD
Founding Dean, School of Environmental Sustainability
Loyola University Chicago
www.luc.edu/sustainability

OUR SCHOOL



INTRODUCING LOYOLA UNIVERSITY CHICAGO'S NEW SCHOOL OF ENVIRONMENTAL SUSTAINABILITY (SES)

WE WERE SCIENTISTS FIRST

When IES began in 2013, our faculty was well versed in the natural science aspects of the environment. Given the enormous complexity of the climate change, pollution, and loss of biodiversity crises, we have been working to increase the interdisciplinary nature of our faculty over the last seven years.

We have hired social scientists, theologians, historians, public health experts, economists, lawyers, and business management experts into our ranks. This infusion of different perspectives on these environmental crises has led to an exciting cross-fertilization among our faculty. This expands their own understanding of these difficult issues through collaborative research and the development of interdisciplinary curricula where they learn and explore with our students.



I have found some amazing mentors and friends throughout IES, learned so much more about myself and my dedication to the environment, and feel incredibly inspired to take that knowledge into the future to make this world a better place. I felt at home in IES all four years and cannot wait to see how much more it grows in the future. THANK YOU!

Bridget Randazzo
(BS '19)

HERE'S A LOOK AT HOW FAR WE'VE COME AND OUR VISION FOR THE FUTURE

CURRICULUM

In our first two years, we only awarded degrees in environmental science and environmental studies. Now, we can boast of six undergraduate degrees, five minors, four dual degrees, three graduate certificates, and one graduate program with two tracks.

UNDERGRADUATE CURRICULUM DEVELOPMENT

6 Majors

- BA in Environmental Policy
- BA in Environmental Studies
- BS in Environmental Science
- BS Conservation & Restoration Ecology
- BS in Environmental Science: Food Systems & Sustainable Agriculture
- BS in Environmental Science: Environmental Health

5 Minors

- Environmental Action and Leadership
- Environmental Science
- Environmental Economics and Sustainability
- Sustainability Management (housed in the Quinlan School of Business)
- Environmental Communication (new 2020–2021 academic year, housed in the School of Communication)

4 Dual Degrees

- Five-Year Dual Degree with Master of Science in Environmental Science and Sustainability
- Five-Year Dual Degree with Master of Public Health
- Five-Year Dual Degree with Master of Public Policy
- Five-Year Dual Degree with Master of Business Administration

GRADUATE CURRICULUM DEVELOPMENT

Master of Science in Environmental Science & Sustainability

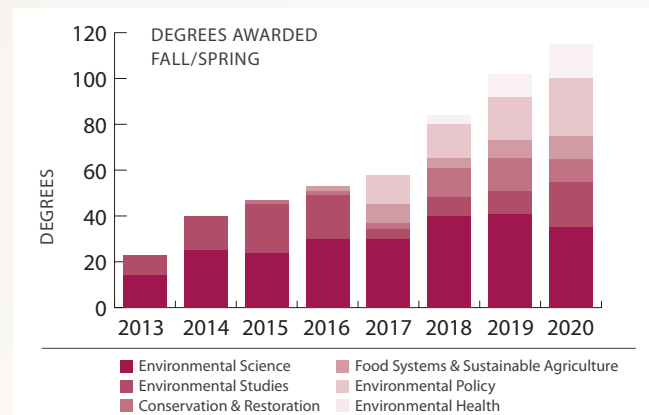
- Professional Track
- Research Track

Graduate Certificates

- Environmental Law and Policy
- Geographic Information Systems (new in 2020–2021 academic year)
- Sustainability Assessment and Planning

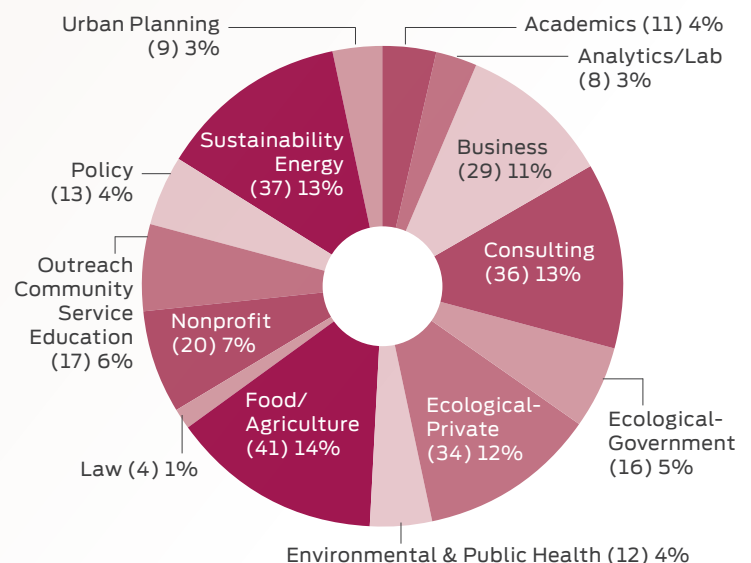
STUDENT GROWTH

Each year, more students seek out SES because of our interdisciplinary programming and academic excellence, research opportunities, internships, and the chance to make a real difference in the world. From 2013 to fall 2020, we have grown to **450** students.



OUR ENVIRONMENTAL LEADERS

Our graduates are working at nonprofits, universities, corporations, and at local, state, and federal government agencies advocating on behalf of the planet. Look below at where **287** of our alumni are making a difference.



HISTORY OF LOYOLA'S COMMITMENT TO SUSTAINABILITY

2004

Loyola President Michael J. Garanzini, SJ, embarked on an ambitious \$750 million building plan to improve infrastructure across all three campuses, with a pledge to make our campuses more environmentally sustainable. Today, Loyola's three Chicago based campuses enjoy 13 LEED-certified buildings. The campuses' energy footprint was reduced by 40 percent during this time period. This is the highest such achievement of all campuses in the Midwest.



2007

STEP (Solutions to Environmental Problems): Biodiesel Program kicked off. STEP: Biodiesel was an interdisciplinary solutions-based course where students repurpose campus waste and innovate marketable products like biodiesel, BioSoap, windshield wiper fluid, and hand sanitizer.

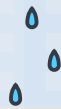
2010

Loyola purchased LUREC (Loyola University Retreat and Ecology Campus) and invested in making academic spaces for ecological teaching and research inside and outside this McHenry County campus. The campus boasts of a geothermal system and summer field courses like ornithology, restoration ecology, agroecology, and other experiential field classes.

2012

The Office of Sustainability was formed under the direction of Loyola's Director of Sustainability, Aaron Durnbaugh, and the campus baseline environmental footprint was assessed and reported.

Loyola adds sustainability literacy to the core curriculum. Today, all incoming freshman are required to take ENV5 101: The Scientific Basis of Environmental Issues, as well as one more science core course which is often an environmental science course.



2005

CUERP (Center for Urban Environmental Research and Policy) was founded with five faculty and staff.

2008

In 2008, the Information Commons was the building that started Loyola's sustainable campus transformation. The building uses 45 percent less energy than a traditional building. The building is automated and contains hundreds of sensors for temperature and wind. This building has won international recognition by sustainable architecture organizations.

2011

First year of LUREC summer field courses.





2014

The Biodiesel Lab was renamed the Searle Biodiesel Lab to honor IES and Loyola donors Michael and Nydia Searle and the Searle Family Trust.



2018

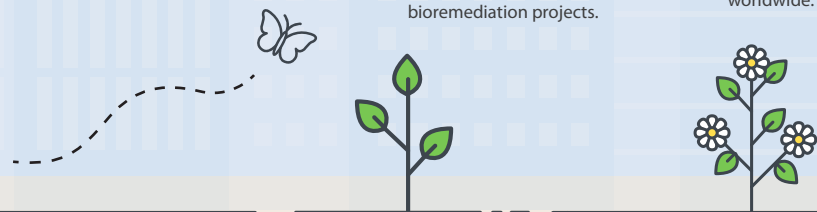
IES launches the Searle Center for Sustainable Innovations, which includes signature programs like IES's STEP, the Waste-to-Energy Programs, LUREC restoration, and bioremediation projects.

2020

Loyola University announces its biggest commitment to the environment yet by launching its new School of Environmental Sustainability.

From 2013–2020: IES grew to 28 faculty and staff and 450 undergraduate and graduate students.

This is the first School of Environmental Sustainability at a Jesuit college or university, worldwide.



2013

The novel Institute of Environmental Sustainability (IES) complex with greenhouse, aquaponics, a biodiesel lab, and the largest geothermal system in Chicago opened its doors and launched the academic IES to undergraduate students. IES was formed by Loyola combining the University's Environmental Science & Studies Department, LUREC, CUERP, and the Office of Sustainability.

IES hosts its first Climate Change Conference with keynote speaker and "Chasing Ice" Photographer James Balog.

2015

Loyola University Chicago Board of Trustees ratified the University's Climate Action Plan, which commits the University to reach carbon neutrality by 2025.

2019

First cohort of IES graduate students in the MSESS (Master of Science in Environmental Science and Sustainability).

PROJECTED & PLANNED GROWTH

2023

SES academic areas of growth focus on urgent and vexing global issues including biodiversity recovery and ecosystem functionality; social, economic, and political drivers of environmental breakdown; and the injustices of environmental toxicology and human health.

2025

Loyola's campuses reach carbon neutrality, a great achievement.

2025

SES expands its faculty and staff to 60 full-time positions and 1,200 students within these programs.



A CLOSER LOOK AT LOYOLA'S SCHOOL OF ENVIRONMENTAL SUSTAINABILITY

Within the next five years, Loyola's School of Environmental Sustainability aims to double its faculty and staff to develop interdisciplinary collaborative research teams that will focus on addressing some of the most vexing environmental problems of our century. Some of our research programs will address the following issues.



BIODIVERSITY

The billions of living species on planet Earth are currently experiencing the largest extinction in human history. This group addresses habitat loss and biodiversity through research, applied practices of conservation, restoration and habitat management, teaching, and community partnerships.

ENVIRONMENT AND SOCIETY

The intersecting crises of ecological destruction and social injustice result from environmentally neglectful economies, policies, legal systems, cultural norms, and values. This group addresses how to best understand these issues and create a more just and sustainable society.

ENVIRONMENTAL HEALTH

Industrial processes produce air, water, soil, and solid waste pollution that has overwhelmed our planet. This group addresses the impacts of toxins in the environment on natural ecosystems and humans.

SUSTAINABLE FOOD SYSTEMS

The industrial food system maximizes short-term profit over long-term sustainability. This group offers students the knowledge and skills to build equitable and resilient food systems that empower communities.

CLIMATE AND ENERGY

This group focuses on advancing energy policy and mitigation issues to shift away from fossil fuels and mitigate climate change.



SES ASSISTANT PROFESSOR RAY DYBZINSKI TEACHING HIS ECOLOGY LAB ONLINE.

RESILIENCE IN THE CLASSROOM

ONLINE TEACHING: MASTERING A CRAFT

In March of 2020, everyone in the Loyola community had their lives severely disrupted by the unexpected and vicious COVID-19 pandemic. Approximately 3,400 classes migrated online. Faculty members adjusted to their remote reality in resourceful, and imaginative ways. Some are deploying technology creatively as a means to recreate, as best they can, the actual classroom experience.

Take Ray Dybzinski, an assistant professor of ecology. In his lab course, students analyzed experiments—what influences rates of decomposition, what affects aquatic microorganism diversity—through statistical coding. In a normal semester, Dybzinski circulates throughout his room, acting as a resource for students with computational questions or concerns. Instead, Dybzinski has cleverly leaned on the breakout rooms feature of Zoom’s video conferencing software, which simulates group work and allows Dybzinski control of his students’ screens should they get tripped up.

“With coding, you can have 99.9 percent of your code right and the wrong .01 percent will kill you. Having expert eyes glance at your code really helps,” said Dybzinski. With Zoom breakout rooms, Dybzinski can do just that.

Thanks to a generous grant by the Searle Family, SES faculty were given summer stipends to develop their fall courses for online instruction. Faculty in SES met in small groups centered on experiential learning, traditional lecture-based classes, ENV5 101 (formerly UCSF 137), and lab classes.

SES faculty met in early May at a virtual retreat with the Office of Online Learning and then worked with their small groups to begin their summerlong projects. Over the course of the summer, they presented their class syllabi and online platforms to each other for peer review. They gained insight from their peers while experimenting within the new online modality. The result was a stellar set of fall classes and technology savvy they can take into their in-person classes in the future.

SES Lecturer Greg Palmer led the ENV5 101 faculty group and comments on the work done in SES to prepare for remote learning.



I know we want to have really high-quality courses available to our students, and I know that [SES] administration has put us in a position to do this. We are being supported for our efforts so that we can build the best educational experience for our students moving forward.

SES Lecturer Greg Palmer



BIODIESEL LAB MANAGER ZACH WAICKMAN PREPARES HAND SANITIZER TO BE DISTRIBUTED ACROSS CAMPUS.

RESILIENCE THROUGH COMMUNITY

Our staff have pivoted from their normal work functions to operations that ensure the health and safety of our campus. SES staff have met in (virtual) committees across campus to determine the most effective way to resume classes. We've also proudly offered our scientific expertise to help Loyola handle the COVID-19 public health crisis. Here's how Searle Biodiesel Lab Manager Zach Waickman repurposed his lab to create hand sanitizer for our campus.

HELPING HANDS: LOYOLA'S BIODIESEL LAB SHIFTS TO PRODUCING HAND SANITIZER FOR USE ON CAMPUS

BY ADAM DOSTER

THIS ARTICLE WAS ORIGINALLY PUBLISHED FOR LOYOLA UNIVERSITY CHICAGO'S WEBSITE AND HAS BEEN ADAPTED HERE.

By the end of April, Loyola University Chicago's three Chicagoland campuses were nearly and eerily vacant. So was the Searle Biodiesel Lab, the domain of lab manager Zach Waickman (BA '08, MBA '13), tucked inside SES. Waickman's hefty processor was quiet, the soap production equipment untouched. Stuck at home, he was left to consider what—if anything—he could offer to aid his community during a pandemic.

Then a few notes started trickling in from curious faculty members and staffers: What about hand sanitizer? Could Loyola produce disinfectant in bulk? After all, the University will need plenty of it when wide-scale campus operations resume, and it's not exactly cheap, or plentiful, at the moment.

Poking around the Internet, Waickman read what he calls a "mildly dangerous" amount of research and news reports on the topic. He dialed up Dean Nancy Tuchman and batted around ideas. They had the right machinery. Waickman had the time. They couldn't find a downside in trying.

"Within a week, it had exploded," Waickman says. "We had a working group that was meeting weekly, we submitted and received full registration with the Food and Drug Administration (FDA), and there was a report produced with details of how we were going to potentially pull this off."

Waickman was to take advantage of a temporary FDA policy that allowed non-traditional manufacturers to develop sanitizer, which is proven to reduce pathogens when soap and water aren't available. He would work alone, obviating the need for social distancing. He'd follow FDA guidance on ingredients, quality control procedures, and labeling requirements. And, if he put in enough sweat equity, he could produce 100 gallons each day, funneled into one-gallon jugs. Those jugs would cost \$10 to produce; on the open market, they can run up to \$30.

He could move quickly, in part, because hand sanitizer production relies on careful measuring and mixing, not a chemical reaction; that learning curve is steeper. And thanks to existing relationships with reliable vendors, Waickman could erect a supply chain for in-demand materials like ethanol and plastic bottles on the fly.

"Everything starts with sourcing," Waickman says. "You have to source it, then you have to carefully document and vet all the raw ingredients."

Once everything is stocked and the work areas and equipment are cleaned and sterilized, Waickman gets down to business. A large mixing vessel sits on a calibrated scale, and Waickman adds precise amounts in a specific order. Once added, the water-thin liquid is stirred carefully before it's fed through a filter and then into jugs. (The ethanol-based material is flammable, requiring the use of explosion-proof pumps.) Those jugs are then labeled, boxed, and palletted.

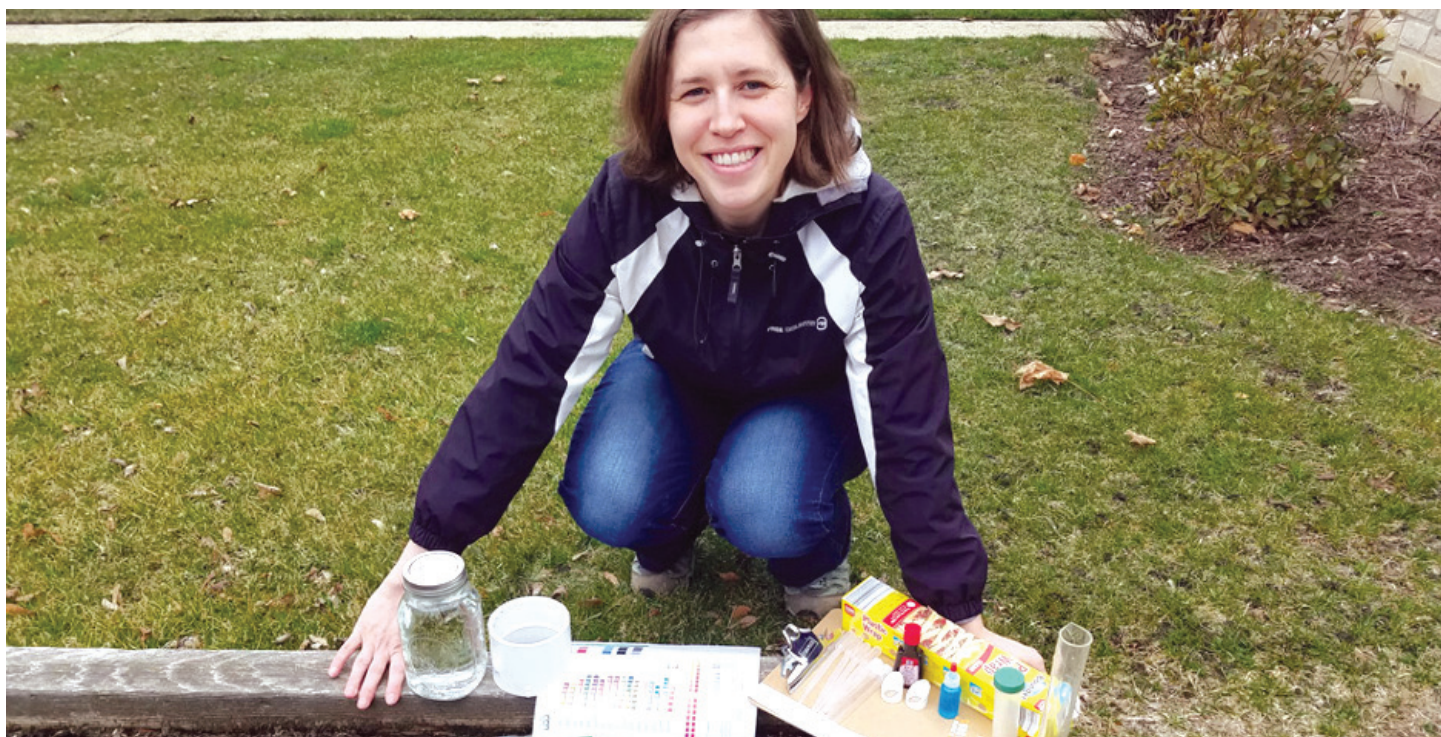
In many ways, the lab is an ideal setting in which to perform this timely work. Aside from the calibrated scales, Waickman can take advantage of the lab's high-intensity ventilation, its stainless steel vats, and its safe storage spaces. The work isn't demonstrably different, in fact, than creating alternative fuels for Loyola's shuttle buses or personal care products for Loyola's restrooms. "This is what we do, to a degree," he says.

With Waickman measuring and mixing as often as he's able, SES will ensure that Loyola has enough sanitizer to stock its three main campuses perpetually, filling dispensers and keeping them filled. The product's shelf life is three years. Discussions have already started between stakeholders across the University—Facilities, Procurement and Purchasing, Housekeeping—about how to ensure effective distribution. From there, other potential uses could arise. Spray bottles? Wet wipes? Additional staffing? Community partnerships?

On Waickman's first day back in Searle, he dressed for success—lab coat, gloves, goggles, organic vapor respirator. The pumps were running, the air compressors humming. Waickman dialed up his stereo speakers to an inappropriate volume for a Wednesday morning, a man alone in his element, using his expertise for the public good. "In the middle of it all," he says, "I might have screamed to myself inside my mask, 'God, I love my job!'"



THE NEW AND IMPROVED FOAMY BIOSOAP ALSO PRODUCED IN THE SEARLE BIODIESEL LAB.



SES LECTURER CARISSA HIPSHER WITH THE SOIL KITS SHE CREATED FOR CLASS.

RESILIENCE THROUGH TECHNOLOGY

THE NEW CLASS ZOOM

BY ADAM DOSTER

THIS ARTICLE WAS ORIGINALLY PUBLISHED FOR LOYOLA UNIVERSITY CHICAGO'S WEBSITE AND HAS BEEN ADAPTED HERE.

In mid-March it was all hands on deck for our faculty and staff as we reinvented our traditional operations. SES faculty like Carissa Hipsher rethought what it means to hold a traditional lab on a virtual platform. Read about her experience below.

Carissa Hipsher knew her “Foundations of Environmental Science” lab would be trickier to reorganize than her traditional lecture classes. In the hours leading up to Loyola University Chicago’s transition to online or virtual instruction on March 13, that lab—or, technically, the lack of one—is where she focused all her energy.

Hipsher was slated to teach her students about the environmental chemistry of soil. It’s the stuff we all walk on

every day, except when we’re cooped up at home, miles or even continents removed from Lake Shore Campus. “Initially, I was trying to think of stuff they could do from home,” she says. “I sent out a survey that had a couple of odd questions on there: ‘Do you have a place where you can dig a one-foot hole? Are you willing to put soil in your oven?’”

For 48 hours, Hipsher went on a mad scramble for supplies. She made a huge Amazon order that she picked up herself at the distribution center. (Who has time for shipping!?) She swung by Home Depot and bought an “insane amount” of PVC piping. At Target, she slid 40 bell jars into her cart. (“They must have thought I was weird.”) Back at her desk, she poured over lab manuals and blitzed Google with search phrases like “DIY soil texture test” and “make your own funnel.” (A party cup and duct tape will do the trick.)

On March 12, with time slipping away, Hipsher and her teaching assistants frantically assembled the lab kits, dumping soil samples into ziplock baggies that could be packed away in suitcases. The alternative, Hipsher admits, was “some terrible assignment of this massive data analysis,” nothing as edifying as handling the authentic material. By 5 p.m. on move-out day, all 40 of her students had come through SES to collect their care package. Hipsher caught her breath and then tried to figure out the rest.



SES GRADUATE STUDENT CARTER CRANBERG.

ENVIRONMENTAL LEADERS THRIVE HERE

SES'S MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (MSESS) PROGRAM COMPLETES INAUGURAL YEAR AMIDST COVID-19

Incoming MSESS graduate student Sam Schurkamp (BS '17) chose SES's Master of Science in Environmental Science and Sustainability at Loyola because he knew the faculty well. "I trust this faculty to provide me with a solid foundation for an academic career. I've known the research team I'm joining since my junior year and grew very interested in the sort of problems they are addressing."

One year in, another MSESS research track student Carter Cranberg has found a support system with his research advisor, Dr. Reuben Keller. Cranberg's research focuses on understanding how native and non-native crayfish are distributed throughout the Chicagoland area. He spent his summer and time in the fall of 2019 donning a pair of waders and jumping into local bodies of water with a dip-net in search of crayfish. This work gave him the foundation for a quick



Adapting to the seemingly daily changes brought on by COVID-19 has required some creative solutions to safely conduct my research, however, SES and my advisor, Reuben, have allowed me to succeed during these turbulent times. I am excited to see what results come out of the research.

Carter Cranberg

start to his field season which will run from June–September 2020. Once his fieldwork portion is complete, he will use GIS mapping and statistical software to see if any relationships become evident with the distribution of species. He's curious about how non-native species get from site to site and whether native crayfish are in abundance.

"I always encourage my masters' students to get a head start on their research during their first semester," says Keller. So last August (2019), Carter started his research right away. "Coming in we knew what his project was going to be, so he went down and sampled a bunch of sites to get a sense of how to do it. He was out there in September and October as well." It's this type of hands-on experience coupled with a supportive faculty that makes SES a unique place to pursue graduate work.

FACULTY FOCUS



DR. REUBEN KELLER AT WORK.

DR. REUBEN KELLER

KELLER'S RESEARCH FOCUSES ON STUDYING THE EFFECTIVENESS OF THE BARRIERS THAT PROTECT THE GREAT LAKES FROM AQUATIC INVADERS.

We've all heard of Asian carp. They're the invasive species of fish (several types of fish, actually) creeping up the Mississippi River and into the Illinois River toward the Great Lakes. Right now, the main defense against these invaders is an electric barrier—a series of gigantic cables emitting electrical currents into the water around the Chicago Sanitary and Ship Canal. We know the electric barriers keep the Asian carp at bay, but what about other aquatic invaders? How do they respond to the electricity or other types of barriers being developed? That's where SES Associate Professor Reuben Keller steps in. Keller is an Aquatic Ecologist who specializes in invasive species.

Some of Keller's research focuses on scud (amphipoda), which he describes as a crustacean similar to roly poly bugs. Scud is small, only a quarter of an inch long, but gets to enormous densities. Sometimes there can be tens of thousands of scud per square meter.

With the help of Loyola's Department of Physics, Keller and his research students have recreated the electric barrier system that is keeping the Asian carp at bay. Keller and his students collect scud from the Illinois River and expose them to different levels of electricity. "These guys are tough," says Keller. "What we've found is that in order to affect their behavior and to stop them from moving through the barrier, you'd need to run those barriers at three or four times the current output. That's just not possible."

Armed with this knowledge, Keller communicates his findings by collaborating with organizations that are responsible for the management of these barriers like the U.S. Army Corps of Engineers and the U.S. Geological Survey. He's also partnered with economists to ask questions about the amount of money the government should be prepared to pay to keep the next invasive species out of the Great Lakes. It's a complicated calculus that takes into consideration industries like shipping (bringing invasive species that are attached to the hull of a boat), the pet industry (transporting exotic animals), and how much slowing down these invaders will cost these industries.

Thanks to funding from the Illinois-Indiana Sea Grant, the Illinois Department of Natural Resources, and the US Fish and Wildlife Service, Keller and his team will be expanding the work they are doing with scud to a wide variety of invasive species that could pass through the Chicago Area Waterway System (CAWS). The objective of this research will be to determine the effectiveness of electric barriers, proposed future carbon dioxide barriers, and water quality barriers at deterring the passage of a wide variety of invasive species.

Keller enjoys the applied and interdisciplinary nature of invasive species ecology and hopes to develop a more complete understanding of the aquatic invaders that surround and infest the Great Lakes. "Over the course of about 25 years or so, ecologists have stopped seeing each invader as its own ecological story. Now, we've begun viewing invasive species through a more holistic lens."



There are many other invaders in the Illinois and Mississippi Rivers that could be at least as devastating as the Asian carp, and much less attention is being paid to them.

Associate Professor Reuben Keller

STUDENT FOCUS



TWO COMMUNITIES FOSTERING SUSTAINABLE SOLUTIONS AT SES

STEP: BIOGAS STUDENTS RESEARCHED LOCATIONS FOR A BIODIGESTER IN FALL OF 2019.

STUDENTS AND MICROBES

BY STEP: BIOGAS STUDENT ISABELLE BORKOWSKI '21

When SES Lecturer Greg Palmer asked me and my STEP: Biogas classmates to find space for a 175 cubic foot gas bag, he couldn't have predicted that we'd scale the side of a building with tape measures in hand. Still, on a balmy September day, we climbed a 15-foot ladder to the roof of the biodiesel lab. The gas bag is a PVC-coated, balloon-like unit that might one day become the storage area for the methane gas produced by a community of microbes. Under anaerobic conditions (without oxygen), these microbes digest organic material like discarded food scraps and paper towels to produce both methane (renewable energy) and liquid fertilizer. It is a natural and controlled process of biodigestion that takes place inside of a biodigester.

As STEP: Biogas students, we were exploring the possibilities of placing a biodigester on campus. Could Loyola create its own renewable energy source and heat its own buildings through the process of anaerobic digestion? With these questions in mind, we were encouraged to think of the course as an energy startup. On the first day of class, Palmer made this unique distinction clear to us, "I don't want to think of you as my students, but rather my coworkers." It was this degree of creative freedom that fostered lively discussion and scientific discovery within the class.

Throughout the semester, we examined scientific literature reviews, Chicago's legal code, and campus logistics to arrive at our ideal biogas generator: a research-size digester called the AD25 from Impact Bioenergy. The microbial community inside this unit would convert nearly 25 tons of organic waste each year into usable electricity and fertilizer for the Lake Shore Campus.

Our final that semester was a daunting one. We were tasked with presenting a feasibility study to Loyola President Jo Ann Rooney and her cabinet for approval. Would they agree to move this project forward? Fortunately, the presentation was a hit—everyone was excited to continue the project and the next semester of STEP: Biogas. "We had seven students from the fall semester stay as peer mentors to help lead the new group of students," Palmer said. With this momentum, spring 2020 students dove into research areas like microbiology. "I had students working on protocols to study the gas that comes out of the digester for purification and odor elimination, as well as the liquid fertilizer product for its storage and stability," added Palmer.

Then COVID-19 happened, and the program was forced to go remote. Palmer and his students brainstormed how to move this project forward from home. Students worked creatively to complete research proposals, literature reviews, and lesson plans for future students. However, the next course of STEP: Biogas will have to involve hands-on, interactive lab work. For this reason, the class has been temporarily halted until students can work safely in labs.

STARS



STUDENTS IN BRIAN OHSOWSKI'S CONSERVATION AND RESTORATION ECOLOGY CLASS AT LOYOLA'S RETREAT AND ECOLOGY CAMPUS (LUREC).

SUSTAINABLE PROGRESS

STARS (Sustainability Tracking, Assessment & Rating System) is a transparent, self-reporting framework for colleges and universities to measure their sustainability performance. STARS is a program of the Association for the Advancement of Sustainability in Higher Education (AASHE).

"Each application process for STARS, we grow leaps and bounds. This time we noticed many more of our classes are incorporating sustainability in their curriculum," said Director of Sustainability Aaron Durnbaugh.

Take a look on the next page at some University highlights from our 2020 report card.



PROGRESS TOWARD PLATINUM





LOYOLA'S STARS REPORT CARD BY AREA

ACADEMICS

85% (49/58 POINTS)

Curriculum

- 64% of academic departments offer at least one sustainability course.
- 19.5% of students graduate with a degree that has a sustainability related learning outcome in its core requirements.

Research

- 10.8% of researchers incorporate sustainability into their research.

81% of academic departments have a sustainability researcher.

SUSTAINABLE DEVELOPMENT GOALS

THE SUSTAINABILITY EFFORTS AT LOYOLA ALSO SUPPORT AND ARE ALIGNED WITH THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (SDGs).

THESE 17 ACTIONS SERVE AS A UNIVERSAL CALL TO ACTION TO END POVERTY, PROTECT THE PLANET, AND ENSURE THAT ALL PEOPLE ENJOY PEACE AND PROSPERITY BY 2030.



ENGAGEMENT

82% (30/36 POINTS)

57% of students are engaged through sustainability outreach and programs.

- Over 5,800 hours were dedicated to peer-to-peer sustainability outreach.
- All incoming students are provided the opportunity to participate in sustainability-related activities.
- 36% of students are involved in over 370,000 hours of community service.
- Student-led sustainability campaigns continue at Loyola including UnCap LUC, Plastic Free LUC, Sustainable Investment Policy, and the Green Graduation Pledge.
- 98% of all employees are reached by a sustainability program.

WE ARE PROUD TO PARTNER WITH:



OPERATIONS

65% (46/71 POINTS)

64% GHG emissions reduction from our 2008 baseline (per weighted campus user).

- 59% of students are engaged through sustainability outreach and programs.
- Loyola conducts an inventory of greenhouse gas emissions every year.
- 23% of food purchases come from plant-based foods.
- Almost 90% of the campus grounds are managed organically, without additional chemical pesticide or fertilizer.

1 GREEN GRADUATION PLEDGE CREATED BY THE STUDENT GOVERNMENT.

PLANNING & ADMINISTRATION

58% (19/32 POINTS)

- Loyola's Sustainability Committee made up of students, staff, and faculty helps guide sustainability efforts and oversee the implementation of the Climate Action Plan.
- Loyola has measurable sustainability goals for Curriculum, Engagement, Operations, and Diversity & Inclusion.

56%

complete toward our 2025 carbon neutrality goal. This is because of high-performing facilities, energy efficient projects, and purchasing clean energy.

31% energy reduction (per gross square foot) since our 2008 baseline.

- Loyola was recognized for its leadership in sustainable electronics purchasing again this year.
- 84% of students and 64% of employees use a sustainable transportation mode to commute to campus
- Loyola has reduced water use by 15.6% (per weighted campus user) from our baseline of 2008. It has reduced 21% when considering per gross square foot.

GREEN GRADUATION PLEDGE

"I pledge to reflect deeply and critically upon the social and environmental impacts of all my endeavors. I will aspire to create a just, humane, and sustainable world for all people through my work, my community, and my actions."



GRADUATE PROGRAMS

SES GRADUATE PROGRAM BY THE NUMBERS

1 Master of Science in Environmental Science & Sustainability with 2 Tracks

Professional Track

- 12 faculty spanning the academic and professional arenas teaching online courses
- Over 67 graduate level elective courses to choose from

Research Track

- 12 major areas of research expertise
- 12 credit hours devoted to planning and conducting an original thesis
- 4 elective courses providing a solid foundation for thesis research

2 Core Courses

- ENVS 401: Sustainable Systems: Natural Science Perspectives
- ENVS 402: Sustainable Systems: Social Science Perspectives

3 2020 Pathways to a Graduate Education Program

- Environmental Law and Policy
- Sustainability Assessment and Planning
- Geographic Information Systems (new in 2020–2021 academic year)

14

Student participants in Loyola's Pathways to a Graduate Education Program

16

Students starting their second year

57

incoming students for 2020

- 8 in research track
- 34 in professional track
- 15 pursuing graduate certificates

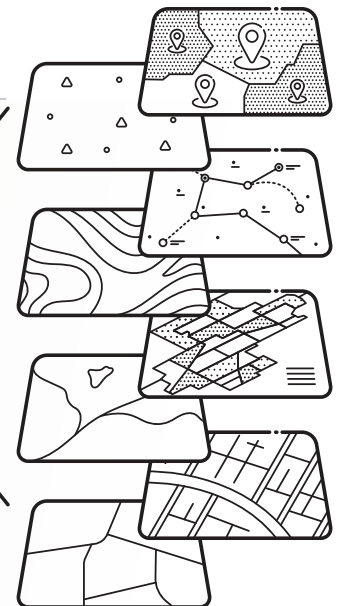
NEW GRADUATE CERTIFICATE IN GIS

In its simplest form, GIS is used for spatial modeling to represent features on the Earth. It can also be used to identify trends in the environment and society, like how many invasive species are showing up in a certain area or how much crime is occurring near parks and other green space. It's an invaluable scientific tool and SES's latest graduate certificate.

Our GIS certificate provides essential knowledge of Geographic Information Systems. GIS is a compilation of sophisticated, multidimensional software and tools used to capture, store, analyze, manage, and present geospatial data. This curriculum provides training in the concepts behind contemporary geographic mapping technology needed to solve complex geospatial problems commonly encountered in environmental sciences, urban planning, social sciences, public health, business, engineering, and many more fields.

Students will take three courses:

- Introduction to Geographic Information Systems
- Advanced GIS Applications
- Remote Sensing



SES IS ALSO DEVELOPING A GIS LAB

—a computer lab for GIS students loaded with the latest GIS software and staffed by GIS Specialist Yanning Wei.

STUDENT ACHIEVEMENT

EACH YEAR, SES HONORS OUTSTANDING STUDENT ACHIEVEMENT; THIS ACADEMIC YEAR WAS NO DIFFERENT. THOUGH OUR STUDENTS FOUND THEMSELVES FINISHING THEIR CLASSES FROM HOME, THEY ALL MADE A DEEP AND LASTING IMPACT ON OUR CAMPUS. WE ARE PLEASED TO HONOR THEIR ACHIEVEMENTS.

SENIOR HONORS

Aldo Leopold Award for Outstanding Achievement

The recipient of this award has demonstrated excellence both academically (≥ 3.20 GPA required) and service toward the greater good.

Rose Marie Mohammadi (BS '20)

Rachel Carson Award for Academic Excellence

This award goes to the SES graduating seniors who earn the highest GPA.

Rose Marie Mohammadi (BS '20)

Camilla Mae Provencher (BA '20)

Berta Isabel Caceres Flores Award for Outstanding Leadership

This award goes to the SES graduating senior who distinguished themselves through exceptional leadership.

Isabelle Sophia Abbott (BA '20)

James E. Hansen Award for Outstanding Performance in an SES Internship

This award recognizes the outstanding performance of one SES graduating senior in an internal SES internship.

Brendan Durkin Twaddell (BS '20)

Wangaria Muta Maathai Award for Outstanding Service

This award recognizes one SES graduating senior who distinguished themselves through service to others.

Maris Camille Yurdana (BA '20)

E.O. Wilson Award for Outstanding Performance in Independent Environmental Research

This award recognizes the outstanding performance of one SES graduating senior in faculty-mentored research.

Lucia Maria Siman Daboub (BS '20)

Loyola University Chicago President's Medallion

This award is given annually to Loyola's most outstanding students who excel not only in the classroom, but also in the world, and who are dedicated to helping those around them.

Kevin Patrick White (BS and BA '20)

SCHOLARSHIPS

SES LUREC Scholarship

Audrey Catherine Carberry ('23)

Michelle Claire Emmerson ('21)

Claire Rouse Foley ('23)

Rhealene Fowler ('20)

Hannah MacKenzie Hutchinson ('23)

Alexa Janczyk ('23)

Hannah E. Maher ('23)

Andrew D. Mullins ('20)

Maggie Elizabeth O'Brien ('21)

Cassidy Gale Redding ('22)

Grace M. Reilly ('23)

Daisy M. Reyes ('22)

Carson Nadine Swallow ('22)

Ben McGraw Wadman ('22)

Catherine Wassilak ('21)

Carbon Undergraduate Research Fellowship

Emily Hodge ('21)

Laura Maskeri ('21)

Maggie Elizabeth O'Brien ('21)

Vraj Patel ('21)

Undergraduate Research Fellows

Justine Nguyen ('20)

Rose Marie Mohammadi ('20)

Eve Olivia Hemingway ('20)

Lucia Maria Siman Daboub ('20)



Whatever your story may be, that passion is what brought you here four years ago to pursue your education at the Institute of Environmental Sustainability (now the School of Environmental Sustainability) and kept you going to graduate today. This passion changed from a wide-eyed love of nature to a realization that we don't have a lot of time to stop climate change. SES has helped us become deeply aware of the scale and scope of our human impact. In the last 50 years, humans made choices that damaged 10,000 years of balance with nature, and the choices that we make in the next decade will decide the outcome for the next 10,000 years.

**SES Student Commencement Speaker
Isabelle Sophia Abbott (BA '20)**



SOAR STUDENTS (STUDENT OPERATION FOR AVIAN RELIEF) PRESENT AT 2019 WEEKEND OF EXCELLENCE.

GRADUATING CLASS OF 2020

BS Environmental Science

- Eric A. Arroyo
- Evan James Baehr
- Joshua David Bonifield
- Madeleine McHale Burt
- Luca Johnson Cherubini
- Gavin Lee Chisholm
- Emma Ashley Congdon
- Mia Alexandra De La Rosa
- Eric Andrew DeBold
- Brittany Elise Degel
- Nathan Matthew Dugener
- Samuel La Russo Frederickson
- Kirsten Caroline Hammons
- Grace Catherine Keane
- Gabriela Marie Krochmal
- Khadija Shoaib Mandviwala
- Anna Terese Marr
- Kevin Raymond Matos
- Zachary M. Mills
- Rose Marie Mohammadi
- Laura Janine Orrico
- Breanna Elizabeth Plucinski
- Mackenzie Roof
- Kailin Marie Mingying Sepp
- Lucia Maria Siman Daboub
- Roshandeep Singh
- Cassandra Leigh Slattery
- Amanda E. Soukup
- Aaron J. Stefanovsky
- Olivia Nicole Sterling
- Dina B. Vavarutsos
- Zachary Robert Wheat
- Brittany Michelle Wheeler
- Matthew J. Zator

BS Environmental Science: Public Health

- Megan Olivia Barrera
- Madeline Laura Demo
- Mikayla Hunter Dixon
- Alexis Rebecca Enright
- Francesca Marie Garza
- Eve Olivia Hemingway
- Sreya Jayaprasad
- Judith April Lynd
- Anne B. McGivney
- Rebecca Page Sadorf
- Brianna Marie Siracuse
- Ann Marie Slaughter

BS Environmental Science: Food Systems and Sustainable Agriculture

- Patrick Paul Baranovskis
- Julia Kamila Jaroc
- Lauren Elisabeth Neher
- Claire H. Nusekabel
- Brendan Durkin Twaddell
- Allison Renee Watson

BS Environmental Science: Conservation and Restoration

- Christine Marie Engbretson
- Rhealene Dee Fowler
- Paul Jacob Hitch
- Mackenzie Svetlana Lanham
- Ellis David Lyles
- Kevin Patrick White
- Ana Katya Youngberg

BA Environmental Policy

- Isabelle Sophia Abbott
- Hamilton Savannah Anderson
- Ryan Bradley Anderson
- Alexandra Claire Baertschi
- Mary Dee Buerer
- Mikayla Marie Ciesil
- Arden Elizabeth Cleves
- Luke Christian Dias
- Matthew Sedgwick Fix
- Caroline Elizabeth Franks
- Madison Elise Hayes
- Madeline Christine Jamrozek
- Anna Elizabeth Jentz
- Camila Kakabadse Estupinan
- Abby Leeser
- Melissa Lobali Mboyo
- Kathleen Marie Meis
- Vanessa Paola Mora
- Kazuki Ogita
- Megan Elizabeth Piontek
- Megumi Megan Prosser
- Jeremy Philippe Ratinaud
- Mackenzie Roof
- Sydney Schultz
- Kevin Patrick White
- Maris Camille Yurdana

BA Environmental Studies

- Emma Aurora Alanis
- Alyssa G. Alcordo
- Catherine Byrne Barr
- Kayla Baum
- Andrew Joseph Baumann
- Jasmine Cerna
- Madeline Laura Demo
- Grant Joseph Gerwing
- Christopher Elliot Gideon
- Amelia Miles Howerton
- Maya Lauren Kelly
- Emma Mansfield
- Shannon Elizabeth McWeeny
- Megan Kathleen Peterson
- Camilla Mae Provencher
- John Ryan
- Alicia M. Vrabec

FINANCIAL REPORTING

GRANTS AND FACULTY PUBLICATIONS

GRANTS

- \$1,195,461 in grant funding
- 14 grants operating in this fiscal year
- 9 grant recipients
- 10 funding sources

FACULTY PUBLICATIONS

- 31 faculty publications
- 27 publication sites
- 15 SES authors
- 118 research collaborators



SES DONORS

\$100,000-\$999,999

Nydia Santos-Searle and Michael Searle

\$10,000-\$99,999

Alvin H. Baum Family Fund
Dorothy (MUND '62) and Michael Carbon, MD (BS '62)
Samantha Dwyer Zinober (BS '03) and Scott Zinober

\$5,000-\$9,999

Elaine (BS '68) and Thomas Layden (MD '69)
Walder Foundation

\$1,000-\$4,999

Anonymous
Jeanne (JFRC '75, BA '77) and Patrick Conway (JFRC '73-'74, BA '74)
EarthBeat
The Jesuit Community of Loyola University Chicago
Gaggero and Tully
Deborah and John Lahey
Eileen and Ronald Meissen, PhD
Judith (BS '63) and Gerald (MSIR '66) O'Connell
School for Field Studies
Solomon Cordwell Buenz
Nancy C. Tuchman, PhD

\$500-\$999

Consulate General of Canada
Ignatian Solidarity Network
Stephanie Kimmel and Mike Conroy
Loyola University Chicago Fellowship Office
Moller Family Foundation
Corinne Sanders
Zenwei Zhu, PhD

\$1-\$499

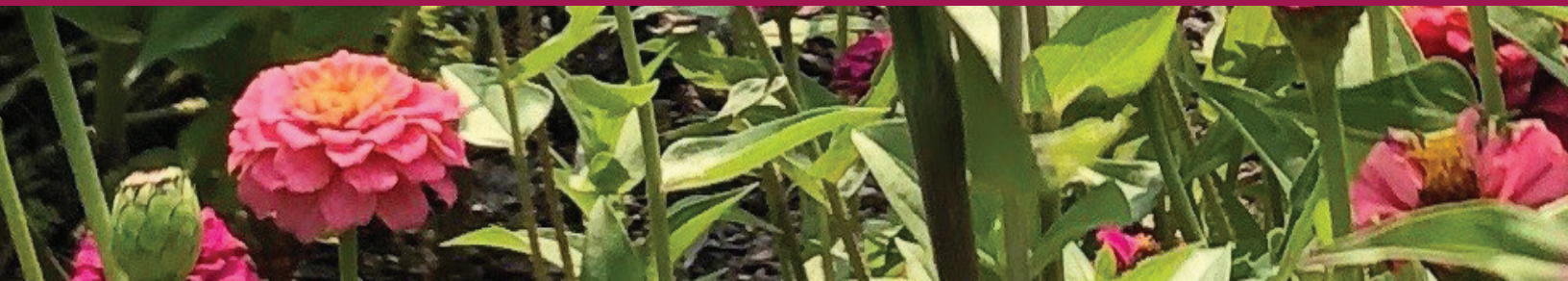
Marilyn Antonik (MEd '70)
Erin DeFrancesco (BS '18)
Carmen-Louise and Clifford Degel
Denise Du Vernay and Majed Aref (BS '17)
Johann Baniqued (BBA '02)
Belyna Bentlage (BA '12)
Sheila and David Crumrine, PhD
Devon Bank
Mary and Kyle Foley
Teresa Krafcisin (BBA '84) and Raymond Goder
Ignatian Lay Volunteer Corps
Ping Jing, PhD
Garrett Klepitsch (BS '17, BS '17)
Kathleen Klingen (MEd '82)
Michael Koob (BS '74)
Kathleen (JFRC '06, BA '07, BS '07) and Peter Kotowski (PhD '16)
Susanne Masi (BS '64)
Evangalina Mayol (MEd '74)
John McCabe (BA '16, BS '16)
Eileen (BA '70, MEd '74) and Robert Schuetz, Jr.
Sarah Scott
Margaret (MUND '70) and Bruce Sents
Maree Stewart (JFRC '09, BA '11)
Jessica Szadziewicz
Adonios Vavarutsos

Monarch photos on the cover, inside back cover, and back cover were taken by Joanie Holleb.



There is nothing in a caterpillar that tells you
it's going to be a butterfly.

– R. Buckminster Fuller





SCHOOL OF ENVIRONMENTAL SUSTAINABILITY

Lake Shore Campus

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SAVE THE DATE

Accompanying Youth to a Hope-Filled Future

Join us for a weeklong
webinar series that will
delve into how our youth
are taking action against
climate change.

MARCH 15–18, 2021

Conference topics will include a keynote conversation with youth activists followed by an intergenerational panel featuring their mentors, art as climate advocacy, the climate migrant's plight and Chicago youth activists seeking climate justice.

See [LUC.edu/climatechange](https://luc.edu/climatechange) for a complete conference schedule.