2026 New Jersey Climate Change Research Symposium

- June 10, 2026 -

Livingston Student Center
84 Joyce Kilmer Avenue
Piscataway, NJ 08854

A list of authors and titles is provided in the agenda below. Abstracts and co-authors for each oral presentation (Appendix A) and poster (Appendix B) are provided at the end of this agenda for brevity.

8:30 AM – 9:00 AM	**CHECK-IN AND LIGHT BREAKFAST** (Livingston Hall, First Floor)

9:00 AM – 9:45 AM	**WELCOME AND PLENARY PANEL** (Livingston Hall, First Floor)

Welcome

- Stuart Shapiro, Dean, Edward J. Bloustein School of Planning and Public Policy, Rutgers University

Plenary. Science and Research for NJ: A Conversation with State Climate and Energy Leaders.

- Katrina Angarone, Chief Strategy Officer, New Jersey Department of Environmental Protection.
- Bob Brabston, Executive Director, New Jersey Board of Public Utilities.
- Christopher Testa, Supervising Administrative Analyst, New Jersey Office of Emergency Management.
- Rachael Shwom, Rutgers University (moderator).

9:45 AM – 10:00 AM	**15 - MINUTE BREAK**

10:00 AM –11:00 AM	**CONCURRENT SESSIONS A**

10:00 AM –11:00 AM

A1: Panel. From Lab to Agency: The Eagleton-BPU Climate Action Fellowship as a Model for State-University Partnership in the Climate Policy Capacity (Livingston Hall, First Floor)

- Kristoffer Shields, Director, Eagleton Science and Politics Program, Rutgers University. *The Eagleton Approach*.
- Kira Lawrence, Director of University of Massachusetts Clean Energy Extension, Professor in the Environmental Conservation and Earth, Geographic and Climate Sciences Departments at UMass Amherst. *Design of the Climate Action Track*.
- Natalie M. Stuart, Research Scientist, Division of Clean Energy, New Jersey Board of Public Utilities. *BPU Fellowship Experience*.
- Shannon Erwin, Program Coordinator, Eagleton Science and Politics Program, Rutgers University. *Science in the Room*. (moderator).

10:00 AM –11:00 AM **A2: Oral Presentations.** Theme: Planning and Policy (Gathering Lounge- 1st Floor)

- Lisa Avichal, New Jersey Department of State, Business Action Center, Office of Planning Advocacy. *Introducing a Climate Change Goal in New Jersey's 2025 State Development and Redevelopment Plan*.
- Vignesh Venugopa, Energy and Environmental Economics, Inc. *New Jersey Energy Master Plan: A Flexible, Economy-Wide Roadmap to Achieve 80% Emissions Reduction Economywide and 100% Clean Electricity.*
- Jordan Gass-Poore, Hazard NJ Podcast. *Covering Contaminated Sites in Your Community.*
- Angie Oberg, Chief Climate Officer, Senior Director of Climate Action and Sustainability, Rutgers University (moderator).

10:00 AM –11:00 AM **A3: Oral Presentations.** Theme: Flooding (Room 202- 2nd Floor)

- Ildiko C. Pechmann, New Jersey Sports and Exposition Authority. *Applied spatial modeling in assessing marsh resilience under future sea-level rise conditions in the Meadowlands of New Jersey.*
- Zeyuan Qiu, New Jersey Institute of Technology. *Community Flood Resiliency from the Perspective of Hydrologically Sensitive Areas in Landscape: A Case of Somerset County in New Jersey.*
- Jonathan J. DeLura, Rutgers University. *Estimating the Depth of FEMA Flood Zones Using ArcGIS Pro.*
- Sinan Rasiya Koya, Rutgers University. *Can Precipitation Nowcasting Strengthen Flash Flood Resilience?*
- Marjorie Kaplan, Sr. Associate Director, Rutgers Climate and Energy Institute and Co-Director NJ Climate Change Resource Center (moderator).

10:00 AM –11:00 AM **A4: Oral Presentations.** Theme: Urban Forestry (Room 201- 2nd Floor)

- Josh Kover, Rutgers Urban Forestry Program. *It's Going To Take a Village To Raise an Urban Forest*.
- Daniela Shebitz, Kean University. *The Root of Urban Renewal: Linking Miyawaki Afforestation to Soil Recovery.*
- Frank Gallagher, Rutgers University. *Resilience of a Novel Urban Woodlot Following Pulse Disturbance Events*.
- Markus Jatsch, Martha Schwartz Partners. *Linear Urban Forest*.
- Allyson Salisbury, Assistant Teaching Professor, Department of Ecology, Evolution, and Natural Resources, Rutgers University (moderator).

11:00 AM - 11:15 AM **15- MINUTE BREAK**

11:15 AM – 12:15 PM **CONCURRENT SESSIONS B**

11:15 AM – 12:15 PM **B1: Panel.** Lessons from the Field: Reporting on Climate Change Resiliency in New Jersey (Livingston Hall- 1st Floor)

- Jackson Hesley, South Jersey Climate News, Rowan University. *Climate Resiliency Through Wetlands and Beach Preservation*.
- Katie Thorn, South Jersey Climate News, Rowan University. *Key Environmental Local Issues to be Addressed by the Sherrill Administration*.
- Anthony Cocarro, Jersey Climate New, Rowan University. *Protecting Environmentally Sensitive Areas Through Government Action*.
- Shayne Crowley, Jersey Climate News, Rowan University. *Resiliency by Restoring Marshland*.
- Dianne Garyantes, Associate Professor, Journalism, Rowan University and Faculty Advisor, South Jersey Climate News (moderator).

11:15 AM – 12:15 PM **B2: Oral Presentations.** Theme: Planning- Flooding and Heat (Gathering Lounge- 1st Floor)

- Judy Huynh, Rebuild by Design. *NJ Flood Risk = Financial Risk: Interactive Tools Mapping Flood Exposure to Public Infrastructure, Property Values, and Displacement Across New Jersey's 21 Counties*.
- Melissa Tier, Princeton University. *Persistent Data Gaps in the Pursuit of Equitable Flood Relocation: Buyouts in NJ and NY.*
- Manasa Bollempalli, Rutgers University. *Poverty, Structural Vulnerability, and the Limits of Climate Adaptation Among Low-Income Residents in Camden, NJ*.
- Daniel Blanco, Rutgers University. *Timing of Emergence of Extreme-Temperature Mortality: A Framework for Assessing Climate-Related Impacts*.
- Lisa Auermuller, Executive Director, MACH, Rutgers University (moderator).

11:15 AM – 12:15 PM **B3: Oral Presentations.** Theme: Education (Room 202- 2nd Floor)

- Ross Gary, Jessica Valenti, and Sarah Sterling, New Jersey Department of Education. *Outcomes from the Early Implementation of Climate Change Education in New Jersey's K-12 Schools*.
- Sarah Wyman & Joshua Korenblat, SUNY New Paltz. *Earthrise Learning Commons for Sustainability Action and the Public Good*.
- Lauren Madden, The College of New Jersey. *Supporting Climate Teacher-Leaders' Capacity to Amplify Climate Change Education in New Jersey.*
- Monika Sikand & Harini Mittal, Bronx Community College CUNY. *The Scalable Green Framework: A Longitudinal Case Study at BCC-CUNY.*
- Carrie Ferraro, Assistant Professor of Professional Practice, Director, Math & Science Learning Center, Rutgers University (moderator).

11:15 AM – 12:15 PM **B4: Oral Presentations.** Theme: Ecology (Room 201- 2nd Floor)

- Siyi Huang, Rutgers University. *Observed increases in large wildfires intensity threaten terrestrial vegetation growth*.
- Kapil Khanal, Rutgers University. *Comparing photosynthetic strategies of 11 Hardwood Evergreen Tree Species in New Jersey.*
- Dina Fonseca, Rutgers University. *Zombie mosquitoes: epidemiological consequences of climate driven selective relaxation*.

- Fred Lubnow, Princeton Hydro. *The Impacts of Climate Change on Aquatic Resources and the Development of Harmful Algal Blooms*.
- Julie Lockwood, Distinguished Professor, Director Rutgers Climate and Energy Institute (moderator).

11:15 AM – 12:15 PM **B5: Oral Presentations.** Theme: Nature-Based Solutions (Collaborative Learning Center, 1st Floor)

- Daniel Barone, Rutgers University. *New Jersey Nature-based Coastal Project Assessment and Evaluation Framework and Tool Development*.
- Jim Bushong, Montgomery Township Environmental Commission. *Converting Stormwater Basins to Native Pollinator Incubators with Biodiverse & Adaptable Native Plant Selections*.
- Tom Lewis, CSA Group Architects & Engineers. *A Florida Case Study with NJ Shore Relevance: the Sarasota Living Laboratory as a Foundation and Accelerator for Climate Resilience, Adaptation and Innovation*.
- Matthew Holthaus, WSP USA Inc. *National Park Service Watergate Wetlands Restoration Project Case Study: Restoration for Today and the Future*.
- Josh Moody, Wetlands and Restoration Research Scientist, Division of Science and Research, NJDEP (moderator).

12:15 PM – 1:30 PM Lunch

Featuring

- Honorable Bob Smith, Chair, New Jersey Senate Environment & Energy Committee.

1:30 PM – 2:30 PM CONCURRENT SESSIONS C

1:30 PM – 2:30 PM **C1: Panel.** Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms (Livingston Hall- 1st Floor)

- Eddie Cohen, Rutgers Center for Math, Science, & Computer Education. *Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms*.
- Roberta Hunter, New Jersey Audubon. *A Seal of Climate Literacy for New Jersey*.
- Tanya Sulikowski, New Jersey School of Conservation. *Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms*.
- Brielle Kociolek, Rutgers Center for Math, Science, and Computer Education (moderator). *Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms*.

1:30 PM – 2:30 PM **C2: Oral Presentations.** Theme: Planning and Policy with a Focus on Energy (Gathering Lounge- 1st Floor)

- Jason Kliwinski, Rutgers University. *The path to net zero energy buildings - how zero energy codes and sustainable standards like LEED v5 and Passive House can show the way.*
- Christopher Whitehead, Chris Whitehead Consulting, LLC. *Protecting the Promise: AI Could be a Swiss Army Knife in the Climate Fight.*
- Wolfram Hoefer, Rutgers University, Department of Landscape Architecture. *Climate Action. An International Perspective on How to Enact Climate Action at the Government Public Interface.*
- Jennifer Souder, Center for Urban Policy Research, Rutgers University (moderator).

1:30 PM – 2:30 PM **C3: Oral Presentations**. Theme: Energy (Room 202- 2nd Floor)

- Tarun Reddy Arasu, Rutgers University. *Regional CO_2 Caps and Emissions Leakage in PJM: A Five-Zone Capacity Expansion Analysis*.
- Anthony Anastasi, Rutgers University. *Predictive Thermodynamic Modeling for Screening-Level Assessment of Biowaste-to-Energy Systems*.
- Ross Rucker, Rutgers University. *Impact of Snow on Solar Array Performance: A Comparison of Agrivoltaic Array Types*.
- Robert Mieth, Assistant Professor, Industrial Systems Engineering, Rutgers University (moderator).

1:30 PM – 2:30 PM **C4: Oral Presentations.** Theme: Storms and Extreme Events (Room 201- 2nd Floor)

- Diana Apoznanski, Rutgers University. *Investigating changes in nor'easter characteristics and their impacts*.
- Mackenzie Weaver, University of Pennsylvania. *Historical Nor'easter Intensity Trends in Reanalysis and Regional Climate Simulations: A Cross-Dataset Perspective.*
- Annabelle Horton, University of Pennsylvania. *Environmental DNA: The First Geological Proxy Capable of Differentiating Nor'easters vs Hurricanes.*
- Janine Barr, Associate Program Manager, Environmental Analysis and Communications Group, Rutgers University (moderator).

2:30 PM – 2:45 PM **15-minute break**

2:45 PM – 3:45 PM **CONCURRENT SESSIONS D**

2:45 PM – 3:45 PM **D1: Panel.** Clean Energy Fighting Climate Change (Livingston Hall- 1st Floor)

- Dave Specca, Rutgers University, Program Lead. *Rutgers Agrivoltaics Program*.
- Yousaf Shahid, Rutgers University, Center for Urban Policy Research. *Thermal Energy Networks (TENs) for New Jersey*.
- Linda Garrett, American Farmland Trust, NY&NJ Regional Director. *American Farmland Trust*.

- Dunbar Birnie, Rutgers School of Engineering and Rutgers Climate and Energy Institute, Area Lead for Renewable Energy, Technology, and Energy Conservation (moderator).

2:45 PM – 3:45 PM **D2: Oral Presentations.** Theme: Planning- Community (Gathering Lounge- 1st Floor)

- Heather Korzun, Urban Coast Institute, Monmouth University. *Developing a Design Pipeline for Nature-Based Climate Resilience Projects in New Jersey Communities*.
- Woojin Jung, Rutgers University. *Developing High Resolution Hazard Vulnerability Index (2HVI) to Improve Community Resilience in New Jersey.*
- Clinton Andrews, Rutgers University. *Empty and exposed: Seasonal housing on the Jersey Shore.*
- Carrie Grassi, WSP USA Inc. *Multi-Hazard Flood Resilience for Multi-Family Affordable Housing in New York City*.
- Rob Freudenberg, Vice President, Energy and Environment, Regional Plan Association (moderator).

2:45 PM – 3:45 PM **D3: Oral Presentations.** Theme: Agriculture (Room 202- 2nd Floor)

- Garin Bulger, Rutgers University. *Climate Change and Regenerative Agriculture in New Jersey.*
- Rebeca Mata, Rutgers University. *Dual-Use Solar Energy Can Promote Climate Resilience: Insights from the Rutgers Agrivoltaics Program*.
- James Shope, Rutgers University. *Seasonal predictive models of blueberry bud break, bloom, and harvest using chilling and heat accumulation*.
- Rajani Karuturi (Pranic Soil) and James White (Rutgers University). *Harnessing the Rhizophagy Cycle for Nutrient Sovereignty.*
- Ashley Kerr, State Policy Director, New Jersey Farm Bureau (moderator).

2:45 PM – 3:45 PM **D4: Oral Presentations.** Theme: Storms & Extreme Events (Room 201- 2nd Floor)

- Hugh Roarty, Rutgers University. *Climatology of New Jersey Coastal Currents*.
- William Schmelz, Rutgers University. *Increasing frequency of coastal erosion indicated by a hindcast model of storm-driven forcing calibrated with beach stratigraphy.*
- Amir Begmohammadi, Baird and Associates. *Projected Changes in Tropical Cyclone Damage in New Jersey Under Future Climate Conditions*.
- Joyce Ong, Research and Grants Facilitator, Rutgers Climate and Energy Institute, Rutgers University (moderator).

3:45-4:45 PM **POSTER SESSION** (concourse)

A list of poster authors and titles is included below. Poster abstracts and co-authors are listed in Appendix B of this agenda.

Poster Lead Author and Affiliation	Poster Title
1. Amanda Archer — Jacques Cousteau National Estuarine Research Reserve, Rutgers University	Mid-Atlantic RISING: Resilience Implementation for Salt-INtruded Geographies
2. Mercy Atolagbe — Montclair State University	Spatial Analysis of Residential Ground Source Heat Pump Adoption Potential in New Jersey
3. Deepali Bidwai — Alpha Square/Independent Researcher	AI-Driven Satellite Analysis of Urban Heat Island Dynamics and Heat Risk Hotspots in New Jersey Cities
4. Sydnie Bogan — Kean University	Environmental Health and Climate Vulnerability in New Jersey's Carceral Facilities
5. Jeremy Cohen — Rutgers University (visiting), Yale University (funding)	Geographic redistributions are insufficient to mitigate the erosion of species' environmental niches
6. Suman Dhakal — Rutgers, the State University of New Jersey	Carbon flux dynamics in a co-located terrestrial ecosystem: a floodplain, a grassland and a pastureland using the eddy covariance data in Duke Farms, New Jersey
7. Nuzhat Fatema — Geography Department, Rutgers University	Flood Knowledge from Below: Why Household Adaptation to Recurrent Urban Flooding Goes Beyond Technical Solutions in Manville, New Jersey
8. Lizbeth F. Gomez — Rutgers Center for Climate, Health, and Healthcare	Wildfire Smoke PM2.5, Fluticasone Use, and Acute Respiratory Illness in All of Us Research Program: A Case Time Series Analysis
9. Theresa Lee — Kean University	Visualizing Heat Inequity: GIS-Based Insights for Climate Adaptation in Carceral Systems
10. Junghoon Lee — Rutgers University	Local Public Finance Factors Influencing Municipal Decisions on Flood Buyouts
11. Mohammad Amin Nozari — University of Delaware	The Influence of Oblique Views and Ground Control Point Distribution on UAS Photogrammetry Precision for Pavement Assessment
12. Rose Ogutu — Delaware State University	AI- Enabled Technologies for Resilience- What is in it for a small grower?
13. Sarah Beganskas — Delaware River Basin Commission	A framework for advancing the climate resilience of water resources in the Delaware River Basin
14. Micah Seidel — Rutgers School of Engineering, Rutgers Agrivoltaics Program	Evaluating Operating Characteristics of Agrivoltaic Systems
15. Kasey Walsh — Rutgers University	Proteomic Analysis of two geographically distinct Atlantic Surf Clam Species
16. Barbara Woolley-Dillon — NJ Department of Environmental Protection	Unlocking the Secrets to Preparing a Buildout Analysis for a Climate Change Related Hazard Vulnerability Assessment (CCRHVA)
17. Lillian Simhon — Office of Climate Action, Rutgers University	Assessing Wood Growth in Forests Around NJ

5:00 PM - 6:30 PM **OFF-SITE NETWORKING HAPPY HOUR** (offsite)

Pino's Gift Basket Shoppe, Wine Cellar, and Lounge

13 N 4th Ave, Highland Park, NJ 08904

Appendix A – Detailed Oral Presentation Information

10:00 AM –11:00 AM **CONCURRENT SESSIONS A**

10:00 AM –11:00 AM **A1: Panel.** From Lab to Agency: The Eagleton-BPU Climate Action Fellowship as a Model for State-University Partnership in the Climate Policy Capacity (Livingston Hall, First Floor)

Abstract: New Jersey's response to the climate crisis depends not only on good policy, but on the people inside government who can translate scientific evidence into regulatory decisions. That capacity doesn't build itself. It requires deliberate investment in the pipeline between research institutions and the agencies where climate change mitigation and resiliency work actually happens.

This panel presents the Eagleton Science and Politics Fellowship's Climate Action Track â€” a structured partnership between Rutgers University's Eagleton Institute of Politics and the New Jersey Board of Public Utilities (BPU) â€” as a replicable model for building scientific capacity in state climate agencies.

Since 2019, the Eagleton Science and Politics Program (ESPP) has placed PhD-level scientists, engineers, and healthcare professionals in full-time fellowships across New Jersey state government. The Climate Action Track, developed through a formal Memorandum of Understanding with the BPU, places fellows directly within the agency responsible for the state's energy transition. The results have been striking: nine of twelve fellows placed through the Climate Action Track are now working at BPU.

What makes the partnership work is not simply the placement. It is the infrastructure around it: researcher training that prepares scientists for the political and regulatory environment before they arrive; structured mentorship from agency staff and ESPP faculty; a curriculum that develops not just technical skills but the adaptive communication and institutional fluency that science-policy work demands.

This panel brings together the full ecosystem of this successful partnership to reflect on what has been built, what has been learned, and what it would take to replicate it.

The Eagleton-BPU model is a proof of concept for a broader question: can universities and state agencies build durable, structured partnerships that move scientific expertise from campus to agency - not as a one-time intervention, but as a sustained pipeline? This panel argues yes and offers seven years of evidence for how.

Panelists:

- Kristoffer Shields, Director, Eagleton Science and Politics Program, Rutgers University. *The Eagleton Approach*.
- Kira Lawrence, Director of University of Massachusetts Clean Energy Extension, Professor in the Environmental Conservation and Earth, Geographic and Climate Sciences Departments at UMass Amherst. *Design of the Climate Action Track*.

- Natalie M. Stuart, Research Scientist, Division of Clean Energy, New Jersey Board of Public Utilities. *BPU Fellowship Experience*.
- Shannon Erwin, Program Coordinator, Eagleton Science and Politics Program, Rutgers University. *Science in the Room* (moderator).

10:00 AM –11:00 AM **A2: Oral Presentations.** Theme: Planning and Policy (Gathering Lounge- 1st Floor)

- Lisa Avichal, New Jersey Department of State, Business Action Center, Office of Planning Advocacy. *Introducing a Climate Change Goal in New Jersey's 2025 State Development and Redevelopment Plan*.
    - **Abstract:** In December 2025, the New Jersey State Planning Commission adopted a new State Development and Redevelopment Plan; the first comprehensive update to the State Plan since 2001. The State Plan reflects current planning principles and best practices in the areas of land use, transportation, housing, environmental protection and enhancement, economic development, provision of public infrastructure, historic preservation, social justice, and adaptation to global climate change. Two new goals were added to the 2025 State Plan compared to the 2001 Plan; (1) Effectively Address the Adverse Impacts of Global Climate Change and (2) Implementing Equitable Planning Practices to Promote Thriving Communities for all New Jerseyans.

      The new Climate Change goal focuses on: Promoting the switch to clean energy, such as wind and solar while cutting pollution from cars, buildings, and power plants; Planning for green neighborhoods that make it easier and safer to walk, bike, and use public transit; and Protecting communities and nature by avoiding building in areas that threaten humans and endangered species while creating stronger, safer infrastructure. The goal prioritizes decarbonization, hazard mitigation, and the protection of coastal areas and riverine corridors.

      The 2025 State Plan also introduced two new Planning Areas. The Metropolitan/Floodprone Planning Area (PA1B) and the Suburban/Floodprone Planning Area (PA2B) recognize developed areas that face current and future flood risk. By acknowledging these current and future risks, the State Plan Policy Map will then reflect which areas of the state must be prioritized for mitigation efforts, whether that is through hardening or managed retreat. The ultimate objectives are to minimize the risks to life and property from natural hazards, advance redevelopment and climate adaptation strategies that reduce flooding impacts and support existing communities, discourage new and unneeded development and growth-inducing infrastructure projects, and implement green infrastructure improvements.

      The State Plan provides a framework for state, regional, and local governments to align planning and investment decisions.

- Vignesh Venugopa, Energy and Environmental Economics, Inc. *New Jersey Energy Master Plan: A Flexible, Economy-Wide Roadmap to Achieve 80% Emissions Reduction Economywide and 100% Clean Electricity.*
    - **Abstract:** The 2024 New Jersey Energy Master Plan (EMP) serves as a long-term strategic roadmap for achieving the State's climate and clean energy goals, including an 80% reduction in economy-wide greenhouse gas emissions by 2050 and 100% clean electricity sales by 2035. The EMP was built on prior policy and programmatic progress, incorporating updated energy system modeling, stakeholder engagement, and evolving federal and regional dynamics to assess multiple pathways to decarbonization.

      The EMP emphasized a flexible, adaptive framework rather than a single least cost pathway, identifying several viable options to meet energy needs while maintaining reliability, affordability, and equity. Core to this approach was identification of "no regrets" actions that can provide benefits across all modeled futures. These include accelerating clean energy deployment, expanding electrification and energy efficiency, ensuring a reliable and modern grid, advancing transportation electrification, promoting affordability and environmental justice, enhancing regional coordination, and investing in workforce development.

      The study included load and emissions forecasting, electric system capacity expansion and resource adequacy modeling. It demonstrated that deep decarbonization is achievable through a combination of clean electricity, electrification, and energy efficiency, with multiple scenarios meeting statutory emissions targets while balancing system costs and reliability. The EMP also reflected a rapidly changing energy landscape, including rising electricity demand, evolving PJM market dynamics, and uncertainty in federal policy and funding.

      Ultimately, the EMP concluded that achieving New Jersey's climate goals would require sustained policy implementation, continued stakeholder engagement, and the ability to adapt strategies as market conditions, technologies, and demand, particularly from emerging sectors, continue to evolve.

      This presentation will summarize key highlights from the EMP. It will also touch on how the projected electric system needs have continued to evolve since this study was conducted with increasingly ambitious expectations of data center development.

      Attendees will gain insight into how EMP modeling frameworks translate policy targets into resource, infrastructure, and cost outcomes, as well as practical considerations for planning under uncertainty.

- Jordan Gass-Poore, Hazard NJ Podcast. *Covering Contaminated Sites in Your Community.*

- **Abstract:** Most of us have a contaminated site near us, but without scientists, journalists, and community members playing a watchdog role, these sites often languish for decades, potentially impacting people's health and the environment. Future extreme weather events fueled by climate change may threaten to further spread the pollution if these sites aren't cleaned up quickly and thoroughly.

  In this presentation, investigative journalist and creator of the “Hazard NJ” and “Hazard NYC” podcasts, Jordan Gass-Pooré provides tips on the ways we can work together to increase public action, government response, and hold the companies responsible for the contamination accountable.

10:00 AM –11:00 AM **A3: Oral Presentations.** Theme: Flooding (Room 202- 2nd Floor)

- Ildiko C. Pechmann, New Jersey Sports and Exposition Authority. *Applied spatial modeling in assessing marsh resilience under future sea-level rise conditions in the Meadowlands of New Jersey.*
  - **Co-authors**: Brian Wlodawski, NJSEA; Chistopher Blackley, NJSEA; Joseph Grzyb, NJSEA; Fransisco Artigas, NJSEA.
  - **Abstract:** The study aimed to understand the impacts of forecasted sea level rise scenarios at the Hackensack Meadowlands in New Jersey. The approximately 8,000-hectare, heavily developed tidal estuary, which receives tidal water through Newark Bay, is situated in a glacial valley with steep, straight sides that rise more than 40 meters from the valley bottom. Under these “bathtub” conditions, with few or no areas to retreat, rising sea levels will increase erosion and the loss of traditional estuarine habitats. The study used high-resolution LiDAR and hyperspectral data, as well as historical sediment accretion and tidal datum, to answer the following questions: Unable to migrate upland due to lack of space, does the marsh vegetation in the Meadowlands have the ability to adapt to greater salinities and new hydrology patterns? As higher water levels will lead to significant changes in ecosystem structure and function, which are the more exposed marsh areas? How will higher water levels affect the current ecosystem services, such as carbon sequestration, water filtration, and flood protection?

    Today approximately 60% of the marsh surface elevations lays below the Mean High Water mark, leaving the estuary highly vulnerable to rising sea levels. Recent water level monitoring indicates a consistent increase in Mean Tide Level over the last two decades, projecting a steady albeit low local water elevation rise at 3 mm/year.

    Utilizing 2022 LiDAR data, the study reveals that 83% of suitable marsh areas are currently vegetated, but recognizes that factors other than SLR, such as development, ditching and construction of coastal defenses may further restrict wetland expansion. In light of 9mm/year predicted sea level rise, by the year of 2100, 28% of the current wetlands will be lost. High marsh and upland areas will sustain the majority the damage with a loss of 89% and 66% of their respective areas.

- Zeyuan Qiu, New Jersey Institute of Technology. *Community Flood Resiliency from the Perspective of Hydrologically Sensitive Areas in Landscape: A Case of Somerset County in New Jersey.*
    - **Co-authors:** Wenlong Feng, Xi'An University of Economics and Finance.
    - **Abstract:** Flood resilience planning and emergency management focus on mitigating flood risk in a well-defined floodplain. The study expands the potential flood risk areas to upland communities beyond the floodplains by incorporating the concept of Hydrologically sensitive areas (HSAs) and assessing the community flood resilience in Somerset County.

      The pattern of HSAs reflects landscape hydrological sensitivity and connectivity. Our study identified that 27.7% of the Somerset County as the flood prone areas, compared to 10.1% as the FEMA 100-year floodplain and 16.5% as the expanded floodplains required by NJDEP REAL Rule. The resulting flood prone area map was overlaid with different land use data including the land use/cover database, the sewer service area (SSA), the preserved open space and farmlands to assess community flood vulnerability and resilience. The traditional flood resilience framework that focuses on the riverine floods in floodplains significantly underestimate community flood vulnerability. Our analysis indicates that 44.3% of “Class 2” residential parcels in Somerset County are in the flood prone areas while only 10.1% and 4.2% of such residential parcels are in the NJDEP expanded floodplains and the FEMA 100-year floodplain, respectively.

      Farmland and open space preservation improves community resilience to flood. Our study shows that 24.3% of preserved farmland and 44.8% of preserved open space are in the flood-prone area, which implies that 75.3% of preserved farmland and 45.2% of preserved open space don’t play a significant role in mitigate flood impacts and help communities to recover from those impacts. There is significant potential to direct the farmland and open space preservation efforts to improve community’s resilience to flood.

      This study identifies where flooding is most likely to occur, how communities are exposed, and where opportunities exist to strengthen resilience. HSAs offer a holistic perspective that aligns nature-based solutions with ecological landscape functions to enhance flood resilience.

- Jonathan J. DeLura, Rutgers University. *Estimating the Depth of FEMA Flood Zones Using ArcGIS Pro.*

- **Abstract:** The Federal Emergency Management Agency's (FEMA) National Flood Hazard Layer (NFHL) contains flood risk data including the expected extent of the 1% and 0.2% annual chance floods. These data can be helpful for determining flood risk in New Jersey, especially for inland areas where flood risk data are often not available. Although FEMA provides depth data for a few select areas of the state as part of their Flood Risk Databases, and base flood elevation (BFE) for coastal areas, most of the state, especially inland areas lack any reliable data for the depth of the 1% and 0.2% annual chance floods.

  Using a novel methodology, the Data Informatics Group (DIG) within the EJ Bloustein School of Planning and Public Policy's Center for Urban Policy Research has estimated flood surface elevations for the FEMA 1% and 0.2% annual chance floods using ArcGIS Pro. These estimated flood surfaces may be used to anticipate the height of flood waters during these flood events. They may be particularly useful for emergency planning, identifying elevated structures, including roadways, that may be inundated during these flood events, and the appropriate heights to elevate these structures for climate change adaptation. This presentation will outline the methodology used to develop these flood surface elevations, DIG analyses performed using these new data, and other potential stakeholder use case scenarios.

- Sinan Rasiya Koya, Rutgers University. *Can Precipitation Nowcasting Strengthen Flash Flood Resilience?*
  - **Co-authors:** Efthymios Nikolopoulos, Department of Civil and Environmental Engineering, Rutgers University; Jie Gong, Department of Civil and Environmental Engineering, Rutgers University.
  - **Abstract:** Accurate short-term precipitation prediction is critical for flash flood forecasting, yet it remains one of the most challenging unsolved problems in hydrometeorology. Radar-based precipitation nowcasting offers a promising approach for short-term forecasts (up to 6 hours), particularly when numerical weather models fail to produce precise predictions. While previous studies have assessed the accuracy of nowcasting methods, their efficacy in generating actionable flash flood warnings remains largely unexplored. In this study, we evaluate multiple nowcasting methods based on their ability to produce flash flood warnings using EF5, NOAA's operational flash flood prediction model, forced with precipitation nowcasts derived from MRMS radar data. We compare several conventional advection-based nowcasting algorithms and machine-learning-based approaches, assessing them across 25 severe flash flood events in the contiguous United States (CONUS) over the past decade. Our results highlight the significant potential of precipitation nowcasting for mitigating the impacts of climate change. As a warming climate intensifies the frequency and severity of flash floods, nowcasting-driven early warning systems offer a scalable, operationally viable pathway to more efficient emergency response, ultimately strengthening community resilience to hydrometeorological extremes.

10:00 AM –11:00 AM **A4: Oral Presentations.** Theme: Urban Forestry (Room 201- 2nd Floor)

- Josh Kover, Rutgers Urban Forestry Program. *It's Going To Take a Village To Raise an Urban Forest*.
    - **Co-authors:** Jason Grabosky, Director of Urban Forestry Program, Rutgers University.
    - **Abstract:** Climate Change is going to make cities dangerously hot and make growing conditions for urban trees exceptionally challenging. However, the importance of urban trees for their cooling benefits can not be overstated in a climate change context. To avoid the compounding stresses due to increased heat, there will be an added management burden to the landowner or authority to continuously water, replace, and treat trees. In this way, urban climate resiliency can either be enacted by community care, buy-in, and stewardship or significant taxation.

      Last year, Rutgers' IP & O removed an abandoned roadway that was a vestige of Camp Kilmer, a WWII training camp. In its place, the soil was amended, and a plant community was designed that factored in climate change and local ecological niches. This plant community was planted by the Rutgers Community and the public on Saturday, April 18th. This event became known as the Tree Planting Festival as it grew to include music, art, and other educational activities, as well as the tree planting. The project, by design, was climate resilient and sustainable, but became more so by connecting people to the land and fostering a culture of stewardship.

      While the environmental and ecological benefits of creating a forest are obvious, the social benefits are underexplored. In addition, while some researchers have acknowledged how community participation is important to urban forestry management, the process of implementation is underexplored. This presentation explores the importance of involving the community in management and design, and how it can be done. With harsher growing conditions and population growth, urban forestry decision makers need to plan for and recognize the fact that everybody has a role to play in climate resiliency. In other words, it's going to take a village to raise an urban forest.

- Daniela Shebitz, Kean University. *The Root of Urban Renewal: Linking Miyawaki Afforestation to Soil Recovery.*
    - **Co-authors:** Andres Ospina Parra, Rutgers Newark; John Evangelista, Executive Director, Groundwork Elizabeth.
    - **Abstract:** Urban areas often suffer from enduring environmental issues including flooding, biodiversity loss, heat island effects, and air and soil pollution. The Miyawaki method of afforestation, characterized by dense planting of native species on remediated soil, has been proposed as a rapid, nature-based solution for restoring urban ecological function. This presentation provides an overview of methods for planning, installing, and monitoring microforests based on the Miyawaki method and presents preliminary assessments of early-stage changes in soil health following microforest

    establishment in formerly redlined neighborhoods in Elizabeth, New Jersey. Specifically, it investigates whether this method improves soil permeability, carbon content, and microbial activity within the first three years of planting. Three microforests aged one, two, and three years were assessed using a chronosequence approach. At each site, soil samples from within the microforest and adjacent untreated urban soil (control) were compared. Microforest soils showed significantly greater porosity (p=0.015), higher void ratios (p=0.009), and reduced compaction compared to controls. Soil permeability improved dramatically, with factors ranging from 5.99 to 52.27. Total carbon content increased with forest age, reaching 2.0 mg C/g in the oldest site (p<0.001). Microbial metabolic rate rose by up to 287.5% (p=0.009), while carbon use efficiency also improved, particularly in the older microforests. Miyawaki microforests significantly enhanced both the physical and biological properties of degraded urban soils, signaling rapid restoration of soil function and the early return of ecosystem services.

- Frank Gallagher, Rutgers University. *Resilience of a Novel Urban Woodlot Following Pulse Disturbance Events.*
    - **Co-authors:** Han Yan, Rutgers University; Nicole Mitroff, NYU.
    - **Abstract:** Given the increase in the rate of and intensity of pulse events due to climate change the ecological resilience of urban forests is a subject of much interest. In this study, we examined the novel vegetative assemblage trajectory of an urban woodlot within a 235-acre urban brownfield. Since our previous work which documented the sites vegetative guild trajectory since 1969 had demonstrated the strong influence of soil metals on forest development, we questioned if the combined effect of soil stress and increase pulse events would alter the sites trajectory. Using Orthomosaic images, digital elevation mapping and normalized data vegetation indices, our research assesses shifts in forest productivity and structural changes. These ecological characteristics are then compared to the long-term effects of the sites' total soil metal load and the impact of two pulse events. Findings reveal a continued expansion of the forest guild at the expense of the herbaceous and shrub guilds and that the expansion correlates less with the total soil metal load in recent years than in our early work. Canopy surface area and volume between 2 and 4 meters above ground and over 4 meters above ground continued to increase between 2003 and 2011, it then decreased significantly between 2011 and 2014, due to the pulse events of the October snowstorm in 2011 and Superstorm Sandy in 2012. However, by 2023 the canopy had more than recovered. These data indicate that the effect of the anthropogenically derived abiotic filter of high soils metal contamination has significantly decreased over time and that given the composition and size of the study site urban novel assemblages can exhibit strong resilience after pulse events.

- Markus Jatsch, Martha Schwartz Partners. *Linear Urban Forest.*

- **Co-authors:** Martha Schwartz, Martha Schwarz Partners, Harvard University Graduate School of Design; Edith Katz, Martha Schwartz Partners, Harvard University Graduate School of Design.
- **Abstract:** Preparing cities for extreme heat is one of the defining engineering challenges of our time. As the climate crisis intensifies, many cities face rising temperatures and increased flooding. Both of these impacts are predicted to affect New Jersey: heatwaves will become more frequent and intense; plus storm intensity will increase with stronger 24-hour rainfall events projected that can lead to flooding.

  Martha Schwartz Partners recently concluded a research project for the Harvard Climate Change Solutions Fund addressing these exact urban climate change consequences. Our findings, based upon the use of a pilot city in Massachusetts, can be applied to cities worldwide where deepening threats of heat and flooding are anticipated. With an aim to cool the city, create environmental equity, mitigate urban flooding as a few of the benefits from our research – we proposed a new paradigm in which urban infrastructure actively contributes to environmental repair.

  This paradigm, as could be applied to vulnerable cities in New Jersey, proposes transforming the urban road infrastructure - the largest publicly owned land asset in most cities - into a continuous eco-logical system. Urban mobility studies predict automated electric vehicles (AEV) adoption to become dominant this century. This will reduce the need for travel lanes and parking which allows narrower street designs whereby significant public land can be reclaimed. This proposal demonstrates how a native forest ecosystem can be integrated into this future road network to provide urban cooling, carbon sequestration, flood mitigation, biodiversity uplift, improved and equitable public health and well-being. Data derived analysis provides monetized cost benefits and long-term value for the city.

  By combining rapidly establishing native forests (Miyawaki Method) with anticipated reductions in road space from AEVs, streets can evolve from movement corridors into a living, evolving infrastructure that helps counter climate change and regenerates urban life with nature.

11:15 AM – 12:15 PM	**CONCURRENT SESSIONS B**
11:15 AM – 12:15 PM	**B1: Panel.** Lessons from the Field: Reporting on Climate Change Resiliency in New Jersey (Livingston Hall- 1st Floor) **Abstract:** The state of New Jersey is warming faster than the rest of the world, increasing 4 degrees - twice the global average - since 1900 (New Jersey Climate Change Resource Center, 2025). Since 1970 alone, the average annual temperatures in Atlantic City have gotten 3.9°F warmer and the city's annual precipitation has increased by 12.6 inches (Climate Central, 2026).

Moreover, New Jersey's sea level rise is occurring at about twice the global average (New Jersey Department of Environmental Protection, 2026). "By 2050, there is a 50% chance that sea-level rise will meet or exceed 1.4 feet above the year 2000 and a 17% chance it will exceed 2.1 feet," according to the New Jersey Department of Environmental Protection. Climate change is at the root of these changes in temperature, sea level, and precipitation in the state. Luckily, there's still time to act.

Climate resilience strategies, such as wetlands protection, environmentally sustainable governmental policies, land preservation, and beach replenishment, have been and are being implemented throughout the state. Yet many residents are not aware of the effects of climate change in New Jersey, nor the measures being taken to mitigate the impact of a warming climate. Consistent news coverage about climate change and climate change resiliency has been disrupted by the economic downturn in the journalism industry, which has resulted in news deserts throughout the state (Abernathy, 2020).

This panel will be made up of four reporters for South Jersey Climate News, an award-winning climate change and environmental news site published by journalism students from Rowan University. The panelists will share about the topics they covered for the news site and discuss the lessons they learned about communicating with the public about climate change resiliency in New Jersey.

South Jersey Climate News is a collaborative news website sponsored by the Journalism Department at Rowan University that provides coverage about climate change in the region. Articles posted on the website are produced by undergraduate journalism students, with faculty supervision, and shared with news partners, including The Press of Atlantic City, NJ Spotlight, Follow South Jersey, Green Philly, and Delaware Currents. The site regularly shares content on its social media channels, including Instagram, Facebook, TikTok, YouTube, and BlueSky.

South Jersey Climate News also is part of a statewide climate reporting collaboration with members of the NJ College News Commons, a network of campus media outlets. The site is the recipient of the 2025 Excellence in NJ Local News Award and a 2025 New Jersey Journalism Impact Award.

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Panelists:

- Jackson Hesley, South Jersey Climate News, Rowan University. *Climate Resiliency Through Wetlands and Beach Preservation*.
- Katie Thorne, South Jersey Climate News, Rowan University. *Key Environmental Local Issues to be Addressed by the Sherrill Administration*.
- Anthony Cocarro, Jersey Climate New, Rowan University. *Protecting Environmentally Sensitive Areas Through Government Action*.
- Shayne Crowley, Jersey Climate News, Rowan University. *Resiliency by Restoring Marshland*.
- Dianne Garyantes, Associate Professor, Journalism, Rowan University and Faculty Advisor, South Jersey Climate News (moderator).

11:15 AM – 12:15 PM **B2: Oral Presentations.** Theme: Planning- Flooding and Heat (Gathering Lounge- 1st Floor)

- Judy Huynh, Rebuild by Design. *NJ Flood Risk = Financial Risk: Interactive Tools Mapping Flood Exposure to Public Infrastructure, Property Values, and Displacement Across New Jersey's 21 Counties*.
  - **Abstract:** This presentation trains users with two new interactive tools developed by Rebuild by Design that map flood exposure to public infrastructure across all 21 New Jersey counties and eight major cities using publicly available data from FEMA floodplains, state tax records, and Blue Acres buyout records.

    The county-level tool draws on a parcel-level analysis of all 3.4 million properties statewide, layered with data on nearly 19,000 public assets including schools, hospitals, fire stations, police stations, wastewater treatment plants, airports, power plants, and contaminated sites. Findings show that 4,348 public assets (nearly 1 in 4) currently sit in flood zones. By 2050, that rises to 6,726 (more than 1 in 3), a 55% increase. Nearly 1.3 million residents live in areas that will be high flood risk, half of whom are lower-income, and $435.9 billion in property value and $5.9 billion in annual tax revenue are threatened. Displacement is already happening with 1,677 flood-damaged properties already acquired through the Blue Acres program.

    The companion city-level tool examines eight cities where public infrastructure exposure is growing fastest: Atlantic City, Newark, Jersey City, Camden, Elizabeth, Paterson, Asbury Park, and Trenton. Atlantic City faces 98% exposure by 2050, while Newark adds 195 facilities to flood zones, the largest absolute increase of any city studied. Four cities see exposure more than double by 2050.

These tools show residents and policymakers exactly what is at risk and where, so they can prioritize investment before infrastructure becomes unusable. The urgency is clear: since 2011, New Jersey has received over $7.9 billion in federal disaster assistance through 14 major disaster declarations related to extreme weather. Despite this, the state has no dedicated funding source for building the climate-ready infrastructure needed to protect communities statewide. The presentation will demonstrate both tools and discuss data sources, methodology, and policy implications.

- Melissa Tier, Princeton University. *Persistent Data Gaps in the Pursuit of Equitable Flood Relocation: Buyouts in NJ and NY.*
  - **Abstract:** There is a growing interest among cities and states around the U.S. in designing local flood relocation programs (more specifically, buyout programs) as one crucial policy option within the climate adaptation toolkit. Buyout programs, however, are both relatively new and immensely complex. It is therefore critically important that we examine the few buyout programs that have occurred to date, to identify their strengths/weaknesses and to facilitate policy learning.

    In this research project, I examine three buyout programs: 1) New Jersey's long-standing program, Blue Acres; 2) New York State's post-Sandy program, NY Rising; and 3) New York City's post-Sandy program, Build It Back. I compare and contrast these programs in terms of their funding sources, program stipulations, and outcomes. For example, I document that the multiple state and federal sources that have provided money to Blue Acres have various stipulations for: appraising the fair-market value of a property, determining which properties are prioritized as high flood risk, which homeowners are considered vulnerable or disadvantaged, and more. I also show that municipal land use laws and local relocation incentives add to the complexity of the Blue Acres program's structure, all in all creating a dizzying range of possibilities even within a singular state program. This contrasts with the short-term NY Rising program, which was fully funded via HUD post-Sandy grants and so in many ways more standardized in its approach.

    While I contribute significantly to our knowledge and documentation of these programs, I also uncover a lack of key datasets and a substantial need for greater data transparency across the board. For example, while I was able to generate novel visualizations and geospatial analysis of where buyouts have occurred via NJ Blue Acres and NY Rising, a parallel dataset is missing for NYC Build It Back. I make specific recommendations for further data needs with respect to these three programs, as well as more general recommendations for improving monitoring and evaluation going forward – including for several new buyout programs currently in design in New York (Resilient Acquisitions, Blue Buffers and the Roadmap for Visioning Managed Retreat). I conclude with some final thoughts on the importance of reducing data gaps in order to help achieve equity and environmental justice goals.

- Manasa Bollempalli, Rutgers University. *Poverty, Structural Vulnerability, and the Limits of Climate Adaptation Among Low-Income Residents in Camden, NJ.*
    - **Co-authors:** Amir Begmohammadi, Baird and Associates.
    - **Abstract:** Financial precarity, limited access to resources, and compounding social stressors frequently undermine residents' capacity to adapt, yet these barriers remain underexamined in New Jersey's adaptation discourse. This paper examines the climate vulnerabilities and adaptive constraints facing low-income, Spanish-speaking Hispanic communities in Camden through a household decision-making lens, as part of the Rutgers University's National Science Foundation's Coastlines and People (CoPe) Megalopolitan Coastal Transformation Hub (MACH) project. Drawing on semi-structured interviews, demographic surveys, and ethnographic methods, this study analyzed how financial limitations, gaps in governmental and non-governmental resource access, and social support networks shape residents' responses to climate hazards. Extreme heat and flooding emerge as the most pressing threats, yet even low-cost adaptations, such as purchasing air conditioning units or renters' insurance, remain out of reach for many participants. Residents instead prioritize immediate survival concerns, including housing and food insecurity, reflecting a broader pattern in which poverty forecloses climate action before it begins. This case study contributes timely evidence to New Jersey's climate resilience planning by centering poverty as a structural barrier to adaptation. It highlights the limitations of frameworks that assume baseline financial stability and calls for adaptation strategies that address economic precarity alongside environmental risk. By foregrounding the lived experiences of marginalized communities, this work advances a more equitable and justice-oriented approach to climate adaptation in New Jersey.

- Daniel Blanco, Rutgers University. *Timing of Emergence of Extreme-Temperature Mortality: A Framework for Assessing Climate-Related Impacts.*
    - **Co-authors:** Robert Kopp, Distinguished Professor, Director of MACH, Co-Director of Climate Impact Lab, Rutgers University
    - **Abstract:** This study introduces a novel Time of Emergence (ToE) framework to assess how climate impacts evolve under different temperature and socioeconomic scenarios. Using subnational mortality-temperature data from Carleton et al. (2022), we apply the framework to projections from the CCSM4 climate model combined with RCP4.5/8.5 and SSP2/3 pathways. The analysis focuses on 24,378 global regions, employing a 20-year rolling window to smooth annual variability and isolate climate change signals by comparing outcomes to a simulated world without climate change. The framework classifies regions into eight emergence categories, capturing how climate change alters mortality trends relative to historical baselines. These categories include scenarios where climate change leads to increased damages or benefits, accelerates or delays the onset of impacts, or results

in mixed outcomes over time. Key findings reveal that socioeconomic development generally reduces temperature-related mortality, but some regions (e.g., poorer, colder areas) only experience benefits under climate change due to reduced cold-related deaths. Conversely, climate change can accelerate benefits (e.g., parts of Canada seeing gains 70–80 years earlier) or delay them (e.g., Myanmar experiencing a 50–60 year delay in benefits due to heat stress). In some cases, climate change negates developmental benefits entirely, as seen in regions like Chicago, or overwhelms adaptation efforts, as in affluent areas like West Sydney.

11:15 AM – 12:15 PM **B3: Oral Presentations.** Theme: Education (Room 202- 2nd Floor)

- Ross Gary, Jessica Valenti, and Sarah Sterling, New Jersey Department of Education. *Outcomes from the Early Implementation of Climate Change Education in New Jersey's K-12 Schools.*
    - **Co-authors:** Listed above.
    - **Abstract:** In 2019, Former Governor Phil Murphy signed an executive order requiring the development and implementation of a statewide Climate Change Resilience Strategy. Recognizing that as New Jersey transitioned to a more resilient and sustainable economy there would be a need for climate literacy across all New Jersey communities and stakeholder groups, Former First Lady Tammy Murphy launched an initiative to incorporate climate change education into the New Jersey Student Learning Standards with the intention to prepare all students to understand how and why climate change happens, the impact it has on local and global communities, and how to act in informed and sustainable ways. With the adoption of the New Jersey Student Learning Standards in June 2020, New Jersey became the first state in the nation to require the teaching of climate change in grades K-12 and across multiple instructional areas. In recognition of his commitment to this initiative, Former Governor Murphy allocated a total of $14.225 million across the 2023 – 2026 State budgets to assist schools with the implementation of climate change education. In fulfillment of each State budget allocation, the New Jersey Department of Education developed and administered grant opportunities that provide educators with high-quality professional development to equip them with the knowledge needed to effectively integrate climate change concepts into their classrooms and that support school districts in developing interdisciplinary, standards-based climate change curriculum. After the first year of grant programming, over 90% of the educators that participated in professional development felt better supported and more confident implementing climate change education in their classrooms. Additionally, thirty-two school districts developed instructional units and corresponding student-centered climate resilience projects, which provided action-oriented learning experiences to over 14,000 students throughout the state. Grant program successes and challenges continue to shape ongoing climate literacy implementation efforts in New Jersey's K-12 schools.

- Sarah Wyman & Joshua Korenblat, SUNY New Paltz. *Earthrise Learning Commons for Sustainability Action and the Public Good*.
  - **Abstract:** Nobel Laureate Elinor Ostrom has observed that local people can create their own organizations and tend to a commonwealth. At this crucial moment of climate instability, sustainability education can and must function as a shared and generative space. Here, people can exchange resources without rivalry, without the need to maximize self-interests at the expense of the whole. They work for knowledge creation and information access as elements of the public good.

    On our interactive website Earthrise Learning Commons (earthrisecommons.org), sustainability learning converges with Open Access digital publishing around this idea of a commons of learning experiences. Here, educators interested in sustainability can band together across disciplinary boundaries and state, national, and continental borders to share and remix curricular innovations, learning activity templates, successful student outcomes, and community projects. Our forthcoming print anthology Sustainability Learning for Action & Community Engagement (Palgrave | Springer Nature 2026) will also exist as an Open Education Resource on this learning hub. In this presentation, we demonstrate the Learning Commons prototype, including a toolbox of resources: a list of sustainability competencies and a set of frameworks to transform sustainability education in any discipline into a project-based, experiential learning opportunity. Here, sustainability education becomes a living, evolving practice.

    The platform's architecture reflects sustainability principles at every level, using an open-source infrastructure where the content, design, and development embody the commons philosophy that grounds all sustainability work and Open Scholarship. By making our framework freely available on GitHub, accessible and replicable, we're not just sharing resources but cultivating an ecosystem for sustainability education where the project becomes a template for others to modify and adopt in their own settings. The platform supports Universal Design for Learning principles, with multiple pathways for engagement and pollination between disciplines. Our growing partnerships make this a key tool to combat climate change.

- Lauren Madden, The College of New Jersey. *Supporting Climate Teacher-Leaders' Capacity to Amplify Climate Change Education in New Jersey.*
  - **Co-authors:** Lori Thompson, The College of New Jersey; Rajvir Kaur, The College of New Jersey.
  - **Abstract:** Predictive studies and past research suggest that widespread climate change education in K-12 settings has the potential to serve as a key solution to the climate crisis. Climate Teacher-Leaders are defined for the purpose of this work as experienced practicing K-12 teachers who engage in extensive professional learning about climate change. This study describes the experiences and

characteristics of climate teacher-leaders who participated in multiple professional development events through New Jersey's statewide Climate Change Learning Collaborative (CCLC) network during Year 1 of it's implementation. Data sources include focus group discussions, survey responses, and observational field notes collected as part of the CCLC program evaluation. The characteristics of these climate teacher-leaders will be described using multiple frameworks for teacher leadership and innovation. We will offer recommendations and suggestions for supporting these climate teacher-leaders and leveraging their skills and expertise in scaling climate change education in K-12 schools across New Jersey.

- Monika Sikand & Harini Mittal, Bronx Community College CUNY. *The Scalable Green Framework: A Longitudinal Case Study at BCC-CUNY.*
  - **Co-authors:** Listed above.
  - **Abstract:** Sustainability education in higher education often relies on centralized models that align poorly with the decentralized governance and workforce-driven missions of U.S. community colleges. This qualitative case study examines Bronx Community College (BCC) to understand how sustainability unfolds as a distributed, longitudinal process across curricular and co-curricular spaces. Findings reveal that while initiatives are organizationally dispersed, coherence is achieved through recurring applied pedagogies and stable program-level pathways. By linking local implementation with system-level commitments, this study offers a scalable framework for integrating sustainability into vocational and technical education within decentralized systems.

11:15 AM – 12:15 PM **B4: Oral Presentations.** Theme: Ecology (Room 201- 2nd Floor)

- Siyi Huang, Rutgers University. *Observed increases in large wildfires intensity threaten terrestrial vegetation growth*.
  - **Co-authors**: Xiaomeng Jin, Rutgers University; Da Guo, Rutgers University; Chi Chen, Rutgers University.
  - **Abstract:** Large fires can pose severe and long-lasting impacts on vegetation structure and functioning, yet their definition and characterization remain inconsistent. Moreover, trends inferred from fire extent and fire intensity diverge, indicating that either metric alone may misrepresent changes in large-fire activity. Definitions based on a single criterion (extent or intensity) can therefore reduce comparability across studies and limit our ability to attribute post-fire impacts and recovery patterns to fire characteristics. In this study, we use satellite observations to jointly characterize large fires as events exceeding the 95th percentile of both burned fraction (BF) and maximum fire radiative power (MaxFRP) and quantify their spatio-temporal patterns across biome types. We then assess biome-specific impacts on vegetation structure (leaf area index, LAI) and evaluate post-fire recovery

trajectories. We observe contrasting spatial and temporal trends between tree- and non-tree-dominated biomes. In tree-dominated biomes, both BF and MaxFRP exhibit increasing trends, with hotspots primarily in Asia and North America. By contrast, non-tree-dominated biomes show declining trends in BF but increasing trends in MaxFRP. Large fires are associated with higher fire-induced LAI loss and weakening three-year LAI recovery, indicating reduced resistance and resilience. Forest biomes experience the largest immediate LAI loss; broadleaf forests recover quickly, while needleleaf forests recover slowly. The recovery process is strongly associated with perturbations in water use efficiency (ΔWUE), light use efficiency (ΔLUE), and 2m air temperature. Our findings highlight the importance of an integrated extent-intensity definition of large fires for resolving divergent trends and for improving understanding and prediction of post-fire vegetation structural recovery across biomes.

- Kapil Khanal, Rutgers University. *Comparing photosynthetic strategies of 11 Hardwood Evergreen Tree Species in New Jersey.*
  - **Co-authors:** Dirk Vanderklein, Montclair State University; Richard Lathrop, Rutgers University; Chi Chen, Rutgers University; Karina Schafer, Rutgers University.
  - **Abstract:** Photosynthesis in plants is foundational to life on earth, and it is influenced by environmental changes. To understand how the species respond towards these changes, we need to understand their photosynthetic strategies reflected in quantum yield, maximum carboxylation capacity (Vcmax), Water Use Efficiency (WUE), and Photosynthetic Nitrogen Use Efficiency (PNUE). We collected more than 360 leaf gas exchange data during the growing season from 2019 to 2024 from 11 co-occurring species of dominant Eastern Hardwood forests in New Jersey and analyzed the results using ANOVA and Tukey HSD test.

    We observed that quantum yield, Vcmax, WUE and PNUE among all species differed significantly. Acer saccharum had the highest quantum yield (0.10±0.06 μmol CO_2 m^{-2} s^{-1}) followed by Acer platanoides (0.08±0.05 μmol CO_2 m^{-2} s^{-1}) with white oak group (Quercus alba, Q. montana) having the lowest quantum yield (0.04±0.02 μmol CO_2 m^{-2} s^{-1}). The red oak group (Quercus rubrum, Q coccinea, Q velutina) had the highest Vcmax (37.9±18.71 μmol CO_2 m^{-2} s^{-1}) while Acer saccharum had the lowest Vcmax of 13.34±6.39 μmol CO_2 m^{-2} s^{-1}. The WUE for Acer platanoides was the highest (5.62±1.42 μmol CO_2 $mmol^{-1}$ H_2O) while Prunus serotina had the lowest WUE of 3.26±1.17 μmol CO_2 $mmol^{-1}$ H_2O. On the other hand, Prunus serotina had the highest PNUE of 3.68±0.99 μmol CO_2 g^{-1} N s^{-1} while Acer saccharum had lowest PNUE (1.87±0.61 μmol CO_2 g^{-1} N s^{-1}).

    Species like Acer platanoides, A. saccharum and Nyssa sylvatica show higher quantum yield and higher WUE suggesting that they exhibit light and water-efficient strategy. Species with high Vcmax corroborate with the high PNUE suggesting that such species have higher photosynthetic efficiency at lower light levels. Species like Prunus serotina have high PNUE that means they maximize nitrogen use at the cost of water showing a trade-off between PNUE and WUE.

- Dina Fonseca, Rutgers University. *Zombie mosquitoes: epidemiological consequences of climate driven selective relaxation*.
    - **Abstract:** Climate change is extending the mosquito season in northern states, including New Jersey, allowing adult *Culex* mosquitoes to remain active later into the fall. Normally, under short daylength female *Culex* mosquitoes do not blood-feed and instead accumulate fat reserves from nectar and fruit sugars, and retreat into sheltered sites to survive the winter.

      However, it has repeatedly been observed that in the fall, *Culex* mosquitoes increasingly feed on humans rather than birds. Although this shift has been hypothesized to result from reduced bird availability due to migration, this has not been conclusively demonstrated. Our recent work identified transcriptomic changes associated with mosquito age and short-day lengths that may also influence host preference.

      We hypothesize that female *Culex* mosquitoes that remain active late into the fall become “zombie-like”: despite little potential reproductive benefit, these older mosquitoes, more likely to be infected, continue seeking blood meals and increasingly bite humans.

      Climate change weakens natural selection against these late-season mosquitoes by extending warm fall conditions and survivorship, potentially increasing the risk of West Nile virus transmission in New Jersey and across the northeastern U.S.

- Fred Lubnow, Princeton Hydro. *The Impacts of Climate Change on Aquatic Resources and the Development of Harmful Algal Blooms*.
    - **Abstract:** In freshwater ecosystems, Harmful Algal Blooms (HABs) are almost exclusively produced by cyanobacteria. This group of photosynthetic bacteria have the potential to produce cyanotoxins, a group of compounds that can negatively impact the health of people, pets, livestock, and wildlife. Thus, such HABs can had a substantial impact on both potable water sources as well as recreational resources. While a number of factors contribute toward the development of HABs, climate change has only exacerbated the influence of these factors. This presentation will review and discuss both the direct and indirect impacts climate change can have on the appearance, frequency, duration and magnitude of HABs in New Jersey's lakes, reservoirs, and rivers. In light of these impacts, the

presentation will also present strategies that can be considered in minimizing such impacts in the preservation, protection, and restoration of our valuable aquatic resources.

11:15 AM – 12:15 PM **B5: Oral Presentations.** Theme: Nature-Based Solutions (Collaborative Learning Center, 1st Floor)

- Daniel Barone, Rutgers University. *New Jersey Nature-based Coastal Project Assessment and Evaluation Framework and Tool Development*.
    - **Co-authors:** David Bushek, Rutgers University; Richard Lathrop, Rutgers University; Robert Miskewitz, Rutgers University; Jenny Shinn, Rutgers University.
    - **Abstract:** Nature-based coastal projects are a central component of New Jersey's climate adaptation strategy and are being implemented rapidly to address flooding, erosion, habitat degradation, and water quality impairment. Despite this growth, consistent evaluation of project effectiveness, durability, and climate resilience outcomes remains limited. Monitoring is often constrained by short funding horizons, limited technical capacity, and ecological response times that extend well beyond post-construction monitoring periods, making cross-project comparison and long-term assessment difficult.

      This is an ongoing NJ Climate Change Resource Center funded project that is developing a standardized framework and practical assessment tools to evaluate implemented nature-based coastal projects in tidally influenced habitats across New Jersey. The framework is designed to assess both project specific objectives such as shoreline stabilization, flood protection, ecological enhancement, and water quality improvement and common outcomes of statewide relevance including sediment stabilization, wetland persistence, and climate resilience co-benefits.

      The project integrates natural science, engineering, and geospatial analysis within an applied decision-support context. Key components include development of a conceptual classification framework and baseline inventory of nature-based projects, identification of core measures and metrics using desktop, field, and hybrid assessment approaches, and pilot testing of the evaluation framework at representative sites. The resulting assessment protocol, standard operating procedures, and guidance documents are being designed for practical use by managers, planners, and practitioners.

      These tools will be implemented as a web-based application integrated into the NJ ResTOrS platform and linked with the Coastal Ecological Restoration and Adaptation Planning tool within the NJ ADAPT suite. Expected outcomes include improved consistency in project evaluation, identification of monitoring gaps, and a foundation for future comparative and return on investment analyses to support evidence-based climate resilience planning in New Jersey.

- Jim Bushong, Montgomery Township Environmental Commission. *Converting Stormwater Basins to Native Pollinator Incubators with Biodiverse & Adaptable Native Plant Selections*.
  - **Abstract:** Public and Private Stormwater Drainage basins present great opportunities to lend our pollinators much-needed help with select native host-plants and highly attractive nectar flora. The two most difficult areas to accomplish this are (1) sun-exposed slopes where the soil gets very dry and is also susceptible to erosion, and (2) the adjacent in-basin areas where baking sun can quickly dry out the soil. More frequent and severe droughts with climate-change are making these areas even more difficult to plan for. Several pilot-project highly-biodiverse flora colonies have been designed and are being implemented in publicly-owned drainage basins to demonstrate how this can be accomplished with diligent flora selections and planting methods. A novel planting technique is being tested to help such flora have a much higher probability of establishing on slopes and resist erosion forces. These pilot projects will help serve as incubators for local pollinators and also serve as demonstrations to inspire other basins to take similar actions in these especially problematic areas while building resilience to worsening climate-change.

- Tom Lewis, CSA Group Architects & Engineers. *A Florida Case Study with NJ Shore Relevance: the Sarasota Living Laboratory as a Foundation and Accelerator for Climate Resilience, Adaptation and Innovation*.
  - **Abstract:** The challenging convergence of dense coastal development, rising seas, vulnerable barrier islands, bayfront communities that drive the economy, and intensifying storms and vulnerability is something that the Florida Suncoast in the vicinity of Sarasota and the New Jersey Shore have in common. To meet this challenge, the Climate Adaptation Center based in Sarasota Florida is currently launching the Sarasota Living Laboratory to create a 10-mile climate resilience and adaptation innovation corridor. The heart of this being a “shared nervous system” of high-density measuring sensors and Artificial Intelligence dashboards to transform the bayfront zone into an instrumented testbed for coastal resilience and to create an adaptation engineering innovation hub. This oral presentation will share further details about the Living Laboratory Program as well as engineering perspectives from a NJ-based and -licensed professional engineer who is the lead resilience engineer for the program, is a board member for both the Climate Adaptation Center and the International Coalition for Sustainable Infrastructure, and is a published author with global expertise on the subject of climate, resilience and sustainability.

- Matthew Holthaus, WSP USA Inc. *National Park Service Watergate Wetlands Restoration Project Case Study: Restoration for Today and the Future*.

- **Abstract:** As a result of climate change effects causing changes more rapidly, wetland managers have to embrace a new approach when designing wetland restorations by no longer designing just to pre-disturbance conditions, but designing restorations that will also facilitate adaptation and long term resilience. The National Park Service proposed to restore wetlands associated with Van Campens Brook at the Watergate Recreation Site by removing artificial dams and ponds, thereby reestablishing its floodplain connection. Restoration efforts were conducted as compensatory mitigation for unavoidable impacts on wetlands associated with a transmission line project. WSP USA, Inc. provided full design, permitting and construction services to achieve a high-functioning wetland and riparian floodplain system with more natural fluvial dynamics.

  The Watergate site is a critical host to multiple special status species documented within the New Jersey Categorial 1 waterway of Van Campens Brook, in which its watershed and resource value is solely contained within NPS property. To develop the overall restoration approach, multiple design studies were conducted, including Hydrologic and Hydraulic modeling, climate resiliency adaptation, geomorphology and reference site surveys, topographic survey, soil investigations and beneficial reuse classification, cultural resource investigations, T&E surveys (flora and fauna) and mitigation plans, and invasive treatment management. Key to the design and sustainability of the site was the evaluation of impacts to designed habitats as a result of climate change. Utilizing over 20 climate models to develop a regionalized temporal model, daily precipitation, evapotranspiration and storm frequency rainfall depths were projected to 2100. The impact of these projected future climate conditions were used to evaluate the adaptability of the design. Adjustments were then incorporated into the restoration design to allow for the natural lateral migration of wetland habitats predicted within Van Campens Brook floodplain.

1:30 PM – 2:30 PM **CONCURRENT SESSIONS C**

1:30 PM – 2:30 PM **C1: Panel.** Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms (Livingston Hall- 1st Floor)

Abstract: As New Jersey continues to lead the nation in integrating climate change education across all K-12 state academic standards, the bridge between scientific research and classroom implementation has never been more critical. This panel explores the Climate Change Learning Collaborative (CCLC), a strategic partnership between Rutgers University (CMSCE) and Community-Based Organizations (CBOs), including New Jersey Audubon, as a data-driven model for climate assessment and pedagogical evaluation. Additionally, CBOs, New Jersey School of Conservation and Sea Grant, from the Ramapo College and Stockton University CCLCs will provide insight into the ongoing research, collaboration, and placed based learning opportunities.

The session will detail how this collaborative ecosystem leverages university-level climate expertise and CBO-led environmental stewardship to provide public school teachers with robust, place-based professional development. CBOs will draw on their ongoing research at their sites and their work with K-12 educators. Central to this discussion is the assessment and evaluation of program efficacy through post-survey data. By analyzing feedback from participating K-12 educators, the CCLC evaluates the successful transfer of climate concepts from university to local classrooms.

Panelists:

- Eddie Cohen, Rutgers Center for Math, Science, & Computer Education. *Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms*.
- Roberta Hunter, New Jersey Audubon. *A Seal of Climate Literacy for New Jersey*.
- Tanya Sulikowski, New Jersey School of Conservation. *Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms*.
- Brielle Kociolek, Rutgers Center for Math, Science, and Computer Education (moderator). *Scaling Climate Change Education through Collaboration: Evaluating the Impact of Climate Change Learning Collaboratives on K-12 Classrooms*.

1:30 PM – 2:30 PM **C2: Oral Presentations.** Theme: Planning and Policy with a Focus on Energy (Gathering Lounge- 1st Floor)

- Jason Kliwinski, Rutgers University. *The path to net zero energy buildings - how zero energy codes and sustainable standards like LEED v5 and Passive House can show the way.*
  - **Abstract:** New Jersey has aggressive clean energy and GHG reduction goals. Significant reductions in new and existing buildings are needed. The NJ Zero Energy Building Roadmap lays out the path. It involves a combination of measures, but key is adoption of strong building codes/standards. We will discuss challenges and opportunities around adopting zero energy codes and/or standards like LEEDv5 and PassiveHouse.

- Christopher Whitehead, Chris Whitehead Consulting, LLC. *Protecting the Promise: AI Could be a Swiss Army Knife in the Climate Fight*.
  - **Abstract:** Data center proliferation and the potential benefits of AI are front of mind, as the scale of financial investment in this space has risen to nearly unprecedented levels around the country. Short term economic benefits from these projects are relatively self-evident, but to date little has been published on how data center proliferation will likely affect existing social and environmental baseline conditions in neighboring communities. Our team at Rutgers University is in the planning stages of a social baseline study for data centers. This presentation will discuss the project, its potential implications, and identify potential areas to minimize projected negative impacts on surrounding communities.

Rushing into this could mean inadvertently being a detriment to the climate fight. We are all looking for more sustainable lower impact ways to lead our lives, and AI holds great promise for potentially unlocking answers across sectors and media, of discovering new materials and uses, of process efficiencies, but only if we set up proper guardrails and rules for environmental and public health impacts. This presentation will discuss how we can best utilize the promise of AI for the betterment of man and as a tool in the climate fight, rather than a hinderance.

- Wolfram Hoefer, Rutgers University, Department of Landscape Architecture. *Climate Action. An International Perspective on How to Enact Climate Action at the Government Public Interface.*
    - **Abstract**: This panel summarizes a comparative dialogue between two highly industrialized and suburbanized regions of Germany and the United States to develop a methodological approach with which to identify best practices for addressing and implementing climate action. The open-minded discourse between international perspectives that continues to emerge from this collaboration of academics, planning officials, and practitioners in landscape planning and design is a model of how to work with a partner geography in other localities, both domestically and internationally, that is replicable in all communities. The case studies introduced in this panel demonstrate the value of learning from such intentional partnering with a region that shares a similarity of physical and social vulnerability to climate change impacts while also remaining distinct in its administrative context, such that differences highlight openings for new ways of thinking.

      Utilizing examples from the textbook that came out of this cooperative effort, the panel will discuss the process and benefits of identifying appropriate geographic coordinates for partnership that can illuminate transferable solutions for both people and place. Insights from the Ruhr Region and New Jersey collaboration highlight policy tools and processes that can be adopted and adapted in large-scale planning approaches; site specific case studies highlight the role of landscape architects as leaders in interdisciplinary teams developing and implementing strategies to meet uncertainties caused and exacerbated by climate change. Beyond the realm of policymakers and practitioners, voices from the community are amplified through a focus on place and connectedness by those whose work in academic and nonprofit sectors foregrounds the lived experience of those most vulnerable to and affected by climate crisis events and ongoing, everyday climate impacts.

      All together, this collection of international climate action at the government/public interface aims to mobilize multiple forms of knowledge and experience in order to inform and enact careful climate response and to inspire similar approaches to learning from others.

      Literature:

Hoefer, Wolfram, Arianna Lindberg, Sebastian Schlecht, Angela Oberg, and Frank Gallagher. 2025. Climate Bridge: An International Perspective on How to Enact Climate Action at the Government Public Interface. 1st ed. Rutgers University Press.

1:30 PM – 2:30 PM **C3: Oral Presentations**. Theme: Energy (Room 202- 2nd Floor)

- Tarun Reddy Arasu, Rutgers University. *Regional CO_2 Caps and Emissions Leakage in PJM: A Five-Zone Capacity Expansion Analysis*.
- **Abstract:** Regional carbon policies can reduce emissions within regulated areas, but their system-wide effects depend on how electricity moves across interconnected markets. This study uses a five-zone capacity expansion model of a PJM-like electricity system to examine how a RGGI-style regional CO_2 cap affects generation, electricity trade, emissions leakage, system costs, and New Jersey's power-sector decarbonization outcomes from 2025 to 2040.
  The model compares a reference case without the cap to a policy case in which New Jersey and a combined Maryland-Delaware-DC zone are subject to a regional emissions cap. The analysis tracks changes in generation mix, interzonal electricity flows, cumulative CO_2 emissions, and total system cost. It also examines how emissions reductions within capped zones are affected by increased generation in uncapped neighboring zones.

  The results show that the cap reduces emissions and gas generation within the capped region, including New Jersey. However, some of these reductions are offset by higher generation and emissions in uncapped zones, especially Pennsylvania, as electricity trade shifts across the regional system. As a result, system-wide emissions decline more modestly than in-region emissions. The cap also increases total system costs slightly, while the largest long-run emissions reductions are driven mainly by clean energy and renewable portfolio requirements rather than the cap alone.
  These findings highlight the importance of regional market interactions in New Jersey climate policy. In an interconnected PJM market, state and regional climate policies can reduce local emissions, but their broader climate value depends on electricity trade, neighboring-state generation responses, and coordination across the grid.

- Anthony Anastasi, Rutgers University. *Predictive Thermodynamic Modeling for Screening-Level Assessment of Biowaste-to-Energy Systems*.
  - **Abstract:** New Jersey generated approximately 1.17 million tons of food waste in 2024 (ReFED, 2026). In addition to food waste, other organic waste streams, such as wastewater biosolids, represent significant opportunities for renewable energy recovery and greenhouse gas mitigation through waste-to-energy technologies. However, the simulation and optimization of these technologies are often limited by the lack of reliable thermodynamic property data for the diverse organic compounds present

in biomass-derived feedstocks. Because these feedstocks consist of complex mixtures rather than single compounds, predictive approaches are needed to estimate thermodynamic properties required for preliminary process evaluation.

Previous work by the authors (Anastasi et al., 2026), developed a predictive framework for estimating enthalpy and Gibbs free energy of formation for organic compounds from elemental composition. In the present work, this framework is extended to include nitrogen- and sulfur-containing compounds enabling prediction for a broader range of species commonly present in biowaste streams.

The modeling framework is applied to representative waste-to-energy systems in New Jersey, including biosolids gasification and anaerobic digestion processes for municipal organic wastes. Representative surrogate compounds are used to approximate feedstock composition, and predicted thermodynamic properties are used to evaluate driving forces, theoretical energy recovery potential, and preliminary heat and work requirements for each conversion pathway.

These results demonstrate that predictive thermodynamic property modeling can serve as a screening-level tool for evaluating biowaste conversion pathways and supporting early-stage design and comparison of waste-to-energy systems aimed at diverting organic waste from disposal, thereby reducing greenhouse gas emissions.

(1) ReFED. Food Waste Monitor: Insights Engine. https://insights-engine.refed.org/food-waste-monitor?break_by=destination&indicator=tons-waste&state=NJ&view=detail&year=2024 (accessed 2026-03-14).
(2) Anastasi, A.; Masuku, C.; Ravikumar, P.; Chundawat, S.; Hildebrandt, D. Estimation of Thermodynamic Properties for Cellulosic Biomass-Derived Compounds: Application to Heat and Work Balances in Process Simulation. In ESCAPE 36 Proceedings; PSE Press, 2026; accepted for publication.

- Ross Rucker, Rutgers University. *Impact of Snow on Solar Array Performance: A Comparison of Agrivoltaic Array Types*.
  - **Co-authors:** Dunbar Birnie, Rutgers University; Micah Seidel, Rutgers University; Arend-Jan Both, Rutgers University.
  - **Abstract:** Recent heavy snowfall events in January and February of 2026 impacted electricity production at the Rutgers' agrivoltaic arrays. Various environmental conditions and technical specifications determine the efficiency of solar energy generation, including module capacity and tilt, ambient temperature, ground surface albedo, and inverter size. Of particular interest after snowfall are three key effects: 1) the snow may collect on top of solar modules and reduce electricity production, 2)

the snow that remains on the ground for an extended period can reflect significant amounts of light back onto the modules, especially for bifacial modules that capture light on both sides, and 3) snowfall happens when the temperature is lower and solar modules have higher efficiency. The Rutgers Agrivoltaic Program operates three sites around the state, two with single-axis tracking bifacial panels and total capacities of 255kWDC and 95kWDC respectively, and the third with stationary vertical bifacial (VBF) panels and a 170kWDC capacity. In addition, Rutgers New Brunswick has parking canopy arrays that are fixed-tilt, allowing us to compare snow effects among all three array types that have the most marketability for agrivoltaics. The fixed-tilt and tracking arrays can experience times when snow may be covering the top of the modules for days, lowering their electricity production. On the other hand, the VBF array at Cook Campus experienced no snow collection but rather benefited substantially from the increased albedo and upward reflected light intensity. Initial calculations using typical meteorological year data showed that a VBF array can generate up to 69% more electrical output when snow is on the ground compared to periods without snow cover. Additional results will be presented based on measured electricity production and weather station data. Results will be discussed in the context of climate change impacting solar energy production in NJ.

1:30 PM – 2:30 PM **C4: Oral Presentations.** Theme: Storms and Extreme Events (Room 201- 2nd Floor)

- Diana Apoznanski, Rutgers University. *Investigating changes in nor'easter characteristics and their impacts.*
    - **Co-authors:** Anthony Broccoli, Rutgers University; Robert Kopp, Rutgers University.
    - **Abstract:** Extratropical cyclones (ETCs), locally known as nor'easters, are impactful storms that drive most of the severe storm surge events in the Northeast United States, including New Jersey. Because they are associated with similar hazards to hurricanes, such as severe property damage from flooding and extreme winds, but they are physically and statistically different, it is important to understand the climatology of nor'easters in order to increase resilience in the affected areas. We use tide gauge data, reanalysis, and historical global climate models (GCMs) to study their climatology and investigate the physical drivers of ETCs in the context of how the likelihood of storm surge producing traits has changed historically and during the current climate regime. ETCs are identified using a cyclone tracking algorithm and their meteorology data are analyzed to find the statistical extreme value distribution (e.g., return period) associated with each characteristic (e.g., pressure, wind, precipitation). This study highlights the extreme value properties nor'easter characteristics, which results in conclusions that are translatable to both the scientific community and community stakeholders.

- Mackenzie Weaver, University of Pennsylvania. *Historical Nor'easter Intensity Trends in Reanalysis and Regional Climate Simulations: A Cross-Dataset Perspective.*

- **Co-authors:** Andra Garner, Rowan University; Dominique Paquin, Sciences du Climat et Services Climatiques, Ouranos, Montreal, Quebec, Canada; Martin Leduc, Sciences du Climat et Services Climatiques, Ouranos, Montreal, Quebec, Canada; Marie-Pier Labonté; Sciences du Climat et Services Climatiques, Ouranos, Montreal, Quebec, Canada; Michael Mann, University of Pennsylvania.
- **Abstract:** Nor'easters, also known as east coast winter cyclones, are powerful winter storms that cause heavy precipitation, damaging winds, and dangerous flooding and storm surge. These storms are some of the most impactful hazards to threaten the U.S. Northeast, including New Jersey, with the most intense storms costing billions of USD in damages and causing severe transportation and power disruptions. Given the hazard nor'easters pose to the densely populated U.S. Northeast, it is critical to understand how they have changed in the recent past so that we may better understand how they will evolve in a future warming climate. Here, we compare historical nor'easter intensity and intensification rates in a high-resolution regional climate model (the Canadian Regional Climate Model, version 5 [CRCM5]) to multiple reanalysis products (ERA5 and CFSR). We identify substantial differences in historical nor'easter intensity and intensification rate quantile trends across our datasets that are also dependent on the intensity metric, the specific quantile considered, the season, and the time period evaluated. This indicates that analyses of historical nor'easter intensity are highly sensitive to methodological choices made regarding these factors, and given this sensitivity, historical trends in these storm characteristics remain unclear. More work is needed to firmly identify how nor'easter intensity and intensification rates might be evolving as the climate warms, and how those changes impact the threat these storms pose to coastal communities in the U.S. Northeast.

- Annabelle Horton, University of Pennsylvania. *Environmental DNA: The First Geological Proxy Capable of Differentiating Nor'easters vs Hurricanes.*
  - **Co-authors:** Wenshu Yap, Nanyang Technological Institute; Jennifer Walker, Rowan University; Donald Barber, Bryn Mawr University; Kaia Susman, Bryn Mawr University; Michael Mann, University of Pennsylvania.
  - **Abstract:** Nor'easters are intense extratropical storms (ETCs) that impact the Northeast of the United States and produce destructive storm surges and substantial waves capable of reshaping coastlines and significantly damaging coastal communities. Despite the observed significance, Nor'easter records are sparse and limited to the short instrumental period. This work investigates the use of environmental DNA (eDNA) as the first novel proxy to distinguish Nor'easter overwash deposits from hurricanes. The seasonal differences in storm occurrence with Nor'easters occurring in winter (Nov – April) and hurricanes in summer (May-Oct) should result in different and distinct microbial and phytoplankton communities present in the Atlantic Ocean and their eDNA signatures are preserved in resulting overwash sediments. This work analyzed the eDNA of two overwash deposits preserved in the geological record at Whale Beach New Jersey. Overwash deposit 1 is from the 1962 Ash Wednesday

Nor'easter and overwash deposit 2 from the Hurricane of 1821. The preliminary work into this objective has successfully extracted, PCR amplified for the microbial communities, sequenced and processed the eDNA from four cores (WB2501, WB2506, WB2508, WB2509). These four cores have been confirmed to contain both the Ash Wednesday Nor'easter and the Hurricane of 1821 through loss on ignition and grain size analysis. The Bray-Curtis dissimilarity values for samples within all four cores reveal a clear separation between hurricane and nor'easter overwash deposit reflecting a significant community assemblage difference between the samples. This indicates that storm depositional processes exert a primary control on microbial community composition within the core. Further investigation has revealed 10 distinct microbes associated with either a Nor'easter or a Hurricane, demonstrating not just the seasonal differences between storms but as well depositional sources. This work demonstrates that eDNA can successfully be used as a geological proxy for differentiating hurricane and nor'easter overwash deposits.

2:45 PM – 3:45 PM **CONCURRENT SESSIONS D**

2:45 PM – 3:45 PM **D1: Panel.** Clean Energy Fighting Climate Change (Livingston Hall- 1st Floor)

Abstract: New Jersey has a long history of environmental and clean energy leadership. This panel will survey and weave together current state-wide efforts to advance clean energy. These include solar, wind, coastal protection, farmland preservation, and electric grid modernization.

Panelists:

- Dave Specca, Rutgers University, Program Lead. *Rutgers Agrivoltaics Program*.
- Yousaf Shahid, Rutgers University, Center for Urban Policy Research. *Thermal Energy Networks (TENs) for New Jersey*.
- Linda Garrett, American Farmland Trust, NY&NJ Regional Director. *American Farmland Trust*.

  Dunbar Birnie, Rutgers School of Engineering and Rutgers Climate and Energy Institute, Area Lead for Renewable Energy, Technology, and Energy Conservation (moderator).

2:45 PM – 3:45 PM **D2: Oral Presentations.** Theme: Planning- Community (Gathering Lounge- 1st Floor)

- Heather Korzun, Urban Coast Institute, Monmouth University. *Developing a Design Pipeline for Nature-Based Climate Resilience Projects in New Jersey Communities*.
  - **Co-authors:** Rachel Forbes, Urban Coast Institute; Tom Herrington, Urban Coast Institute.
  - **Abstract:** New Jersey has emerged as a national leader in climate action, committing substantial resources to coastal resilience. Through NOAA's Climate Resilience Regional Challenge, the State was awarded $72.5 million for Building a Climate Ready New Jersey ("Ready NJ"). Within this larger

initiative, the Urban Coast Institute (UCI) leads the “Design Pipeline,” which aims to establish the means and organizational structures to move communities from resilience planning through the design process and into implementation.

One element of the Design Pipeline is to advance natural and nature-based climate resilience project planning and design in 18 to 20 overburdened and disadvantaged communities. While this award is transformative, it cannot fund every proposed climate resilience project in across the state. Strategic decision-making is required to determine which communities are best suited to receive support through this grant.

This presentation will demonstrate how climate science, policy research, and decision support tools can inform on-the-ground climate resilience efforts. Specifically, it will describe UCI’s approach to community selection, which began with a survey-level spatial analysis in ArcGIS and was then refined through interviews with Ready NJ partner organizations. Finally, the presentation will look ahead to UCI’s engagement strategy and the Design Pipeline team’s long-term approach for supporting the implementation of natural and nature-based resilience projects.

- Woojin Jung, Rutgers University. *Developing High Resolution Hazard Vulnerability Index (2HVI) to Improve Community Resilience in New Jersey.*
    - **Co-authors**: Lucas Marxen, Rutgers University; Tawfiq Ammari, Rutgers University; Younsung Kim, George Mason University.
    - **Abstract:** Climate hazards do not affect all communities equally. Across New Jersey, socially and economically disadvantaged neighborhoods face disproportionate exposure to climate risks, yet existing tools fail to capture the full complexity of their vulnerability. Current indices rely primarily on census-derived demographic variables aggregated at coarse geographic scales, such as census tracts or block groups, underrepresenting the physical characteristics of the built environment, access to critical resources, and communities' adaptive capacity. Planners and hazard mitigation officials are often ill-equipped to identify the highest-need areas or understand how affected residents perceive and communicate about climate risk.

      This project addresses these gaps through the development of a high-resolution Hazard Vulnerability Index (2HVI) designed to deliver fine-grained, community-sensitive assessments of climate hazard exposure across New Jersey. The 2HVI integrates multiple, complementary data streams: satellite imagery capturing land cover and physical landscape features; neighborhood morphology indicators reflecting built environment characteristics; Points of Interest (POIs) data representing access to essential services and resources; transportation network connectivity metrics; and social media text revealing how residents describe, frame, and experience climate-related events in their own communities. By combining computational analysis with linguistically grounded signals drawn from lived experience, the 2HVI bridges the gap between top-down quantitative assessment and bottom-up community knowledge.

This multi-modal, data-fusion approach enables a more holistic and spatially precise characterization of vulnerability than existing tools can provide. The resulting index will provide policymakers, urban planners, and community organizations with high-resolution insights to guide resilience planning, infrastructure investment, and targeted resource allocation toward the populations and places facing the greatest climate risk. The 2HVI advances a decision making tool for climate adaptation in New Jersey and the pipeline of creating the index can be applied to other regions.

- Clinton Andrews, Rutgers University. *Empty and exposed: Seasonal housing on the Jersey Shore.*
    - **Abstract**: The 55 resort communities that make up the Jersey Shore host 291,000 housing units worth almost $158 billion, but many of the homes enjoy only seasonal use. On average, 40% of these housing units sit vacant except in the summer months, and in some municipalities the winter vacancy rate is closer to 90%. On average, 59% of the assessed property value in these municipalities sits in the FEMA 100-year flood plain, and in some locations, it is closer to 100%. Seasonal housing on the Jersey Shore thus represents a substantial investment that is at risk from coastal flooding and rising sea levels.

      The consequences of flooding are less for seasonal housing units than for units occupied year-round, because flood damage will be unlikely to threaten human life or cause household displacement. Instead, the losses will be mainly financial. FEMA appropriately distinguishes between seasonal and year-round housing types and only provides assistance to primary residences, although versions of the National Flood Insurance Program are available to both. However, the policy implications do not end there, in part because the housing units themselves are interchangeable and most could serve either seasonal or year-round residents.

      This paper presents new data to quantify the extent of seasonality in Jersey Shore municipalities. It provides historical context regarding the growth of seasonal housing along the Jersey Shore. It considers the current role of seasonal homes from alternative policy perspectives including local public finance, local economic development, affordable housing supply, environmental impacts, and public beach access. Finally, it speculates about the future roles of these housing units in an era of increased remote work, assetization, short-term rentals, and climate risk.

- Carrie Grassi, WSP USA Inc. Multi-Hazard Flood Resilience for Multi-Family Affordable Housing in New York City
  - **Abstract:** Climate change is intensifying coastal flooding, extreme precipitation, and heat in dense urban environments, with disproportionate impacts on low-income and historically marginalized communities. This presentation summarizes the New York City Department of Housing Preservation and Development (HPD) Multi-Hazard Flood Resilience Study, an ongoing initiative led by WSP that translates climate risk into equitable, implementable adaptation strategies for multi-family affordable housing. The study focuses on seven Mitchell Lama cooperative housing developments, home to approximately 14,800 residents, where aging infrastructure, constrained capital planning, and exposure to multiple sources of flooding create compounding vulnerability. The analysis characterizes coastal storm surge and extreme rainfall-driven stormwater flooding under current and future climate conditions, then links these hazards to site- and building-scale exposure pathways. Engineering assessments evaluate vulnerability across key building systems, with particular attention to mechanical, electrical, and plumbing assets whose failure can trigger cascading outages, prolonged service disruptions, and delayed recovery. To quantify these vulnerabilities, the team applies lifecycle risk modeling to estimate potential damages and losses and to test how mitigation concepts change expected outcomes over time. Resident engagement is conducted through a community working group, which helps ground risk findings in lived experience and informs strategy prioritization and conceptual design. Findings are used to connect concepts to benefit–cost analyses and funding applications. Overall, the case study demonstrates a practical, multidisciplinary framework that combines hazard science, engineering design, economics, and community-centered governance to advance climate justice goals while improving resilience performance. Lessons learned are transferable to other cities seeking to move from high-level resilience policy to actionable investments in affordable housing.

2:45 PM – 3:45 PM **D3: Oral Presentations.** Theme: Agriculture (Room 202- 2nd Floor)

- Garin Bulger, Rutgers University. *Climate Change and Regenerative Agriculture in New Jersey.*
  - **Abstract:** The New Jersey agricultural sector is already experiencing the impacts of climate change through increasingly erratic precipitation, more frequent extreme weather events, and mounting pressure on soil and water systems. At the same time, a growing number of farmers across the state are adopting regenerative agricultural practices that emphasize soil health, ecological diversity, and long-term resilience. This session explores how climate change is shaping regenerative agriculture in New Jersey and what these dynamics imply for agricultural policy and climate adaptation. Drawing on original survey data from the state's first survey of regenerative farmers, the session examines how producers are experiencing climate-related risks and how they are responding through practices such

as crop diversification, cover cropping, rotational grazing, protected growing structures, and adjustments to planting and harvest schedules.

  - While these strategies reflect a proactive approach to climate adaptation, regenerative farms often operate on small acreages, rely heavily on off-farm income, and face persistent challenges related to infrastructure, land access, labor capacity, and regulatory complexity. The discussion situates these farm-level realities within New Jersey's broader agricultural and policy landscape, including existing soil conservation programs and emerging regenerative initiatives, while also drawing lessons from policy frameworks in other states. Particular attention is given to the importance of infrastructure, technical and educational assistance, and land tenure security, which are underdeveloped yet critical components of climate resilience.

- Rebeca Mata, Rutgers University. *Dual-Use Solar Energy Can Promote Climate Resilience: Insights from the Rutgers Agrivoltaics Program*.
  - **Co-authors:** Daniel Ward, Rutgers University.
  - **Abstract:** Agrivoltaics, the simultaneous use of land for agricultural production and solar energy generation, has emerged as a promising climate resilience strategy for NJ's agricultural sector. The Rutgers Agrivoltaics Program (RAP) operates three research and demonstration systems across NJ: the Rutgers Animal Farm in New Brunswick (170 kWDC), the Snyder Research and Extension Farm in Pittstown (94.5 kWDC), and the Rutgers Agricultural Research and Extension Center in Upper Deerfield (255 kWDC). Each site consists of a unique installation featuring different panel mounting configurations and cropping strategies, enabling a detailed assessment of agricultural yields and energy generation.

    RAP's interdisciplinary approach integrates agronomy and horticulture, engineering, environmental science, soil science, social science, and economics to evaluate the suitability of agrivoltaics for NJ farms. Ongoing research evaluates the performance of economically important commodities, including forage grasses, hay, soybeans, and vegetable crops. Results from the first two growing seasons indicate that responses vary across crop species. For example, hay yields were not affected by the presence of elevated solar panels, whereas soybean yields were positively affected in one season and negatively in another. Similarly, yields of tomato, pepper, and eggplant decreased with proximity to the solar panel rows. Nevertheless, the expectation is that any yield losses will be offset by the revenue from the renewable electricity generated.

RAP is contracted by the NJBPU to help implement the Dual-Use Solar Energy Pilot Program. This program aims to ensure that agrivoltaic development remains aligned with farmers' needs, farmland preservation goals, and the need to produce clean and affordable electricity.

So far, our work suggests that agrivoltaics has great potential to improve climate resilience by increasing renewable energy production without reducing productive agricultural land. We hope our research will show that agrivoltaics is a win-win for NJ farmers and the state's efforts to substantially reduce greenhouse gas emissions.

- James Shope, Rutgers University. *Seasonal predictive models of blueberry bud break, bloom, and harvest using chilling and heat accumulation.*
    - **Co-authors:** Peter Oudemans, Rutgers University; Robert Muldowney, Rutgers University; David Robinson, Rutgers University.
    - **Abstract:** Climate change poses a challenge for New Jersey blueberry growers as winters have warmed and spring temperatures have become more variable, which can affect blueberry yield, quality, and variety selection. Cultivar choice is influenced by plant phenology, including chilling and heating requirement, bud break timing, flowering, and fruit ripening. These traits must align with the local climate for timely and reliable bloom and avoidance of damaging weather such as late spring frosts. These stages also define the timing of specific management practices such as herbicide and insecticide applications. Misalignment between crop development, climate, and management practices can increase production costs and lower yield and fruit quality. To improve seasonal production in a more variable climate and for long-term planning, we have developed optimized predictive models of highbush blueberry budbreak, bloom onset, and harvest. The models using both chilling hours and growing degree days from 22 years of blueberry phenology and climate observations in Hammonton, New Jersey. Including both winter chilling and spring warming provided a better prediction of phenology than just one variable, with a cross validated R2 of 0.6–0.85 and a cross validated error of approximately 3–3.5 days. We use the average daily climatology to inform this predictive approach that can be used by growers and researchers for operational forecasts, improving on the current Rutgers blueberry phenology tool. As the climate warms, these seasonal drivers may conflict. The accelerating effect of a warmer spring may be at odds with the delaying effect of a warmer winter, indicating that phenology may not just shift earlier to accommodate a new climate. Future warming suggests that harvest and bud break may occur earlier, but annual bloom may exhibit higher interannual variability.

- Rajani Karuturi (Pranic Soil) and James White (Rutgers University). *Harnessing the Rhizophagy Cycle for Nutrient Sovereignty.*

- **Abstract:** The Rhizophagy Cycle allows corn to acquire nitrogen without synthetic fertilizers. We will demonstrate how professional biological monitoring can produce high-quality, R3-stage corn yields while reducing input costs by over $100 per acre. This has tremendous potential for farm viability, climate mitigation and water quality protection.

  1. The Economic and Climate Challenge in New Jersey Agriculture
  As of 2026, New Jersey's agricultural landscapes which harvested 61,000 acres of corn in 2024 with an average yield of 157 bushels per acre (USDA NASS) faces a critical paradox. Conventional maize production remains tethered to synthetic nitrogen (Urea) inputs that are increasingly volatile and ecologically damaging. Standard agronomic guidance for our state's average yield necessitates applying approximately 157 to 196 lbs of synthetic Nitrogen per acre. With projected 2026 urea prices surpassing $600 per ton, New Jersey farmers face an average input cost of $102 to $127 per acre for nitrogen alone. Beyond the financial burden, these applications contribute significantly to our greenhouse gas footprint through Nitrous Oxide (N_2O) emissions and pose persistent leaching threats to our watersheds. In this panel, I will detail my transition away from this high-input model toward a state of "Margin-Based Autonomy."

  2. Innovation: The Rhizophagy Cycle and Oxidative Scavenging
  My case study examines a transformative biological alternative: the Rhizophagy Cycle. Building on groundbreaking research from the Rutgers University Department of Plant Biology (White et al., 2024; 2025), I demonstrate Dr.White's research on how plants utilize Reactive Oxygen Species (ROS), specifically superoxide, to actively internalize and "digest" soil bacteria. This "biological farming" allows the plant to harvest nitrogen directly from microbial protoplasts (L-forms), bypassing the need for traditional chemical salts. By shifting the focus from the soil solution to the internal root environment, I show how I allowed the plant to manage its own nutrient supply chain. This innovation suggests that New Jersey's corn acreage could transition from passive nutrient recipients to active nutrient scavengers, provided the soil microbiome is professionally managed.

  3. Methodology: Professional Biological Assessment and SFW Protocols
  A key differentiator of my work is the integration of professional diagnostic tools outside the traditional university lab setting. As a Soil Food Web (SFW) Certified Lab Technician, I leaned on my training to perform biological assessments that quantify microbial biomass. By identifying specific ratios of bacteria, fungi, and protozoa through microscopy, I ensured a functional "BioCompleteness" was in place to sustain the rhizophagy process before planting. I

also look at roots under epifluorescence regularly. Diabase rock powder from Trap Rock Industries was obtained with assistance from Joseph Heckman. It was sprinkled across the entire plot during spring 2025. No other inputs were applied during the entire season.

This methodology demonstrates that NJ producers can achieve scientific rigor and nutrient independence through on-site biological monitoring. My transition from "prescriptive" nitrogen applications to "biologically-verified" management allowed for the total elimination of synthetic inputs.

4. Case Study Results: Success at the R3 Stage and Seed Viability

In my 2025 trial, I cultivated Ukrainian corn varieties selected for their inherent resilience and adaptation to low-input environments. Throughout the growing season in my New Jersey trial, I applied zero synthetic nitrogen or commercial seed treatments. Although this residential trial was not designed for a volumetric bushel-per-acre analysis, the crop demonstrated exceptional physiological vigor. I harvested a significant portion of the yield at the R3 (milk) stage for personal consumption, noting excellent grain fill and superior flavor profiles. The remaining ears were left to reach full maturity, resulting in high-quality, viable seed for my 2026 season. I have proved that the rhizophagy cycle is a robust mechanism capable of supporting the energy-intensive demands of grain filling without the $127/acre nitrogen overhead seen in conventional systems.

5. Socio-Economic Significance and Policy Implications

I believe the implications of these results for New Jersey's 2026 Climate Resilience Strategy are profound. By moving toward a "Biology-First" model, I address three critical areas simultaneously:

- *Decarbonization: Eliminating the carbon-intensive manufacturing and application of synthetic urea.*
- *Water Stewardship: Protecting New Jersey's sensitive aquifers and watersheds from agricultural nitrate leaching.*
- *Economic Resilience: Strengthening the financial health of NJ farms by reducing overhead. When I reduced my nitrogen input costs to zero, I effectively mitigated the economic risk associated with climate-driven price volatility.*

6. Conclusion: A Roadmap for Bio-Sovereignty

Ultimately, my project serves as a proof-of-concept for a decentralized, biologically managed agricultural system. I suggest that the future of New Jersey's climate adaptation lies in the *hands of "Bio-Sovereign" producer's technicians and farmers who combine cutting-edge research with professional assessment skills. By reclaiming the Rhizophagy Cycle, I aim to show that New Jersey can lead the region in demonstrating that food security and climate mitigation are integrated products of a healthy soil microbiome. In this panel, I will discuss how these tools can be scaled to support the broader NJ agricultural community through technical assistance programs (TAP) and community-led biological management.*

2:45 PM – 3:45 PM **D4: Oral Presentations.** Theme: Storms & Extreme Events (Room 201- 2nd Floor)

- Hugh Roarty, Rutgers University. *Climatology of New Jersey Coastal Currents.*
    - **Co-authors:** Tim Stolarz, Rutgers University; Josh Kohut, Rutgers University; Michael Smith, Rutgers University; Ethan Handel, Rutgers University.
    - **Abstract:** The climatology of surface currents off the coast of New Jersey was characterized using multi-year observations from the Rutgers University Center for Ocean Observation Leadership high-frequency (HF) radar network. This distributed network of shore-based HF radars provided high-resolution, synoptic measurements of ocean surface radial velocities, enabling the reconstruction of hourly surface current vector fields out to the Mid-Atlantic Bight shelf break and inner shelf. We processed and quality-controlled aggregated data from 2002–2024 to derive seasonal and interannual current patterns, emphasizing the influence of atmospheric forcing, river discharge, and large-scale oceanographic processes such as the Gulf Stream and shelf–slope interactions. Composite averaging reveals distinct seasonal regimes: enhanced southwestward shelf flows in winter, associated with strong northerly winds and shelf-break jet anomalies, and more variable, wind-modulated currents in summer. Cross-shelf exchange and alongshore transport display coherent patterns linked to prevailing wind stress and regional sea-level gradients, with statistically significant correlations with local wind-stress curl. Interannual variability in mean current magnitude and direction reflects modulation by North Atlantic Oscillation phases and episodic weather events. The HF radar climatology provides an essential baseline for validating coupled ocean–atmosphere models, assessing transport pathways for pollutants and biological larvae, and improving forecast skill in coastal prediction systems. These results demonstrate the value of sustained HF radar observations for advancing understanding of coastal current climatology and supporting regional oceanographic research and management.

- William Schmelz, Rutgers University. *Increasing frequency of coastal erosion indicated by a hindcast model of storm-driven forcing calibrated with beach stratigraphy.*
    - **Co-authors:** Kenneth G. Miller, Rutgers University; Jonathan Liu, Rutgers University; J.N. Stanley, Rutgers University; James V. Browning, Rutgers University.

- **Abstract:** We present a new integrated data-modeling approach to identify storm thresholds and frequencies along barrier coastlines. We evaluate storm impacts using beach stratigraphy at North Beach, Sandy Hook, New Jersey derived using ground penetrating radar (GPR) to identify 20 stratigraphic surfaces. Surfaces were constrained temporally between 2009 to 2019 CE using centimeter-accurate GNSS data, facilitating correlation of individual stratigraphic events to historical storms. To quantify the forcing conditions responsible for preserved erosion surfaces, we ran over 1000 48-h XBeach simulations using tide-gauge and offshore buoy data (2009–2019). We then statistically emulated XBeach outputs and calibrated them with observed beach-profile change using a semi-empirical model, and predicted the storms likely to produce preserved erosion surfaces. From the modeling results, we assess storms exceeding a water-level threshold of 1.27 m above MSL and significant wave heights of 3.78 m resulted in significant coastal erosion. Analysis of hindcast wave conditions and water level data suggest the exceedance frequency of this storm threshold has increased two-fold between 1979 and 2023 CE, reflecting a regional signal relevant to the broader U.S. Mid-Atlantic coastline. We physically validate our model estimated threshold values with trench excavations and by collecting pre-, during-, and post-storm data for a recent January 10, 2024 storm that exceeded them. The results offer a quantitative basis to predict potential for storm-driven erosion at Sandy Hook and along the coast in New Jersey. Additionally, this is ongoing work through which we aim, beyond the primary research, to: 1) develop locally calibrated information regarding coastal change that can help inform local coastal resource management; and 2) engage students at Rutgers in coastal research here in New Jersey.

- Amir Begmohammadi, Baird and Associates. *Projected Changes in Tropical Cyclone Damage in New Jersey Under Future Climate Conditions*.
  - **Abstract:** Tropical cyclones (TCs) are a primary driver of coastal flooding and economic loss in New Jersey's coastal counties, producing storm surge and high-speed winds. This study quantifies how projected changes in TCs affect Expected Annual Damage (EAD) in New Jersey's coastal counties. We employ a large synthetic TC dataset derived from downscaled reanalysis data and global climate model projections to represent both present-day and end-of-century storm conditions. For each storm, spatially and temporally varying wind and pressure fields are used to force the high-resolution ADCIRC hydrodynamic model. Model-simulated surge is combined with depth–damage relationships to estimate event-level economic losses.

    By holding socioeconomic exposure constant and varying only TC climatology, we isolate the contribution of climate change–driven storm behavior to future damage. The results provide quantitative estimates of how evolving tropical cyclone characteristics may amplify coastal flood losses in New Jersey by the end of the 21st century.

Appendix B – Detailed Poster Information

Posters are listed in alphabetical order.

	Lead Author	Co-Authors	Poster Title	Poster Abstract
1	Amanda Archer — Jacques Cousteau National Estuarine Research Reserve, Rutgers University	Kate Tully, University of Maryland; Holly MIchael, University of Delaware; Emmie Woerner, University of Maryland; Becky Epanchin-Niell, University of Maryland	Mid-Atlantic RISING: Resilience Implementation for Salt-INtruded Geographies	Saltwater intrusion is an often-invisible process that is challenging to identify until it has already caused substantial harm to coastal lands. Salty coastal waters seep inland – above and below ground – salinizing soils and waters, devastating crop harvests, and causing physiological drought in trees. In the low-lying Mid-Atlantic region large areas of coastal farmland and forest have converted to marsh, causing substantial economic losses and damage to ecosystems. The goal of Resilience Implementation for Salt-INtruded Geographies (RISING) Mid-Atlantic is to significantly improve the resilience and well-being of rural coastal communities in Maryland, Delaware and New Jersey who are impacted by saltwater intrusion and other coastal stressors. We will achieve this by developing and implementing coordinated, community-engaged solutions for two important coastal economic sectors: farming and forestry. RISING is assembling a coalition of farmers, landowners, researchers, government, non-profits, and the private sector will work together to develop, evaluate, and implement science-based solutions. The RISING Cross-State Workshop, held in February 2026, gathered over 56 participants from different sectors to establish a share vision of resilience and actionable strategies to address climate stressors impacting coastal landowners. By developing and implementing a portfolio of practical solutions, the project seeks to improve the resilience and well-being of rural coastal communities impacted by saltwater intrusion, now and in the future.
2	Mercy Atolagbe — Montclair State University	n/a	Spatial Analysis of Residential Ground Source Heat Pump Adoption Potential in New Jersey	Research Question: Which New Jersey counties demonstrate the highest suitability for ground-source heat pump adoption in new residential construction based on geological capacity, economic conditions, demographic characteristics, and infrastructure readiness? Residential heating in New Jersey (NJ) contributes significantly to carbon emissions; nevertheless, the adoption of ground source heat pumps (GSHPs) is alarmingly low at 0.14% of housing units, despite considerable federal incentives. This study establishes a GIS-based multi-criteria suitability analysis to determine optimal spatial locations for GSHP implementation throughout NJâ€™s varied residential building inventory. The methodology utilizes GIS-based weighted overlay analysis to evaluate the possibility for GSHP adoption throughout NJ. Geological suitability is determined from the NJ Department of Environmental Protection bedrock geology shapefile, with lithology types categorized by drillability and thermal conductivity parameters. New residential construction activity is delineated by 2024 building permit data from the NJ Department of Community Affairs,

				categorized into single-family, duplex, multifamily, and mixed-use dwelling types at the county level. Socioeconomic parameters, such as population density and income projected from 2020 US Census tract data, delineate regions with adequate market demand and economic potential for GSHP investment. These layers are superimposed to pinpoint counties where advantageous geology, ongoing residential construction, and conducive demographics intersect. Initial findings include county-level maps of these multi-criteria layers, which will be used to support ongoing research to produce suitability maps identifying GSHP adoption hotspot zones where favorable geology coincides with active residential development and supportive socioeconomic conditions. This research provides evidence-based guidance for targeting installation incentives to maximize emissions reductions in support of NJâ€™s 2050 carbon neutrality goal. Keywords: Geothermal heat pump, geothermal energy, GIS suitability analysis, bedrock geology, building decarbonization.
3	Deepali Bidwai — Alpha Sqaure/Independent Researcher	n/a	AI-Driven Satellite Analysis of Urban Heat Island Dynamics and Heat Risk Hotspots in New Jersey Cities	Urban Heat Island (UHI) effects are intensifying across New Jersey’s urban centers, increasing heat exposure risks for vulnerable populations and stressing infrastructure systems. This study presents an AI-enabled geospatial framework to analyze and map urban heat dynamics using multi-source satellite data. Land Surface Temperature (LST) derived from Landsat imagery (2020–2024) is integrated with land cover information from Dynamic World to distinguish urban and non-urban areas and quantify UHI intensity. The analysis leverages scalable cloud-based processing and machine learning techniques to identify spatial patterns and temporal changes in surface temperature. The Urban Thermal Field Variance Index (UTFVI) is computed to detect heat stress hotspots, enabling high-resolution mapping of areas experiencing extreme thermal conditions. Results indicate that urban areas in cities such as Camden, Newark, and Jersey City are consistently 2–5°C warmer than surrounding regions, with strong spatial clustering of persistent heat hotspots. This work demonstrates how satellite remote sensing and AI can provide rapid, data-driven insights into urban climate risks. The framework supports applications in heat mitigation planning, including identification of priority areas for urban greening, cooling interventions, and climate resilience strategies. By providing a scalable and transferable methodology, this study contributes to ongoing efforts to monitor, assess, and respond to climate change impacts in New Jersey’s urban environments.
4	Sydnie Bogan — Kean University	Theresa Lee, Kean University ; Galia Shokry, Kean University	Environmental Health and Climate Vulnerability in New Jersey's Carceral Facilities	The purpose of this participatory action research study is to investigate how environmental health risks interact with systemic inequities and climate vulnerabilities within New Jersey’s carceral facilities. Prisons often operate in hazardous environmental conditions, exposing incarcerated individuals and staff to contaminants, extreme heat, poor air and water quality, and outdated infrastructure. Incarcerated individuals and staff are uniquely vulnerable due to their limited ability to adapt to or protect themselves from these conditions. This study assesses these risks their health and social impacts and institutional responses, to address

				the following research question: To what extent do environmental and climate-related conditions shape the health, safety, and lived experiences of incarcerated individuals and facility personnel? We employ a mixed-methods design that integrates both quantitative and qualitative data to examine environmental health risks in carceral settings. Data collection methods include an introductory survey, semi-structured interviews, and geospatial analysis. The study also incorporates secondary data from the New Jersey Department of Environmental Protection (NJDEP), Open Public Records Act (OPRA) submissions, and documentation from the Clean Water Action and Women Who Never Give Up advocacy campaign. Grounded in a community-driven, action-oriented framework, the research prioritizes the voices and experiences of directly impacted individuals. These storytelling components are essential to the study's methodology as it humanizes the lived realities of carceral populations, challenging narratives that render them invisible within environmental and climate policy discussions. By centering justice-impacted voices, this research aims to more systematically include carceral populations in EJ advocacy and policymaking and to press for improving environmental conditions in correctional facilities. Additionally, this study aims to bridge critical gaps in public health and environmental justice research through an interdisciplinary and participatory approach that centers populations with restricted mobility and limited rights in the face of climate impacts.
5	Jeremy Cohen — Rutgers University (visiting), Yale University (funding)	Walter Jetz, Yale University	Geographic redistributions are insufficient to mitigate the erosion of species environmental niches	As climate change accelerates, species may survive in place thanks to niche plasticity or adaptation or must shift their ranges to conserve their environmental niches. Examples of such range shifts abound, but to date an assessment of species success in retaining niches and limiting their climate change exposure is missing. This issue is especially relevant in northern temperate regions including New Jersey, where species can move north to keep pace with increasing temperatures. We developed a novel method to account for biases inherent in tens of millions of citizen science observations, allowing us to evaluate how species have mitigated their environmental niche loss using geographical redistributions in the US including in New Jersey. We find that over 20 years, 406 bird species redistributed their summertime breeding ranges 0.64Â° north, mitigating their expected exposure to warming by ~1.28 Â°C and thus averting 48% of expected warming had they stayed in place. Despite these movements, species were still exposed to an average ~1.35 Â°C increase in maximum daily temperature and few species achieved complete niche retention. Meanwhile, species only mitigated ~0.47 Â°C (11% of expected) in winter, experiencing warming of ~3.74 Â°C, with almost no species fully retaining their niches. Species moving the furthest north succeeded most in retaining niches across both seasons, but most geographical redistributions were only partially effective at mitigating exposure to climate change. As expected, but previously untested at this scale, species with traits associated with dispersal ability achieved the greatest redistributions and niche retention. The gap

				between climate change exposure and species historical niches is growing rapidly even in a highly mobile group such as birds, that this project arms conservationists and managers with information about which species might be lagging behind climate change.
6	Suman Dhakal — Rutgers, the State University of New Jersey	Karina V.R Schafer, Rutgers University	Carbon flux dynamics in a co-located terrestrial ecosystem: a floodplain, a grassland and a pastureland using the eddy covariance data in Duke Farms, New Jersey	Understanding carbon flow dynamics of terrestrial ecosystems is vital to devise nature-based solutions (NBS) to mitigate global climate change. This study assessed and compared $CO2$ and $CH4$ fluxes and their predictors using eddy covariance data from three co-located ecosystems: an inland floodplain, a natural grassland, and a pastureland at Duke Farms, NJ. The investigated sites contributed neither a significant amount of CH4 flux to the atmosphere nor did they sequester CO2. The annual sum (gap-filled) of CO2 flux at the floodplain (2020), natural grassland (2022), and pasture site (2025) was 89.9 (SE ± 3.7), 138.5 (SE ± 5.9), and 175.7 (SE ±8.7) g C-CO2 m-2 yr-1, respectively. Furthermore, no significant CH4 emissions were detected from the sites. The average annual CH4 emission (gap-filled) from the floodplain site was 0.00020 (SD± 0.00046), at the grassland site was 0.00026 (SD ± 0.00119), and at the pasture site was 0.00027 (SD ±0.00185) g C-CH4 m-2 yr-1. Our results suggest that the pasture site is releasing the highest amounts of both CO2 and CH4 among the three. Light was the major predictor of CO2 flux, but a significant difference was observed at the grassland site, where CO2 fluxes were found driven by soil moisture along with light. The major predictors of CH4 flux were also light followed by air temperature (TA) with main divergence at the pasture site, where soil and air temperature were dominant. Grasslands and floodplains were comparatively more resilient to slight fluctuations in TA, and rainfall, but were prone to losses of carbon from soil due to land use change. Whereas variation in carbon flux in pastureland was more related to grazing. Thus, managing hydrology in floodplains, vegetation in grasslands, and grazing in pastures is crucial to turning them from carbon sources into sinks. Key words: terrestrial ecosystem, CO2 flux, CH4 flux, predictors of carbon flux
7	Nuzhat Fatema — Geography Department, Rutgers University	Manasa Bollempalli, Rutgers University; Ami Ly, Rutgers University; Victoria Ramenzoni, Rutgers University	Flood Knowledge from Below: Why Household Adaptation to Recurrent Urban Flooding Goes Beyond Technical Solutions in Manville, New Jersey	Why do households continue to face persistent vulnerability despite the expansion of technical flood mitigation measures and formal adaptation programs? Dominant climate adaptation frameworks rely heavily on technocentric approaches such as flood maps, infrastructure, and cost-benefit models, assuming that households make rational decisions based on officially defined risk. However, this approach overlooks how lived experience, social relationships, and structural constraints shape adaptation in practice. This study addresses a key gap in climate adaptation scholarship by examining how households perceive flood risk, make adaptation decisions, and navigate recovery beyond technocratic frameworks. Focusing on Manville, New Jersey, a 2.5-square mile working class town of nearly 11,000 residents, surrounded by the Raritan, Millstone, and Royce Brook rivers, this study examines how recurrent flooding (Floyd in 1999, Irene in 2011, and Ida in 2021) reshapes household decision-making and adaptation pathways. Drawing on ethnographic fieldwork, including 50 semi-structured interviews with residents and supported by the MACH (Megalopolitan Coastal Transformation Hub), this poster analyzes how households

				interpret risk, evaluate adaptation options, and engage with institutional programs such as FEMA and the Blue Acres buyout program. Early findings show that households rely on experiential knowledge, embodied memory, and community networks to assess flood risk and guide adaptation decisions. These forms of â€œknowledge from belowâ€ often vary from official risk assessments and shape whether residents elevate homes, relocate, or remain in place. Adaptation decisions are constrained not only by physical exposure but also by financial limitations, bureaucratic barriers, emotional attachment to place, and trust in institutions. As a result, technical solutions alone fail to address the social and institutional dimensions of vulnerability. These findings suggest that adaptation is a socially embedded process shaped by inequality, lived experience, and institutional accessibility. By centering lived experience in a chronically flood-prone community, this research demonstrates the need to integrate household knowledge alongside technocentric approaches in climate governance and offers timely insight for strengthening equitable, inclusive, and community-informed climate resilience in New Jersey.
8	Lizbeth F. Gomez — Rutgers Center for Climate, Health, and Healthcare	Ashwaghosha Parthasarathi, Rutgers Health-RWJBarnabas Health Center for Climate, Health, and Healthcare; Soko Setoguchi, Rutgers Health-RWJBarnabas Health Center for Climate, Health, and Healthcare.	Wildfire Smoke PM2.5, Fluticasone Use, and Acute Respiratory Illness in All of Us Research Program: A Case Time Series Analysis	Background: In-vitro studies demonstrated that simultaneous exposure to fluticasone propionate (FP) and particulate matter (PM) increased rhinovirus replication through suppression of innate antiviral responses and upregulation of the viral entry receptor ICAM-1. Whether this translates to increased risks of acute respiratory infection (ARI) at the population level, remains unknown. New Jersey residents face growing exposure to wildfire smoke PM2.5 driven by climate change, with smoke transport events from western wildfires increasingly affecting air quality across the northeastern United States. Objective: To examine the interaction between wildfire smoke PM2.5 and fluticasone use and acute respiratory illness incidence. Methods: We conducted a case time series analysis among 18,617 adults (>18 y) ever diagnosed with asthma or chronic obstructive pulmonary disease (COPD) in the All of Us Research Program (2006–2020). Daily wildfire smoke PM2.5 estimates were assigned to participants' ZIP3 residential areas and averaged across 30-day intervals. Fluticasone exposure was ascertained from prescription records. We fit conditional Poisson regression to estimate within-person rate ratios for ARI associated with smoke PM2.5, fluticasone use, and their interaction, adjusting for calendar time trends and seasonality. Additive interaction was estimated using the relative excess risk due to interaction (RERI). Results: Fluticasone use was associated with a 33% higher ARI rate compared with fluticasone-off intervals (RR 1.33, 95% CI 1.06, 1.67). Wildfire smoke PM2.5 was independently associated with increased ARI incidence RR 1.08 per 1 μg/m3 increase (95% CI 1.03, 1.14). The interaction between smoke PM2.5 and fluticasone showed a non-significant multiplicative effect (RR 1.05, 95% CI 0.94, 1.17). On the additive scale, the RERI was modest but not statistically significant (0.10, 95% CI −0.01, 0.21).

				Conclusions: In this case time series analysis of adults with asthma/COPD, both fluticasone use and wildfire smoke PM2.5 were independently associated with higher ARI incidence. Interaction estimates suggested a small synergistic effect, with modest evidence of additive synergism. Future population studies with precise exposure assessment are needed validating the possibility that wildfire smoke exposure impacts ARI susceptibility among asthma/COPD adults using fluticasone.
11	Theresa Lee — Kean University	Galia Shokry, Kean University; Syndie Bognan, Kean University	Visualizing Heat Inequity: GIS-Based Insights for Climate Adaptation in Carceral Systems	Carceral facilities are, by design, sites of constrained life and limited agency. Access to basic thermal comfort, warmth in winter and relief from extreme summer heat, is not something incarcerated individuals can control. As climate change intensifies temperature extremes, these conditions become increasingly harmful, producing sustained and cumulative bodily consequences rather than temporary discomfort. Heat in carceral spaces should therefore be understood not as an abstract climate indicator, but as an everyday, embodied pressure imposed on populations already subject to structural constraint. When rehabilitation is pursued within environments that expose individuals to preventable physical harm, the ethical boundaries of punishment and care are brought into question. Allowing incarcerated people to endure extreme heat conditions raises fundamental concerns about how societies define responsibility, dignity, and the limits of state-sanctioned suffering. Incarcerated individuals are rarely treated as priority populations within climate adaptation planning. They exist in an institutional “out of sight, out of mind” space, where their exposure to environmental risk is often ignored and, in some cases, implicitly deemed undeserving of protection. Within this condition of exclusion, state actors can fail to respond to harmful environmental conditions with little visibility or consequence. One of the earliest indicators of this breakdown is the absence of integrated data linking climate conditions to lived environments within carceral facilities. This lack of transparency and accountability around thermal conditions allows chronic exposure and environmental degradation to persist without formal recognition or intervention. One way to address this lack of transparency is through spatial mapping that renders conditions of environmental risk visible and legible. By mapping thermal danger within these facilities, the lived experience is translated into a form that can enter the public, policy, and institutional discourse necessary for active discourse. These visual depictions function not merely as representations, but as exercises of accountability that create new possibilities for advocacy, policy pressure, and intervention. In this way, spatial data disrupts the normalization of suffering within the carceral system by challenging the assumption that extreme environmental exposure is an acceptable situation for populations already subjected to disproportionate harm. Using five years of outdoor temperature data, provided by PRISM Climate Group at Oregon

				State University, this project identifies and maps multi-day heat wave events, defined as periods of sustained extreme heat over three-plus consecutive days. GIS-based spatial analysis is used to map and examine the frequency and duration of these events statewide. While outdoor temperature does not fully capture how the built environment amplifies heat through concrete thermal mass, limited airflow, or population density, sustained extreme heat serves as a conservative indicator of cumulative thermal stress in settings where individuals lack control over their environment. This poster presents facility level heat exposure maps and summary indicators that translate prolonged temperature pressure and risk into a human-centered assessment of environmental danger. As New Jersey experiences increasingly frequent and severe heat events driven by climate change, the conservative indicators presented here are likely to understate future thermal risk, making the case for climate-responsive facility standards and adaptation planning that explicitly includes incarcerated populations.
12	Junghoon Lee — Rutgers University	Clinton Andrews, Rutgers University	Local Public Finance Factors Influencing Municipal Decisions on Flood Buyouts	As sea levels rise and extreme climate events intensify, local governments face a critical choice between "retreat" (e.g., flood buyouts) and "retrofit" (e.g., structural elevations) to mitigate disaster risks. While existing literature often focuses on homeowner preferences or socioeconomic factors, the influence of municipal public finance remains underexplored. This study examines how the structure of municipal revenues and expenditures shapes climate adaptation outcomes. Using a nationwide municipality-level dataset (2002–2022) integrated from OpenFEMA and the Census of Governments, this research investigates the fiscal incentives and constraints behind flood buyout decisions. The empirical analysis employs a double-hurdle model to distinguish between the factors influencing a municipality's participation in hazard mitigation and the subsequent scale of adopted retreat strategies. Key hypotheses investigate whether a high dependency on property taxes, given their role as a municipality's primary revenue source, creates a path dependency that discourages buyouts due to fears of tax base erosion. The study also examines whether diversified revenue streams and higher intergovernmental aid buffer this fiscal impact, incentivizing retreat. Additionally, the study explores the possibility that expenditure stickiness, characterized by inflexible costs in public safety and education, may present institutional barriers to resident relocation. The findings provide practical implications for states like New Jersey, where extreme property tax dependency and the active implementation of buyout programs necessitate a reevaluation of municipal fiscal structures. By identifying how local fiscal conditions constrain climate adaptation policies, this study offers insights for reforming New Jersey's municipal finance models to align local fiscal health with long-term climate adaptation goals.
15	Mohammad Amin Nozari — University of Delaware	n/a	The Influence of Oblique Views and Ground Control	Over the past two decades, unmanned aerial systems (UAS) have gained increasing traction as a tool for pavement inspection, particularly for evaluating rutting, apparent lift thickness, and surface irregularities. Despite their widespread use, there remains a lack of consensus

			Point Distribution on UAS Photogrammetry Precision for Pavement Assessment	regarding the optimal number and distribution pattern of ground control points (GCPs) for accurate georeferencing. In this study, six test configurations were created using two types of imagery—nadir and oblique—and varying GCP patterns, to assess their influence on the accuracy of digital elevation models (DEMs), over a 50 m × 50 m pavement test area. A combination of geostatistical methods, including kriging and inverse distance weighting (IDW), along with metrics such as RMSE, MAE, and bias, was used to evaluate performance. The results show that the use of oblique imagery significantly improves model accuracy when GCPs are limited. While increasing the number of GCPs beyond five did not yield notable improvements, error metrics and semivariogram behavior remained consistent across patterns. However, spatial analysis tools, including Getis-Ord Gi* and Moran's I, revealed localized clusters of high error, particularly in configurations lacking oblique coverage. These findings underscore the importance of evaluating not only global accuracy measures, but also spatial patterns of error when designing UAS-based pavement surveys. The analysis supports the conclusion that a minimal but strategically distributed set of GCPs —on the order of approximately five per 2500 m^2— combined with oblique imagery, can provide reliable elevation modeling for small-scale pavement assessment.
16	Rose Ogutu — Delaware State University	Gulnihal Ozbay, Delaware State university; Rosalyn Battle, Delaware Sate University; Allison Chatrchyan, Cornell University	AI- Enabled Technologies for Resilience- What is in it for a small grower?	Artificial Intelligence (AI) enabled technologies are increasingly becoming the preferred method commercial farmers use to monitor crop fields. Through AI, farmers receive real time data on crop health, pest infestations, soil and weather conditions that can affect overall yield. Contrary to the popular belief that small scale farming has nothing to gain from AI tools, a recent survey showed that the use of AI powered apps that help diagnose crop diseases, identify pests etc. is on the increase. Most popular are the AI driven forecasts that capture microclimate variations. These tools help growers navigate challenges and increase resilience for sustainable production. In general, there is need for localized information for planting times and irrigation schedules. AI Institute for Land, Economy, Agriculture and Forestry (AI-LEAF) aims to incorporate agriculture knowledge with AI knowledge to create weather-smart agriculture solutions that specialize in field-to-market decision support tools. Another AI-LEAF key goal is to lower the cost of and improve accounting for carbon in farms and forests to empower carbon markets and inform decision-making. How does the small farmer fit in? As part of this collaboration, Delaware State University, an 1890 Institution, spotlights AI technologies and their benefits to urban and small farmers in the Mid-Atlantic region
18	Sarah Beganskas — Delaware River Basin Commission	Joseph Fogarty, Delaware River Basin Commission; Amanda, Delaware River Basin Commission; Avery, Delaware River Basin Commission	A framework for advancing the climate resilience of water resources in the Delaware River Basin	The Delaware River Basin Commission (DRBC) is developing a Water Resources Resilience Plan (WRRP) that adapts a traditional climate resilience plan framework to apply to Basin-wide water resources. The 13,500-mi2 Delaware River Basin provides drinking water for over 3 million people in New Jersey and 11 million others in New York, Pennsylvania, and Delaware. The Basin's water resources also support navigation, energy generation, recreation, and a diverse ecosystem. As the federal-interstate agency charged with managing, protecting, and improving shared water resources in the Basin, the DRBC is well poised to convene partners to advance the resilience of these resources.

				Taking a Basin-wide approach, the Water Resources Resilience Plan identifies actions to protect three broad water resource assets: water availability, aquatic life, and landscape. Phase 1 of the WRRP, published in March 2026, established a framework for the plan, incorporating feedback collected from engagement with over 150 stakeholders between December 2024 and October 2025. Phase 2 of the WRRP, which focuses on addressing climate change hazards, is currently underway and will include a vulnerability assessment, gap analysis, and prioritization of recommended actions. The vulnerability assessment characterizes the impacts of seven climate-related hazards to the Basin's water resources: water temperature increase, drought, flooding, land inundation, salinity intrusion, wildfire, and changing winter weather. This assessment considers both moderate- and high-emissions scenarios, as well as near-term and end-century planning horizons. The gap analysis defines a goal outcome for each water resource asset, outlines a strategic pathway for achieving that outcome, and identifies any gaps that need to be addressed. Recommended actions that DRBC can take to improve climate resilience are drawn from these gaps and will be prioritized according to impact, urgency, relevance, reach, synergy, adaptivity, and feasibility. Stakeholder engagement in Phase 2 continues to inform the plan's focus and scope.
19	Micah Seidel — Rutgers School of Engineering, Rutgers Agrivoltaics Program	Ross Rucker, Rutgers School of Engineering; Dunbar Birnie, Rutgers School of Engineering; Arend-Jan Both, Rutgers School of Environmental and Biological Sciences, New Jersey Agricultural Experiment Station.	Evaluating Operating Characteristics of Agrivoltaic Systems	Agrivoltaic systems allow farmers to integrate the generation of solar energy into their agricultural practices, thereby contributing to clean energy goals and creating a more predictable income stream for the farm. Various environmental conditions and technical specifications determine the efficiency of solar energy generation, including panel capacity and tilt, ambient temperature, ground surface albedo, and inverter size. Maximizing energy generation requires understanding the relative significance of each of these factors. During the Spring of 2024, the Rutgers Agrivoltaic Program started operating three agrivoltaic sites, two with single-axis tracking bifacial panels and total capacities of 255kWDC and 95kWDC respectively, and the third site with stationary vertical bifacial panels and a capacity of 170kWDC. Pairs of solar panels were connected to single power optimizers that recorded electricity production. Using Python, electricity production data from these sites were collected over the past two years, documenting instantaneous energy generation, plane-of-panel irradiance, east and west facing irradiance, ambient temperature, and internal panel temperature at 15-minute intervals. These were compared with wind speed, wind direction, and total horizontal irradiance which were recorded at nearby weather stations. The data was used to investigate the feasibility of discovering solar tracker malfunctions in the single-axis tracking panels based solely on the measured electricity production. This would be useful because agrivoltaic sites may not be visited daily, and thus malfunctions may not be discovered for some time. The fixed vertical panel site provided a reference for energy losses associated with non-ideal panel orientation, as the panels frequently operated at unfavorable incidence angles during midday. Recorded electricity production was also compared to amounts predicted by the widely used solar calculator PVWatts developed by

				the National Laboratory of the Rockies (formerly NREL). Results from these comparisons can be used to make more accurate electricity production estimates for agrivoltaic installations across the Northeast.
20	Kasey Walsh — Rutgers University	Rachel Davitt, Rutgers University; Michael Acquafredda, Rutgers University; Daphne Munroe, Rutgers University; Timothy Stephens, Rutgers University	Proteomic Analysis of two geographically distinct Atlantic Surf Clam Species	Shellfish play critical ecological roles in coastal ecosystems, including water filtration, habitat formation, and shoreline protection. In addition, shellfish industries represent significant economic value for local and national governments. In New Jersey, the aquaculture industry is currently dominated by the eastern oyster (Crassostrea virginica) and the hard clam (Mercenaria mercenaria), however there is growing interest in expanding the industry such as introducing the Atlantic surf clam (Spisula solidissima). S. solidissima is a promising candidate due to its rapid growth, various rearing techniques, and an established market. However, climate change poses challenges for clam survival and long-term success of the aquaculture industry because thermal stress (i.e., rising seawater temperatures) may lead to decreased growth and increased mortality. We used proteomic data to investigate differences in thermal tolerance between two geographically distinct surf clam subspecies, S. solidissima solidissima (solidissima) and S. solidissima similis (similis). The former lives in deep, cooler waters in the Atlantic, whereas similis inhabits shallow and warm habitats. Clams from each subspecies were split into two groups, one acclimated to 20oC and the other to 26oC. Proteins were extracted from gill and mantle tissues and sent for proteomic analysis at the Rutgers University CABM core facility. A total of 18,082 protein groups were identified across all samples, with the two subspecies having 1,037 differentially abundant proteins between them. These data suggest the existence of subspecies physiological differences regardless of temperature stress. This study is ongoing with a second experiment aimed at determining the proteomic response to heat stress by each subspecies and hybrid individuals. I will report on the results of the initial analysis and its potential relevance to the aquaculture industry. Future work is aimed at providing the foundation, based on omics data, for choosing broodstock that are likely to be resilient to climate change in New Jersey.
21	Barbara Woolley-Dillon — NJDEP	Meghan Leavey, PP, AICP, GISP, NJDEP; Montana Knutsen, NJDEP; Matthew Baumgardner, NJDEP	Unlocking the Secrets to Preparing a Buildout Analysis for a Climate Change Related Hazard Vulnerability Assessment (CCRHVA)	In February 2021, New Jersey law required municipalities preparing or significantly updating the land use element of their master plans to prepare a Climate Change Hazard Vulnerability Assessment (CCRHVA), including a buildout analysis. This process has faced significant challenges over the past five years. The NJDEP has developed guidance for this study. Topics will include: its purpose, helpful resources, common challenges, tips, and examples from different communities. The guidance will aid professionals, consultants, and municipal officials in creating a tool to assess development patterns in response to climate change hazards. Learning Objectives: • Understand the different reasons and methodologies for preparing a buildout analysis. • Identify common challenges and best practices in conducting a buildout analysis for

				CCRHVA. • Obtain useful NJDEP guidance and resources for successful projects.
22	Lillian Simhon — Office of Climate Action, Rutgers University	Frank Gallager, Department of Landscape Architecture, Rutgers University; Angela Oberg, Office of Climate Action, Rutgers University	Assessing Wood Growth in Forests Around NJ	Climate change is an ongoing threat to our environment, and finding mitigation strategies will be vital for protecting the planet against irreversible harm. Carbon sequestration is a natural solution to capture atmospheric carbon that takes place in forests and other carbon sinks. In this study, annual wood growth was assessed for trees at the NJ School of Conservation and the Livingston Ecological Preserve. Trees at the School of Conservation peaked in annual wood growth in the mid 1900s, while trees at the Ecological Preserve peaked in the early 2020s. Because the Ecological Preserve is a much younger forest than the School of Conservation, carbon sequestration is still ongoing.