13th Sustainability Symposium
Thursday, March 26th, 2026
12:00 PM - 5:30 PM
Bucknell Campus

photo by Getty Images

Tree Networks: Trees as Social, Ecological, and Technical Beings

Hosted by the Bucknell Center for Sustainability & the Environment

PROGRAM WITH ABSTRACTS

March 26, 2026

Center for Sustainability & the Environment
Bucknell University

http://sustainabilitysymposium.scholar.bucknell.edu/

Table of Contents

The Sustainability Symposium celebrates sustainability and environmental related research, teaching, creative works, practice, and action where faculty, staff, students, and community stakeholders from regional institutions share their completed and ongoing works, network for ongoing or new initiatives, and are inspired by shared keynote activities. This annual meeting showcases work from the natural sciences, physical sciences, social sciences, engineering, management, and humanities exploring emerging themes such as climate change, energy, human rights, food, and resilience.

The Center for Sustainability & the Environment

The Bucknell Center for Sustainability & the Environment creates impactful, interdisciplinary, experiential opportunities for learning and research that address global and environmental challenges. By enabling collaborative scholarship from across the University, we empower students and faculty to explore, learn about, engage with and transform their world.

The Center for Sustainability & the Environment was created as the Bucknell Environmental Center in 2005 with support from about 50 faculty and staff from across the University and from students, who helped to define areas of interest. From the beginning, the center sought to create a University-wide platform capable of supporting collaborative, interdisciplinary scholarship, teaching and outreach, situating Bucknell as a national leader in applied research and teaching on 21st-century environmental and sustainability issues.

Today, the Center's three signature programs manage a network of 18 interdisciplinary field stations and sites in Pennsylvania giving students, faculty, and community partners experiential, applied research and learning opportunities that impact our local communities and beyond.

Watershed Sciences & Engineering Program
Bucknell makes the most of our proximity to the majestic Susquehanna River through the Watershed Sciences & Engineering Program. By taking the classroom outdoors, Bucknell connects people to the river and builds upon our existing strengths in science and engineering. Faculty, staff and students partner with local, state and federal organizations on watershed research, stewardship and conservation projects.

Sustainable Technology and the Built Environment Program
Bucknell's Sustainable Technology and the Built Environment Program works to build on the University's advances in sustainable technology through research, programs and projects. Using the campus as a living-learning laboratory, the program brings a collaborative, hands-on approach to a variety of topics, including climate change, renewable energy and eco-landscaping.

Place Studies Program
The Place Studies program explores how we imagine, sustain, understand, and engage with place historically, in the present, and in potential futures, and brings this to life through experiential and transformative education and scholarship. It is, at its core, about creating transformative approaches to understanding human-environment relationships, broadly defined, and over time. This includes areas such as sustainable communities, community revitalization, environmental histories, policy, environmental justice, energy transition, placemaking and place meaning, creative works with sustainability and/or environmental foci, and more.

Letter from Symposium Chair

Welcome to the 13th Annual Sustainability Symposium!

In 2013, the Center for Sustainability and Environment held its first sustainability symposium, *Envisioning a Sustainable University*. That event furthered discussions and actions that continued to push Bucknell's progress towards being a more sustainable institution. In the years since, the sustainability symposia have centered on topics including Reimagining Prosperity (2014); Imagination, Design, and Creativity (2015); Global Sustainabilities (2016); Generations of Power (2017); Climate Changes: All Hands on Deck (2018); Envisioning the Future: Energy, Climate, and Human Rights (2019); Adapting in Uncertain Times (2021); Is it Really too late?: Hope, Agency, and Change (2022); Moving from hope to action: Building thriving communities (2023), Perspectives on Sustainability (2024), and Change Makers and Community Builders (2025). Each symposium has engaged attendees in discussions furthering our understanding of human-environment interactions; showcasing projects, creative works, and research from across disciplines; and engaging practitioners and researchers in collaborative endeavors for thriving communities.

This year's Sustainability Symposium, *Tree Networks: Trees as Social, Ecological, and Technical Beings*, invites us to consider the dynamic relationships between trees, forest ecosystems, and our social entanglements. This event is part of the Weis Center's Trees Series and highlights work at the intersection of trees, data science, and sustainability.

Bucknell's campus has long been defined by its relationship to trees. In 1926, President Emory Hunt wrote, "Oak trees do not make scholars; yet they affect students. Bucknell's ancient oaks play no negligible part in the shaping of student character. They are one of those intangible influences which, united, make up the atmosphere of the real university." In the 1930s, a "Cabin Committee" searched for a wooded location to provide students with an opportunity to benefit from being in nature. What is now known as Cowan was the result of this search, purchased for $4,000 by the community - the President at the time offering $1,000 and students fundraising among classmates and parents to acquire the rest. In 1954, Weaver Pangburn reflected, "In a secluded location, individuals are brought into close contact with Nature. Cowan offers opportunities for wholesome, unsophisticated social activity, relaxation, contemplation, reverence."

Join us as we learn from national author Dr. Beronda Montgomery, author of When Trees Testify, as she uses trees to weave together black history and botanical knowledge. The event will include a panel to discuss different efforts to integrate trees into our communities and study their ecology. Following this, three different excursions are scheduled spanning tree history, tree meaning and tree data. We wrap up with a Sustainability Expo, featuring a range of creative works, research, and environmental activism; Dr. Montgomery will also be available to sign books, available for purchase through Mondragon Books, during this time.

This year, we welcome over 25 speakers/presenters representing more than 50 authors, activists, practitioners, and artists. We welcome you to learn from and inspire one another, and create new networks that nurture pathways for mutual thriving in our communities and work.

Shaunna Barnhart and Olyssa Starry
Co-Chairs, 13th Annual Sustainability Symposium

Schedule of Events

THURSDAY– MARCH 26

All events are held in MacDonald Commons

12:00 p.m. – 12:50 p.m. Keynote Address by Beronda Montgomery: ***"When Trees Testify: Learning with and from trees."*** Lunch Provided

1:00 p.m. – 2:20 p.m. ***"Tree Under Pressure: How are we doing with protecting our forests?"***

Panelists:

Leandro Bonfim - Assistant Professor of Management & Organizations
Sarah Lower - Associate Professor of Biology
John Penniman - Associate Professor of Religious Studies
Vandy Scoates - Visiting Assistant Professor of Set Design
Catherine Smith - Co-Owner Chicory Lane

Moderator:

James Shields - Panel Moderator, Professor of Comparative Humanities and Asian Thought and Faculty Director, BCSE

2:30 p.m. – 3:50 p.m. Campus Excursions:

Option #1: Tree Evolution: Dinosaurs, Bugs, and Pollen Oh My!
Option #2: Tree Data Crunching Interactive Workshop
Option #3: Tree of Peace: The History and Meaning Behind One Very Special Tree on Campus

4:00 p.m. – 5:30 p.m. Sustainability Expo and Book Signing with Beronda Montgomery, books available for purchase from Mondragon during signing
Range of research, creative works, and tabling showcasing sustainability and environment related scholarship, action and more.

5:30 p.m. Closing Remarks

Keynote Address

When Trees Testify:
Learning with and from trees

(March 26, 12:00-12:50pm – MacDonald Commons)

Photo Credit Nicolas T. Kaguri

Beronda Montgomery

Writer, Science Communicator, Research

In a cultural and personal reclamation of Black American history and Black botanical mastery/expertise, I offer lessons from the natural world shared through the science and stories of long-lived trees. I will highlight trees explored in When Trees Testify: Science, Wisdom, History and America's Black Botanical Legacy, including oak, willow, and apple. while examining my own family's personal history with enslavement and a close relationship with nature and trees.

About Beronda Montgomery:

Beronda L. Montgomery, PhD is writer, science communicator, and researcher. During 2025-2026, she is serving as the Sally Starling Seaver Fellow at the Radcliffe Institute at Harvard University. Beronda has spent 20 years in academia, most recently as Vice President for Academic Affairs/Dean (2022-2024) and Professor of Biology of Grinnell College (2022-present). Prior to that Dr. Montgomery was an endowed Professor of Biochemistry and senior administrator, including Assistant Provost of Faculty Development and Associate Vice President of Research and Innovation, at Michigan State University (2004-2022).

As a researcher, Dr. Montgomery studies how individuals perceive, respond to, and are impacted by environments in which they exist. Her laboratory-based research efforts are focused on the responses of photosynthetic organisms to external light and nutrient cues. Additionally, Dr. Montgomery pursues this theme in the context of effective mentoring and academic leadership.

Dr. Montgomery is a Fellow of the American Academy of Microbiology (2018), the American Association for the Advancement of Science (2020), the American Society of Plant Biologists (2021) and the American Society for Biochemistry and Molecular Biology (2022), as well as American Society for Cell Biology Mentoring Keynote honoree (2021). She was named one of Cell‘s Inspiring Black Scientists in America. Dr. Montgomery has received the Excellence in Diversity and Inclusion Award from the American Society of Plant Biologists (2024), Excellence in Supporting Diversity, Equity, Inclusion & Belonging from the North American Arabidopsis Steering Committee (2024), and 2023 Hutchinson Medal of the Chicago Horticultural Society. In 2025 she was named recipient of the Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM), the Nation's highest honors for mentors who work to fully develop the Nation's human resources in STEM. Dr. Montgomery is author of two books Lessons from Plants (Harvard University Press, 2021) and When Trees Testify (Henry Holt, 2026).

Panel Discussion

Tree Under Pressure:
How are we doing with protecting our forests?

(March 26, 1:00-2:20pm – MacDonald Commons)

Trees are under pressure. They are enduring pressures on their ecological ability to thrive with threats from changing climate, pressures on land use change, and disease. There are also pressures from the changing human preferences influenced by social and economic values. This then leaves humans with the ethical and moral conundrums involved in the management of these living beings. In light of this, the panel will explore the various meanings of trees under pressure and the way we value them.

Panelists:

Catherine Smith, Co-Owner Chicory Lane

Sarah Lower, Associate Professor of Biology

Leandro Bonfim, Assistant Professor of Management & Organizations

Vandy Scoates, Visiting Assistant Professor of Set Design

John Penniman, Associate Professor of Religious Studies

James Shields, *Moderator*, Professor of Comparative Humanities and Asian Thought and Faculty Director, BCSE

About Panelists

Catherine Smith, Co-Owner Chicory Lane - Catherine Smith co-owns Chicory Lane in Centre County, a 68-acre old farm now conserved to sustain the ecology and habitat value of wetlands, grasslands, pollinator fields and @ 40 acres of remnant, successional, or restored forest. A conservation easement guides the owners' land use and conservation practices.

Leandro Bonfim, Assistant Professor of Management & Organizations - Prof. Bonfim's work intersects with trees through his work with traditional communities of agroecological erva-mate producers in Southern Brazil. The erva-mate (Ilex paraguariensis) tree is a native Southern American crop that grows under the shade of another cultural touchstone of his home state, the Paraná Pine (Araucaria angustifolia) tree forests. In his work, he explores how these communities can leverage economic, cultural, and ecological institutional logics to shape the identities and memories of different peoples for promoting a more sustainable and just value chain for smallholder farming communities

John Penniman, Associate Professor of Religious Studies - Prof. Penniman's current research on the history of religion, herbalism, and pharmacology in the ancient mediterranean world includes an examination of how myths about olive trees inform the medicinal effects attributed to olive oil. Because olive oil was the most common drug substance in antiquity, the cultural meanings of olive trees played a significant role in shaping perceptions of the drug's power.

Sarah Lower, Associate Professor of Biology - Dr. Lower explores the ecology and evolution of one of nature's wonders: fireflies. Her collaborative research examines transitions in pheromone and light-based communication, the drivers of variation in firefly immune systems, and strategies for their conservation. While globally diverse, many species, from the spring-emerging Pyractomena borealis to the hardy winter firefly, rely on trees to survive and reproduce. This dependence highlights the vital role that trees play in ensuring the long-term survival of these populations.

Vandy Scoates, Visiting Assistant Professor of Set Design -Trees have always been at the core of my work, both materially and conceptually. As a theatrical set designer and scenic artist, wood is my primary medium even though my practice often involves transforming it, painting and sculpting one kind of wood to resemble another, or even to evoke entirely different materials. A great example of this is in the Theater departments upcoming musical Head Over Heels which runs March 27-30 in the Harvey Powers Theater. This ongoing dialogue with trees highlights its versatility while deepening my awareness of its inherent structures, grain patterns, and expressive potential. In my teaching, particularly in my biomimicry course, trees frequently emerge as powerful models of efficient and adaptive design. These natural systems inform not only how I think about design but also how I guide students to see materials as dynamic, responsive, and interconnected.

Moderator:
James Shields, Professor of Comparative Humanities and Asian Thought and Faculty Director, BCSE

Rooted like the trees I walk among, I hail from a long line of Irish mariners, Scottish accountants, Dutch Loyalists, and Spanish-Filipino rebels — born in Maritime Canada, educated across three continents, and perpetually drawn back to Japan, where I immerse myself in waterfalls and Buddhist anarchist movements. As a comparative humanist specializing in Asian thought, my work centers on crafting viable forms of religious humanism — merging rational philosophy with spiritual practice — to address poverty, the climate crisis, and other urgent human challenges. I build bridges across disparate eras, cultures, and ways of being, with the ultimate goal of shifting habits of mind and body to change the world. When not wandering forest paths or engaging in madcap conversations with friends and strangers, I can be found listening to tenderpunk music, studying human evolution, and imbibing Symbolist art.

Excursions & Workshops

Tree Evolution: Dinosaurs, Bugs, and Pollen Oh My!

Olyssa Starry, Center for Sustainability & the Environment, Bucknell University

Mark Spiro, Department of Biology, Bucknell University

2:30 p.m. – 3:50 p.m. Leave from MacDonald Commons at 2:30

Note: This will be a lot of walking.

Many tree species are representatives of the ancient lineages alive today. On this walk, we learn different features and life history strategies of trees on campus and question whether these may have been responses to changes in their environment -including potential dinosaur predators!

Tree Data Crunching Interactive Workshop

Kelly McConville, Dominguez Center for Data Science, Bucknell University

2:30 p.m. – 3:50 p.m. Leave from MacDonald Commons at 2:30 OR meet on site at the Data Science Center at 2:45 in Taylor Hall

Come learn how to visualize and summarize data related to trees! We will explore data on trees in Pennsylvania and on-campus using the data science software, R. No prior coding experience is required.

Tree of Peace: The History and Meaning Behind One Very Special Tree on Campus

Sid Jamieson, Cayuga Nation of the Haudenosaunee Confederacy

2:30 p.m. – 3:50 p.m. Leave from MacDonald Commons at 2:30 OR meet on site at the Peace Tree at 2:45 - the white pine in front of the KLARC.

Join Sid Jamieson of the Cayuga Nation of the Haudenosaunee Confederacy, and Emeritus Bucknell Lacrosse Coach, to learn about the history of the white pine, its meaning to Haudneesaunee, and the significance of the white pine planted in front of the KLARC.

Creative Works

Fire in the West, Seen from the East

Duane Griffin, Associate Professor of Geography, Bucknell University

During the 19th century, particulate matter injected into the stratosphere by the intense volcanic eruptions of Tambora and Krakatoa produced, among other things, startling optical effects that influenced the evolution of western art through the work of painters such as JMW Turner and Edvard Munch. For the past two decades, increasingly powerful updrafts created by increasingly and extensive and long-lived wildfires in western US and Canada have had similar effects on stratospheric aerosol concentrations and atmospheric optics. The hues and chroma of these latter dawn and dusk lightshows eerily parallel the endless stream of digital photos of the fires that create them. Since 2018, I have been documenting this aesthetic echo and what it might reveal about the wildfires' ultimate roots in climate change, resource management, consumption, energy policy, and other perversions of the relationship between the social, cultural, technological, and political economic system we depend on for our day-to-day subsistence, the planetary life support system that makes it possible, and the future of both.

Poster Presentations

Effects of Leaf Litter on Soil chemistry and Physical Conditions

Dylan Atkinson, Undergraduate Student, Bucknell University; **Olyssa Starry**, Center for Sustainability & the Environment, Bucknell University

Common yard care practices have always promoted the removal of fallen leaves, yet the ecological impacts of this disturbance on soil health and microbial activity remain unclear. A previous study examining leaf-removal effects reported no significant difference in soil carbon levels between raked and unraked conditions, but it did not evaluate other key soil properties that influence microbiome structure and function. Our project, Leaf Them Be, examines how fallen leaves' presence affects soil chemistry and physical conditions beneath different tree species. We studied three pairs of mature trees: sweet gum, pin oak, and bur oak. We removed fallen leaves from one tree in each pair while leaving the other undisturbed. For each tree, we measured soil pH, phosphorus, nitrogen, temperature, and soil compaction as indicators of nutrient cycling processes and microbiome quality. By comparing soils with raked and unraked leaves at the surface across multiple species, this study aims to determine whether fallen leaves contribute to better soil nutrients and favorable conditions in the short term for diverse soil microbiomes, or if raking leaves has no effect. Our findings will help inform sustainable lawn care practices and promote low-impact strategies for supporting ecosystem health.

Updating the City of Shamokin's Flood Insurance Rate Map

Thandeko Bango, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Bucknell Center for Sustainability & the Environment; **Alimara Cassidy**, Community Resiliency Project Coordinator, SEDA-Council of Governments; **Betsy Kramer**, Program Manager for Community Revitalization, SEDA-Council of Governments; **Brittiny Wright**, Program Assistant, SEDA-Council of Governments

Accurate mapping is essential for communities to know and understand their potential flood exposure and risk. Changes in land development, precipitation, and infrastructure can impact the probability of flood hazards. Updating flood mapping determines insurance rates and can influence the direction of development and revitalization efforts in communities. When flood maps are redrawn, communities have a period in which to appeal. However, without adequate engineering support, a community's capacity to engage in an informed appeal process can be limited. In 2019, the City of Shamokin requested that the appeal period for a revised Preliminary Flood Insurance Rate Map (FIRM) be extended due to initial lack of engineering support for appealing. This Preliminary FIRM projected a doubling of the flood plain. At the request of SEDA-Council of Governments (SEDA-COG), a Bucknell University student intern mapped potential impact of this change and a history of flood insurance claims. This information was used by SEDA-COG, on behalf of the City, to successfully request permission and funding to do a hydrology and hydraulics (H&H) study as part of the extended appeal process. With a grant of $130,000, the City hired GPI, an independent consulting engineering firm, to assess the physical hydraulics and hydrology of the city, generating a report which deemed that the original FEMA assessments were much higher than the hydrologic realities of the landscape. Their revised map showed an increase in the floodplain of about 25%, not 100%. Another student intern then created public outreach materials for residents to help explain the flood mapping process and its impact on the community. In this poster, we review the process and findings of this mapping reassessment, reflect on university-community partnerships in the process, and highlight the impact of the new findings.

Optimizing Agrivoltaics for Sustainable Food and Energy Production

Cody Busch-Weiss, Undergraduate Student, Bucknell University

Agrivoltaics offers a way to increase land-use efficiency by co-locating solar energy production and agriculture, but optimizing panel configurations requires accurate, high-resolution modeling of light distribution and crop response. This work presents a GPU-accelerated ray-tracing framework developed in Python using Taichi to simulate solar irradiance and ground-level photosynthetically active radiation (PAR) for arbitrary 3D agrivoltaic geometries. The model integrates solar geometry, weather data, and seasonal PAR accumulation to evaluate both photovoltaic energy output and crop growth potential. The framework was validated against measurements from several grid-scale photovoltaic systems across the U.S., and used to analyze multiple panel configurations for raspberry cultivation at the Bucknell farm. Results demonstrate the ability to resolve spatial PAR variability and identify configurations that improve combined land productivity.

An Air Quality Sensor Network for the Lower Anthracite Coal Region of Pennsylvania

Doug Collins, Associate Professor of Chemistry, Bucknell University; **Dabrina Dutcher,** Associate Professor of Chemical Engineering, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University

Air quality measurements are widely dispersed across rural areas. Without monitoring equipment in between the federal regulatory measurement stations, we are essentially blind to the real conditions that exist and affect the health of smaller communities. We present a sensor network designed to address the gap in air quality measurements within a geographically unique locale in Pennsylvania: the Lower Anthracite Coal Region. The network is designed as a community asset, producing data that can be used for advocacy, ongoing community development, and scientific research. We hope that the project will also enhance awareness for ways in which citizen scientists can implement environmental observing tools for actionable results.

Shaping Shamokin's Pearl St Lot

Cristian Cruz, Undergraduate Student, Bucknell University; **Shaunna Barnhart,** Center for Sustainability & the Environment, Bucknell University

Post-industrial coal communities, like the City of Shamokin, have many vacant municipal lots that serve as both neglected brownfields, posing environmental hazards, and potential sites for city renewal. This research focuses on a city-owned plot of land sandwiched between Pearl Street and a freight railroad line, which was historically used for locomotive repairs. This study attempts to determine the feasibility of converting this underutilized space into a community asset through a combination of environmental site assessment and recreational engagement. Environmental analysis using X-ray fluorescence (XRF) soil testing revealed Lead (Pb) concentrations of 205 ppm, slightly exceeding the EPA residential screening level of 200 ppm, as well as Arsenic (As) and significant Iron (Fe) deposits. These preliminary findings, coupled with the site's physical constraints, remnant concrete foundations, leftover coal ash, and overgrown vegetation, highlight the obstacles to brownfield redevelopment. To align future possibilities with community needs, a survey was distributed to 5th Ward residents to gauge attitudes toward community improvement, foraging, and green space. This research serves as a stepping stone for the City of Shamokin and the Foraging Friends organization to improve residents' well-being. By synthesizing soil health data with public opinion, this project provides a framework for navigating the legal and protective hurdles required to transform a neglected industrial brownfield into a safe, beautiful, community-led green space.

Community Attitudes Towards Solar in Kulpmont

Addison Dobson, Undergraduate Student, Bucknell University; **Shaunna Barnhart,** Center for Sustainability & the Environment, Bucknell University

As we try to transition away from fossil fuels, understanding the local attitudes toward renewable energy sources in communities is of growing importance. This study examines the perspectives of the community of Kulpmont, Pennsylvania, which is a former coal mining community. It focuses on data collected in 2025 and looks at residents' support for solar adoption in their community, their concerns, and overall views on renewable energy. Results show a broad support for solar energy and included various motivations for this support. The majority of respondents viewed renewable energy as valuable and supported the installation of solar in public spaces and for public use. However, cost remained a major barrier. These findings suggest that while residents differ in their reasons for supporting renewable energy, but they do largely agree on its importance.

Collaboration for the Future: The Role of Universities in Climate Action Planning

Zane Hensal, Undergraduate student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University

In recent years, the development of climate action plans have become increasingly popular across the world, with municipalities both big and small developing plans that work to combat energy, waste, and transportation issues. While first emerging in European nations, climate action planning has since become popular within the United States; however, issues of capacity can often restrict smaller more rural municipalities from being able to do climate planning for the future. By performing a content analysis, where all three plans were analyzed, we found places of similarities and divergence between the plans. Through a series of interviews with key members of three rural climate action plans, we discovered strengths, weaknesses, and stagnant areas of concern surrounding the development of these plans. This study seeks to understand how universities can collaborate with municipalities with resources, knowledge, and skills to develop and implement climate action plans.

Grow what you eat: Local agricultural solutions for global diets

Declan Le, Undergraduate Student, Bucknell University; **Giang Cao,** Undergraduate Student, Bucknell University; **Olyssa Starry,** Center for Sustainability & the Environment, Bucknell University

Our project explores how international students are challenged by food insecurity and scarcity. Students struggle with finding foods that are important not just for health but also for representing our culture. For example, certain ingredients can be important for holiday celebrations but difficult to procure. We are conducting a survey through the B-Eats Food Pantry at Bucknell to better understand student preferences for locally grown produce. In addition to being difficult to procure, these food crops are sometimes also difficult to grow. Some can be grown in a greenhouse but still others cannot, and additionally some species may be invasive to our region. We are looking to identify crops that both suit student needs and are going to be safe and minimally challenging to grow. If we make progress in growing crops that support students' different dietary and cultural needs, we can diversify our campus and strengthen our international community.

Undergraduate Forestry Data Science

Kelly McConville, Director, Dominguez Center for Data Science, Bucknell University; **Austin Carroll**, student, Bucknell University; **Will Lindquist**, student, Bucknell University

Come learn how you can participate in the Undergraduate Forestry Data Science (UFDS) Summer Research Program. UFDS is a collaboration between Bucknell University, Reed College, and the US Forest Service Forest Inventory and Analysis Program. Student researchers will talk about their 2025 projects and you can find out more here: https://ufds-lab.com/

Shamokin Air Quality Visualization

Shane Monoghan, Undergraduate Student, Bucknell University; **Walker Allen,** Bucknell University**; Jack Beneigh,** Bucknell University**; Max Goldzweig,** Bucknell University; **Samuel Tuffour,** Bucknell University**; Robert Lerner,** Bucknell University**; John Kirincich,** Bucknell University

The Shamokin Air Quality Visualization project is a year-long senior design project that seeks to bring access to air quality data to the Lower Anthracite Coal Region (LACR) in an attempt to engage the community by providing them with information about the air quality they are exposed to. Using data from a new sensor network that intends to fill an important gap in rural air quality measurements, the project promises to deliver a publicly-accessible website that will help keep residents of the region informed about the current air quality. The website is approaching its alpha stage, a phase of the project where collecting user feedback is critical. It has been designed with best practices pertaining to the user-interface and user-experience in mind, but any and all feedback is extremely valuable at this time and will help shape the website before its anticipated release to the public later this spring. To help improve the website, we will be seeking feedback from those in attendance at the expo.

Operational Benefits of a Residential Microgrid: Economic, Environmental, and Carbon Impacts

Anthony Nyoyoko, Master's student, Bucknell University; **Peter Mark Jansson**, P.E. Associate Professor of Electrical and Computer Engineering, Bucknell University

This project evaluates the operational benefits of a residential microgrid with emphasis on economic performance, environmental sustainability, and carbon reduction potential. The system integrates rooftop solar generation, real-time electrical monitoring through a smart power meter, and a local controller that manages household loads based on live grid and market conditions. Electrical data are logged at five-minute intervals, enabling high-resolution analysis of system behavior.

From an economic perspective, the microgrid reduces exposure to peak electricity pricing by shifting flexible loads away from high-cost hours and increasing the use of locally generated solar energy. By coordinating generation and demand more effectively, the system improves energy efficiency and reduces dependence on centralized power plants during peak demand periods.

Because peak pricing hours often align with higher marginal carbon intensity on the grid, time-based load management also creates opportunities for carbon reduction. In addition, the system demonstrates strong reliability and resilience through sustained data availability and the ability to operate in islanded mode during grid disturbances.

This work highlights how residential microgrids can serve as practical platforms for advancing sustainable, economically stable, and carbon-conscious energy systems at the community level.

Nutrient Loading Reduction Capability in Aged Green Roofs

Gabriella Santos Meltzer, Undergraduate Student, Bucknell University; **Kevin Gilmore**, Associate Professor, Civil and Environmental Engineering, Bucknell University

As climate change accelerates, intense rain events have been persistent, damaging communities in unprecedented ways. Green roofs are a type of sustainable infrastructure that has been implemented on top of modern buildings to mitigate the effects of climate change. However, the presence of nutrients important to plant life, such as nitrogen and phosphorus, in stormwater runoff can deeply damage nearby waterways through eutrophication. This research focuses on the capabilities of the four green roof test plots atop Academic East to reduce stormwater volume, how the green roof may affect nutrient loading in stormwater runoff, and how changing plant cover may affect these parameters. To do this, the green roof testing lab found in Academic East was restored and redesigned for side-by-side analysis of the test plots. Although the project could not be fully completed in one summer, it was found that the green roof, with no changes, considerably reduced stormwater volume, peak flow rate, and ammonium mass loading for one large storm event. For this same storm event, nitrate and phosphate mass loading in the runoff appeared to increase. In the future, more research focusing on the effects of changing plant cover plans needs to be done.

Zero Waste: Bucknell & Beyond

James Shields, Professor of Comparative Humanities & Asian Thought, Bucknell University; **Bailey Hansen**, student, Bucknell University; **Shiv Khubani**, student, Bucknell University; **Odilon Ligan**, student, Bucknell University; **Aditya Pudasaini**, student, Bucknell University; **Skyler Le**, student, Bucknell University

This project explores how small institutional spaces can become laboratories for rethinking waste systems. In the RCAP dinner seminar Zero Waste: Bucknell and Beyond, five students are working collaboratively to redesign two shared kitchen spaces in Bucknell's Humanities Center as near–"Zero Waste" environments. The project combines waste auditing, stakeholder engagement, and design-based intervention. Students are conducting material inventories, tracking waste streams, interviewing custodial and facilities staff, and developing practical tools such as signage, waste-sorting systems, and behavioral "nudges" to reduce disposables and contamination. Beyond technical solutions, the project asks broader questions about responsibility, labor, and institutional infrastructure: How is waste produced, and who manages it? What would it mean to redesign everyday spaces around reuse and accountability? At this table, students will share their research methods, preliminary findings, and design ideas while inviting conversation about how small-scale interventions can spark wider institutional change.

Organizations

Chicory Lane

Catherine Smith, Co-Owner, ChicoryLane; **Lauren Smith,** Communications, ChicoryLane

ChicoryLane is an ecological reserve near Spring Mills protected by a Conservation Easement held by Clearwater Conservancy. Its 68 acres are actively managed for conservation.The landscape is natural and scenic. It includes wetlands and meadows, streams, remnant and successional forests, and a grassland. This diversity of habitats is especially inviting to birds and butterflies. A system of mowed trails makes most of the property accessible to walkers.

Climate Reality Project

Sandy Fields, Chair, Climate Reality Project - Susquehanna Valley PA Chapter

Come and learn more about the Climate Reality Project here in the Susquehanna Valley. Climate Reality Project is a global organization, founded 20 years ago by former Vice President Al Gore, dedicated to raising awareness of the climate crisis and encouraging communities to take action to prepare for and mitigate effects of the crisis. The Susquehanna Valley Chapter works with communities in this area on local climate action and emergency planning, new fossil fuel project opposition, and envisioning the renewable energy future.

Epsilon Eta

Elliott Kilgallen, President; **Kayleigh Long**, student, Bucknell University; **Hallie McClure**, student, Bucknell University; **Ella Slayton**, student, Bucknell University; **Kevin Gares**, student, Bucknell University

Epsilon Eta (ENP) has been established as a student-run, environmental and sustainability-focused professional society at Bucknell University. Epsilon Eta works to find leadership, volunteer, and career growth opportunities to build professional relationships in the sustainability field that can help with post-graduate plans. We focus on empowering students to participate in sustainability efforts both on Bucknell's campus and in the surrounding communities. There is no monetary fee for joining, and we welcome any majors, any grades, and any experiences to apply to join!

Get involved in the Dominguez Center for Data Science!

Kelly McConville, Director, Dominguez Center for Data Science, Bucknell University, **Emma Button**, student, Bucknell University; **Josh Kearstan**,student, Bucknell University; **Tamim Rahman**, student, Bucknell University

The Dominguez Center for Data Science offers many opportunities for Bucknell students, faculty, and staff, to engage with data and AI. Visit our table to learn about how the Center can support you through our workshops, events, consulting opportunities, communities of practice, and collaborative projects. Current data science student fellows will also be available to tell you about their projects and experiences in the Center.

Sustainability Expo

The Sustainability Expo is a chance for students, staff, faculty, and community groups to share their work in a broad range of sustainability and environment research, action, creative works, prototypes, and more. Students are welcomed and encouraged to present their work from course projects, summer research, and even tabling with their student groups. Organizations, non-profits, and campus units are invited to table at the Expo and share their good works and opportunities for environmental and sustainability engagement as well.

A special thanks to the set-up crew for the Sustainability Expo!

Event Co-Sponsors

We thank each of the following supporters who provided funding for this event:

- Center for Sustainability & the Environment
- Comparative and Digital Humanities Program
- David Burpee Endowment
- Department of Biology
- Department of Critical Black Studies
- Department of Economics
- Department of Environmental Studies
- Department of Geography
- Department of History
- Department of Management and Organizations
- Dominguez Center for Data Science
- Humanities Center
- University Lectureship Committee

The following provided additional support:

- Weis Center for the Performing Arts
- Department of Political Science.
- Mondragon Bookstore

Conference Committee

Shaunna Barnhart, Ph.D.
Director, Places Studies Program
Center for Sustainability & the Environment

James Shields
Faculty Director, Center for Sustainability & the Environment,
Professor of Comparative Humanities and Asian Thought

Janeen Putman
Operations Director, Center for Sustainability & the Environment

Krista Smith
Office Assistant, Center for Sustainability & the Environment

Olyssa Starry
Director, Sustainable Technology & the Built Environment Program
Center for Sustainability & the Environment

Jesse Greenawalt
Event Technology Specialist
Library & Information Technology

Jeffrey Campbell
Senior Event Technology Support Specialist
Library & Information Technology

Bucknell
UNIVERSITY

Since 2005