

**28th BES Annual Meeting
October 15, 2025
Abstracts**

Oral Presentations

Does the Sycamore forest patch cool its surroundings? A bike-based air temperature investigation

Mike Alonzo, American University

Darryn Waugh, JHU; Ali Eyni, JHU; Thomas McCarty, BGS; Isabel Horst, JHU; Dexter Locke, USDA

We used bicycle-mounted air temperature sensors to measure the air cooling impact of a Baltimore forest patch. With Baltimore Green Space organizing, we setup three ride days in August and September of 2025 and 2026. Each ride lasted for at least 3 hours, with riders (mostly) continuously repeating loops on the north and south sides of the patch. Continuous riding allowed us to isolate the spatial effect of the patch on temperature from the temporal effect of changing weather. A joint space–time model separates the diurnal warming and cooling trends from a fixed spatial temperature surface. On our two best-sampled rides, grid cells adjacent to the patch averaged 0.20–0.26 °C cooler than the study-area mean, with the signal fading beyond 100 m. A spatial block bootstrap places the forest-versus-open contrast between roughly –0.35 and –0.14 °C (95% CI). Constant northwest winds confound wind direction with land cover, so a downwind cooling plume could not be tested here.

Urbanization alters mineral weathering and stream water chemistry in Dead Run watershed, Baltimore

Kehinde Bosikun, University of Maryland, Baltimore County (UMBC).

Joel Moore - Towson University, Claire Welty - University of Maryland, Baltimore County (UMBC)

Chemical weathering supplies dissolved ions and nutrients that influence water quality and biogeochemical processes that support stream ecosystem function. In urban watersheds, these natural fluxes commonly are modified by anthropogenic inputs, including de-icing salts and weathering of built infrastructure such as concrete and asphalt. In this study, we used the reactive transport model PFLOTRAN to investigate how urban inputs influence stream water chemistry in Dead Run watershed in suburban Baltimore, Maryland. First, we simulated long-term mineral weathering via natural processes for 500,000 years to identify key controlling factors of mineral weathering and baseline porewater chemistry under pre-urban conditions. The resulting mineral assemblage was then used to run 25-year and 100-year simulations under urbanized conditions, considering solute inputs associated with de-icing salt and infrastructure weathering. Model results indicate that road-salt-driven cation exchange is a key control on Mg and Ca mobilization, accounting for about 82% and 33% of the modeled Mg and Ca concentrations, respectively. Concrete weathering also appears to be an important control on Ca concentrations

and contributes to elevated alkalinity and pH. By comparing pre-urban and urban scenarios, we quantified relative contributions of natural mineral weathering and urban-associated processes to stream water chemistry. This framework provides a process-based approach for understanding how urbanization modifies critical-zone geochemistry and may influence ecological functions in Baltimore's headwater streams. This work has been supported by the NSF Critical Zone Collaborative Network.

Healthy Soils, Healthy Green Spaces

Sophia Burnett, Legacy Metals JHU

Dr. Katalin Szlavecz

Legacy Metals is a Baltimore community project measuring heavy metal concentrations in urban soils. Given Baltimore's aging housing stock, trafficked roadways, and industrial history, the city is particularly exposed to heavy metal contaminants such as lead. The objectives of this project are: 1) assess parcel-level variations in soil heavy metal concentrations, and 2) provide residents with actionable information to reduce exposure, guide land management decisions, and support environmental justice efforts. We either provide residents with free soil collection kits, or, with their permission, visit their property and collect samples directly. To date, over 150 sites have been sampled, translating to over 400 samples. Most site analyses thus far show safe levels of arsenic, cadmium, copper, and zinc. However, about 50% of samples contained moderate levels of nickel, and about 30% of samples contained lead concentrations exceeding the EPA screening level of 200 parts per million. We continue to investigate spatial trends, both on the parcel-level comparing near building soils to surrounding green spaces, and on the neighborhood-level evaluating variables such as distance to major roadways, industrial operations, land use history, and more.

The impacts of urbanization on woodland snake communities: A case study of Central Maryland

Gemma Field, UMBC

Christopher Swan, UMBC

Urbanization has been expanding globally, bringing a suite of ecological changes which can impact species' persistence. Reptiles, particularly snakes, are underrepresented in urban ecology, despite their importance to ecosystem health. This study aims to evaluate how urbanization affects snake communities in Maryland. We are using coverboards, visual surveys, and wildlife cameras to detect snakes at forested sites across an urbanization gradient. This study is ongoing, but urban sites are producing higher detections, possibly due to higher resource concentration. Preliminary results suggest higher species abundance, and lower evenness and richness in urban sites. 10 species have been detected, of which 6 were detected at urban sites. These findings indicate that urbanization may be impacting snake communities, which is important for determining where and how to focus conservation efforts. This research will contribute knowledge on how urbanization affects snakes, which can be used to guide sustainable development and land management decisions.

Synthesis of long-term BES water quality data

Peter Groffman, City University of New York.

The Baltimore Ecosystem Study (BES) established eight long-term watershed monitoring stations along an urban-rural gradient that capture the integrated influence of the biological, physical, built, and social aspects of urban ecosystem structure. Since 1998, continuous data on stream stage and discharge as well as weekly water samples for analyzing nitrate, phosphate, total nitrogen, total phosphorus, chloride, sulfate, turbidity, temperature, dissolved oxygen, and pH have been collected. In this talk we ask; “is water quality improving? Has delivery of nitrogen and phosphorus to Baltimore harbor declined? How has climate change, especially extreme events affected water quality? How have efforts to improve the management of salt and fertilizer and changes in atmospheric chemistry affected water quality. While there have not been marked improvements in water quality over the past 25 years, for multiple reasons, our data suggest that efforts to improve water quality have had positive effects on a very challenging problem.

Resilience Assessments for Maryland's Communities: Past and Future Work

Katie May Laumann, University of Maryland Center for Environmental Science (UMCES).
Conor Keitzer (UMCES)

We will present and seek feedback on a new project- the assessment of Maryland’s resilience to natural- and human-caused hazards. Our project approach is community-centered; we will work with communities as well as researchers, subject-matter experts, and decisionmakers throughout this project. We view those people on the ground, experiencing vulnerabilities and the results of climate (and other) hazards, to have valuable information and experiences. This information must be incorporated into decision-making in order to make resilience efforts as relevant and impactful as possible. We have honed our community-driven approach by conducting assessments of climate resilience and vulnerability at three scales in Maryland: the coastal zone, the county scale (Charles County), and in two communities (Pine Street in Cambridge and Eastport in Anne Arundel County). We will present on the methods and results of this work, and the insights it brings to our new project. Now, we seek to bring lessons learned to Baltimore in order to ensure the county and city are fully represented in the work we’re embarking on.

Learning from STEW-MAP: Adapting a Territorial and Relational Approach to Social Action in Northern France

Fellag Lucas, Nord Federation - Secours Populaire Français
Belin Hyacinthe

This 8-minute presentation will use the attached support document as a visual guide. Pages 2–6 will be reviewed briefly to introduce the Nord Federation of Secours populaire français, its territorial network, and why STEW-MAP is relevant to our work. The main focus will be the final section, where we explore how a territorial and relational approach could be adapted to

social action and what this raises around networks, trust, reciprocity, data governance, and shared value. The presentation ends with three open questions intended to support discussion rather than seek definitive answers. A short online form will also be available for participants who wish to share additional reflections voluntarily.

Comparing the growth and physiology of street and park trees in Baltimore

Stella Marti, Johns Hopkins University.

Meghan Avolio (Johns Hopkins University), Nancy Sonti (US Forest Service) Beatriz Shobe (JHU)

Intentional tree planting and maintenance decisions may enhance urban forest productivity and function, but will require knowledge of tree species responses to high environmental variability across urban sites. For this study, we focused on four common species– *Quercus alba*, *Cercis canadensis*, *Acer rubrum*, and *Liriodendron tulipifera*– to examine how tree site type (street vs. park) and environmental factors affect tree growth and physiology (stomatal conductance and chlorophyll fluorescence). We found that park trees grew significantly more than street trees, regardless of species. We also found that soil moisture was higher in parks than in street tree pits, and was the primary driver of stomatal conductance. Stomatal conductance varied, with different species showing site type effects, temporal effects, or interactive responses. We found that responses of Φ_{PSII} (effective quantum yield of photosystem II) varied by species. Ultimately, this study contributes to the understanding of species-specific responses in urban systems.

Transatlantic exchanges on remediating and restoring polluted soil for urban agriculture

Regis Maubrey, Greenway international.

Nathalie Lombard, UMBC

How can industrial-legacy regions across the Atlantic learn from each other's environmental issues and adaptation strategies? This presentation introduces the rich possibilities for transatlantic exchanges between Baltimore-DC, USA, and the Lille-Roubaix area, France. Despite geographic distances, entities in both territories share comparable visions for aligning social justice with environmental policy, research, and grassroots action. History of these transatlantic efforts will first be presented with examples of how the respective organizations (non-profits, administrations, research institutions) are dealing with their local social-environmental and climatic issues. An ongoing research exchange to support urban agriculture will then be presented, with shared knowledge on tools and remediation strategies to achieve healthy soil by 2050.

Birdsong and extreme heat: landscape and trait-dependent responses

Justin Nowakowski, Smithsonian Environmental Research Center.

Aidan Kirchgraber, Shelley Bennett (SERC)

Bird populations in cities face greater thermoregulatory challenges than their suburban and rural neighbors, as urban heat island effects exacerbate temperature extremes under climate change.

An open question is whether expansion of urban green spaces through forest restoration and tree planting can help maintain biodiversity, in part, by increasing ecological resilience to these temperature extremes. Here, we measured changes in avian vocalization behavior during and after extreme heat events at urban sites in Baltimore and Annapolis and at exurban sites in Edgewater, MD. We assessed the importance of forest canopy in these contrasting landscapes for temperature buffering and explore traits associated with varied responses of common bird species to extreme temperature events.

Nature Bridges

Gabriel Pickus, Baltimore Forest School.

Nature Bridges West Baltimore connects schools, parks, and faith institutions into walkable stewardship corridors, beginning with Belmont Elementary and Bard High School Early College. This presentation shares the past year's Baltimore Forest School story: the 2026 COBOR City Council resolution and the advocacy it's driving, anti-dumping policy, outdoor pre-K expansion, a future Druid Hill Park nature center, citywide canopy and tree-maintenance standards, water cleanliness and consent decree advocacy, and the Gwynns Falls State Park Master Plan. We'll walk through the first two Nature Bridge site designs, Temple X's Garden of Eden project, off-grid water systems and environmental monitoring for faith institutions, paired with a digital sign for food giveaways, community services, and emergency announcements in grid-down situations, and the NextGen Foresters teen certification pipeline. As restoration begins, we need BES's help establishing baseline ecological research and documenting these landscapes' real story before, during, and after.

Network Brokers to Facilitate Knowledge Coproduction in Community Forestry: Implementing Maryland's 5 Million Tree Initiative in Baltimore

Michele Romolini, Loyola Marymount University Center for Urban Resilience
Isabel Torres, Loyola Marymount University Center for Urban Resilience, Jaline McPherson, The Nature Conservancy Baltimore Program, Isaac Hametz, The Nature Conservancy Baltimore Program, Ralinda Wimbush, Women of Color Outdoors, Courtney Morgan, Studio for Collaboration, Research and Design, Varun Gole, Studio for Collaboration, Research and Design

While Maryland's 5 Million Tree Initiative (5MT) includes planting 500,000 trees in urban and underserved areas by 2031, planting rates in urban areas are currently insufficient to meet that goal. Existing research identifies that trusted, local community groups can help overcome barriers to urban forestry participation through culturally responsive approaches and existing social ties. In Baltimore, community groups may not have the resources or capacity to access 5MT's annual tree planting grant programs, and alone these groups are unable to implement at scale. This talk will describe how The Nature Conservancy (TNC) developed a strategy in Baltimore centered on network science. Rather than acting as a direct community group, TNC adopted the role of a network broker and boundary organization, actively facilitating relationships and knowledge coproduction related to the implementation of 5MT. To bridge the distance between state agencies and community groups, TNC partnered with trusted intermediary "connector" organizations to lead outreach and recruitment of groups interested in planting trees

in their neighborhoods. Through a series of engagements designed to learn participants' priorities and place-based expertise, TNC worked to create technical resources reflecting the local context. Then, in community design workshops, participants utilized these co-created resources to develop tree planting plans and proposals for 5MT grants. Early evidence suggests that this networked approach successfully facilitated relationships and made urban forestry more accessible. The process of engagement, capacity building, and technical assistance allowed for new community groups to prepare grant applications for projects collectively benefitting over 30,000 people in Baltimore. Interviews with partner organizations indicate that meeting residents "where they are" and prioritizing storytelling alongside technical data builds essential trust and local capacity. This work has broader implications for how strategic network brokers can catalyze policy implementation by increasing the two-way flow of knowledge between public agencies, research, and practice.

Coffee as Conservation: Connecting Baltimore to Bird Friendly Landscapes

Yemi Seriki, Sagro Farms - Baltimore Forest School

What does a cup of coffee in Baltimore have to do with a forest in Central America? More than we might imagine. Sagro Farms uses coffee as a bridge between communities, working landscapes, and conservation across borders. This presentation explores Sagro's work as farmers and partners with coffee-producing communities to advance Smithsonian Bird Friendly practices that protect tree canopy and habitat for migratory birds traveling between North America and coffee-growing regions. Just as importantly, we examine how those global conservation efforts can create meaningful local connections. In Baltimore, Sagro brings organic and Bird Friendly coffee into community spaces, creating opportunities to connect everyday coffee consumption with broader conversations about biodiversity, sustainable agriculture, and the communities responsible for producing it. The presentation offers a practical model for connecting ecological stewardship, agricultural livelihoods, and urban communities through something millions of people already encounter every day: their morning cup of coffee.

Co-producing sustainable built environments in AI era: Integrating traditional knowledge systems into green building rating standards to advance the Sustainable Development Goals (SDGs)

Archana Sharma, Morgan State University

Kirsten M. Leong, College of Social Sciences, University of Hawaii, United States Geological Survey, United States, Jagath Munasinghe, Department of Town & Country Planning, University of Moratuwa, Chartered Architect, Sri Lanka, Joseph P. Brewer II, College of Liberal Arts & Sciences – Indigenous Studies, University of Kansas, Esther A. Obonyo, School of Engineering Design and Innovation, Pennsylvania State University

Sustainability standards built on narrow, technocratic knowledge bases produce narrow, technocratic outcomes—a risk amplified at unprecedented scale in the AI era. While the US-based Leadership in Energy and Environmental Design (LEED) and India's Green Rating for Integrated Habitat Assessment (GRIHA) have established foundational frameworks for sustainable buildings, their effectiveness is increasingly questioned: the United States and India

rank 44th and 99th respectively on the United Nations SDG Index, revealing a significant performance gap between certification and genuine sustainable development. Through a systematic review of 244 articles, filtered to 45 with most cognate narrative, the paper argues that the gap reflects a failure of co-production, specifically, the systematic exclusion of traditional knowledge systems (TKS) from the design and governance of rating standards. Drawing on Wyborn et al.'s 2019 typology of co-production modes and empirical evidence from other experts, we examine how select Native American design principles & Mandala Urbanism offer theoretically grounded, practically actionable pathways to improve LEED & GRIHA. We propose 4 pathways: framing standards in TKS-indigenous wisdom, alignment with SDGs, indexing seven-generation resilience, & recording lessons from failure, while also arguing for co-production of green building rating systems with traditional knowledge holders to make the AI-enhanced assessments epistemically rigorous.

The interplay of interannual climate variability, genetic relatedness, and site type on urban tree growth and mortality

Beatriz Shobe, Johns Hopkins.

Meghan Avolio (JHU) and Nancy Sonti (Forest Service)

Urban trees are critical green infrastructure, yet how cultivar identity shapes growth and survival remains poorly understood. We tracked growth and mortality of 500 urban *Acer rubrum* and *A. platanoides* trees over five years (2021–2025) across a heterogeneous urban matrix in Baltimore, Maryland. Using microsatellite genotyping, we distinguished cultivars, wildtype individuals, and hybrids, then used phylogenetic signal metrics and variance partitioning to assess contributions of lineage and site conditions to growth. For *A. rubrum*, growth varied little by site type, but a significant phylogenetic signal emerged, intensifying during the 2024–2025 drought. For *A. platanoides*, growth varied more by site type, with slower growth in parks, while phylogenetic signal was weaker, reflecting limited differentiation in this invasive species. Mortality was low overall, driven by anthropogenic factors in developed settings and disturbance in forests. These findings show lineage and climate interact to shape urban tree performance, informing cultivar selection.

Co-producing urban silviculture: a stone soup approach to transdisciplinary science

Nancy F. Sonti, US Forest Service

J. Morgan Grove (Yale University), Max R. Piana (Harvard University), Richard A. Hallett (US Forest Service), Michael S. Martin (Stillmeadow), Yorell Tuck (Stillmeadow)

Urban forest patches on private or community land are often overlooked but are critical green spaces providing opportunities for transformative connections between humans and wild nature for local communities and ecosystems. Urban silviculture is an emergent land management practice that is best achieved as a transdisciplinary science, incorporating the knowledge and work of scientists, land managers, landscape designers, policymakers, and local residents to define problems, set long-term goals, build partnerships, and realize solutions. The case study of Stillmeadow PeacePark illustrates the potential for transdisciplinary co-production of urban silviculture in the USA and more broadly. This approach offers new insights into fundamental

social-ecological processes and can address press and pulse disturbances at multiple scales. Developing community-driven transdisciplinary science can be a way to create opportunities for restoration work in communities that have historically been excluded from financial investment and technical services.

Evaluation of pollutant removal effectiveness of stormwater facilities using high-frequency water quality sensors

Claire Welty, UMBC/CUERE and CBEE.

Mary McWilliams, UMBC; Andrew Miller, UMBC; Jack Malone, UMBC; Robert Bathurst, SmartSWM

We have instrumented inlets and outlets of three stormwater management facilities in Dead Run watershed with high-frequency sensors to estimate load reduction of total nitrogen, total phosphorus, and total suspended solids. Under Maryland requirements, pollutant removal effectiveness must be demonstrated using laboratory analysis of grab samples spanning entire storms, which can be challenging to collect. We aim to demonstrate correlation of TN, TP, and TSS in grab samples to relevant sensor data, such that sensor data can be used to estimate pollutant removal. In addition, we will be installing SmartSWM Continuous Monitoring and Adaptive Control technology in 2027 to test the hypothesis that CMAC can be used to enhance pollutant removal. Instrumented facilities include one wet pond and two extended-detention dry ponds upgraded with gabion sand filters. Sensor data include specific conductance, temperature, turbidity, nitrate, and discharge. Initial results will be presented. This work is supported by Chesapeake Bay Trust.

Poster Presentations

The Baltimore City Canid Project

Nicole Barbour, Towson University.

Nicole Barbour, Alyssa Cruz, Madelyn Clayton, Stella Ward, Toluwani Idowu, Harald Beck, Towson University

Canids such as coyotes (*Canis latrans*) and foxes (red, *Vulpes vulpes*) have adapted to survive and even thrive in urban areas, but potentially at the cost of altered inter-specific interactions and exposure to various risks. We present preliminary findings from a novel project in Baltimore City, MD, which uses seasonal deployments of non-invasive camera traps in green spaces across the urban gradient to determine the diversity, abundance, and activity patterns of wild canids. Our first season of data (Apr-May, 2026) found that red foxes had a broad occurrence across the City and the highest abundance ($n = 249$) relative to coyotes ($n = 7$), which occurred mainly in northern areas. Results further suggest coyotes are limiting their activity to nocturnal hours, possibly in avoidance of humans and domestic dogs, whereas red foxes are occurring throughout the day. Future data collection is needed to support canid management in the state.

Investigating architectural design syntax of energy efficiency: Preliminary Research on courtyard buildings and thermal comfort

Namrata Dhobekar, Morgan State University.

Dr. Archana Sharma, Morgan State University

Courtyards are widely used for their energy-efficient design and are adopted in different climatic regions worldwide for thermal comfort strategies. However, the relationship between courtyard shape or typology and its energy conservation abilities remains unclear. A majority of the existing studies associate courtyard shapes with other variables such as orientation, vertical aspect ratio, wall-to-window ratio, sky view factor, etc. Hence, this review aims to investigate whether courtyard geometry, specifically courtyard shape type, is related to energy conservation in buildings under different climatic conditions. It also refers to the traditional Indian Mandala typologies as a conceptual framework to understand different courtyard archetypes (Sharma, 2015; Sharma, 2022). For this purpose, peer-reviewed journal articles, review papers, and doctoral dissertations from 2015 to 2026 have been reviewed. The results highlight research patterns, observed characteristics in case studies, dominant and unexplored research areas, and gaps in the existing literature.

Evaluating Microbial Water Quality and Rapid Detection Methods for Urban Recreational Water Safety

Kathryn Dixon, Department of Global, Environmental, and Occupational Health, School of Public Health, University of Maryland and Smithsonian Environmental Research Center.

Claire M. Barlow¹, Hana A. Fisaha¹, Shruthi Kishore¹, Bianca Sanchez², Megan Stallard², Carey Pelc², Rylee Wernoch², Katrina Pagenkopp Lohan², Rebecca L. Hale², Rachel E. Rosenberg Goldstein¹. 1. Department of Global, Environmental, and Occupational Health, School of Public Health, University of Maryland, College Park. 2. Smithsonian Environmental Research Center, Edgewater

Extreme weather and infrastructure failures introduce pathogens into urban waterways, therefore posing a risk to recreators. Pathogen exposure can cause gastrointestinal illness and skin infections. Time-consuming monitoring methods can delay sharing water quality information. Rapid detection methods are needed to prevent exposure in real time. Since March 2026, we have sampled two sites in a Baltimore stream for *Escherichia coli* and *Staphylococcus aureus*. One site is co-located with a high-frequency in-situ water quality sensor. *E. coli* was present above EPA's recreational standard (410 MPN/100mL) in 89% (39/45) of samples with a mean concentration of 2,239 MPN/100mL. *S. aureus* was present in 61% (25/41) of samples and 22% (9/41) were positive for methicillin-resistant *S. aureus*. Future work will identify associations between bacteria, water depth, and water quality parameters. Understanding environmental conditions that may predict unsafe waterways in real time is critical for protecting health.

A Comparative Assessment of *Sesarma Reticulatum* Impacts Across Salt Marsh

Jaire Long, Towson University

Alice Besterman; Towson University

Salt marsh die-off in the US has been linked to herbivory by the crab *Sesarma reticulatum*, which removes vegetation and can sometimes accelerate marsh loss. Whether *Sesarma* pose a similar threat in Chesapeake Bay marshes is unclear. We aimed to determine whether *Sesarma* is present within a Chesapeake Bay salt marsh slated for restoration, and whether there was evidence of negative impacts to vegetation. We used pitfall traps and transect surveys to quantify *Sesarma* impact. Along transects we measured crab abundance, burrow density, percent grazed stems, and percent bare ground. Pitfall traps suggested low *Sesarma* relative abundance, with samples dominated by *Minuca pugnax* (fiddler crab). Surveys revealed localized areas of *Sesarma* impact. There was also evidence of marsh recovery once *Sesarma*'s preferred plant for grazing was removed. Findings indicate while *Sesarma* impacts in this marsh are not as severe as elsewhere, monitoring should continue in case environmental changes impact abundance.

Work in Progress: Impacts of maintenance duration, wood anatomy, and planting site on urban tree longevity

Stella Marti, Johns Hopkins University.

Meghan Avolio (Johns Hopkins University), Nancy Sonti (US Forest Service), Megan Curtiss (University of Maryland, Baltimore County)

Urban trees provide vital services to urban systems, and as a result, across the US, cities are undertaking ambitious tree planting goals, such as Maryland's 5 million tree planting goal. The full benefits of urban trees are only realized if the trees live to maturity; therefore, it is necessary to better understand how post-planting maintenance impacts tree survivorship. We take a

comprehensive approach to understand what impacts tree survival and health by focusing on the duration of tree maintenance, a key aspect of stewardship, by comparing 2- and 5-year maintenance post-planting. We are considering microclimate, comparing how exposure to urban heat and planting site type impacts survivorship of street trees. This five-year study will assess 500 trees, evaluating survivorship, growth, health, and tree physiology to better understand patterns of tree mortality and identify best planting practices within a common maintenance regime for planted urban trees.

Characterization of stream chemistry of storms from high-frequency sensor data at BES field sites

Mary McWilliams, UMBC/CUERE

Claire Welty, UMBC; Peter Groffman, CUNY and Cary Institute; Jon Duncan, Penn State;

Andrew J. Miller, UMBC; Jack Malone, UMBC

The Baltimore Ecosystem Study has collected weekly stream chemistry data for 28 years, at sites co-located with USGS stream gaging stations, spanning a gradient of urbanization. We installed high-frequency sensors at these locations beginning in 2023 to complement weekly data. YSI EXO2 sondes outfitted with specific conductance, temperature, turbidity, pH and dissolved oxygen probes collect data at a 5-minute frequency. S::can Spectrolyserv3 sondes collect TOC, DOC, and NO₃-N at a 15-minute frequency. Data enable investigation of responses of stream chemistry to storm events including consistency in water quality patterns across storms and land cover. Here we compare behavior of NO₃-N, SC, suspended sediment, TOC, and DOC for multiple storms in 2026. Suspended sediment [mg/L] is estimated from turbidity [FNU] from our previously- collected data relating the two quantities. This work is part of the Baltimore Social-Environmental Collaborative Urban Integrated Field Laboratory, supported by DOE.

Predicting Functional Capabilities of Microbial Communities from Road Salt Exposed Urban Soils Using 16S Amplicon Sequencing Data

Wolf T Pecher, The University of Baltimore

The project aims to assess functional capabilities and identify DNA signatures of microbial communities from road salt exposed soils using next generation sequencing data. In this study 16S amplicon sequencing datasets were analyzed from a project showing that road salt exposed soils harbor more halophilic Bacteria and Archaea than un-impacted soils (Pecher et al. 2019, PloS ONE 14(9): e0221355). Using PICRUSt2, a bioinformatic tool to predict microbial community functions, the functional capabilities of the microbial communities were assessed. Generally, road salt has a negative effect on nutrient cycling. However, preliminary analysis indicates that enzymes involved in nitrogen cycling were more prevalent in salt exposed soils than in the un-impacted soil, possibly because the exposed sites may have received runoff containing fertilizer promoting growth of microbes involved in nitrogen cycling. The un-impacted soil did not receive runoff. Additional analyses and experiments are underway to confirm or refute this finding.

Cemeteries as Historic Urban Green Spaces

Megan Schumacher, UMBC

Dawn Biehler, UMBC

This poster will explore how cemeteries served as Baltimore's early urban green spaces. In the mid-nineteenth century, public health concerns and cultural shifts about death and outdoor spaces led to the rise of the rural cemetery movement, where artfully landscaped cemeteries designed to evoke ideals of rural life were constructed on the outskirts of cities. In rapidly changing Baltimore, cemeteries became places of agency, memory, and leisure in an increasingly hierarchical and hostile city. Through analyzing newspaper reports, maps, and other primary sources, this poster provides insights into how nineteenth century cemeteries moved beyond utilitarian burial spaces to become green spaces infused with heritage and community controlled legacies. Investigating the history of these cemeteries can help shape how we understand them as green spaces in the present.

Tree branch removal effects on leaf gas exchange measurements

Maggie Sehnert, Smithsonian Environmental Research Center

Kendal Morris (Pacific Northwest National Labs (PNNL) and SERC), Pat Megonigal (SERC),

Alice Stearns (SERC), Mark Norris (Stevenson University)

As sea-level rises, coastal forests are threatened by widescale mortality from saltwater exposure and inundation. The Terrestrial Ecosystem Experiment to Probe the Effect of Storm Treatments (TEMPEST) experiment annually floods upland forest plots separately with freshwater or brackish saltwater to understand the ecosystem processes that precede tree mortality. During summer of 2026 a suite of photosynthetic data was collected from three focal tree species in TEMPEST. However, tree height required that branches be removed for measurement. Our project aimed to address this methodological constraint by investigating how the cutting disturbance, time delay, and access to fresh- versus saltwater may have impacted measurements. We found that there was no significant impact from either the cutting disturbance or time delay, which improves our confidence in the data collected. Response to salinity was species-specific and aligns with visual observations seen in the field, providing new evidence of a physiological basis for these observations.

Associated Ecology Diagrammatic Approach for Prioritizing Urban Stream Restoration

Archana Sharma, Morgan State University.

Urban stream restoration has become one of the most widely implemented watershed-management practices in the United States, driven by objectives that include water-quality improvement, habitat restoration, flood mitigation, stormwater management, and regulatory compliance (FISRWG, 1998, USACE 2021, Leopold, 1996). Despite substantial public investments in restoration programs over the past several decades, researchers continue to identify significant uncertainty regarding how restoration sites are prioritized and selected. While restoration science has advanced considerably in the areas of channel design, ecological assessment, and monitoring, comparatively less attention has been devoted to the development of

consistent decision-making frameworks for allocating restoration resources across watersheds (Noe et al. 2024; Sousa, 2025). The proposed associated ecology diagrammatic (AED) approach, while being AI and ML friendly, when used in the design process, can improve prioritization decision-making by explicitly unpacking the of the associated ecosystem of the stream, watershed processes and its impacts at site-specific micro level, scalable to macro-level.