



AEES QUARTERLY



Official Newsletter of the American Ecological Engineering Society

Eleventh Edition | Fall 2024



ECOLOGICAL ENGINEERING IN ACTION

East Carolina University graduate student, Matthew Barnes, collects water samples from mesocosm floating treatment wetlands (FTWs) containing salt-tolerant aquatic plant species at NC State University’s Marine Aquaculture Research Center. His research investigates the nitrogen and phosphorus removal capabilities of FTWs from backwashed wastewater produced from recirculating aquaculture systems.

NEWS THIS QUARTER

CALL TO ACTION

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- Join or renew your membership for 2025
- Join an AEES Committee
- Submit your work to the JEED for publication
- Watch the Student Lightning Talks
- Watch the latest quarterly webinar
- Send photos and stories for EE in Action
- Donate to the OSU Fund honoring Dr. Mitsch

PRESIDENT'S MESSAGE

By Eric Roy, AEES President, Associate Professor, University of Vermont Rubenstein School of Environment & Natural Resources | eric.roy@uvm.edu



➤➤➤ GREETINGS FROM YOUR AEES PRESIDENT

As usual, I left the most recent AEES Annual Meeting feeling refreshed, inspired, and determined. I hope you all felt the same. A huge thank you to the team at Virginia Tech for hosting such a wonderful event in Blacksburg at the end of May, as well as the event sponsors and attendees. For many years, AEES gatherings and AEES members have been a huge part of my professional life. It was a tremendous honor to step into the AEES President role, which has provided me with more insight into the many important and inspiring efforts underway within AEES.

In many ways, the work of our various AEES committees is the heart of our society. We recently launched a new ad hoc AEES Communications Committee and plan to continue enhancing our outreach and web presence. This includes our newsletters, branding, website, and webinars. Updates and highlights from each committee are provided in this newsletter. I encourage anyone wanting to engage more with AEES to reach out to me or one of the [Committee Chairs](#) – there are plenty of ways you can chip in. Aside from helping to advance AEES goals, an important benefit of participation in our committees is the opportunity to build relationships with other AEES members around the country.

Mark your calendars for our next webinar by Dr. Kyle McKay, PE of the US Army Corps of Engineers' Environmental Laboratory on November 14th from 12-1 pm ET. The webinar is titled "Engineering with Nature® as a Means to Jointly Advance Infrastructure and Conservation Outcomes" ([MS Teams link](#)). This will be our second recent AEES webinar. Thanks to Dr. Fouad Jaber for his fantastic webinar in August focused on green infrastructure for flood resilience, as well as the many AEES members who attended. Recordings of past AEES webinars can be viewed [here](#). We plan to host winter and spring AEES webinars in 2025 – stay tuned for details on those!

I encourage you to consider submitting your next manuscript to our very own AEES publication, [Journal of Ecological Engineering Design](#) (JEED). Submissions to JEED are increasing and it is exciting to see the journal continue to take shape. Thank you to those who have contributed to JEED as an author, reviewer, editor, or committee member so far!

A well-known fact: students are essential to AEES. In this newsletter, we highlight the amazing work of some of our AEES student members. I think you will agree that the future of ecological engineering is bright!

We can now look forward to the **2025 AEES Annual Meeting on May 28-30 at the University of Georgia in Athens, GA**. Keep an eye out for the annual meeting website and call for abstracts in the coming months. Thank you to Dr. Brian Bledsoe and the rest of the Conference Planning Committee for the work underway to host another successful and inspiring AEES event.

Finally, a huge thank you to Brittany Santore for leading the development of this newsletter! Brittany – we greatly appreciate what you contribute to AEES.

Sincerely,

Eric Roy, PhD, PE

AEES President

Associate Professor, Rubenstein School of Environment & Natural Resources

Department of Civil & Environmental Engineering

University of Vermont

2024-2025 EXECUTIVE COMMITTEE

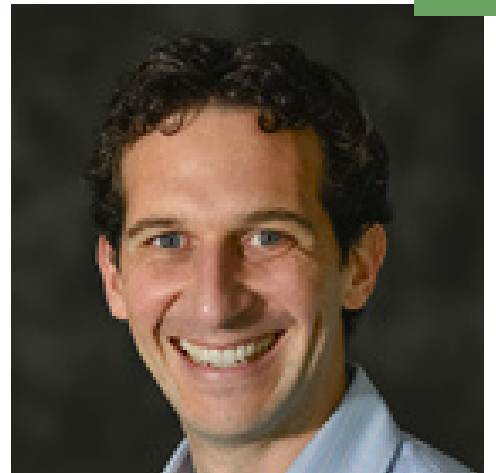


➤➤➤ PRESIDENT ERIC ROY | FULL BIO

Dr. Eric D. Roy is an Associate Professor of Environmental Sciences within the Rubenstein School of Environment and Natural Resources at the University of Vermont. Dr. Eric Roy first became involved with AEES as a Master's student at the 2007 Annual Meeting. He has now participated in twelve AEES conferences. Prior to serving as the current AEES President, he served as Vice President during 2023-2024. Dr. Roy also played a pivotal role in the launch of the society's *Journal of Ecological Engineering Design*, serving as the inaugural AEES-JEED Committee Chair. He continues to contribute to the AEES-JEED Committee, as well as the Membership and Awards Committee.

VICE PRESIDENT MAURICIO ARIAS | FULL BIO <<<

Dr. Mauricio Arias is an Associate Professor of Water Resources in the Department of Civil and Environmental Engineering at the University of South Florida. Dr. Arias chaired the Conference Planning Committee in 2023 and led the organization of the 2023 Annual Meeting in Tampa, FL. He has been an active member of the Society since 2007 when he was a graduate student at the University of Florida. Dr. Arias has been a part of the AEES Journal of Ecological Engineering Design since its inception in 2020 and now Chairs the AEES-JEED Committee. Dr. Arias also became a lifetime member 5 years ago.



➤➤➤ SECRETARY NATASHA BELL | FULL BIO

Dr. Natasha Bell is an Assistant Professor of Ecological Engineering at Virginia Tech in the Department of Biological Systems Engineering. Dr. Bell has been a member of AEES since she was an undergraduate at Clemson (shoutout to Dr. Ani Jayakaran for introducing her to the Society!). She served as AEES Student Representative during her PhD and currently serves as an active member of the AEES DEIJ Committee. This is her 2nd year as Secretary for the Society.

2024-2025 EXECUTIVE COMMITTEE

TREASURER **BILL STROSNIDER** | [FULL BIO](#) <<<

Dr. William “Bill” Strosnider is an Associate Professor and Director of Baruch Marine Field Laboratory at the University of South Carolina. Dr. Strosnider is a frequent reviewer for *Ecological Engineering* and the *Journal of Ecological Engineering Design*. This is Dr. Strosnider’s 3rd year as Treasurer for the Society. He has been an active member of the Society for 18 years and a lifetime member since 2010. As Treasurer, Dr. Strosnider ensures the financial health of the Society.



>>> GRADUATE STUDENT REP. **KYLE BOUTIN** | [FULL BIO](#)

Kyle Boutin is a PhD candidate at North Dakota State University and his research focuses on wetlands for reduction of sediment and nutrient loadings in impaired watersheds. He first became involved with AEES at the 2019 Annual Meeting in Asheville, NC. He has been a member of the Student Committee since 2022 and currently chairs that committee. As Graduate Student Representative, Kyle coordinates the monthly Student Lightning Talks, helps the Executive Committee to improve student outreach and incorporation of student focused ideas into the Society’s activities and Annual Meeting.



PAST PRESIDENT **DAVID BLERSCH** | [FULL BIO](#) <<<

Dr. David Blersch is an Associate Professor of Ecological Engineering in the Biosystems Engineering Department at Auburn University. Dr. Blersch has been a member of AEES since its earliest days, having attended the first AEES conference in 2001 as a Master’s Student from the University of Maryland. Dr. Blersch has had extensive involvement in AEES committees, shepherding the early forms of the Body of Knowledge committee, and past and current involvement on the Certified Ecological Designer (CED) committee. Dr. Blersch has served as Secretary and President of AEES. Now as immediate Past President of the Society, Dr. Blersch helps to ensure continuity for the Society and provide guidance on previous and continuing endeavors and goals, including continuing to chair the CED Committee.



HELP US HONOR DR. BILL MITSCH

➤➤➤ RUTHMARIE AND BILL MITSCH GRADUATE STUDENT SUPPORT FUND

Bill Mitsch changed the world. The disciplines of Ecological Engineering and Wetlands Science would not exist in their current form if not for his diligence, expertise, and tireless mentoring of so many scientists and engineers. To honor the incredible contributions of Dr. William J. Mitsch, several of his former students have organized an effort to create the Ruthmarie and Bill Mitsch Graduate Student Support Fund at The Ohio State University. The Fund provides research support for graduate students pursuing research in Wetland Ecology, Aquatic Ecology, and/or Wetland Restoration. We can think of no better way to honor him than to establish an endowed scholarship fund to continue to support students.

Prior to his retirement in 2022, Dr. Mitsch was Eminent Scholar, Director of the Everglades Wetland Research Park, and Juliet C. Sproul Chair for Southwest Florida Habitat Restoration at Florida Gulf Coast University. Until 2012, he was at The Ohio State University for 27 years including 20 years as Founder and Director of the Olentangy River Wetland Research Park and 15 years as Distinguished Professor in the School of Environment and Natural Resources. He authored or co-authored close to 800 research papers, abstracts, and other publications including 25 books, including the popular textbooks “Wetlands” and “Ecological Engineering and Ecosystem Restoration”. He founded and was Editor-in-Chief of the international journal Ecological Engineering for 25 years. He was AEES President from 2002-2003 and the 2004 Stockholm Water Prize Laureate. He received the first Odum Award for Ecological Engineering Excellence from AEES in 2018.

You don't have to be an OSU alum to recognize and appreciate the contributions of Bill Mitsch. If you're working in the fields of Ecological Engineering, Wetlands Ecology, or Ecosystem Restoration, you owe something to Bill. He laid the foundation for so many of us.

Please consider supporting this effort and honoring Dr. Mitsch! Any amount is appreciated!



**MAKE A GIFT TO
THE FUND HERE**



2024 ANNUAL MEETING RECAP



ECOLOGICAL ENGINEERING & DESIGN: LAUNCHING A NEW ERA

The American Ecological Engineering Society (AEES) hosted its 24th Annual Conference at Virginia Tech from May 28-31, bringing together 170 participants from academia, environmental consulting, government, and non-profit sectors. Impressively, over half of the attendees were students, many of whom attended thanks to travel scholarships funded by a National Science Foundation conference grant.

This year's conference emphasized the development of accredited Ecological Engineering [majors](#) nationwide, including at Virginia Tech. Attendees were treated to a wide range of insightful presentations, from using coastal wetlands to protect shorelines, to the sustainable design of solar farms and data centers, and enhancing habitats for freshwater mussels.

One of the most exciting aspects was the hands-on experience—conference-goers toured the cutting-edge research facilities at the [StREAM Lab](#), BSE bioprocessing labs, and the Freshwater Mollusk Conservation Center. Members of the VT Site and Infrastructure Development team also led a fascinating tour showcasing campus stormwater facilities and effective design and maintenance strategies.



Adding to the professional development opportunities, AEES offered its [Certified Ecological Designer](#) training, a professional certification program designed to equip ecological engineers with essential skills and credentials in the field.

A major highlight was the keynote address by Dr. Candice Piercy, Research Environmental Engineer with the U.S. Army Corps of Engineers Research and Development Center. Dr. Piercy's inspiring talk focused on the increased use of nature-based solutions in infrastructure design, referred to as "Engineering with Nature," across the U.S. Army Corps of Engineers and other US Federal Agencies.

Dr. Susan Sajadi, Assistant Professor in the Department of Engineering Education at Virginia Tech, led a powerful discussion on the importance of diversity, equity, inclusion, and justice (DEIJ) in engineering, and discussed opportunities for ecological engineering to be a leader in this space.

Special congratulations are in order for this year's awardees! Dr. Jay Martin received the prestigious Odum Award, and we're proud to announce that Drs. Cully Hession, Pat Kangas, Jay Martin, and Tess Thompson were inducted as AEES Fellows. A huge thank you to all the conference [sponsors](#), organizers, and volunteers—your dedication made this event a tremendous success!



2024 BUSINESS MEETING RECAP

ECOLOGICAL ENGINEERING & DESIGN: LAUNCHING A NEW ERA

This year's AEES business meeting kicked off with thoughtful opening remarks from our outgoing President, David Blersch, reflecting on a year filled with progress and collaboration. Dr. Blersch was honored to announce the results of our recent elections: Kyle Boutin has been elected as our new Student Representative, Bill Strosnider has been re-elected as Treasurer, and Mauricio Arias will serve as Vice President and President-Elect.

In an important step forward, two proposed amendments to the AEES Bylaws were approved, resulting in a redefined vision of our Core Values.

The American Ecological Engineering Society's Core Values are:

1. Integration of ecological principles into engineering practice for the mutual benefit of all people and the environment;
2. Professional development through inclusive approaches to lifelong learning, career mentoring, and certification;
3. Advancement of our understanding of ecological engineering through research and practice for environmentally just outcomes; and,
4. Education of a diverse workforce and outreach with the public and decision-makers for the betterment of all communities.

On behalf of the Society, we are pleased to report an increase in our financial reserves and the potential initiation of investments, alongside a boost in membership, with 165 total members for 2024. Updates from the seven committees were provided and are detailed in this newsletter, reflecting our collective commitment to progress and the achievements we have made over the past year. The meeting also celebrated the achievements of our students, with poster competition awards going to Katherine Porterfield, Maureen Nabulime, and Micayla Schambura, while Emily Nottingham, Taylor Vroman, and Levi McKercher received awards in the student oral competition.

Looking forward, new business included discussions around exciting new initiatives, including the revival of the student design competition and a proposal to provide upfront travel awards for students to foster greater participation. Further discussions around these initiatives will continue over the coming months. The importance of incorporating landscape architects and ecologists into the AEES mission was also highlighted, particularly in the context of ABET accreditation activities.

As we wrapped up, we officially welcomed Dr. Eric Roy as our new AEES President. Mark your calendars for next year's conference, which will take place at the University of Georgia's Classic Center in downtown Athens, GA, from May 28 to 30, 2025. Here's to another year of innovation and collaboration within our Society!



COMMITTEE UPDATES

➤➤➤ JOIN A COMMITTEE AND SEE THE IMPACT YOU CAN MAKE!

The 7 AEES Committees are always looking for members to join their ranks and help push the Society to the next level. To learn more about the roles each committee plays in the success of the Society, visit the [AEES Committees](#) page on the Society's Website or reach out to a Committee Chair for more information.

**DIEJ :
DIVERSITY,
INCLUSION,
EQUITY, &
JUSTICE**

➤➤➤ **COMMITTEE CHAIR: JOEY SMITH | SMITH.10402@OSU.EDU**

The Diversity, Inclusion, Equity, and Justice (DIEJ) committee has been collaborating with other committees and membership to amend our Society's core values. These amended core values were voted on last quarter and officially adopted at the business meeting in May. Our new core values can be found on the homepage of the [Society's website](#). We were delighted to invite Dr. Susan Sajadi, Assistant Professor of Engineering Education at Virginia Tech, to deliver a speech for our DIEJ session of the 2024 conference. We heard about DIEJ in theory, how this theory can be applied in practice, and then ideated ways our Society can build dialogue that leads to action. Our committee followed this presentation with an update on how we have been responding to the 2023 Society-wide climate survey. This quarter, we aim to establish operating procedures for our committee, continue collaborating with other committees, and synthesize the feedback we received from the 2024 conference. Our committee meetings will be held the first Friday of the month noon-12:30pm Eastern through the end of 2024, and we warmly invite you to join. Email [Joey Smith](mailto:Joey.Smith) for more information.

COMMITTEE CHAIR: MICHAEL BURCHELL | MIKE_BURCHELL@NCSU.EDU <<<

The Membership and Awards committee (MAC) received excellent applications for the 2024 AEES Odum award and the 2024 class of AEES Fellows. We selected sub-committees to review the applicants and make the selections for these prestigious awards. Dr. Jay Martin, Dr. Cully Hession, Dr. Tess Thompson, and Dr. Pat Kangas were selected to the 2024 Class of AEES Fellows. Dr. Jay Martin was also selected for the 2024 Odum Award. These awards were presented during a special ceremony at our annual meeting in May. This Fall, the 2025 call for nominations will be announced, so please start preparing to nominate candidates for next year's awards. This year we hope to make more progress creating new awards for Early Career professionals and graduate students. The committee currently meets every two months and is always searching for additional committee members. Contact [Mike Burchell](mailto:Mike.Burchell) if you have any questions or are interested in serving on this very rewarding committee.

**MAC:
MEMBERSHIP
& AWARDS**

➤➤➤ **COMMITTEE CHAIR: TRICIA MOORE | TLCMOORE@KSU.EDU**

**BOK:
BODY
OF
KNOWLEDGE**

The Body of Knowledge (BOK) Committee has had a couple of exciting advances since the annual AEES meeting. The Ecological Engineering accreditation criteria that BOK committee members developed in collaboration with ASABE, AAEEES, and ASCE were approved by the Engineering Accreditation Committee of ABET in July. These criteria will be reviewed by ABET's Engineering Area Delegates this fall and, if approved, will be available to ecological engineering programs seeking accreditation in Fall 2025. The BOK committee has also completed the majority of its review process for identifying core skills, knowledge, and abilities for ecological engineering undergraduates and aims to have a draft document outlining this body of knowledge by the end of this year. To assist the BOK committee in their work, contact [Tricia Moore](mailto:Tricia.Moore).

EDITOR IN CHIEF: SARA MCMILLIAN | JEED@UVM.EDU <<<

The Journal of Ecological Engineering Design (JEED) is the open-access journal of AEES, published in partnership with the University of Vermont Press. Visit [our website](#) or contact us at jeed@uvm.edu with any questions or to inquire about submissions. The AEES-JEED Committee is hard at work behind the scenes, meeting biweekly with the journal's Editor-in-Chief and Production Manager to plan, manage, and discuss all aspects of the journal's development. We are excited to welcome Dr. Rod Lammers, our newest committee member, who will be leading efforts to develop a policy on the use of AI in JEED publications. In terms of publications, we have already published seven papers and two editor's notes, with eight manuscripts currently under review and two papers accepted and moving into production. Additionally, we hosted a workshop for our associate editors at the end of September to ensure they are fully aligned with the journal's rules and procedures, and to maintain consistent standards for review and publication. Interested in getting involved? The best ways to contribute are by submitting your papers and signing up to become a reviewer. We look forward to your participation!

JEED:
JOURNAL
OF
ECOLOGICAL
ENGINEERING
& DESIGN

>>> COMMITTEE CHAIR: DAVID BLERSCH | DBLERSCH@AUBURN.EDU

The Certified Ecological Designer (CED) committee successfully supported the CED Workshop & Design charrette at the recent AEES meeting in May/June, having over 15 attendees from membership. The workshop (or sufficient substitute, based on application) is a requirement for application for the CED/ACED program, and future workshops are planned using the same model of integrating into future annual meetings. As always, industry practitioners, academics, students, and all others interested in certification are encouraged to register for future CED workshops and certification. The CED Committee prepares to review applications and portfolios for the current CED and ACED applicants, and is preparing to award new certifications based on those. Finally, the CED committee is involved in updating all online content regarding CED program, striving to make the program more transparent and to make the application process seamless and straightforward. Meetings are planned monthly for the upcoming cycle to support these efforts. As always, the committee is looking for representation balanced from industry, government, and academia, so new members are continuously encouraged. Please contact [David Blersch](#) if you would like to join.

CED:
CERTIFIED
ECOLOGICAL
DESIGNER

COMMITTEE CHAIR: KYLE BOUTIN | KYLE.BOUTIN@NDSU.EDU <<<

The Student Chapter Committee serves to enhance the experience of membership for students in this organization. To that end, we have recently launched a monthly lightning talk series to highlight the excellent ecological engineering research being conducted by AEES students. Our first six speakers are the award winners from this year's oral and poster presentation competitions and the first three presentations are available to view on the [Student Community Page](#) of the Society's website. These talks are open to the public, and we encourage you to attend! All talks begin at 12 pm Eastern.

STUDENT
CHAPTER
COMMITTEE

>>> COMMITTEE CHAIR: BRITTANY SANTORE | BRITTANY_SANTORE@NCSU.EDU

The AEES Executive Committee formed the ad hoc Communications Committee to evaluate the Society's brand, create new logos, and develop branding guidelines. Additionally, the committee will be working on expanding the quarterly newsletter and Society's website with additional content and improving the Society's outreach. We are meeting on the 3rd Wednesday of each month at 9 am Eastern. Contact [Brittany Santore](#) for more information. No experience required.

AD HOC
COMMUNICATIONS
COMMITTEE

STUDENT POSTER COMPETITION WINNER SPOTLIGHT

>>> KATE PORTERFIELD

Institution: University of Vermont

Department: Civil and Environmental Engineering

Degree: PhD in Civil and Environmental Engineering

Advisor: Eric Roy, PhD, PE

Poster Presentation Summary: *“Ecological Accounting and Microplastic Flow for Different Food Waste Management Strategies”* - Diverting food waste to composting and anaerobic digestion (AD) can reduce landfill methane emissions and create a more circular economy, however, eutrophication and contamination from plastic packaging pose potential tradeoffs. We used mass balance modeling and life cycle assessment to compare the climate, eutrophication, and plastic pollution impacts of current landfill-dominant US food waste management to two hypothetical nationwide organics recycling scenarios. We estimate that a national organics recycling policy could reduce the climate impact of food waste management by up to 83 and 89%, under composting- and AD-dominant scenarios, respectively. However, land application of food waste-derived composts and digestates would offset only ~1% of US mineral N and P fertilizer consumption while potentially increasing localized eutrophication risks and resulting in the accumulation of up to 1.5 ± 0.6 million t of plastic in US agricultural soils over the next 100 years.



The most exciting part of your research: The most exciting part of my research is working with stakeholders to tackle emerging challenges like microplastics contamination in organics recycling. Collaborating directly with practitioners in the field enables us to generate actionable data that can directly inform and shape policy and practice decisions.

Connections of your research to Ecological Engineering: My work focuses on systems-level ecological engineering and design, aiming to address questions like: “What is the best way to manage food waste to optimize carbon, nitrogen, and phosphorus cycling?” and “what are the potential unintended consequences of a systemic change in the way we manage waste?”

Fun fact about you: In my free time I like to garden, cook, mountain bike, and read historical fiction!

STUDENT POSTER COMPETITION WINNER SPOTLIGHT

»» MAUREEN NORAH MABULIME

Institution: University of Maryland College Park
Department: Environmental Science and Technology
Degree: PhD in Environmental Science and Technology
Advisor: Stephanie Lansing, PhD

Poster Presentation Summary: *“Assessing Municipal Solid Waste (MSW) Characteristics for Bioenergy Production within a Circular Bioeconomy”* - Projections show a significant rise in municipal solid waste (MSW) generation by 2050, making its characterization crucial for effective waste management and resource recovery. This study utilized a Quality by Design approach to analyze MSW composition, focusing on material and quality attributes important for bioenergy production. We conducted a multi-scale analysis, considering sources of waste generation and seasonal variations. Sampling was conducted from schools, restaurants, grocery stores, and landfills. Quarterly campaigns over a year assessed waste composition across seasons. Our findings indicate that food waste represents the largest component of MSW at 31%, followed by paper (18%) and yard waste (7%). Seasonal data revealed increased high-moisture organic content during spring 2023 to 2024, with moisture levels ranging from 5% to 65% and bulk densities between 220 g/L and 1120 g/L. The calorific value of the waste varied between 19 and 29 MJ/kg. Biochemical methane potential (BMP) analysis showed that restaurant waste produced the highest biogas (752 mL/g VS) and methane yields (429 mL/g VS) from single collections. Variations in methane yields highlighted the impact of waste collection strategies on energy potential. Statistical analysis indicated significant differences in energy production between different sources of waste generation highlighting the need for tailored waste management and treatment strategies.



The most exciting part of your research: The most exciting part of my work is discovering the unique waste compositions from various sources, reminding me that they all stem from human activity. Observing organic waste finding its way to landfills makes me reconsider my disposal habits and recognize the potential valuable resources like bioenergy and biofertilizers that could be recovered in the fight against climate change.

Connections of your research to Ecological Engineering: My research is connected to ecological engineering as it emphasizes the recovery of valuable resources from waste, turning potential environmental burdens into clean energy. Using waste for bioenergy supports a circular economy by closing the loop on resource use. Waste materials that would otherwise contribute to landfill pollution are transformed into energy, reducing reliance on fossil fuels and promoting sustainable practices. This aligns with ecological engineering principles by fostering systems that work harmoniously with natural processes to support environmental sustainability and resilience.

Fun fact about you: I love exploring the campus farmer's market for unique ingredients to experiment with in my cooking, which helps me connect with the community and learn about sustainable practices. I also have passion for hiking, always seeking new trails to appreciate the beauty of nature.

STUDENT POSTER COMPETITION WINNER SPOTLIGHT

>>> MICAYLA SCHAMBURA

Institution: University of Vermont

Department: Civil and Environmental Engineering

Degree: MS in Civil and Environmental Engineering

Advisor: Eric Roy, PhD, PE

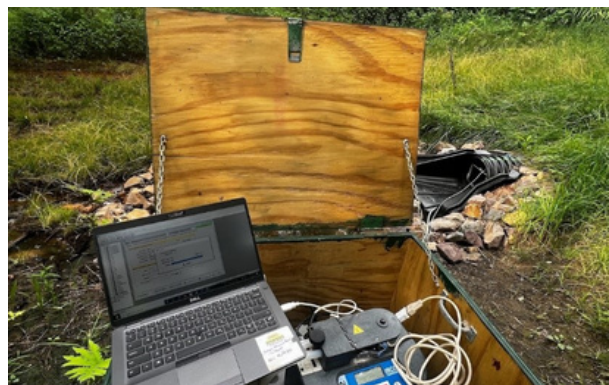
Poster Presentation Summary: *“Investigating the Net Freshwater Eutrophication Potential of a Stormwater Sand Filter through Life Cycle Analysis”* - A primary goal of many stormwater best management practices (BMPs) is to reduce nutrient loading from runoff into aquatic ecosystems. While these practices can demonstrate local

benefits to water quality in some cases, the overall environmental benefits and burdens of BMPs are infrequently assessed. The background life cycle impacts of a BMP include five stages: acquiring raw materials, transporting the materials to the construction site, construction activity, maintenance, and end-of-life treatment (e.g., landfill disposal). In some cases, the lifetime nutrient removal achieved by the system in the foreground may not exceed the embodied background nutrient emissions to the environment. In this study, two stormwater sand filters with media comprised of 95-97% sand and 3-5% drinking water treatment residuals (DWTRs) were monitored in the field to inform estimates of phosphorus load removal performance. In tandem, life cycle analysis (LCA) was conducted using openLCA to estimate the embodied freshwater eutrophication potential (FEP) for the five stages of the BMP’s life cycle, using Monte Carlo analysis to account for uncertainty. Preliminary results indicate that it is highly likely the sand filter systems enhanced with DWTRs could provide a net benefit for global freshwater sources.

The most exciting part of your research: This study was met with an unusually rainy field season, which allowed for us to obtain a lot of stormwater monitoring data in just a couple seasons! It has also opened a door to the world of stormwater design, allowing me to partake in many exciting conversations with both researchers and professionals.

Connections of your research to Ecological Engineering: My research is grounded in ecological engineering principles, focusing on stormwater best management practices that are enhanced with a waste material (i.e. DWTRs) to reduce downstream nutrient pollution. Furthermore, applying life cycle analysis to assess the benefits and tradeoffs of these systems aligns with developing sustainable strategies for protecting the environment.

Fun fact about you: My favorite pastimes include baking, cooking, reading, and traveling!



STUDENT ORAL COMPETITION WINNER SPOTLIGHT

EMILY NOTTINGHAM BYERS, PHD

Institution: USDA-ARS (Formerly University of Kentucky)
Department: Soil Drainage Research Unit (Formerly Biosystems and Agricultural Engineering)
Degree: PhD in Biosystems and Agricultural Engineering
Advisor: Tiffany Messer, PhD

Oral Presentation Summary: *“The Fate of Nitrate in the Presence of Contaminant Mixtures: A 15N Isotopic Study at the Mesocosm Scale”* - Wetland treatment systems are used extensively to mitigate surface runoff. While wetland treatment for nitrogen mitigation has been comprehensively reviewed, the implications of other contaminants of potential concern such as common-use pesticides and pharmaceuticals on nitrogen reduction remain relatively unreviewed. Therefore, this study sought to determine the impact that contaminant mixtures from urban (imidacloprid, caffeine, and PFOS) and rural (atrazine, glyphosate, and sulfate) environments have on nitrogen removal processes. Two types of constructed wetlands, floating treatment wetlands (FTW), and free water surface wetlands (FWS), were tested to determine the impact that wetland design has on treatment removal potential along with planted and un-planted controls, equating to 24 mesocosms with replicates. Six experiments were tested to determine if the contaminants of potential concern impacted nitrate removal when they appeared alone and together in various mixtures. This was followed by a 15N tracer study to determine the specific wetland processes impacted by the contaminant mixtures. Results indicate that the contaminant mixtures inhibit nitrate removal compared to the presence of each individual contaminant. Additionally, the FWS outperformed the FTW earlier in the growing season (May-June), while the FTW outperformed the FWS once the plants had matured later in the season (July-September). By understanding the impact that different types of contaminants have on nitrogen removal processes within these systems, treatment wetlands can be specifically designed to treat and manage contaminants of potential concern.

The most exciting part of your research: I have really enjoyed being able to build upon field, laboratory, and greenhouse studies to develop ecological-based treatment methods for both rural and urban communities throughout Kentucky. Another exciting part of was getting to see my research integrated in high-school curriculum and outreach projects that engaged students from across the commonwealth.

Connections of your research to Ecological Engineering: The work I did is founded on ecological engineering principles including contaminant fate and transport, biogeochemistry, and engineering design. The research was also interdisciplinary in nature and collaborated with engineers, microbiologists, forest ecologists, and ecotoxicologists.

Fun fact about you: I've recently moved to Columbus, OH and am working as a postdoctoral scholar with the USDA-ARS studying the impacts of in-field and edge-of-field management on downstream water quality.



STUDENT ORAL COMPETITION WINNER SPOTLIGHT

>>> TAYLOR VROMAN

Institution: Iowa State University

Department: Agricultural and Biosystems Engineering

Degree: PhD in Environmental Science

Advisor: Michelle Soupir, PhD

Oral Presentation Summary: *“Microbial Communities as a Pathway to Improved Woodchip and Corncob Bioreactor Design and Performance”* - Nutrient export from crop fertilizer application via subsurface tile drainage results in water quality damage and potential harm to downstream communities on a local and global scale. Woodchip bioreactors are an emerging ecological edge-of-field technology that hold great promise as an engineered denitrification system. In bioreactors agricultural water interacts with microbial communities from woodchips and corncobs resulting in nitrate removal. Bioreactors are novel technology in that these systems treat nitrate laden water in a smaller physical area. Although we know that bioreactors are an effective conservation tool, the microbial community responsible for denitrification is largely unexplored. Six upflow columns were designed to represent bioreactors in a controllable environment for monitoring of microbial communities, greenhouse gas production, and water chemistry. Three columns contained a carbon source of woodchips and three contain corncobs and were run for six months at two HRTs (8 hr, 16 hr). Preliminary data shows corncobs are more efficient at nitrate removal than woodchips at 8 h HRT; however, corncobs produced more carbon dioxide. The corncobs had a notable initial flush of TOC, potentially causing the carbon dioxide production. Additional trends were observed in ORP, DO, pH, NO₃-N, NO₂-N, and NH₄⁺ water analysis. Future analysis include analysis of water and media microbial communities relative to explain greenhouse gas production and water chemistry analyses. Further work will determine denitrifying gene presence to assist in developing an optimal performing bioreactor with minimal greenhouse gas production and increased nitrate removal rates.



The most exciting part of your research: The potential impact of my research is the most exciting to me. I love that I get the opportunity to study something that really, truly matters and is accessible to stakeholders.

Connections of your research to Ecological Engineering: Denitrifying bioreactors use the natural denitrification process in an enhanced system. We are able to manage system performance by studying various aspects of design, but still rely on the core denitrification process overall.

Fun fact about you: In my free time, I'm an avid golfer and pickleballer!

STUDENT ORAL COMPETITION WINNER SPOTLIGHT

>>> LEVI MCKERCHER

Institution: University of South Carolina

Department: Biological Sciences

Degree: PhD in Biological Sciences

Advisor: William Strosnider, PhD & Joshua Stone, PhD

Oral Presentation Summary: *"Something's Fishy Here: Considering the Role of Coastal Stormwater Retention Ponds as Habitat for Fish"* - Coastal stormwater retention ponds are designed to manage flooding and improve runoff water quality in developed landscapes; however, these ponds may also serve as habitats for aquatic organisms. The goal of this research is to characterize fish communities within several tidally influenced stormwater retention ponds located along a salinity gradient in coastal South Carolina. Nearly 3,000 individuals across 21 freshwater and saltwater taxa were collected over 18 months from these ponds which frequently experience drastic changes in salinity following high tide, hurricane, or heavy rainfall events. Species collected often and in high abundances include eastern mosquitofish, mummichog, and sailfin molly, while other species such as common snook, weakfish, black drum, and ladyfish were collected less often and in lower abundances. Additionally, seasonal variation in stormwater pond fish communities was observed. Transient fish species (those who live in estuaries for a portion of their life cycle) were only collected during spring and summer but not during fall and winter, whereas resident fish species (those who live in estuaries for their entire life cycle) were collected in every season. Further, transient fish species were often collected as small juveniles in early spring, then collected again as larger juveniles nearer the adult stage in late summer, indicating that these ponds may serve as nurseries which facilitate juvenile fish growth. Results from this study indicate that coastal stormwater retention ponds may support diverse fish communities which may influence pond water quality, nutrient cycling, and trophic ecology.

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The most exciting part of your research: Surprise wildlife sightings. Whether it be bottlenosed dolphins in estuarine creeks or American alligators in coastal stormwater ponds, I never know what I might encounter on any given field day.

Connections of your research to Ecological Engineering: Often, engineered systems are designed to provide one specific service, however additional benefits (or unintended consequences) may result. My dissertation research aims to quantify the habitat value provided by coastal stormwater retention ponds and retrofitted constructed floating wetlands, both of which are primarily designed and used for water quality improvement. Ultimately, my goal is to inform urban designers, engineers, and pond management professionals, guiding them towards multi-functional stormwater retention pond and floating wetland designs which foster diverse and healthy plant and animal communities, enhance local aesthetics, and encourage public engagement while also providing water quality improvement.

Fun fact about you: I was born and raised in South Dakota which is where I first gained an appreciation for nature. I'll never forget the first time that I swam in the Big Sioux River with carp jumping all around me.

OPPORTUNITIES TO GET INVOLVED

SPOTLIGHT ECOLOGICAL ENGINEERING IN ACTION

AEES is always looking for new stories to tell! Ecological engineering in action can happen in a variety of places -- academia, industry, locally and abroad. If you have a project to spotlight, know someone we should interview, or have interesting photos or videos, we want to hear from you. Your story could be highlighted on the AEES website, included in the AEES Quarterly Newsletter, or featured in the Journal of Ecological Engineering & Design (JEED). Next time you are in the field, lab, classroom, or conference, take some pictures and [share your experience with us!](#)

JOIN A COMMITTEE. MAKE AN IMPACT

The Society is always eager to have members serve on one of our [8 committees](#). Whether it is helping with recruitment efforts, contributing to developing our body of knowledge, or supporting our growing communication needs, there are multiple ways your efforts can make an impact at AEES. Join us!

CAREER OPPORTUNITIES

ENGINEERING MANAGER (CIVIL/ENVIRONMENTAL/ECOLOGICAL)

Ducks Unlimited - Dexter, MI - Posted 10-18-2024

ASSISTANT PROFESSOR - ECOLOGICAL ENGINEERING

University of Minnesota - Minneapolis, MN - Posted 10-17-2024

ASSISTANT OR ASSOCIATE PROFESSOR - BIOSYSTEMS ENGINEERING

Clemson University - School of Civil and Environmental Engineering and Earth Science - Clemson, SC - Posted 10-09-2024

WATER RESOURCES ENGINEER

Wildlands Engineering - Springfield, VA - Posted 10-08-2024

PHD/MS STUDENT POSITIONS

University of Kentucky Biosystems and Agricultural Engineering Department - Lexington, KY - Posted 09-09-2024

HMEI ENVIRONMENTAL FELLOWS PROGRAM

High Meadows Environmental Institute (HMEI) at Princeton University - Princeton, NJ - Posted 08-28-2024

CIVIL ENGINEERING TECHNICIAN

Ducks Unlimited, Inc. - Syracuse, NY - Posted 08-28-2024

GRADUATE STUDENT ASSISTANTSHIPS

University of Florida Agricultural and Biological Engineering Department - Urban Water Resources Engineering Lab - Gainesville, FL - Posted 04-15-2024

DO YOU HAVE A POSITION YOU WOULD LIKE TO HAVE POSTED?

Email Communications Manager, [Brittany Santore](#), with the details and the date that the post should be removed.