2026 Long Island Sound Research Conference

June 4-5, Mystic CT

Photo by Syma A. Ebbin

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ACKNOWLEDGEMENTS

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We extend our gratitude to the two plenary speakers: retired Director of the EPA Long Island Sound Office, Mark Tedesco and Dr. Hendrik Hamann, Professor for Atmospheric Sciences at Stony Brook University and AI Chief Scientist at Brookhaven National Laboratory for their presentations. Finally, we extend our appreciation to all the oral and poster presenters for sharing their research. Their work contributes to the health and resilience of Long Island Sound and its surrounding communities.

CONFERENCE CODE OF CONDUCT

The 2026 Long Island Sound Research Conference is dedicated to creating a respectful, inclusive environment for all attendees. We expect all participants to maintain a professional and respectful attitude. Any form of harassment or inappropriate behavior will not be tolerated.

Thursday, June 4, 2026

9:00 – 10:00 am **Check-in and Poster Set-up**
Pre-function Hallway, Clipper Ballroom; communal area

10:00 – 10:10 am **Welcome**
Schooner Ballroom
Opening Remarks by Dr. Sylvain De Guise, director CTSG, Dr. Rebecca Shuford, director NYSG, EPA Long Island Sound Partnership

10:10 – 11:10 am **Plenary 1**
Schooner Ballroom
What is Actionable Science Anyway? Perspectives on Long Island Sound Restoration; Mark Tedesco, Director, EPA Long Island Sound Office, Retired

11:10 – 11:20 am **TRANSITION TIME**

11:20 am – 12:20 pm **Parallel Session 1**

Session 1A. Clean Waters and Healthy Watersheds
Schooner Ballroom
Moderator: Kamazima Lwiza

1. *Reinvigorating the Science-Policy-Management Connection – An Earth System Approach*; **Paul E. Stacey**, Footprints In The Water LLC
2. *Land Cover and Land Cover Change for the Entire Long Island Sound Watershed;* **Emily H. Wilson, Qian Lei-Parent, David Dickson**, University of Connecticut, Center for Land Use Education and Research (CLEAR)
3. *New Land Cover Map Viewer and Dashboards for Long Island Sound Watershed*; **Qian Lei-Parent, Emily Wilson, David Dickson,** University of Connecticut CLEAR
4. *Long Island Sound Water Quality Monitoring Program: Where we've been What we've Found and Where we're Headed*; **Matthew Lyman, Katie O'Brien-Clayton, Carriel Cataldi,** Connecticut Department of Energy and Environmental Protection

Session 1B. PFAS and Contaminants
Cutter Ballroom
Moderator: Jess Brandt

1. *How are Long Island Sound Phytoplankton Thermal Niches Impacted by the Presence of PFAS;* **Niko DeSousa, Colin T. Kremer, Hagen Klobusnik, Sophie Provencher, Brandon Chan,** UConn EEB

2. *Ingestion and egestion of cryo-milled tire tread particles by oysters (Crassostrea virginica) and mussels (Mytilus edulis);* **Anne L. Gilewski, Bridget Holohan, Sandra E. Shumway, J. Evan Ward;** University of Connecticut, Department of Marine Sciences
3. *Microbiomes under stress – Tolerance of the blue mussel Mytilus edulis and its gut microbiome to toxic pharmaceutical exposure*; **Abhishek T. Naik(1), Bridget A. Holohan(1), Spencer V. Nyholm(2), and J. Evan Ward(1**), (1)University of Connecticut, Department of Marine Sciences, (2)University of Connecticut, Department of Molecular and Cell Biology
4. *Tide and buoyancy influences on plume structure and enterococci distribution at Rocky Neck Beach, Connecticut*; **Luke Glass, Michael Whitney**, University of Connecticut

12:20 – 1:10 pm	**Lunch** Communal Area/Iron Lounge/Courtyard
1:10 - 2:00 pm	**Poster Session** Clipper Ballroom, Communal Area and Pre-function Hallway
2:00 – 3:00 pm	**Parallel Session 2**

Session 2A. Nitrogen and Hypoxia
Schooner Ballroom
Moderator: Lane Smith

1. *Drivers of oxygen variability in western Long Island Sound investigated using high-frequency biogeochemical and physical observations*; **Peisen Tan, Leonel Romero, and Cara Manning,** University of Connecticut
2. *Who Thrives When Oxygen Falls? Restructuring of Microbial Communities during Coastal Hypoxia;* **Luciana Santoferrara, Jodi Dharam, Pukhraj Kaur, Chloé Marchand, Indranil Mukherjee, Nicholas Sardes**, Department of Biology, Hofstra University
3. *Transport of effluents from Waste Water Treatment Plants in Long Island Sound;* **Michael M. Whitney, Penny Vlahos, Meg Shah, Luke Glass**, Department of Marine Sciences, University of Connecticut
4. *A Current Assessment of Nitrogen Overenrichment and Hypoxia In Long Island Sound*; **Gary H. Wikfors**, NOAA Fisheries Service, Northeast Fisheries Science Center

Session 2B. Informed and Engaged Public
Cutter Ballroom
Moderator: Syma Ebbin

1. *The Ocean Identity survey: A valid and reliable measure of human connections to ocean environments*; **Miriah M. R. Kelly, Christopher J Budnick, Jo-Marie Kasinak, Sacred Heart University, Emma McKinley, Jamie M.P. Vaudrey**, Southern Connecticut State University

2. *Beneath the Blue Horizon - Linking Science and Education Using Story Maps;* **Ivar Babb, Zoe Kendall, Chris Conroy, Peter Auster, Roman Zajac, Catherine Matassa, James O'Donnell, Grant McCardell,** University of Connecticut
3. *Places and Spaces: Cultivating Senses of Belonging in the Urban Watershed Through Children's and Family Programming*; **Erin McKeehan**, Wildlife Conservation Society
4. *Student Solutions for Strengthening Our Community: Protecting City Island and Long Island Sound Against Climate Change*; **Mary Jean McCarthy, Jase Bernhardt, Christopher Maher, Amanda Perrone**, Adelphi University

3:00 – 3:15 pm **Break**

Pre-function Hallway

3:15 – 4:15 pm **Parallel Session 3**

Session 3A. Informed and Engaged Public
Schooner *Ballroom*
Moderator: Penny Vlahos

1. *Connecting People to Place through a Long Island Sound Watershed StoryMap;* **Cary Chadwick, Emily Wilson,** University of Connecticut, Center for Land Use Education and Research (CLEAR)
2. *Elucidating bottom boundary layer dynamics in Long Island Sound**;*** **Alejandro Cifuentes-Lorenzen, Mehrnoosh Abassian, Kate Randolph, James O'Donnell, Grant McCardell and Molly James**, University of Connecticut, Department of Marine Sciences
3. *Bioindicators of microplastics: are bivalves the best choice? (spoiler, they are not);* **Kayla Mladinich Poole, Bridget A. Holohan, Sandra E. Shumway, J. Evan Ward**, University of Rhode Island
4. *Cooking up a Solution: Chefs on the Frontline of Invasive Species Management***; Anna Johnson, Bryce DuBois**, University of New Haven

Session 3B. Nitrogen and Hypoxia
Cutter Ballroom
Moderator: Sylvain De Guise

1. *Optimizing Nutrient Reductions Across the Long Island Sound Basin*; **Craig Connolly, Naomi Detenbeck,** U.S. EPA, Office of Applied Science and Environmental Solutions, Coastal Science and Solutions Division, Atlantic Coastal Science Branch
2. *Dog Waste Contributions to Water Quality Impairment and the Potential for Community-Based Interventions;* **Michael Doall, Sarah Esenther, Michael Pascucilla, Allison Beaulieu,** Brown University, East Shore Health District
3. *Maximizing nitrogen bioextraction through the co-cultivation of seaweed with oysters;* **Brooke Morrell, Timothy Curtin, Margot Eckstein, Anna Meichenbaum, Jeffery Kraemer, Christopher Gobler**, SOMAS, Stony Brook University

4. *Improving nitrogen fixation and denitrification measurements in Zostera marina beds using noble gas tracers*; Kelsey **Ward, Craig Tobias, Cara Manning,** UCONN Avery Point

4:15 – 5:30 pm **Social Hour & Posters**
Clipper Ballroom; Communal Area/Iron Lounge/Courtyard

Dinner on your own

Friday, June 5, 2026

8:00 – 9:00 am **Check-in & Continental Breakfast**
Pre-function Hallway and Communal Area

9:00 -10:45 am **Parallel Session 4**

Session 4A. Microalgae and HABs
Schooner Ballroom
Moderator: Mike Whitney

1. *Nutrients, algal blooms, and hypoxia: retrospective and prescient approaches for the future management of Long Island Sound*, **Christopher J. Gobler, Jiyeon Sung, Sarah McCready, Jennifer Goleski, Marcella Wallace, Lucas Chen**, Stony Brook University
2. *Uncovering Microalgal Diversity in Long Island Sound Using Culture Isolation and Taxonomic Characterization*; **Fernando Gómez, Alexander Francoeur, Senjie Lin,** University of Connecticut
3. *From Seagrass to Macroalgae: Linking Nutrient Enrichment to Benthic Community Patterns in Connecticut Embayments;* Ma**tthew Leason, Jamie Vaudrey, Jason Krumholz,** 1. Department of Marine Sciences, University of Connecticut 2. Connecticut National Estuarine Research Reserve
4. *Declining trends, multi-factor drivers, and temperature tipping points in Long Island Sound phytoplankton revealed by ecological and machine learning approaches;* **Senjie Lin, Huan Zhang, Tangcheng Li, Huaizhi Qin and Jiebin Zhou,** University of Connecticut
5. *Two Unusual New Diatom Strains from Long Island Sound*; Alexander Francoeur, **Fernando Gómez, Jackson Sanders, Yifan Gu, Trent Norred, Senjie Lin**, University of Connecticut

6. *Harmful algal blooms create multi-stressor conditions: Co-occurrence of hypoxia and acidification during Alexandrium and Dinophysis blooms in Long Island Sound*; **Ryan B. Wallace, Mairead Farrell, Adrienne Tracy, Andrew Lundstrom, Christopher J. Gobler,** Department of Environmental Studies and Sciences, Adelphi University
7. *Quantifying wastewater-associated nitrogen impacts on Long Island Sound harmful algal bloom development*; **Dianne I. Greenfield, Julie Granger, Craig Tobias**, CUNY Advanced Science Research Center

Session 4B. Temperature
Cutter Ballroom
Moderator: Becky Shuford

1. *State of the Long Island Sound Zooplankton Monitoring Program*; **Hans Dam, Gihong Park**, Dept. Marine Sciences, University of Connecticut
2. *Determining Acartia spp. nauplii abundance and phenology in Long Island Sound using mtCOI gene*; **Sunnidae Gallien, Gihong Park, Hans G. Dam,** University of Connecticut
3. *Vulnerability to warming under food limitations in a common Long Island Sound copepod depends on thermal tolerance metric*; **Rowan A. Batts, Ava Arleo, Hans G. Dam,** University of Connecticut, Department of Marine Sciences
4. *Evaluating Changes in Habitat Suitability for Cold- and Warm-Adapted Species in the Long Island Sound*; **Claire Ober, Stephanie Arsenault, Krystina Braid, Sarah Praisner, Yong Chen, Kurt Gottschall, Kim McKown, John Maniscalco,** Stony Brook University
5. *Temperature Variation in Nests of Northern Diamondback Terrapins (Malaclemys terrapin terrapin) within Connecticut*; Zeanna Graves, Theodora Pinou, Western Connecticut State University
6. *A grouper on its way north: Experiments & ocean models suggest that Black Sea Bass will change their winter migrations;* **Hannes Baumann, Max Zavell, James O'Donnell, Marc de Vos, Samantha Siedlecki, Catherine M. Matassa, Eric T. Schultz**, University of Connecticut, Marine Sciences
7. *Abiotic and Biotic Drivers of Declining Flounder Abundance, Distribution, and Condition in Long Island Sound, USA*; **Max Zavell, Katherine Helmer, Kelli Mosca, Matthew Gates, Kurt Gottschall, Paola Batta-Lona, Hannes Baumann, Sebastian Klarian, Eric Schultz,** School for Marine Science and Technology, University of Massachusetts, Dartmouth

10:45 – 11:00 am **Break**
Pre-Function Hallway

11:00 am – 12:30 pm Parallel Session 5

Session 5A. Salt marshes + Microplastics
Schooner Ballroom

Moderator: Syma Ebbin

1. *Site-Specific Strategies for Improving Salt Marsh Restoration Success in Long Island Sound, USA;* **Rebha Raviraj, Sarah Crosby, Jennifer Bowen, Randall Hughes, Jack Matthias, Nicole Spiller, LaTina Steele, Kasey Burns, Mary Donato, Marisa Fajardo, Jared Kannel, Nesy Oja, Marisa Olavarria, GraceAnne Piselli, Domenic Romanello, Danielle Schwartz, Justin Susarchick, Nicole Woosley, Abigail Tripler**, The Maritime Aquarium at Norwalk
2. *Assessing the Resilience of Restored Salt Marshes Under Warming Conditions;* **Marisa Fajardo(1), Sarah C. Crosby(1), Nicole C. Spiller(2), Randall Hughes(4), LaTina Steele(3), Kasey T. Burns(2), Mary K. Donato(2), Marisa Olavarria(2), Rebha Raviraj(1), Domenic Romanello(1), Samantha Rowland(1), Justin P. Susarchick(1),** (1) The Maritime Aquarium at Norwalk, Norwalk, CT, (2) Harbor Watch (Earthplace, Inc.), Westport, CT, (3) Sacred Heart University, Department of Biology, Fairfield, CT, (4) Northeastern University, Department of Marine and Environmental Sciences, Nahant, MA
3. *Novel measurements of turbulent kinetic energy dissipation rates in a narrow and shallow coastal salt marsh channel;* **Molly M. James, Alejandro Cifuentes-Lorenzen, and James O'Donnell,** Department of Marine Sciences, University of Connecticut
4. *Leveraging Native Engineering and Reshaping Microbial Ecology: The Cascading Impacts of Invasive Crabs and Phragmites on Coastal Resilience;* **Ritwik Negi, Precious Attah, Kaylee Freema**n, University of New Haven
5. *Habitat Restoration In A Highly Impacted Urban Estuary;* **Maria Rosa***,* Connecticut College
6. *Microplastic exposure and antioxidant gene expression in wild estuarine killifish (Fundulus spp.);* **FNU Deesha, Christian W. Conroy, Alireza G. Senejani, Eddie D. Luzik,** University of New Haven

Session 5B. Sustainable and resilient Communities
Cutter Ballroom
Moderator: Dianne Greenfield

1. Carbonate System Parameters in Long Island Sound Reveal Hypercapnia as an Additional Stressor the Western Sound Ecosystem; **Erich Nitchke, Penny Vlahos, Samantha Glass, Katie O'Brien-Clayton, Alexis Sims**, University of Connecticut
2. *Wave, Surge and Groundwater-induced Erosion and Recession of Sandy Bluffs*; Ali Farhadzadeh and Henry Bokuniewicz, Stony Brook University
3. *Resilient Mystic: Adapting to sea-level rise in Downtown Mystic/Stonington;* **John Truscinksi,** Connecticut Institute for Resilience and Climate Adaptation
4. *Equitable Access to Long Island Sound Waterfront and Beaches through On-demand Mobility*; **Mohammad Pourmatin, Samuel Osei Poku, Anil Yazici, Elizabeth Hewitt,** Department of Civil Engineering, Stony Brook University
5. *Ammonia confertitesta, Ammonia advena, and Trochammina hadai: Recently discovered foraminiferal invasions in Long Island Sound*; Elly **Goetz1, James T. Calton2, Ellen Thomas1,3,** 1 Department of Earth and Planetary Sciences, Yale

University, 2 Coastal and Ocean Studies Program, Williams College - Mystic Seaport, 3 Department of Earth and Environmental Sciences Wesleyan University

6. *Developmental plasticity, not adaptation to ocean warming, determines a copepod response to marine heatwaves* **Lisa A. Piastuch, Yurina Shirai, Hans G. Dam, Catherine M. Matassa**, University of Connecticut

12:30 – 1:15 pm **Lunch Schooner Ballroom**

1:15 – 2:15 pm **Plenary 2**

Schooner Ballroom

Why AI Matters? Dr. Hendrik Hamann, Professor for Atmospheric Sciences at Stony Brook University; AI Chief Scientist, Director's Office at Brookhaven National Laboratory

2:15 – 2:20 pm **TRANSITION TIME**

2:20 – 3:35 pm **Parallel Sessions 6**

Session 6A. Shellfish
Schooner Ballroom
Moderator: Lane Smith

1. *Modeling Oyster Larval Transport in Long Island Sound*; **Hayden Holcomb, Michael Whitney, Catherine Matassa,** University of Connecticut
2. *Sink Dynamics and Larval Connectivity: A Spatially Explicit Model of Eastern Oyster Restoration in Oyster Bay*; **Tanvi Jain, Aaren Freeman, Jashanpreet Kaur, Emma Nikols, Kaiya Provost, and Ryan Wallace**, Adelphi University
3. *Assessment of natural and restored oyster population health in Long Island Sound - Observations of environmental drivers on population dynamics;* **Mariah L. Kachmar, Kyra J. Lenderman, Sarina Dery, Genevieve Bernatchez, Isaiah Mayo, Samuel Gurr, Kelly Roper, Mark Dixon, LTJG Tyler Houck, Barry Smith, Lydia M. Bienlien, Gary H. Wikfors, Lisa Milke, Meghana Parikh, and Katherine M. McFarland**, NOAA Fisheries Northeast Fisheries Science Center Milford Lab
4. *A coupled modeling framework to guide spawner sanctuary placement for eastern oyster (Crassostrea virginica) restoration*; Emily G. Jeran, Andy Huang, Aaren Freeman, Ryan B. Wallace, Environmental Studies and Sciences, Adelphi University

Session 6B. Seafloor mapping + Sustainable and Resilient Communities
Cutter Ballroom
Moderator: Erica Casper

1. *Long Island Sound Seafloor Habitat Mapping Initiative Phase V & Beyond;* DeAva Lambert and Members of the Long Island Sound Cable Fund Steering Committee, Connecticut Department of Energy & Environmental Protection
2. *Temporal variability in seabed morphology in LIS between Norwalk and Huntington Bay (the LIS Cable Fund Phase III Area)*; Roger D. Flood, Mohamed Elsaied, School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University,
3. *Offshore Movement and Habitat Use of Atlantic Horseshoe Crabs (Limulus polyphemus) in Relation to Seafloor Habitats;* Neetu Dhanda, Chris Conroy, Catherine Matassa, Peter Auster, Roman Zajac, Ivar Babb, Kate Randolph, University of New Haven
4. *Amending salt marsh sediment additions: Incorporation of shells prevents the development of acid sulfate soils*; Sage E. Ganshirt, Rachel Biton, Graham Bornhorst, Chris S. Elphick, Min T. Huang, Jacob Isleib, Beth A. Lawrence, Itamar Shabtai, Blaire Steven, and Ashley M. Helton, University of Connecticut
5. *Revisiting the mechanisms of adaptation after 200 generations of simultaneous ocean warming and acidification in a widespread marine copepod;* Victoria Marie Glynn, Rowan Batts, Lisa Piastuch, Gihong Park, Amber Grunow, Reid Brennan, Hans Dam*, Melissa Pespeni*, University of Vermont / University of Connecticut Avery Point *Joint senior authors

3:45-4:00 pm Conference Wrap-up

Schooner Ballroom
Closing Remarks by Dr. Sylvain De Guise, director CTSG,
Dr. Rebecca Shuford, director NYSG

4:00pm **Adjourn and Networking**

Safe travels home!

Posters

Clean Waters & Healthy Watersheds

1. *Spatial and Temporal Trends of Heavy Metal Contamination in Bridgeport and Black Rock Harbor Surface Sediments, Fairfield County, Connecticut*; **Autumn Smith, Vincent Breslin**; Southern Connecticut State University, Environment, Geography and Marine Sciences
2. *Bottom roughness length scales for modeling Long Island Sound;* **Grant McCardell, James O'Donnell, Alejandro Cifuentes-Lorenzen, Mehrnoosh Abbasian, Todd Fake, Kay Howard-Strobel**;University of Connecticut
3. *Seasonal variability of Carbonate Parameters in Western Long Island Sound (August 2024-December 2025)*; **Erich Nitchke, Penny Vlahos, Samantha Wilder, Evelyn Powers;** University of Connecticut
4. *Ranking macroalgae for nitrogen bioextraction potential;* **Amanda Shore, Peter J. Park**; SUNY Farmingdale
5. *Quantitatively Assessing Photodegradation of Domoic Acid in Coastal Waters;* **Rachel Spera, Quin Zabel, Dianne Greenfield, Penny Vlahos**; University of Connecticut
6. *Beyond the 3 mg/L Threshold: A Recurrence-Based Risk Indicator for Coastal Hypoxia Assessment*; **Reza Badpa, Kamazima M.M. Lwiza,** School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University
7. *Investigating Coastal Sedimentation, Trace Metals, and Carbon Burial along the Connecticut coast in association with the USDA-NRCS LIS CZSS*; **William Ouimet, Preston Senderoff, Saranya Gautam**; University of Connecticut
8. *Impacts of Summer Hypoxia on Bacterioplankton Abundance and Diversity in Hempstead Harbor, Long Island Sound*; **Alexia Gulino, Clara Strehle, Indranil Mukherjee, Luciana Santoferrara;** Department of Biology, Hofstra University
9. *Phytoplankton Abundances Across Long Island Sound Point-Source Inputs;* **Julia M. Sandke, Erin Schneider, Victoria Vossler, Melissa Celik, Julie Granger, Craig Tobias, Penny Vlahos, Dianne I. Greenfield**; School of Earth and Environmental Sciences, Queens College, City University of New York
10. **Sound, satellites, action: Optimized and accessible water quality products for Long Island Sound from space**; Kyle J. Turner, Joshua Harringmeyer, Tong Lin, Maria Tzortziou, Joaquim Goes, Helga Gomes, Jinghui Wu, Luka Catipovic; The City College of New York, CUNY
11. *Tidal marsh mediation of nutrient dynamics in Long Island Sound* ; **Alexandra Frenzel, Craig Tobias, Peter Ruffino;** University of Connecticut, Department of Marine Sciences

12. *Contrasting biogeochemical trajectories in adjacent estuaries: Interdecadal trends in water quality in Hempstead Harbor and Cold Spring Harbor, NY*; **Andy Huang, Ryan B. Wallace**; Adelphi University
13. *Grain Size Analysis and Spatial Distribution of Heavy Metals within the Bladen's River Dam Impoundment (Seymour, Connecticut);* **Gary Hoehne, Nicholas Fedorchuk, Vincent Breslin, Katelyn Alix, Jam Hayton, Kayla Balbachan;** Southern Connecticut State University
14. *Effect of improved water quality on molluscan communities in Long Island Sound;* **Gregory P. Dietl, Matthew J. Pruden, John C. Handley;** Paleontological Research Institution
15. *Evaluating the role of vertical mixing in modulating hypoxia in western Long Island Sound*; **Mehrnoosh Abbasian, James O;Donnell, Alejandro Cifuentes-Lorenzen, Craig Tobias**; University of Connecticut
16. *Investigating the Effects of Acute and Long-term Exposure to PFAS on Temperature Stress in Long Island Sound Phytoplankton* ; **Niko DeSousa, Colin T. Kremer, Hagen Klobusnik, Brandon Chan, Sophie Provencher**;University of Connecticut EEB
17. *Water as a Common Good: Monitoring the Quality of our Local Watersheds*;**Al-Warith Mallick, Parinita K. Datta, Diana Garcia Melgar, Fernando Nieto, Duncan Quarless**; SUNY College at Old Westbury
18. *Data-Driven Forecasting of Bottom Dissolved Oxygen in Western Long Island Sound;* **Reza Badpa, Kamazima M.M. Lwiza;** School of Marine and Atmospheric Sciences
19. *Oyster health and restoration in Long Island Sound - Understanding population dynamics of natural and unmanaged oyster beds;* **"Sarina Dery, Kyra J. Lenderman, Mariah L. Kachmar, Genevieve Bernatchez, Isaiah Mayo, Samuel Gurr, Kelly Roper, Mark Dixon, LTJG Tyler Houck, Barry Smith, Lydia M. Bienlien, Gary H. Wikfors, Lisa Milke, Meghana Parikh, and Katherine McFarland;** NOAA Fisheries
20. *Leveraging High-Resolution sensors for Fine-Scale Chlorophyll-a Dynamics in Complex Urban Waterways*; Tong Lin, Maria Tzortziou, Kyle Turner; City University of New York
21. *Testing Phytoplankton Community Responses to Nitrogen Form Along an Urban-Exurban Gradient in Long Island Sound*; **Victoria Vossler, Julie Granger, Craig Tobias, Julia Sandke, Erin Schneider, Georgie E. Humphries, Dianne I. Greenfield;** School of Earth and Environmental Sciences, Queens College, City University of New York
22. *Focusing on Fertilizer: A new tool to help target lawn fertilizer outreach*; **Qian Lei-Parent, David Dickson, Robert Johnston, Jamie Vaudrey, David Newburn, Tom**

Ndebele, Haoluan Wang, Kaichao Chang, Derek Wietelman, University of Connecticut

23. *Microplastic Dispersal Driven by Lagrangian Coherent Structures*; **Sunghwan "Sunny" Jung**; Cornell University
24. *Occurrence and Characterization of Per- and Polyfluoroalkyl Substances (PFAS) in Historical Long Island Sound Sediments;* **Martin Castro, Nicholas Ring, Pengfei Zhang, William Ouimet, Zhongqi Cheng, Yuemei Ye**; Lehman College
25. *PFAS in Archived Fish: Insights from Preserved Biological Specimens*; **Kevin W. Shaffer, Oliver N. Shipley, Yi Zhang, Ashley Nicoll, Thi Anh Nguyen, Euna Kim, Yong Chen, Elsie M. Sunderland, Nicholas S. Fisher, Michael G. Frisk, Christopher J. Gobler, Lokesh P. Padhye**; New York Center for Clean Water Technology, Stony Brook University
26. *Context-dependent water clearance by aquacultured eastern oysters, Crassostrea virginica, assessed by valve gape monitoring*; **Bryanna Porter-Pompey, Ian Dwyer, Nils Volkenborn**; Stony Brook University, School of Marine and Atmospheric Sciences
27. *The Long Island Sound Clearinghouse—an online platform that directs users to publicly available information for the basin*; **Harper Beckers, Gina Groseclose, Milan Liu, Erik Myers, Mark Poe, Christopher Schubert**; U.S. Geological Survey
28. *Impacts of a near shore wastewater outfall on carbonate chemistry*; **Hanaan Yazdi, Roy Price, Tyler Menz;** Stony Brook University, School of Marine and Atmospheric Sciences
29. *Dark Side of the Bloom: Characterizing Population Dynamics of a Toxic Dinoflagellate (Alexandrium catenella)*; **Charlotte Melnitsky, Hagen Klobusnik, Colin T. Kremer**; University of Connecticut
30. *Meeting Energy Demands While Maintaining Healthy Watersheds and Thriving Habitats*; **Devan Nichols, Thomas Gillen**; ASA Analysis and Communication Inc
31. *Otolith and eye lens biomarkers for tautog and winter flounder in Long Island Sound*; **Ryan A. Wagner, Karin E. Limburg**; SUNY ESF
32. *Remediation of water and soil contaminated by per- and polyfluoroalkyl substances;* **Yanna Liang, Tao Jiang, Nahid Perez, Aswin Ilango**; University at Albany

Informed and Engaged Public

33. *Insights from the Economic Contribution of Connecticut's Aquaculture Sector, 2016-2023;* **Tessa L. Getchis; Christopher Laughton; Rigoberto A. Lopez; Luis Seoane Estruel; Angela Zhang**; CT Sea Grant and University of Connecticut

34. *Mixed Methods Process for Long Island Sound Schools Network Improvement*; **Ashley Morrell, Diana Payne**; Connecticut Sea Grant
35. *The SAFER Mobile App: An Interactive Tool for Coastal Storm and Power Outage Preparedness, Adaptation, and Recovery;* **Carolyn A. Lin;** University of Connecticut
36. *Developing hands-on lessons to increase the public's knowledge of and impact their perceptions towards local seafloor ecology*; **Zoe Kendall, Chris Conroy, Ivar Babb;** University of New Haven
37. *A Case Study of the COASTS program: Community Opportunities for Accessing Science Training on the Sound (COASTS)*; **Karin Jakubowski, Sarah Novarro, Christian Conroy, Jean-Paul Simjouw, Amy Carlile;** University of New Haven COASTS Program
38. *Surface currents and coastal connectivity: Drifter-based insights for a Mid-Atlantic Bight offshore wind project*; **Meg Shah, Michael M. Whitney**; University of Connecticut
39. *Developing a GIS data directory to support decision-making in Long Island Sound;* **Carlee Dunn, Karen Aerni, Peter Auster, Ivar Babb, Christian Conroy, James O'Donnell, Kaylan Randolph, Roman Zajac, Catherine M. Matassa**; University of Connecticut Avery Point
40. *Developing A Higher Education Aquaculture Pathway In Connecticut To Increase Aquaculture Workforce Development*; **Emma Cross, Alysa Mullen, Tessa Getchis**; Southern Connecticut State University

Sustainable and Resilient Communities

41. *"We live here": Coastal Retreat and Policy Adaptation*; **Emmanuel Xon;** Southern Connecticut State University
42. *Simulating Compound Flooding from Coastal and Pluvial Processes in New Haven, CT, using Super-Fast INundation of CoastS (SFINCS)*; **Leah Topping, Liv Herdman, Salme Cook;** U.S. Geological Survey
43. *Evaluating Flood Extent in Long Island Tidal Marsh Using the HYDRAFloods Tool, SAR, and Ocean-Color Instruments*; **Britnay Beaudry, Dr. Joshua Herringmeyer, Dr. Brian Lamb, Dr. Maria Tzortziou;** CUNY City College
44. *Patterns in Emergent and Epifauna Distribution in Long Island Sound's Central Basin;* **Faith Chepchirchir, Chris Conroy, Catherine Matassa, Roman Zajac, Ivar Babb, Peter Auster, Kate Randolph**; University of New Haven

45. Places *to Sea: An investigation of coastal access and community resilience*; **Alyssa Pfitzer Price, Harrison Bohrer, Giovanna McClenachan, David Taylor, Mary Collins, Melissa Finucane**; Stony Brook University
46. *Sediment addition to submerging marshes: Flooding frequency controls generation of acid sulfate soils in salt marsh sediment*; **Rachel Biton, Graham Bornhorst, Sage Ganshirt, Chris S. Elphick, Min T. Huang, Jacob Isleib, Beth A. Lawrence, Itamar Shabtai, Blaire Steven, and Ashley M. Helton**; University of Connecticut
47. *High-resolution compound flood modeling and mapping framework for Long Island Sound*; **Chris Lashley, Shima Kasaei, Gwen Macdonald**; Stantec
48. *Embodied Coastal Blue Spaces: Sensorimotor Engagement and Affect;* **Jefferson A. Ikediuba, Professor Bryce DuBois**; University of New Haven
49. *Monitoring Salt Marsh Resilience: Sub-Pixel Vegetation Composition Mapping in Long Island Sound Salt Marshes Using Dense Landsat Time Series*; **Ashley Grinstead, Beth Lawrence, Chris Elphick, Ashley Helton, Xiucheng Yang, Shi Qiu, Zhe Zhu**;University of Connecticut
50. *Upper thermal regimes and quiescence in the temperate coral Astrangia poculata;* **Alina Tran, Sean P. Grace**; Southern Connecticut State University

Thriving Habitats and Abundant Wildlife

51. *Can we use remote sensing to improve our understanding of tidal flooding risk in coastal marshes?*; **Emily Feng, Emily Winslow, Maya Ray, Zhe Zhu, Chris Elphick;** University of Connecticut
52. *Investigating how tidal restoration and Phragmites management affect carbon stocks in Long Island Sound salt marshes*; **Evelyn Hall, Nicolette Nelson, Chris S. Elphick, Molly McCann, Ashley M. Helton, Beth Lawrence**; University of Connecticut
53. *Using hydrologic- and population dynamic-modeling to forecast impacts of droughts and land development on river herring populations: Year 1 Results*; **James Knighton, Matt Sobota, Griffin Noak, Adrian Jordaan, Reese Dorroh, Kevin Job, Katherine Helmer, Eric Schultz;** University of Connecticut
54. *The utility of continuous imaging of microscopic particles in deepening our understanding of phytoplankton in Long Island Sound;* **Zofia Baumann, Kaylan Randolph, Nicholas Beckles, Hazel Levine, Kristine Prelich;** Department of Marine Sciences, University of Connecticut

55. *A Database Documenting Saltmarsh Restoration History in the Long Island Sound Region*; **Molly McCann, Nicolette Nelson, Evelyn Hall, Beth Lawrence, Ashley Helton, Chris Elphick**; University of Connecticut
56. *More Than a Grain of Salt: Re-assessing Floristic diversity in an overlooked Westchester County Salt Marsh*; **Julie D'Onofrio**; Lehman College
57. *Impacts of Seaweed Aquaculture on Water Quality and Zooplankton Abundance and Diversity in Guilford, Connecticut*; **Kaitlin Wagner, Jon McGee, Dr. Emma Cross;** Southern Connecticut State University
58. *Creating a ranked list of salt marsh elevation change drivers to support restoration and management in Long Island Sound*; **Nicole E. Woosley (presenter), Sarah C. Crosby, Giovanna McClenachan, Therese Apuzzo, Marisa Fajardo, Jared Kannel, GraceAnne Piselli, Nesy Oja, Rebha Raviraj, Domenic Romanello, Danielle Schwartz, Justin P. Susarchick, Abigail S. Tripler**; The Maritime Aquarium at Norwalk
59. *Combining long-term datasets, remote sensing techniques, and field sampling to advance salt marsh restoration and management in Long Island Sound;* **Therese Apuzzo, Giovanna McClenachan, Sarah Crosby, Nicole Woosley**; Stony Brook University

Appendix I Oral Presentation Abstracts (organized by session)

Session IA. Clean Waters and Healthy Watersheds

Reinvigorating the Science-Policy-Management Connection – An Earth System Approach; **Paul E. Stacey;** Footprints In The Water LLC
Understanding of ecosystem structure and function has grown enormously in the past century. Earth System Models (ESM) now integrate ecosystem-level management with human and natural processes to sustain stability, resilience and life support functions in balance with environmental and human health and well-being. “Safe Zones” established for nine “Planetary Boundaries” provide a superior framework for assessment and planning with downscale potential to guide watershed-level comprehensive landscape management. I will overview the ESM approach and the implications for research that more effectively guides policy and management in these times of lost stationarity and regime shift. A GIS-based watershed health metric and decision support framework devised for CT and the LIS Partnership by UConn’s CLEAR and Footprints In The Water LLC are used to quantify watershed condition, management needs, and potential benefits. These attributes comprehensively assess Healthy Watershed and Clean Water status to better guide management to a safe zone, targeting both environmental and human health and well-being outcomes in context of today’s challenging Social-Ecological System (SES). These analyses have now expanded to the entire LIS basin using CLEAR’s new 1986-2023 mapping to identify trends and net change over time for watershed health, and nutrient loading. Importantly, management focus can now shift context from current activities to the actions necessary to attain health status and nutrient loading reductions. Concrete, quantitative goals and plans essential to policy and management will be proposed that engage public support offering tangible potential gains in local benefits.

Land Cover and Land Cover Change for the Entire Long Island Sound Watershed; **Emily H. Wilson, Qian Lei-Parent, David Dickson**; University of Connecticut, CLEAR
For decades, UConn CLEAR has provided and used land cover and land cover change maps to support decision making and educational programs. The original CLEAR Changing Landscape Land Cover showed land cover and change over a 30-year period (1985-2015). The discontinuation of the CLEAR Changing Landscape Land Cover and the evolution of Federal land cover efforts led UConn CLEAR and the Long Island Sound Partnership to explore new options. The National Land Cover Database (NLCD) was identified as the most suitable, and even more so with the recent release of Annual NLCD. Annual NLCD has many advantages including back-dating to 1985, annual updates, national coverage, consistency that allows for change analysis, and availability of supplementary layers such as impervious estimation. The land cover along with analyses, numbers, and charts are now available on the CT ECO website through an interactive tool that includes a map viewer and data dashboards. The presentation will explain the project and introduce the tools and results, which will be shared more thoroughly in two following presentations.

New Land Cover Map Viewer and Dashboards for Long Island Sound Watershed; **Qian Lei-Parent, Emily Wilson, David Dickson**; University of Connecticut CLEAR
This presentation will demonstrate how to use the interactive tool that was presented in "Land Cover and Land Cover Change for the Entire Long Island Sound Watershed" (Emily Wilson). The tool has recently been released by the University of Connecticut Center for Land Use Education and Research. It includes an interactive map viewer and data dashboards that allow users to explore land cover and land cover change by HUC-12 watershed, municipality, riparian area, and major land cover class from 1985 to 2023 for the entire Long Island Sound Watershed (from Canada to the Sound). The tool is available at https://s.uconn.edu/landcover.

Long Island Sound Water Quality Monitoring Program: Where we've been What we've Found and Where we're Headed; **Matthew Lyman, Katie O'Brien-Clayton, Carriel Cataldi;** Connecticut Department of Energy and Environmental Protection
The Connecticut Department of Energy and Environmental Protection (CTDEEP) has been monitoring the water quality of Long Island Sound (LIS) for over 30 years. Year-round monthly sampling includes monitoring for nutrients, chlorophyll a, biological oxygen demand, and water column profiles of temperature, salinity, pH, turbidity and dissolved oxygen. Summer sampling provides data on the recurrent low dissolved oxygen condition known as hypoxia. The monitoring program has been expanded over the years to include monthly phytopigment, plankton and most recently ocean acidification monitoring. CTDEEP staff strive to work with other local researches to aid them in their research efforts on LIS by providing boat time or sample collections during scheduled surveys. Staff will provide a history of the monitoring program, provide a general analysis of monitoring program data and discuss additional research projects and changes in program design over the years. The CTDEEP encourages the research community to make use of the monitoring program's decades long data set as an aid to complementary research and assessment efforts in Long Island Sound and elsewhere.

Session IB. PFAS and contaminants

How are Long Island Sound Phytoplankton Thermal Niches Impacted by the Presence of PFAS; **Niko DeSousa, Colin T. Kremer, Hagen Klobusnik, Sophie Provencher, Brandon Chan;** UConn EEB
Per- and polyfluoroalkyl substances (PFAS) are contaminants of emerging concern and are likely to bioaccumulate and bio-magnify. Studies on PFAS are commonly done in higher trophic organisms like macroinvertebrates and fish. While phytoplankton and their interactions with PFAS are hardly understood, they are the base of marine food webs, serving as important entry points for contaminants into the food web. In this study, the interactive effects of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) pollution and temperature were observed in two phytoplankton species from the Long Island Sound (LIS) and one cultivated species listed respectively (*Chlorosarcinopsis haolphila, Thalassiosira spp., Phaeodactylum tricornutum Bohlin*). More specifically, genomic and experimental techniques were used to understand how rising temperatures

and PFAS influence the growth of marine phytoplankton from LIS. The expected results were (1) as PFAS concentration goes up, growth of phytoplankton will be negatively impacted, and (2) as temperature increases past the thermal optimum, phytoplankton growth will be decreased. Therefore, (3) as PFAS concentration increases, the thermal tolerance of phytoplankton will decrease. As well (4) if PFAS are exposed chronically (2-weeks before reads) compared to acutely (day-of-reads), the phytoplankton growth will be inhibited more. Overall, no PFOA/PFOS-affected wells showed significant differences in growth rate compared to non-contaminated wells. Supported by p-values from one-way ANOVA for growth rates of species between control, acute, and chronic exposure, Thalassiosira spp. = 0.928, C. haolphila = 0.992, P. tricornutum = 0.93. Lastly, BCF values for PFOA/PFOS were calculated across 3 temperatures (12, 20, 27 °C) for Thalassiosira.

Ingestion and egestion of cryo-milled tire tread particles by oysters (Crassostrea virginica) and mussels (Mytilus edulis); **Anne L. Gilewski1, Bridget Holohan1, Sandra E. Shumway1, J. Evan Ward1;** University of Connecticut, Department of Marine Sciences
Tire wear particles (TWP) are recognized as significant anthropogenic contaminants in estuaries adjacent to human-built environments; however, few studies have examined their interactions with estuarine animals. Suspension feeders could be particularly impacted as they process large volumes of water and capture small particles (3 µm) with high efficiency. Using the eastern oyster (*Crassostrea virginica*) and blue mussel (*Mytilus edulis*), this study evaluated selective rejection, ingestion, and egestion of particles (= TWP; 20-211 µm) over 96 h. Animals were fed TWP directly with a similar-sized diatom over a 2 h period. Pseudofeces and feces were collected at <3 h, 24 h, 48 h, 72 h, and 96 h, digested in 1M sodium hydroxide, and TWP counted. At 48 h and 96 h, a subset of bivalves were sacrificed, the gut isolated, digested in 1M sodium hydroxide, and residual TWP counted. Results demonstrated that both species rejected the highest proportion of TWP in <3 h, and oysters rejected a higher proportion (29.9%) than mussels (3.1%). Small amounts of rejected TWP were noted up to 48 h post-exposure in both oysters (1.9%) and mussels (2.3%). The proportion of TWP egested by oysters in intestinal feces (<3 h) was higher (48.4%) than mussels (10.9%). Overall, 96.7-98.3% of egested material was eliminated within 72 h, with gut tissue confirming <1% at 48 and 96 h for both species. This research provides vital information for adverse outcome pathways of TWP exposure by identifying the proportion actually ingested and the time-course for elimination in oysters and mussels.

Microbiomes under stress – Tolerance of the blue mussel Mytilus edulis and its gut microbiome to toxic pharmaceutical exposure; **Abhishek T. Naik*(1), Bridget A. Holohan(1), Spencer V. Nyholm(2), and J. Evan Ward(1);** (1) University of Connecticut, Department of Marine Sciences; (2) University of Connecticut, Department of Molecular and Cell Biology
Pharmaceutically active compounds in wastewater discharge can create toxic conditions for marine life. Suspension-feeding animals are especially vulnerable as they filter large volumes of water per unit time, bringing their internal tissues into constant contact with these evolutionarily foreign compounds. Carbamazepine (CBZ), an anti-epilepsy medication, exhibits <10% removal efficiency following traditional sewage treatment

techniques, causing several sublethal toxic effects in suspension-feeding bivalves. CBZ exposure can disrupt the gut microbiomes of zebrafish and frog larvae, but in bivalves, these effects are not known. The gut microbiome plays crucial functional roles across the animal kingdom, including detoxification of ingested toxins in several terrestrial herbivores and insects. However, functional roles of bivalve microbiomes, especially under toxic stress, are poorly understood. Here, the effect of CBZ on the blue mussel (*Mytilus edulis*) "holobiont" was assessed, encompassing effects on both the mussel and its microbiome. Mussels were maintained in a system of sterilized glass microcosms, fed sterilized microalgal diets, and exposed to CBZ at concentrations ranging from environmentally relevant (1 µg/L) to highly polluted (10 and 40 µg/L). Toxic effects on mussels were evaluated by measuring biochemical markers of oxidative stress and neurotoxicity. The composition and activity of bacterial communities in the gut microbiomes were assessed using differential mRNA expression patterns derived from metatranscriptomics sequencing. By correlating host and microbiome tolerance to CBZ, this study sets up a framework for future experiments directly targeting host-microbiome tradeoffs involved in biotransformation of CBZ by the blue mussel.

Tide and buoyancy influences on plume structure and enterococci distribution at Rocky Neck Beach, Connecticut; **Luke Glass, Michael Whitney**; University of Connecticut
Rocky Neck Beach in Connecticut regularly suffers from high enterococci concentrations, impeding beach access. A small freshwater brook on the eastern side of the beach delivers a small plume of fresh, bacteria-laden water directly onto the beachfront. Although long-term monitoring indicates spatially varying alongshore freshwater distribution, temporal changes in plume structure and mixing over a tidal cycle here remain unclear. A high-resolution hydrodynamic model, motivated by high-frequency CTD transect sampling and in-situ discharge measurements during the 2024/25 summer seasons, was used to understand buoyancy and tidal influences on the alongshore structure of the Rocky Neck plume. Model results from the neap tide scenario shows remnant plume waters to be perpetually present at the brook mouth. Spring tide results exhibit a large departure from the neap tide scenario during the low/flood stage. Greater alongshore momentum advects the plume farther west along the beachfront but fully mixes the plume waters away before the next plume pulse. Plume waters extend furthest west in the neutral buoyancy scenario and is deflected left and right out of the mouth by the tidal current. Reduced salinity gradients during a spring tide could therefore pose greater risks to bathers at western Rocky Neck. These results provide greater insight into small-scale river plume behavior under different forcings. Results highlight the importance of tidal sampling to capture daily variability. Results imply the need for CTD point sampling alongside water sample collection, and increased sampling frequency if the alongshore salinity gradient is small.

Session 2A. N and Hypoxia

Drivers of oxygen variability in western Long Island Sound investigated using high-frequency biogeochemical and physical observations; **Peisen Tan, Leonel Romero, and Cara Manning**; University of Connecticut

Despite reductions in nutrient loading to Long Island Sound (LIS), seasonal hypoxia continues to negatively impact water quality, and the extent and duration of hypoxia varies interannually. Here, we present high-resolution observations from a wire-following profiler (Wirewalker) in western LIS from June to September 2025, providing new insights into the physical and biogeochemical drivers of oxygen variability over hourly to seasonal timescales. The autonomous profiler collected up to 250 vertical profiles per day over depths from 2 to 25 m, measuring temperature, salinity, dissolved oxygen, chlorophyll, horizontal currents, and turbulence. The Wirewalker measurements were complemented by surface wave and wind measurements, and an acoustic Doppler current profiler on a subsurface buoy which was used to characterize currents and turbulence in the upper 10 m of the water column. Our observations capture episodic periods of enhanced mixing associated with strong up-estuary winds (southwestward winds) during the summer, including a pronounced event in mid-August during the passing of Hurricane Erin offshore of Long Island. During these wind events stratification broke down and subsurface oxygen concentrations increased. We are examining the interactions between wind and tidal straining of the density field, surface wave activity, and stratification. When winds and tides transport more dense surface water up estuary, stratification decreases and mixing increases. Up-estuary winds also increase surface wave-mediated mixing due to increased fetch. Our observations suggest that the timing of Hurricane Erin and its impact on ventilating subsurface waters contributed to the historically low extent of hypoxia in western LIS in 2025.

Who Thrives When Oxygen Falls? Restructuring of Microbial Communities during Coastal Hypoxia; **Luciana Santoferrara, Jodi Dharam, Pukhraj Kaur, Chloé Marchand, Indranil Mukherjee, Nicholas Sardes;** Department of Biology, Hofstra University
Coastal hypoxia is tightly coupled with microbial activities, including nutrient-driven overgrowth of phytoplankton and oxidation of excess organic matter by bacterioplankton. Simultaneously, the conditions generated may differentially favor or constrain distinct microbial groups, for example impairing the growth of microzooplankton and other obligate aerobes that are crucial to higher trophic levels. To examine these dynamics, we are conducting a multi-summer study of microbial communities (Bacteria, Archaea, Eukarya) in Hempstead Harbor, Long Island Sound, spanning pre-, peak, and post-hypoxic conditions. Since 2022, we have quantified weekly/bi-weekly changes in microbial biomass and diversity by combining flow cytometry, inverted microscopy and DNA metabarcoding in surface and bottom waters at five stations along the harbor. We have found relatively stable microbial biomass but significantly different alpha-diversity (Shannon index) and beta-diversity (community composition) between normoxic and hypoxic periods. Changes in taxonomic profiles across the oxygenation gradient show a succession of prokaryotes with oxidative and reductive metabolisms, and microbial eukaryotes indicative of parasitism and endosymbiotic interactions during hypoxia. Biomass, diversity and taxonomic profiles are more variable within each summer than among years, stations or depths, suggesting an important role of seasonal dynamics alongside oxygenation levels. Planned analyses for 2026 include higher temporal resolution through the full year, quantification of top-down

controls on phytoplankton and bacterioplankton, and genome-resolved analyses of microbial biogeochemical potential.

Transport of effluents from Waste Water Treatment Plants in Long Island Sound; **Michael M. Whitney, Penny Vlahos, Meg Shah, Luke Glass;** Marine Sciences, University of Connecticut
Wastewater treatment plants (WWTPs) in Connecticut and New York discharge effluents into the tributaries and embayments of Long Island Sound (LIS). Tracking transport of WWTP effluents through LIS is important because they can episodically introduce untreated sewage and they persistently carry contaminants and nutrients. Decades of nitrogen-based management and corresponding infrastructure improvements have reduced WWTP nutrient inputs. Regulations and treatment technologies, however, are only beginning to contend with many emerging contaminants. The model-informed nitrogen management framework takes a static view of effluent distributions and their effects on LIS water quality. Storms, seasonal cycles, and interannual changes, however, lead to distinct flow pathways and exposure areas. This study draws on new and existing research to quantify the major spatial patterns and temporal variability of municipal WWTP effluent transport. The modeling approach couples hydrodynamics from Regional Ocean Modeling System (ROMS) with tracking by the Lagrangian TRANSport (LTRANS) model. The ROMS simulation spans decades and has supported several LIS publications. LTRANS individually tracks effluent from municipal WWTP sources in Connecticut, New York City, and Long Island. Shorter-term (48-hours) and longer-term (1-month) exposure areas are compared, storm response is highlighted, and seasonal maps are generated. Connectivity among different LIS regions is quantified. This study paves the way for application to the anticipate release of the LIS-Hydrodynamic and Water Quality Modeling Support (LIS-HWQMS) and corresponding incorporation of biogeochemistry. The approach can be tailored to specific contaminants, management interventions, and WWTP improvements with these new capabilities and future research.

*A Current Assessment of Nitrogen Overenrichment and Hypoxia In Long Island Sound;*Gary **H. Wikfors**; NOAA Fisheries Service, Northeast Fisheries Science Center
The environmental problem dominating the focus of the LIS Partnership for 40 years has been seasonal hypoxia caused by nitrogen (N) overenrichment of primary production. This focus has stimulated consequential investments in point-source nutrient-capture in Publicly-Owned Treatment Works (POTWs) in both Connecticut and New York, substantially curtailing N loadings and lowering areal extent and duration of hypoxia in most of LIS. This success in N-load control and desired system response suggests reconsideration of continued system-wide N-load reductions to address current conditions. Current conditions can be summarized as: 1) Primary production in most of LIS is nitrogen-limited in summer; N-fixing cyanobacteria bloom every summer, but toxigenic Harmful Algal Blooms are very rare. 2) Hypoxia is no longer a ""system-wide"" impairment; it is highly localized. 3) Chronic, seasonal hypoxia is limited to two specific areas:
a. The Western Narrows, where nutrients released into the East River Tidal Strait (a high-nutrient, low-chlorophyll water body) are relieved of light limitation as sediments settle,

resulting in unusually high primary production. b. Coastal embayments where restricted tidal flushing leads to long residence time of non-point-source nutrients. N-caused hypoxia in the Western Narrows has been addressed by N-removal in New York City POTWs in the East River, with system response in progress. In specific embayments with restricted tidal flushing, non-point N-capture and nutrient bioextraction will be most effective if implemented directly in watersheds and within the affected embayments. Concentrating mitigation investments in the specific places where N-caused hypoxia remains will be more beneficial than general system-wide restrictions.

Session 2B. Informed and Engaged Public

The Ocean Identity survey: A valid and reliable measure of human connections to ocean environments; **Miriah M. R. Kelly 1, Christopher J Budnick 1, Jo-Marie Kasinak 2, Emma McKinley 3, Jamie M.P. Vaudrey 4;** 1 Southern Connecticut State University; 2 Sacred Heart University; 3 Cardiff University; 4 University of Connecticut
Worldwide, ocean ecosystems are experiencing unprecedented levels of anthropogenic pressure, and as efforts to address the challenges facing the global ocean continue to fall short, there is a growing call for greater consideration of the human dimensions of ocean issues. Alongside this increased recognition of the influence of human actions on the ocean, there is a growing and diverse range of initiatives targeted at enhancing human-ocean connections and fostering pro-ocean actions across the United Nations Ocean Decade, Ocean Conferences, and Ocean Sciences agendas. Yet, few resources exist for measuring the unique connections humans maintain with ocean spaces. Ocean identity is an emerging construct that gives insights into the multiple dimensions of human identity development as it relates to ocean spaces. Building on earlier work to explore the conceptual framework of ocean identity, the instrument presented here tests the conceptual ocean identity attributes to establish a statistical model and quantitative scale depicting the essential components of ocean identity. To develop the ocean identity scale, we used a three-phase process: 1)Instrument development and refinement (n=6) 2) exploratory analysis for factor structure (n=373), and 3) confirmatory factor analysis and convergent/divergent tests (n=352). The result of this work is a four-factor (ocean connectedness, ocean worry, ocean expression, and ocean engagement) model consisting of twenty items that span cognitive, affective, and behavioral realms. This valid and reliable instrument that can be used in a range of education, outreach, and engagement contexts.

Beneath the Blue Horizon - Linking Science and Education Using Story Maps; **Ivar Babb, Zoe Kendall, Chris Conroy, Peter Auster, Roman Zajac, Catherine Matassa, James O'Donnell, Grant McCardell;** University of Connecticut
The Long Island Sound Seafloor Habitat Mapping Initiative (LISSHMI) began developing comprehensive seafloor maps in 2012 and has continued this effort to date in areas identified as high priority based on management and research needs. This effort has generated thousands of underwater images and video, hundreds of data products including spreadsheets, maps and models. The Environmental Systems Research Institute (ESRI) is a leader in the development of geographic information systems (GIS) and in 2011

introduced the first Story Map, which is "a web-based platform used to create interactive stories combining maps, multimedia (videos, images), and text." This presentation will introduce some of the Story Maps developed by the LISSHMI to promote understanding and engagement of the wonders of the Sound. Updates on recent efforts working with the University of New Haven to align these products with educational standards to provide a unique resource for marine science educators will also be discussed.

Places and Spaces: Cultivating Senses of Belonging in the Urban Watershed Through Children's and Family Programming; **Erin McKeehan**; Wildlife Conservation Society
The pursuit of ecological resiliency in the face of climate change, biodiversity loss, and attempts to suppress social and scientific progress (Sun & Ye, 2025) requires an integrative approach to existing participatory systems. A critical component of this pursuit is understanding, addressing, and removing barriers to the unequal distribution of nature, also referred to as "the nature gap" (Rowland-Shea et. al, 2020). Further, cultivating lasting senses of belonging in nature within historically excluded communities, such as families with children, enriches multi-scale ecological health and well-being. At the Wildlife Conservation Society's Bronx Zoo, children's and family educational programming along the Bronx Riverwalk seeks to increase access to natural spaces, develop senses of belonging, and advance sustained community-focused stewardship in the Long Island Sound watershed and beyond. This presentation will offer belonging strategies for environmental education practitioners engaging with waterways, as well as discuss a narrative analysis of belonging assessments of the Bronx Zoo's Family Nature Club and other children's programming.

Student Solutions for Strengthening Our Community: Protecting City Island and Long Island Sound Against Climate Change; **Mary Jean McCarthy, Jase Bernhardt, Christopher Maher, Amanda Perrone;** Adelphi University
March 2026 New York State Education Department policy now makes climate education an explicit requirement across K–12 curriculums, a development that teachers have welcomed. Environmental stewards working toward sustainable, resilient communities—and all those who value an informed and engaged public stand to benefit from students' increased understanding of climate change. This presentation shares NYC high school student proposals for City Island and Long Island Sound designing a model of a coastal resiliency solution for a local neighborhood, coastline, or community. Students integrate both green (natural) and gray (engineered) infrastructure elements to reduce the risks of flooding, erosion, and other storm impacts. City Island is a small island and neighborhood in the northeastern Bronx, New York City, situated at the western end of Long Island Sound, just south of Pelham Bay Park and east of Eastchester Bay. The project is embedded in a ten-day comprehensive unit aligned with the New York State Science Learning Standards, addressing core climate change knowledge, including causes (primarily human activity), earth systems interactions (e.g., water, atmosphere, and oceans), and data analysis. Students examine impacts such as extreme weather, sea level rise, ecosystem changes, and local and global consequences. Importantly, they apply their learning to mitigation and adaptation strategies, resiliency infrastructure design, and the evaluation of trade-offs.

Overall, this project promotes collaboration, critical thinking, creativity, and the application of environmental science and engineering principles.

Session 3 A. Informed and Engaged Public

Connecting People to Place through a Long Island Sound Watershed StoryMap; **Cary Chadwick, Emily Wilson**; University of Connecticut, Center for Land Use Education and Research (CLEAR)
The University of Connecticut's Center for Land Use Education and Research (CLEAR) has developed an award-winning interactive ArcGIS StoryMap in collaboration with the Long Island Sound Partnership. The StoryMap, Connections to Long Island Sound, communicates the complexity and interconnectedness of the Long Island Sound watershed. Spanning more than 16,000 square miles across six states and supporting nearly 9 million people, the watershed links diverse landscapes, communities, and environmental challenges. This presentation will demonstrate how the StoryMap integrates geographic data, narrative, and multimedia to make scientific and geographic information accessible and engaging for broad audiences. It combines maps of land cover, population patterns, and natural resources with cultural connections to highlight the dynamic interactions between communities and the environment. In addition to showcasing the StoryMap's content and design, the presentation will briefly discuss its development process, including collaboration among regional partners and the translation of complex datasets into compelling visual storytelling. The session will also explore how this tool can support education, outreach, and decision-making for municipalities, researchers, and community organizations.

Elucidating bottom boundary layer dynamics in Long Island Sound; **Alejandro Cifuentes-Lorenzen, Mehrnoosh Abassian, Kate Randolph, James O'Donnell, Grant McCardell and Molly James;** University of Connecticut, Department of Marine Sciences
Effectively characterizing bottom friction is critical for mechanistically describing coastal hydrodynamics, including tidal structure, sediment resuspension, and transport. In numerical models, bottom stress is commonly parameterized through an aerodynamic roughness length within a rigid-wall, log-layer framework that assumes constant stress and a local balance between shear production and dissipation. However, these parameterizations are often applied with spatially uniform and, at times, unrealistically large roughness values, obscuring key physical processes in the bottom boundary layer. Here, we present preliminary results from direct observations of turbulent kinetic energy dissipation rates and turbulence structure within the bottom boundary layer across multiple sites in Long Island Sound. These observations reveal interesting spatial variability and consistencies in the turbulence intensity and vertical structure of the turbulence. Observations are compared against (i) a one-dimensional turbulence closure model (General Ocean Turbulence Model, GOTM) and (ii) a three-dimensional hydrodynamic model (Finite Volume Community Ocean Model, FVCOM). This work underscores the need for improved, observation-informed representations of bottom friction that capture the spatiotemporal variability of turbulence in coastal environments. Ongoing efforts focus on

developing scaling relationships for dissipation rates and stress that can be incorporated into next-generation modeling frameworks.

Bioindicators of microplastics: are bivalves the best choice? (spoiler, they are not); **Kayla Mladinich Poole, Bridget A. Holohan, Sandra E. Shumway, J. Evan Ward**; University of Rhode Island

Microplastics are an emerging contaminant distributed world-wide. Many studies have suggested that suspension-feeding bivalves would be good bioindicators for microplastics as they are known to consume plastic particles in the environment, are widely distributed, sessile, and easy to collect. However, bivalves are selective feeders and do not consume all particles that they capture. This study investigated how other suspension feeders interact with microfibers of different sizes and polymer types to assess their suitability as bioindicator species, including: the Atlantic slippersnail *Crepidula fornicata* (gastropod), sea grape *Molgula manhattensis* (tunicate), and rough sea squirt *Styela clava* (tunicate). Animals were offered aged polyester or nylon microfibers of different lengths, or nylon and polyester microfibers of similar lengths during 2-h exposure periods. Pseudofeces and feces were collected during and after exposure and the microfibers within enumerated. Bivalves exhibited size-based selection of microplastics, with rejection of up to 60% of captured fibers and rapid egestion of up to 40% of ingested fibers within 3 h. Slippersnails exhibited selective rejection of fibers similar to bivalves but rapidly egested over 50% of some fiber lengths. Tunicates rejected a lower proportion of microfibers compared to molluscs with S. clava being the least selective, rejecting less than 4% of captured fibers regardless of size. Both tunicate species, however, egested between 20% and 75% of ingested fibers within 3 h. Polymer type did not influence ingestion or egestion of fibers by any species. These data demonstrate that certain species of tunicates should be investigated further as candidates for biomonitoring purposes.

Cooking up a Solution: Chefs on the Frontline of Invasive Species Management; **Anna Johnson, Bryce DuBois**; University of New Haven

Traditional invasive alien species (IAS) management practices are expensive, with the United States spending millions annually on control efforts. Despite these investments, IAS still damage ecosystems and contribute to species decline. Alternative strategies, like consumptive-based management (CBM), have emerged to support traditional approaches at a lower cost. While typically small in scale, some species, like green crabs, are now being utilized in restaurants. The chefs who serve IAS and their motivations for doing so present a key, but understudied aspect of CBM. This presentation reports the outcomes of a study that explores the experiences and motivations of chefs who serve IAS. Using snowball sampling, initial interviewees were identified through regional organizations focused on encouraging sustainable consumption. Fourteen individuals were identified, including eleven chefs who consistently serve IAS in New England, from Maine to Connecticut. Of these, ten (eight men and two women) were interviewed using a semi-structured protocol. Results of qualitative analysis found that all interviewees were chef-owners between the ages of 38 and 51. Across all participants, sourcing sustainable food was the primary motivation for serving IAS. Green crabs were the most frequently used IAS, due to their flavor profile and sourcing availability. Chefs identified two sourcing pathways for green crabs: distributors and individual fishermen, though only two distributors were identified in the region. These results contribute to outreach and education efforts related to Long Island Sound. Specifically, they highlight opportunities to expand CBM by developing chef-focused trainings to improve familiarity with IAS and identify reliable sourcing pathways.

Session 3B. Nitrogen and Hypoxia

Opt*imizing Nutrient Reductions Across the Long Island Sound Basin*; **Craig Connolly, Naomi Detenbeck;** U.S. EPA, Office of Applied Science and Environmental Solutions, Coastal Science and Solutions Division, Atlantic Coastal Science Branch
U.S. EPA previously released a static version of the River Basin Export Reduction Optimization Support Tool (RBEROST) for the Upper Connecticut River basin (v1s). RBEROST is designed to enable stakeholders to identify the least cost solutions to meet watershed nutrient loading targets with consideration of potential upgrades to septic systems or wastewater treatment plants, implementation of stormwater best management practices or agricultural conservation practices, and restoration of riparian zones. EPA is preparing to release a dynamic version of RBEROST that covers the entire Long Island Sound (LIS) basin. The dynamic LIS RBEROST is coupled with the new USGS dynamic SPARROW loading model for LIS, which yields seasonally and yearly source load estimates for 2000-2020. The dynamic version of RBEROST not only allows users to evaluate how least-cost solutions and probabilities of success in meeting targets vary between seasons and wet versus dry years but also allows users to evaluate lags in the performance of management practices related to storage of legacy nutrients in the system. In this presentation we provide an overview of updates to the LIS RBEROST, a description of linkages to source loads from dynamic SPARROW for the LIS North Shore watersheds and from a groundwater-based model for the LIS South Shore watersheds, and preliminary results. Initial findings indicate that achievable targets and least cost solutions vary by normal, wet, and dry years.

Dog Waste Contributions to Water Quality Impairment and the Potential for Community-Based Interventions; **Sarah Esenther, Michael Pascucilla, Allison Beaulieu**; Brown University, East Shore Health District
The U.S. dog population has increased by ~70% since 1996, and nearly two-thirds of households now own a dog. While dog ownership provides physical and mental health benefits, dog feces can contain pathogens and protozoa that pose risks to human health, including Campylobacter, Salmonella, Yersinia, E. coli, Giardia, Cryptosporidium, and strains of antibiotic-resistant Enterococcus. These risks are amplified in urban areas with dense dog populations, particularly where poor waste cleanup and stormwater runoff transport fecal contamination into recreational and aquaculture waters. Despite its growing prevalence, dog waste remains an underrecognized contributor to water quality impairment, and few models for sustainable, community-driven remediation exist. We present a case study from Branford, CT, where microbial source tracking was used to

identify canine waste as a driver of E.coli contamination and guide intervention. Contrary to initial assumptions that failing sewage systems were responsible, 2023 sampling revealed that elevated bacterial levels were primarily linked to canine waste. In response, a two-pronged behavior and infrastructure campaign was developed and implemented in partnership with local stakeholders in 2024. Follow-up sampling in 2024-2025 showed substantial reductions in E. coli and canine-associated markers. Notably, no beach closures occurred during this period. As dog populations grow and climate change intensifies precipitation and runoff, coastal waters will face increasing threats from nonpoint source pollution. DNA-based tools such as microbial source tracking, combined with targeted community-based interventions, will be essential for protecting recreational and aquaculture waters.

Maximizing nitrogen bioextraction through the co-cultivation of seaweed with oysters;
Michael Doall, Brooke Morrell, Timothy Curtin, Margot Eckstein, Anna Meichenbaum, Jeffery Kraemer, Christopher Gobler; SOMAS, Stony Brook University
Like bivalves, seaweeds are non-fed, extractive aquaculture crops that sequester nutrients from surrounding waters. These nutrients are removed from marine systems when bivalves and seaweed are harvested, a process known as bioextraction. This study sought to directly quantify and compare nitrogen (N) removal rates obtainable through the year-round co-cultivation of oysters and seaweed across a eutrophication gradient in Long Island Sound, NY, ranging from eutrophic urban waters near New York City (East River), to a mesotrophic, suburban bay ~40 miles away (Mt. Sinai Harbor). Sugar kelp, *Saccharina latissima*, was cultivated during the colder months (December-May) along horizontal long-lines, and Ulva sp. was co-cultivated with oysters in floating bags during the warmer months (May-November). Based on the biomass yields and N content of each species, along with realistic farm design assumptions, it was estimated that a one-hectare kelp-Ulva-oyster farm would be capable of removing 390 kg N yr-1 in eutrophic waters, and 306 kg N yr-1 in mesotrophic waters, with the relative contribution of each aquaculture species differing among the sites. Seaweed, and kelp in particular, was more effective at extracting nitrogen in the more nitrogen-rich waters, owing to significantly higher tissue N content (kelp and Ulva) and significantly higher growth rates (kelp). Oysters, conversely, had significantly higher growth and extracted more nitrogen in the less nitrogen-impacted waters, potentially due to better water quality for oyster growth. The results demonstrate that the co-cultivation of seaweed and bivalves can maximize nitrogen bioextraction across a range of estuarine conditions and water qualities.

Improving nitrogen fixation and denitrification measurements in Zostera marina beds using noble gas tracers; **Kelsey Ward, Craig Tobias, Cara Manning**; UCONN Avery Point
Eelgrass (*Zostera marina*) performs many ecosystem services in coastal systems, including improving water column oxygenation and providing nursery habitat for economically significant species. Its abundance in Long Island Sound has decreased due to anthropogenic pressures including warming and eutrophication. Currently, there are conflicting results on whether the presence of Z. marina facilitates net nitrogen addition or removal in sediments. Resolving these discrepancies would improve predictions of how

eelgrass habitat restoration efforts will impact water quality. We aim to improve understanding of eelgrass-mediated N2 fluxes by improving the N2/Ar method, in which measurements of Ar, an inert noble gas, are used to quantify physically driven changes in N2 gas saturation. We are refining this method by modifying a membrane inlet mass spectrometer (MIMS), which currently measures N2 and Ar, to also measure the noble gases Kr and Ne. This upgrade will allow us to separately resolve biological N2 fluxes from changes in N2 concentration driven by diel temperature and ebullition effects. Currently, we have achieved precisions of <1% on all gas measurements. We are testing the method on Z. marina mesocosms in a recirculating aquaculture system. We will perform incubations in the mesocosm system comparing buckets with bare sediment to buckets planted with Z. marina sods, with both light and dark trials for each treatment. Additionally, we plan to employ this method in the field to study local Z. marina beds. This research could inform coastal management practices and eelgrass restoration efforts and simultaneously improve understanding of coastal biogeochemical processes.

Session 4A. Microalgae and HABs

Nutrients, algal blooms, and hypoxia: retrospective and prescient approaches for the future management of Long Island Sound; **Christopher J. Gobler, Jiyeon Sung, Sarah, McCready, Jennifer Goleski, Marcella Wallace, Lucas Chen**; Stony Brook University

Phytoplankton blooms, HABs, and hypoxia are threats to ecosystems, economies, and public health in and around LIS. Work for this project is generating data to understand how multiple nutrients (N, P, Si) are affecting phytoplankton and harmful algal blooms (HABs) in LIS today and under future climate change scenarios and how this, in turn, impacts hypoxia, and how response today may differ from 25 years ago. During the spring and summer of 2025, we established our time series sampling for HABs with NY sampling of Northport Harbor and Cold Spring Harbor sampling commencing in March and CT sampling of Palmer Cove and Mumford Cove starting in early April. Blooms of varying magnitudes occurred in all four locations in succession with Alexandrium blooms occurring in April and May, and Dinophysis blooms happening mostly in June. Blooms were generally nitrogen (N) limited, with responses in CT being stronger than responses in NY and responses of Dinophysis communities being stronger than responses of Alexandrium communities. N was also capable of significantly increasing community oxygen consumption. Temperature increases were of secondary importance, sometimes acting additively with N to promote algal blooms and increasing oxygen consumption rates. Nutrient reductions were capable of significantly reducing algal biomass and proved effective even in the face of elevated temperatures. In most cases, a 50% nutrient reduction was needed to cause a significant reduction in algal biomass. Results from cruises performed in the open waters of Western LIS, Central LIS, and Eastern LIS will also be presented.

Uncovering Microalgal Diversity in Long Island Sound Using Culture Isolation and Taxonomic Characterization; **Fernando Gómez, Alexander Francoeur, Senjie Lin;** University of Connecticut

Microalgae diversity underpins primary production, food web dynamics, and harmful algal bloom (HAB) development in coastal marine ecosystems, yet it remains poorly characterized in Long Island Sound (LIS) due to historically limited investment in sustained culture-based taxonomic studies. Here, we establish a culture-based framework integrating morphological and molecular characterization of microalgal isolates obtained at UCONN Avery Point Campus. Our collection spans a broad size and phylogenetic range, from picoplankton such as Ostreococcus (~1 µm) to large centric diatoms such as *Coscinodiscus wailesii* (500 µm). Particular emphasis is placed on cryptophytes, key prey of the ciliate Mesodinium, which drives summer discoloration events and facilitates the proliferation of toxin-producing Dinophysis spp. The resulting strains will be deposited in the Provasoli-Guillard National Center for Marine Algae and Microbiota (NCMA) to facilitating access for research, teaching, and aquaculture. This effort promotes work with local strains, thereby reducing the risk of introducing non-native species while using imported strains. Our strain library includes Chlorophyta, Dictyochophyta, Haptophyta (including Phaeocystis, and coccolithophores), Raphidophyta, Bacillariophyta, and a diverse suite of potentially harmful dinoflagellates (*Alexandrium, Amphidinium, Heterocapsa, Prorocentrum, Scrippsiella,* etc.), including putative novel taxa. For heterotrophic or otherwise recalcitrant taxa, molecular characterization is conducted using single-cell PCR. Finally, integrative observations of natural assemblages and culture isolates will be compiled into a photographic guide for phytoplankton identification. Together, this work establishes a foundational resource for resolving microalgal diversity in LIS and advances our ability to link taxonomy with ecosystem function in a dynamic estuarine environment.

From Seagrass to Macroalgae: Linking Nutrient Enrichment to Benthic Community Patterns in Connecticut Embayments ; **Matthew Leason, Jamie Vaudrey, Jason Krumholz**; 1. Department of Marine Sciences, University of Connecticut; 2. Connecticut National Estuarine Research Reserve
Coastal embayments within Long Island Sound exhibit substantial variability in nutrient loading driven by population density, embayment flushing time, and other factors. These factors create heterogeneous environmental conditions that influence the distribution and abundance of benthic primary producer communities within, and between embayments. Understanding how this variability shapes ecological patterns is critical for effective management of nearshore habitats. This study examines relationships between a Watershed-Embayment Adjusted Nitrogen Enrichment (WEANE) Factor and benthic primary producers (macroalgae and seagrass) using biomass assessments from grab sampling and camera sampling across Long Island Sound embayments. Field data on percent cover and biomass were collected under contrasting sampling intensities (low density: 2011–2014; high density: 2021–2025). A positive linear relationship is observed between the average macroalgae biomass per embayment and WEANE Factor, where higher nutrient loading and longer flushing times are associated with increased macroalgal abundance and a corresponding decline in seagrass presence. Relationships between average macroalgae percent cover per embayment to WEANE factor are still under investigation. These findings inform nutrient management and optimized monitoring

strategies in support of sustaining healthy and resilient coastal habitats within Long Island Sound.

Declining trends, multi-factor drivers, and temperature tipping points in Long Island Sound phytoplankton revealed by ecological and machine learning approaches; **Senjie Lin, Huan Zhang, Tangcheng Li, Huaizhi Qin and Jiebin Zhou**; University of Connecticut
Long-term phytoplankton changes offer insight into how a coastal/estuarine ecosystem responds to climate warming and nutrient management. Using an 11-year (2013–2023) microscopy-based time series (1,230 samples) from 10 stations spanning from the western to eastern Long Island Sound (LIS), combined with hydrological data and machine learning, phytoplankton biomass was found to decline significantly, driven by diatom losses, while dinoflagellates remained relatively stable, lowering the diatom:dinoflagellate ratio. Random forest models captured nonlinear relationships between environment and biomass (R^2 up to 0.70), revealing that diatoms were most strongly associated with water chemistry (e.g., dissolved oxygen, biogenic silica), whereas dinoflagellates correlated primarily with temperature. Critically, the analysis identified temperature tipping points beyond which diatom abundance declined sharply while dinoflagellates increased, indicating nonlinear community shifts under warming. These results show that climate warming, interacting with nutrient reductions, is restructuring LIS phytoplankton and that interpretable machine learning is a powerful tool for detecting ecological thresholds relevant to adaptive coastal management.

Two Unusual New Diatom Strains from Long Island Sound; **Alexander Francoeur, Fernando Gómez, Jackson Sanders, Yifan Gu, Trent Norred, Senjie Lin**; University of Connecticut
Diatoms are a major group of phytoplankton in aquatic ecosystems, yet rare species are often overlooked in routine surveys. In our laboratory, while investigating the diversity of live phytoplankton in Long Island Sound (LIS), two distinctive diatom strains were isolated into clonal culture. Molecular phylogenies based on SSU and rbcL genes, together with detailed frustule morphology from light microscopy and SEM, indicate that these strains represent two potentially new species in the genera Pseudo-nitzschia and Cyclotella. The Pseudo-nitzschia strain, from a toxin producing genus of more than 50 described species, departs from the typical canoe like shape that forms straight chains; instead, it shows pronounced constrictions on both sides of the central interspace, producing strongly curved chains and clustering genetically with toxic congeners. The Cyclotella strain, belonging to a large group of common brackish centric diatoms with radial symmetry, displays a distinctive single asymmetric indentation in valve view and is phylogenetically related to C. *atomus*. Both morphologies were consistent across clonal cultures for over four months, supporting their status as stable taxonomic features rather than environmentally induced teratologies, which are usually transient responses to acute stressors. Salinity fluctuations in LIS may nonetheless have favored their occurrence, given known links between salinity and the distribution and physiology of Pseudo-nitzschia and related taxa. Live phytoplankton observation thus enabled the discovery and isolation of these rare taxa, providing the basis for formal species description and for evaluating their

potential roles in diatom morphogenesis studies and as bioindicators of environmental change.

Harmful algal blooms create multi-stressor conditions: Co-occurrence of hypoxia and acidification during Alexandrium and Dinophysis blooms in Long Island Sound; **Ryan B. Wallace, Mairead Farrell, Adrienne Tracy, Andrew Lundstrom, Christopher J. Gobler;** Department of Environmental Studies and Sciences, Adelphi University
While harmful algal blooms (HABs), hypoxia, and ocean acidification are common occurrences in coastal zones, research investigating the co-occurrence and interactions between these processes has been lacking. Here, we documented the initiation, peak, and demise of eight distinct HAB events caused by Alexandrium catenella and Dinophysis acuminata over a two-year period in two estuaries (Northport Harbor and Cold Spring Harbor, NY). We concurrently characterized the dynamics of carbonate chemistry, including pCO2 and the saturation state of aragonite (Ωar), pH, dissolved oxygen (DO), and general environmental conditions in space and time. HABs occurred in succession and reached high densities with Alexandrium blooms exceeding 104 cells L-1 being succeeded by Dinophysis blooms exceeding 106 cells/L. Alexandrium blooms occurred during spring months under generally normoxic conditions with moderate levels of pCO2 (400 – 1,000 µatm), only brief periods of acidification (pH < 7.5), mostly saturating conditions for aragonite, and an absence of hypoxia. In contrast, Dinophysis blooms, which occurred in summer, consistently co-occurred with bouts of extended nocturnal acidification (8.71 to 13.6 hr/day) and hypoxia (0.52 to 3.88 hr/day) coupled with higher levels of pCO2 (1,000 – 3,500 µatm), and undersaturating conditions for aragonite (Ω < 1). During both blooms, nearshore locations hosted higher cell densities, lower pH and DO, and higher pCO2 compared to open water regions. The co-occurrence of multiple stressors including nocturnal hypoxia, acidification, Ωar undersaturation, and HABs, coupled with strong diel cycling of DO, pH, and pCO2, especially during Dinophysis blooms, represents a significant and previously unrecognized threat for marine life.

Quantifying wastewater-associated nitrogen impacts on Long Island Sound harmful algal bloom development; **Dianne I. Greenfield, Julie Granger, Craig Tobias**; CUNY Advanced Science Research Center
Anthropogenic nitrogen (N) loading to Long Island Sound (LIS) from wastewater, runoff, and other sources is linked to water quality impairments, including hypoxia and harmful algal blooms (HABs). Successful wastewater management has substantially reduced N-inputs, but water quality and shellfish safety challenges remain. Previous and published work showed that dissolved inorganic N (DIN)-form, particularly elevated ammonia+ammonium, which is a primary component of wastewater effluent, was associated with growth of flagellated species in western LIS. This included HAB dinoflagellates. Conditions increasing DIN inputs to LIS, such intense storms mobilizing N-rich wastewater effluent, may therefore favor HAB expansion, and potentially over algal taxa characteristic of ‘healthy’ ecosystems. Here we present an overview of our Long Island Sound Partnership-funded work that explores how precipitation-induced wastewater discharge affects both N-levels and HAB development. This project combines multi-year field surveys,

experimentation, and kinetics to identify ecosystem responses to stressors relevant to LIS management. Anticipated research products will align with Objectives and Implementation Actions within CCMP Theme 1, Clean Waters and Healthy Watersheds.

Session 4B. Temperature

State of the Long Island Sound Zooplankton Monitoring Program; **Hans Dam, Gihong Park;** Dept. Marine Sciences, University of Connecticut

Zooplankton are sentinels of water quality and climate change, and the main trophic link from primary producers to consumers to upper trophic levels. Zooplankton also play key roles in biogeochemical cycles. The Connecticut Department of Energy and Environmental Protection established a Long Island Sound (LIS) Zooplankton Monitoring Program in 2002, which supports LIS Partnership and Clean Water Act objectives to monitor and assess water quality conditions to improve understanding of source contributions, their impacts on ecosystem health, and the relative performance and benefits of nutrient reduction actions. The monitoring program samples monthly at six stations along the axis of LIS. In this presentation, we will summarize the spatial and temporal trends in abundance and biomass of > 0.2 mm zooplankton for the period 2002-2024. We will also highlight the phenology of the three most important taxa and the relative control of temperature and phytoplankton in controlling phenological changes. We will highlight research gaps that could augment the utility of the zooplankton monitoring program.

Determining Acartia spp. nauplii abundance and phenology in Long Island Sound using mtCOI gene; **Sunnidae Gallien, Gihong Park, Hans G. Dam**; University of ConnecticutThe abundance and phenology of dominant copepod species, *Acartia hudsonica* in winter-spring and Acartia tonsa in summer-fall in Long Island Sound (LIS), have been characterized since 2002 by the CT-DEEP sponsored Zooplankton Monitoring Program. The adult and copepodid stages of these species, respectively, are identified by microscopy. The naupliar stages of copepods are not identified to species because of their morphological similarity, which making it cost prohibitive. However, molecular identification is a useful method that allows one to quantify species-specific nauplii. Species-specific TaqMan probes were designed and labeled with 2 distinct fluorescent dyes (duplexing qPCR) targeting mitochondrial cytochrome c oxidase subunit I (mtCOI) gene. We hypothesize that there will be a linear relationship between mtCOI copy number and naupliar body carbon, suggesting that qPCR data can estimate the abundance of each species even during co-occurring periods. Because the specimens were preserved in DNA-damaging formaldehyde, we need to optimize a protocol with subsequent tests for: 1. probe sensitivity and specificity; 2. comparison of living/preserved nauplii specimen with different periods; 3. applying to the decadal CT-DEEP nauplii samples. In combination with continued tests, this approach may provide insight into the seasonal and long-term changes of the dominant Acartia spp. in the LIS.

Vulnerability to warming under food limitations in a common Long Island Sound copepod depends on thermal tolerance metric; **Rowan A. Batts, Ava Arleo, Hans G. Dam;** University of Connecticut, Department of Marine Sciences

Acartia tonsa is abundant summer, coastal copepod in Long Island Sound (LIS) that acts as an important food source for larval fish. Rising ocean temperatures when combined with food limitations, may cause *A. tonsa* to exceed its upper thermal limit, leading to population declines. Multiple methods have been developed to quantify thermal limits in aquatic species. We measure the upper thermal limits of *A. tonsa* using two methods, Critical Thermal maximum (CTmax) and Lethal Temperature 50 (LT50) under food replete and starvation conditions. CTmax is the temperature where an individual stops responding to stimulus during rapid, acute temperature ramping while LT50 is the temperature where population mortality is 50% after 24 hours of exposure to a single temperature per individual. Due to the shorter duration of thermal stress, CTmax gives a higher thermal limit than most mortality-based metrics. We collected A. tonsa from Esker Point in Groton, CT after which individuals experienced either 3 days of starvation or food replete conditions. We found that CTmax was ~ 35.5°C for both treatments and unaffected by starvation. LT50, however, was significantly affected by starvation with starved individuals seeing an LT50 of 25.8°C compared to 30.5°C for the food replete treatment. Temperatures at our collection site can exceed 26 °C meaning that short term food limitations can cause mass mortality at ecologically relevant temperatures, a finding that is not illustrated in the CTmax measurements alone. Climate change is likely to increase population vulnerability due to changes in copepod prey communities and increasing prevalence of extreme temperatures.

Evaluating Changes in Habitat Suitability for Cold- and Warm-Adapted Species in the Long Island Sound; **Claire Ober, Stephanie Arsenault, Krystina Braid, Sarah Praisner, Yong Chen, Kurt Gottschall, Kim McKown, John Maniscalco;** Stony Brook University
Species composition in the Long Island Sound (LIS) has shifted over time due to changing environmental conditions and climate-driven variability. In recent decades, the LIS has shifted from a fish community dominated by cold-adapted species in the spring and warm-adapted species in the fall, to a fish community dominated by warm-adapted species in both seasons. The initial work identifying this shift was completed more than 15 years ago, and as climate impacts intensify, more recent analysis is needed. The objective of this study is to evaluate changes in habitat suitability and potential distribution of cold- and warm-adapted species in the LIS using a Habitat Suitability Index (HSI) framework. For 15 selected species, we quantify relationships between species occurrence and key environmental conditions and develop models to hindcast, nowcast, and forecast changes in suitable habitat over time. We use these models to map spatial patterns of habitat suitability and evaluate how the extent and distribution of suitable habitat have shifted. In addition, we identify areas of persistent suitable habitat that may function as thermal refuges, as well as regions experiencing contraction or expansion in suitability. These results provide insight into how climate-driven environmental change is restructuring habitat availability in the LIS and offer a practical framework for informing monitoring, conservation, and ecosystem-based management in a rapidly changing coastal system."
Temperature Variation in Nests of Northern Diamondback Terrapins (Malaclemys terrapin terrapin) within Connecticut; **Zeanna Graves, Theodora Pinou**; Western Connecticut State University

Diamondback terrapins (*Malaclemys terrapin*) are a keystone species that occupy brackish water habitat and are listed as vulnerable. Terrapins have Type 1a temperature-sex determination meaning nesting conditions of 31°C or higher will result in more females, while temperatures below 27°C result in predominately male development. Low humidity egg chambers favor females. This suggests temperature and humidity can impact sexual development and may explain the female bias reported in populations. Although significant female bias was observed in Connecticut, preliminary results suggest that the sex ratio can vary among sites sampled. My research applies iButton technology to measure temperature and humidity in soil with various physical features (vegetation, soil substrate, and sun exposure) along the Connecticut coastline to sample the microclimate of terrapin beaches. Soil temperature is affected by physical parameters and can explain the clustering effect observed as well as the female bias seen in Connecticut. “Potential nests” (tagged with iButtons) were placed in a grid along a transect to record daily/seasonal changes and used to confirm there is a behavioral microhabitat preference for fecund females. Preliminary results indicate that soil temperature varies significantly along the coastline. Understanding thermal variation will identify optimal and diverse nesting habitat that support healthy populations, improving the sustainability of terrapins, and may explain why nesting occurs in some spots and not others.

A grouper on its way north: Experiments & ocean models suggest that Black Sea Bass will change their winter migrations; **Hannes Baumann, Max Zavell, James O’Donnell, Marc de Vos, Samantha Siedlecki, Catherine M. Matassa, Eric T. Schultz**; University of Connecticut, Marine Sciences
The northern stock of black sea bass *Centropristis striata* has greatly expanded in recent decades and now occurs abundantly in most Northwest Atlantic (NWA) coastal waters from spring to fall. During winter, this species still migrates offshore to avoid waters below their presumed thermal limit (~6°C), but the fitness benefit of this strategy diminishes as inshore waters warm and migration distances to suitable (>10°C) overwinter habitat shrink. We conducted 2 overwinter experiments on black sea bass juveniles to simulate their thermal experience of migrating offshore or remaining within Long Island Sound (LIS) during an exceptionally warm winter. We found that overwintering inshore caused only minor reductions in survival (100→84%), led to no loss in lipid reserves, but incurred a growth cost, because juveniles in the offshore experiment gained 3× more in length (4× more in weight). We then coupled downscaled climate models to LIS air-winter temperature records, thereby projecting mean LIS winter temperatures to increase from 3.2°C to 4.8°C by 2050–2060. This will reduce the average time <6°C in LIS by 30%, from 95 to 68d per year. A separate shelf model projected the rapid northward movement of the 10°C isotherm in February bottom temperatures on the NWA shelf, thereby reducing the minimum overwinter migration distance from currently ~600 to ~120 km by 2055. Our synthesis suggests that inshore overwintering will become increasingly feasible for black sea bass, perhaps leading to partial migration patterns that further enables the poleward range expansion of this species.

Abiotic and Biotic Drivers of Declining Flounder Abundance, Distribution, and Condition in Long Island Sound, USA; **Max Zavell, Katherine Helmer, Kelli Mosca, Matthew Gates, Kurt Gottschall, Paola Batta-Lona, Hannes Baumann, Sebastian Klarian, Eric Schultz;** School for Marine Science and Technology
Concurrent anthropogenic changes have restructured marine community assemblages and trophic dynamics in Long Island Sound (LIS, between Connecticut and New York, USA). Among the affected taxa are species of flatfishes such as Winter Flounder (*Pseudopleuronectes americanus*) and Summer Flounder (*Paralichthys dentatus*). Winter Flounder populations have collapsed throughout southern New England, and although adult populations of Summer Flounder have remained stable, their recruitment has recently declined. Both species have been designated as "species of greatest conservation need". To quantify potential drivers affecting Winter and Summer Flounder population dynamics we analyzed over forty years of Long Island Sound Trawl Survey (LISTS) data to assess changes in environmental variables (substrate, temperature, depth, salinity, dissolved oxygen) and species composition (competitors and prey) in LIS and how these changes might affect population dynamics of these species. Further, we developed predictive models that will inform management responses for flatfish species under continued abiotic and biotic change. Between 1990 and 2024, mean Winter Flounder abundance decreased by ~97%, while mean Summer Flounder abundance decreased by ~69% and remained stable through 2024. Mean competitor species abundance increased by ~295% while prey species abundance decreased by ~74% between 1995 and 2024. Initial analysis suggests that both species preferentially occupy habitats at depths < 20 meters. Declines in the abundance of both species are associated with warmer bottom water temperatures and increases in competitor abundance. Abiotic and biotic change will have an ongoing effect on flatfish habitat usage and abundance.

Session 5A. Salt marshes + microplastic

Site-Specific Strategies for Improving Salt Marsh Restoration Success in Long Island Sound, USA; **Rebha Raviraj, Sarah Crosby, Jennifer Bowen, Randall Hughes, Jack Matthias, Nicole Spiller, LaTina Steele, Kasey Burns, Mary Donato, Marisa Fajardo, Jared Kannel, Nesy Oja, Marisa Olavarria, GraceAnne Piselli, Domenic Romanello, Danielle Schwartz, Justin Susarchick, Nicole Woosley, Abigail Tripler,** The Maritime Aquarium at Norwalk
Restoration success in salt marshes varies due to differences in elevation, soil condition, and environmental stressors, making it important to identify site-specific planting strategies that improve restoration outcomes. In a previously restored marsh in Long Island Sound, USA, we compared successful and failed planting areas and evaluated techniques designed to improve plant establishment and survival. At sandy low marsh and compacted high marsh sites, plugs of Spartina alterniflora and Spartina patens were planted using treatments including soil tilling, root modification, and fertilizer application to determine which approaches were most effective under different marsh conditions. Plant health and survival were measured using percent cover, stem height, and above- and belowground

biomass. Tilling previously failed areas in compacted high marsh did not improve plant viability, and root modification reduced plug survival and plant cover in sandy low marsh. However, tilling combined with fertilizer improved plant performance in low marsh, while tilling combined with root modification improved performance in high marsh. Additional work is underway using field greenhouse structures to simulate warming conditions and assess how plant source and temperature may influence restoration success under future climate scenarios. Together, these findings will provide practical restoration guidance and demonstrate the importance of matching planting techniques to site conditions to improve restoration efforts and long-term marsh resilience.

Assessing the Resilience of Restored Salt Marshes Under Warming Conditions; **Marisa Fajardo(1), Sarah C. Crosby(1), Nicole C. Spiller(2), Randall Hughes(4), LaTina Steele(3), Kasey T. Burns(2), Mary K. Donato(2), Marisa Olavarria(2), Rebha Raviraj(1), Domenic Romanello(1), Samantha Rowland(1), Justin P. Susarchick(1),** (1) The Maritime Aquarium at Norwalk, Norwalk, CT, (2) Harbor Watch (Earthplace, Inc.), Westport, CT, (3) Sacred Heart University, Department of Biology, Fairfield, CT, (4) Northeastern University, Department of Marine and Environmental Sciences, Nahant, MA
Climate change poses one of the greatest modern threats to salt marshes, putting salt marshes at risk of drowning if they do not maintain an elevation at least equal to sea level. Natural and restored marshes in Connecticut differ in plant morphology and genetics, suggesting that restoration status may affect resilience to sea level rise. Warming temperatures will likely affect plant growth parameters important to elevation gain, but these effects may differ based on restoration status. Here, we monitored the growth of the low marsh foundational species, Spartina alterniflora, in natural and restored marshes in Connecticut, using in situ greenhouse cubes to simulate warming. Although the warming treatment increased stem height in restored marshes, greater accumulation of growing degree days decreased stem height in all marshes. For other stem metrics, including stem diameter, density, and volume, warming had either a negative or a neutral effect on the growth of S. alterniflora, with more negative effects on stem growth observed in natural marshes. Natural and restored marshes also showed differing responses to submergence on aboveground stem growth. The results of this study show that natural and restored marshes may respond differently to warming and sea level rise, which will likely affect resilience. This research is expected to create long term conservation benefits by providing predictive information that can be used to effectively manage marshland. Results can assist restoration practitioners and land managers in implementing efficient restoration and management strategies and can bolster the framework for decision-making in salt marsh management.

Novel measurements of turbulent kinetic energy dissipation rates in a narrow and shallow coastal salt marsh channel; **Molly M. James, Alejandro Cifuentes-Lorenzen, and James O’Donnell,** Department of Marine Sciences, University of Connecticut
Sediments are vital for marsh health, enabling vertical accretion. The transport, resuspension and erosion of sediments are strongly modulated by local turbulence. In this environment, the turbulent kinetic energy (TKE) is primarily produced through vertical shear

of horizontal velocity and dissipated through viscous and mixing processes, leading to what is classically considered a production-dissipation balance. We collected observations in the channel of Brucker Marsh at the Barn Island Wildlife Management Area in Stonington, CT. The single main channel was narrow and shallow, approximately 6 m wide and 1.1 m above the channel bed, at the instrument locations. The deployment consisted of two bottom-mounted acoustic Doppler current profilers sampling at a high-frequency and capable of resolving the local turbulence structure. The deployment captured 13 tidal cycles. We estimated TKE dissipation rates from the second order structure function and TKE production from direct measurements of the velocity structure and turbulent fluctuations. Overall, we observed a production-dissipation balance with TKE dissipation rates larger during ebb than flood portions of the tide. When the marsh was inundated, TKE dissipation rates evolved differently over the tidal cycle from when the marsh was not inundated, suggesting exchange with the marsh vegetation alters the TKE budget. We highlight the relevance of quantifying the turbulent kinetic energy, dissipation rates and overall turbulence structure in shallow and narrow marsh channel. We propose that this effort can provide much needed insight into both modeling and future observational studies in sediment transport dynamics across marsh systems.

Leveraging Native Engineering and Reshaping Microbial Ecology: The Cascading Impacts of Invasive Crabs and Phragmites on Coastal Resilience; **Ritwik Negi, Precious Attah, Kaylee Freeman**; University of New Haven
Non-native species are expected to alter salt marsh function but the extent to which they impact resilience to climate change and sea level rise is unclear and may vary based on site specific factors. We conducted multiple assessments of two invasive species, Asian shore crabs (*Hemigrapsus sanguineus*) and Phragmites australis on intertidal habitats in southern Connecticut. Results demonstrated that the invasive Asian shore crabs preferred coarse sand habitats associated with rocky structures (55% detection) associated with anthropogenic disturbance. Notably, H. sanguineus occupancy increased significantly alongside higher M. pugnax densities, suggesting that invasive species leverage native ecosystem engineering in tandem with modified physical substrates. Complementary investigations into invasive Phragmites australis revealed significant shifts in soil function and microbial ecology. While total nitrogen and carbon stocks were comparable to native *Sporobolus alterniflorus* zones, native soils exhibited higher C:N ratios, enhancing carbon sequestration potential. 16S rRNA sequencing showed distinct microbial community structures, with vegetation explaining up to 13.5% of community variation. Phragmites soils supported higher diversity at finer taxonomic levels, while Sporobolus maintained broader taxonomic diversity. Combined, these findings underscore a complex biotic-abiotic coupling where modified substrates and invasive flora reshape intertidal community dynamics. By targeting critical knowledge gaps at intermediate and small scales, this research provides essential data for dynamic process models that predict marsh resilience to climate change and inform future restoration policies.
Habitat Restoration In A Highly Impacted Urban Estuary; **Maria Rosa,** Connecticut College
Habitat loss and degradation have weakened essential ecosystem services historically provided by oyster reefs and adjacent marshes to coastal communities. This has made

coastal communities especially vulnerable to sea level rise (SLR), and in recent years accelerated coastline loss. A project in New London, CT was implemented to directly evaluate the incorporation of Reef Balls™ in this area as a nature-based strategy to protect coastal features and restore habitat. Sediment accretion at the protected area was measured and compared to a nearby area with no intervention. A combination of Breder and minnow traps, and visual surveys of the structures, were carried out to determine if additional viable reef habitat was provided. Results have shown ~3cm/yr of sediment accretion attributed to the implementation of the reef compared to reference sites. There was also a transition of the sediments from predominantly cobble to fine grained sand. Further, trap data indicates higher biodiversity at the reef than in the reference sites, one of which is nearby natural marsh. There is also evidence of connectivity between the marsh and the restoration installation. Our findings provide strong evidence that the Reef Balls™ are providing both habitat and shoreline protection in this impacted marine estuary. Despite the additional challenges imposed by this site (e.g., high tidal range, longshore vs. onshore energy, highly erosive baseline) Reef Balls™, at least initially, appear to be a successful approach for habitat restoration and environmentally sustainable erosion protection in the region.

Microplastic exposure and antioxidant gene expression in wild estuarine killifish (Fundulus spp.); **FNU Deesha, Christian W. Conroy, Alireza G. Senejani, Eddie D. Luzik,** University of New Haven
Microplastics are now ubiquitous in the estuarine environment, raising concerns about their biological impacts on organisms. Killifish (Fundulus) play a key role in estuarine food webs and commonly serve as sentinel species in studies on anthropogenic impacts. In this study, wild Fundulus were collected from five different sites in the lower Quinnipiac River (upstream and downstream). Livers and stomachs were digested using 10% KOH and vacuum filtered, and the isolated microplastics were quantified. Preliminary results indicate that microplastics were detected in fish from all sites, with spatial variability in abundance which reflects the differences in local pollution sources and habitat characteristics. To understand how microplastic exposure affects cellular and molecular changes related to killifish health, we measured changes in stress-related genes involved in antioxidant defense (SOD and CAT) using quantitative PCR, with gene expression normalized to the housekeeping gene β-actin. Additionally, polymers were identified by FTIR spectroscopy to infer potential sources. We hypothesized that higher microplastic burden increases antioxidant gene expression in Fundulus. These findings provide insights into microplastic accumulation in wild estuarine fish populations and associated physiological responses, highlighting the importance of monitoring and managing microplastic pollution in estuarine ecosystems.
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Session 5B. Sustainable and resilient Communities

Carbonate System Parameters in Long Island Sound Reveal Hypercapnia as an Additional Stressor the Western Sound Ecosystem; **Erich Nitchke, Penny Vlahos, Samantha Glass, Katie O'Brien-Clayton, Alexis Sims**, University of Connecticut
Estuaries are complex transition zones where freshwater, typically from rivers, mixes with saline oceanic water, and biological productivity is high, which impacts carbonate system parameters and measurements. Estuaries undergo two types of acidification. The first is the long-term influx of carbon dioxide gas (CO2) from rising atmospheric CO2 levels. While the second, however, is through seasonal eutrophication wherein excess respiration generates elevated CO2 levels in the waters. This seasonal hypercapnia represents an additional stressor to the Long Island Sound (LIS) estuary in New England, and it is an important factor to constrain for sustaining LIS ecosystem integrity. In 2023, the Connecticut Department of Energy and Environmental Protection integrated measurements of total dissolved inorganic carbon (DIC), total alkalinity (TA), and spectrophotometric pH to their monthly sampling effort, allowing for the establishment of a time-series of LIS carbonate system measurements. This study presents the data from 2023 and 2024 to highlight the trends and insights in LIS's carbonate system parameters. Furthermore, we utilize CO2SYS to derive aragonite saturation (ΩAr) utilizing different combinations of carbonate parameters to assess the impact of ocean acidification on organisms utilizing calcium carbonate. We also utilized CO2SYS to derive TA from DIC and pH alone in order to compare the differences and error between these calculated values versus those measured directly. Finally, we compare our results with hydrological data taken from the United States Geological Survey for two major freshwater contributors to the Sound to analyze trends within the context of variations in freshwater discharge.

Wave, Surge and Groundwater-induced Erosion and Recession of Sandy Bluffs; **Ali Farhadzadeh and Henry Bokuniewicz**; Stony Brook University
Controlled laboratory experiments in a wave flume show that variations in the groundwater saturation front within sandy bluffs (similar to those along Long Island's North Shore on Long Island Sound) facilitate expansion of undercutting at the bluff toe and promote sapping. These processes contribute to bluff instability and lead to episodic failures. Pore-water pressure dynamics-correlated with incident wave energy-interact with rapid rises in the saturation front, elevated water levels from surges, and the formation and expansion of toe undercutting to trigger these episodic events. Elevated surge levels submerge protective beaches, allowing waves to directly attack and undercut higher portions of the bluff toe. Field inspections confirm that wave-induced undercutting remains a fundamental driver, particularly during storm surges or high water level events that inundate the beach and enable direct wave impact at the bluff base. Groundwater sapping and reduced saturated soil strength are persistent contributing factors. Bluff stability is further compromised by the region's glaciated terrain. This terrain features hills, depressions, and troughs that complicate drainage pathways and concentrate rainwater. It also includes a "layer-cake" subsurface stratigraphy of alternating sand and clay layers that retards groundwater flow. Bluff materials with substantial fine-grained components (silt and clay) provide cohesion and support near-vertical scarp faces. Vertical scarps near the bluff top often form from groundwater sapping along horizontal clay layers, especially

when combined with wave undercutting at the toe during elevated water levels. In addition, bluff face collapses that remove vegetation expose bare sand. Rainwater, potentially augmented by septic systems and irrigation, can then wash down the face and accelerate erosion.

Resilient Mystic: Adapting to sea-level rise in Downtown Mystic/Stonington; **John Truscinski,** Connecticut Institute for Resilience and Climate Adaptation
The Resilient Mystic Project, led by CIRCA and completed in partnership with the Town of Stonington and Fuss & O'Neill, focused on the portion of Mystic that is within the Town of Stonington, specifically the portion of Mystic known as Downtown Mystic that extends from Mystic River and Mystic Harbor on the west to Williams Cove and the Pequotsepos River on the east and northward along the State Route 27 corridor past the Mystic Seaport Museum. Both the Mystic and Pequotsepos Rivers are tidally influenced. Downtown Mystic is highly urbanized, containing a dense streetscape, parking lots, and hundreds of businesses, tourist attractions, and residential properties. The area hosts the world-famous Mystic Seaport Museum, shopping and restaurant attractions, historic structures, numerous shipyards and marinas, a railroad station, and critical healthcare and emergency response facilities. As a result of local development patterns that emerged in response to Mystic's historic water-dependent industries, the area is especially vulnerable to coastal flooding. Downtown Mystic is already experiencing impacts from high tides and coastal storm surge, and projected impacts from sea level rise and increased flooding have further potential to damage Mystic's cherished historical structures, impede transportation, and hinder access to community lifelines. This presentation will provide an overview of some key aspects of the study such as the changing flood risk to downtown from sea level rise, as well as, near and longer-term actions the town can consider to adapt to these changes.

Equitable Access to Long Island Sound Waterfront and Beaches through On-demand Mobility; **Mohammad Pourmatin, Samuel Osei Poku, Anil Yazici, Elizabeth Hewitt,** Department of Civil Engineering, Stony Brook University
Access to public beaches promotes physical and psychological health, fosters a sense of community, offers cooling opportunities during heat waves, and advances the goals of environmental justice. Lack of public transportation options and the overreliance on personal vehicles are major hurdles for equitable access to waterfront and beaches on Long Island. The objectives of this project were to: 1) design and pilot on-demand shuttles that will facilitate equitable public access to Long Island Sound (LIS) waterfront and 2) assess opinions of the pilot and pro-environmental attitudes towards the LIS to determine project impacts. To achieve these objectives, the research team launched a free shuttle during Summer of 2024 and 2025 in partnership with private sector partner Flexigo and local shuttle operator Beach Limo NYC. A survey was administered to all riders on the shuttles (n=73) and a control group survey was administered to non-riders (n=1388). Findings indicate that the shuttle pilot successfully reached individuals with more limited transportation access, particularly younger and lower-income residents who reported significantly lower levels of private vehicle ownership compared to the broader population. The results further show that interest in waterfront access is not limited by environmental

concern, as both riders and non-riders expressed similarly strong pro-environmental attitudes toward the Long Island Sound. Outcomes of this work include contributions to research gaps, proof of viability and financial feasibility of the shuttle, and increased access to and awareness of the LIS among community members and end users.

Ammonia confertitesta, Ammonia advena, and Trochammina hadai: Recently discovered foraminiferal invasions in Long Island Sound; **Elly Goetz1, James T. Calton2, Ellen Thomas1,3**, 1 Department of Earth and Planetary Sciences, Yale University, 2 Coastal and Ocean Studies Program, Williams College - Mystic Seaport, 3 Department of Earth and Environmental Sciences Wesleyan University
Long Island Sound (LIS) has a long history of urbanization and associated port development. Therefore, LIS has many non-native marine species. Compared to known non-native plants and animals, microscopic invaders are elusive and understudied, with unknown ecological consequences. We identified three foraminiferal species in Long Island Sound that had not been identified historically and hypothesize about their introduction and proliferation: *Ammonia confertitesta* and *Trochammina hadai* originated from east Asia, but *Ammonia advena* from further south along the US Atlantic coast. We identified *Ammonia confertitesta* in morphologically core (~10,000 ybp – 2001 CE) and sediment samples (2023) using morphology and DNA. The earliest A. confertitesta specimen was from Western LIS (near New York City) from ~1820 CE, but the species did not increase in abundance until the 1970s. We attribute this lag to initially low propagule pressure, followed by a rise in container shipping (and concomitant increase in volume of ballast water) in the latter part of the 20th century, and thus potentially multiple introductions. We likewise identified *Ammonia advena*, and speculate it moved northwards due to anthropogenic warming. We found *Trochammina hadai* on 'derelict' lobster traps from eastern LIS collected from November-December 2025. The traps were abandoned after the decline of lobster populations in the 1990s and now act as a hard substrate for benthic organisms, including foraminifera. T. hadai is low in abundance and has not been found in other parts of LIS, suggesting a relatively recent introduction from the east rather than the west, unlike *Ammonia confertitesta*.

Developmental plasticity, not adaptation to ocean warming, determines a copepod response to marine heatwaves; ***Lisa A. Piastuch, Yurina Shirai, Hans G. Dam, Catherine M. Matassa*; University of Connecticut**
Marine heatwaves (MHW), thermal events during which temperatures exceed the 90th percentile of 30-year historical mean for more than five days are increasing in frequency, intensity, and duration. MHW can have adverse effects on ectotherms since such high temperatures are often physiologically stressful. Organisms can cope with MHW via phenotypic plasticity or genetic adaptation to warming, but the relative roles of these adaptive mechanisms is poorly understood. We tested how evolutionary thermal adaptation and developmental thermal plasticity shaped the response of the copepod, Acartia tonsa, to future MHW by measuring the responses of warm-adapted (reared at 22°C for >150 generations) and warm-acclimated (22°C for two generations) copepods to MHW temperatures of 27.5°C and 30.8°C. Adult breeding pairs were exposed to MHW

conditions for 7.5 days during which we measured survival, egg production rate (EPR), and egg hatching success (HS). To test for transgenerational effects, surviving adults (F0) were returned to 22°C to produce offspring (F1) that were reared to adulthood and then subjected to the same MHW as their parents to compare the survival, EPR and HS. Our preliminary results did not reveal greater survival, EPR, HS, nor transgenerational benefits in the adapted treatment compared to the acclimated treatment. This suggests that evolutionary adaptation to elevated temperatures does not provide additional benefits beyond those of developmental plasticity during future MHW.

Session 6A. Shellfish

Modeling Oyster Larval Transport in Long Island Sound; **Hayden Holcomb, Michael Whitney, Catherine Matassa,** University of Connecticut
Eastern oysters (Crassostrea virginica) provide numerous ecosystem services to coastal communities along the US east coast, including shoreline stabilization, water filtration, habitat for diverse fish and invertebrate assemblages, and support for valuable fisheries. In Connecticut, commercial shellfish harvests have averaged $15M USD per year since 2020, and recreational shell fishing further contributes to local coastal economies. However, the ecosystem services provided by benthic adult oysters in one location depend on the successful recruitment of pelagic larvae, which may originate from adults at other locations or reefs. Pelagic larval transport may therefore limit connectivity among existing oyster reefs and shape population dynamics. We employ a coupled biophysical larval transport model to identify potential connectivity among oyster beds along the Connecticut coast of Long Island Sound. Importantly, we assess the potential for one of the state's largest natural oyster beds to serve as larval source for the region's oyster reefs and how net transport from this large bed depends on environmental conditions such as temperature, salinity, and the impacts of wind and river discharge on local hydrodynamics. Understanding how existing oyster beds reproduce and recruit new oysters is imperative for sustainable aquaculture and effective restoration. Our results will identify reefs that may be particularly important for oyster recruitment and population connectivity in Long Island Sound. By identifying areas with high potential recruitment, our results might also inform the timing or location of habitat restoration efforts (e.g., cultch deposits or artificial reefs) to improve the likelihood of success.

Sink Dynamics and Larval Connectivity: A Spatially Explicit Model of Eastern Oyster Restoration in Oyster Bay; **Tanvi Jain, Aaren Freeman, Jashanpreet Kaur, Emma Nikols, Kaiya Provost, and Ryan Wallace**, Adelphi University
Efforts to restore the depleted eastern oyster (*Crassostrea virginica*) metapopulation in the Oyster Bay-Cold Spring Harbor (OBCSH) system are underway, yet an understanding of how these interventions influence system-wide population dynamics is lacking. This study developed a spatially explicit, stage-structured matrix model to project the ten-year trajectory of the OBCSH oyster metapopulation. The model integrated demographic parameters calibrated using Approximate Bayesian Computation and larval connectivity simulated through a coupled hydrodynamic-particle tracking model. Results indicate that

larval connectivity and pelagic larval mortality are the primary drivers of the OBCSH metapopulation, with within-patch demographic processes playing a secondary role. Larval connectivity primarily dictates source vs. sink dynamics, while pelagic larval mortality establishes the overall direction of population growth. However, these drivers alone cannot sustain a severely depleted population. Targeted oyster deployments are required to achieve minimum population densities and allow spatial connectivity to function, shaping the long-term viability of the metapopulation.

Assessment of natural and restored oyster population health in Long Island Sound - Observations of environmental drivers on population dynamics; **Mariah L. Kachmar, Kyra J. Lenderman, Sarina Dery, Genevieve Bernatchez, Isaiah Mayo, Samuel Gurr, Kelly Roper, Mark Dixon, LTJG Tyler Houck, Barry Smith, Lydia M. Bienlien, Gary H. Wikfors, Lisa Milke, Meghana Parikh, and Katherine McFarland,** NOAA Fisheries Northeast Fisheries Science Center Milford Lab

Oysters provide essential economic and ecosystem services to coastal communities including Long Island Sound (LIS). Both regionally and nationally, shellfish restoration continues to increase and expand natural beds, presenting an opportunity to increase oyster-related ecosystem services and further support the commercial shellfish industry. Little is known about how expansion may affect the proliferation and transmission of oyster parasites between restored and cultured populations. To better understand the host-parasite interactions in a changing environment, we completed monthly disease (*Perkinsus marinus* (Dermo), *Haplosporidium nelsoni* (MSX), *Haplosporidium costale* (SSO)) and reproduction assessments at two unmanaged, self-sustaining natural oyster beds in Connecticut and one subtidal restored bed in New York. Continuous water quality monitoring, combined with oyster biometrics, provides a quantitative understanding of the seasonal dynamics and will help to identify relevant water quality variables.

Preliminary analysis shows Dermo disease following historic trends with peaks in late summer coinciding with peak water temperatures. Body condition and gonad development were also correlated with temperature. Water variables deviated from historical trends, with temperatures frequently exceeding 25°C and pH ranging from 7.0 to 8.5. Further disease analysis using qPCR and histology will improve our understanding of how changing environmental factors are affecting oyster population health. This comprehensive approach will fill critical information gaps and develop a hazard analysis to guide restoration planning that promotes the success of natural, restored, and cultivated oysters and supports healthy, resilient ecosystems and coastal communities.

A coupled modeling framework to guide spawner sanctuary placement for eastern oyster (Crassostrea virginica) restoration; **Emily G. Jeran, Andy Huang, Aaren Freeman, Ryan B. Wallace,** Environmental Studies and Sciences, Adelphi University

Preliminary analysis shows Dermo disease following historic trends with peaks in late summer coinciding with peak water temperatures. Body condition and gonad development were also correlated with temperature. Water variables deviated from historical trends, with temperatures frequently exceeding 25°C and pH ranging from 7.0 to 8.5. Further disease analysis using qPCR and histology will improve our understanding of how changing

environmental factors are affecting oyster population health. This comprehensive approach will fill critical information gaps and develop a hazard analysis to guide restoration planning that promotes the success of natural, restored, and cultivated oysters and supports healthy, resilient ecosystems and coastal communities.

Session 6B. Seafloor mapping + Sustainable and Resilient Communities

Long Island Sound Seafloor Habitat Mapping Initiative Phase V & Beyond; **DeAva Lambert and Members of the Long Island Sound Cable Fund Steering Committee,** Connecticut Department of Energy & Environmental Protection
The Long Island Sound Seafloor Habitat Mapping Initiative conducts benthic mapping of Long Island Sound (LIS), providing seafloor landscape maps depicting habitat structure and the ecological characteristics associated with those habitats. These mapping projects integrate information from a variety of sources including acoustic bathymetry, backscatter, sedimentary, geochemical, physical, and biological data for LIS, which convey critical pieces of information essential for improving science-based environmental management and enhancing the scientific understanding of potential energy infrastructure effects and mitigation of their impacts. The Mapping Initiative is administered by the LIS Cable Fund (LISCF) Steering Committee, consisting of federal, state, and academic partners from Connecticut and New York. LIS Seafloor Habitat Mapping Initiative projects are conducted through a collaborative partnership combining national and local expertise and resources, which includes the USGS Woods Hole Coastal and Marine Science Center, the Stony Brook University School of Marine and Atmospheric Sciences, and two regional academic consortiums led by the University of Connecticut and Columbia University. The LIS Seafloor Habitat Mapping Initiative selects priority areas in LIS for benthic mapping based on their ecological value, multiple use conflicts, compliance, resource management, and potential for further development. This presentation provides an update on the expansion of the Mapping Initiative beyond the initial three priority areas into additional areas of LIS to comprehensively map the seafloor and develop desired products conveying information about the seafloor habitat structure and characteristics with the goal to map the entire LIS seafloor by 2035.

Temporal variability in seabed morphology in LIS between Norwalk and Huntington Bay (the LIS Cable Fund Phase III Area); **Roger D. Flood, Mohamed Elsaied**, School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University
Bathymetric and acoustic backscatter data derived from high-resolution multibeam mapping reveals seafloor topographies, sediment distribution patterns, benthic processes, industrial infrastructure and many other features and, as a result, have become important components of benthic habitat studies. The Long Island Sound Seafloor Habitat Mapping Initiative under the LIS Cable Fund was undertaken to help manage infrastructure uses in LIS. The habitat studies have benefited from NOAA seafloor mapping done for charting purposes over the past two decades, from USGS seafloor mapping projects, and from SoMAS multibeam seafloor mapping supported by the LIS Cable Fund. New multibeam

data collected by SoMAS in the Phase III Area in 2023 entirely overlaps high-resolution multibeam data collected by NOAA in 2012, 2015 and 2020 and the existence of repeat multibeam surveys help us to understand seafloor variability at a range of temporal and spatial scales. Seafloor topography can be measured with a vertical accuracy of perhaps +/- 0.1 m but it is difficult to quantitatively compare acoustic backscatter data collected during different surveys. Large-scale topographic and backscatter patterns (generally related to sediment characteristics) are broadly consistent between surveys. However, many smaller-scale differences are observed between surveys. Some of the observed seafloor differences are related to human activity including (permitted) dredged sediment disposal, shellfish dredging and the installation of cables. Sedimentation processes likely cause changes of cable and pipeline trenches as well as of many small-scale sedimentary features of uncertain origin, including pockmarks. Some fairly large areas with lower backscatter may result from shellfish dredging.

Offshore Movement and Habitat Use of Atlantic Horseshoe Crabs (Limulus polyphemus) in Relation to Seafloor Habitats; **Neetu Dhanda, Chris Conroy, Catherine Matassa, Peter Auster, Roman Zajac, Ivar Babb, Kate Randolph,** University of New Haven
While Atlantic horseshoe crab *Limulus polyphemus* movements and distribution in intertidal habitats are clearly described and closely monitored, their behavior and spatial ecology on the seafloor has received less attention. Our study focuses on characterizing L. polyphemus use of benthic habitats in western Long Island Sound, their behavior on the seafloor, and their associations with fine- and broad-scale habitat features. We analyzed geolocated images and video of the seafloor collected during October 2024 and May 2025 to document L. polyphemus through direct observations of individuals and by identifying recently made tracks in sediments. We characterized the behaviors of observed individuals, including direction of travel and instances of amplexus, and described surficial sediments and habitat features including burrows. The influence of larger-scale habitat characteristics, including sediment grain size, depth, and bottom stress on L. polyphemus distributions are being assessed. Additionally, this spatial dataset is compared to existing assessments of L. polyphemus distributions in the Sound. This study provides important insights on L. polyphemus spatial ecology, habitat use, and behavior, which can be used to inform management and conservation of this threatened and ecologically important species.

Amending salt marsh sediment additions: Incorporation of shells prevents the development of acid sulfate soils; **Sage E. Ganshirt, Rachel Biton, Graham Bornhorst, Chris S. Elphick, Min T. Huang, Jacob Isleib, Beth A. Lawrence, Itamar Shabtai, Blaire Steven, and Ashley M. Helton**, University of Connecticut
Application of dredged sediment to salt marsh surfaces is a common management technique that addresses accelerated sea-level rise as it increases marsh elevation and resilience. However, dredged sediments are often potential acid sulfate soils (PASS) that can produce sulfuric acid when exposed to oxidizing conditions at the marsh surface and inhibit vegetation regrowth. Here, we used six soils and four amendments (oyster shells, slipper snail shells, recycled concrete and limestone) in a replicated laboratory experiment

to explore the capacity of materials containing calcium carbonate and calcium oxide to buffer acidity in sediment addition projects. Soils previously identified as PASS and representing a wide range of characteristics (organic matter = 0.45-33.75%; sand = 33.5-85.67%) were homogenized with amendments at a 10:1 ratio by weight (n = 90). Experimental units were flooded with saltwater and sampled for soil pH weekly for 12 weeks. Oyster shells (final = 5.07±0.32; Δ = -1.88±0.6) and slipper snail shells (final = 4.81±0.23; Δ = -1.92±0.63) significantly buffered soil pH compared to controls (final = 3.51±0.11; Δ = -3.34±0.44; $p < 0.001$), although buffer effectiveness varied with soil type. Recycled concrete (final = 3.7±0.1; Δ = -3.25±0.43) and limestone (final = 3.96±0.17; Δ = -3.01±0.44) did not alleviate acidity generation in any soil. Our findings indicate that shell amendments to PASS dredge during salt marsh sediment addition projects can ameliorate acidity and may improve restoration outcomes. We will further explore the buffering potential of shell amendments in an in-situ experiment over the growing season of 2026.

Revisiting The Mechanisms Of Adaptation After 200 Generations Of Simultaneous Ocean Warming And Acidification In A Widespread Marine Copepod; **Victoria Marie Glynn, Rowan Batts, Lisa Piastuch, Gihong Park, Amber Grunow, Reid Brennan, Hans Dam*, Melissa Pespeni*,** *Joint senior authors" University of Vermont / University of Connecticut Avery Point
To fully comprehend how organisms will persist under climate change, we need to consider synergistic stressors over multiple generations. Experimental evolution allows us to manipulate long-term selection regimes, making it a powerful tool to interrogate the relative contributions of adaptation and plasticity. For marine invertebrates, the combined effects of ocean warming and acidification (OWA) have already begun to detrimentally impact natural populations. Microbiome dynamics are an important response mechanism for marine invertebrates. However, few studies assess how multigenerational stressors shape host-microbiome interactions. The copepod Acartia tonsa is a fortuitous system to explore this question, as these animals have rapid generation times (14 days) and can be cultured for multiple generations in the lab. By experimentally evolving A. tonsa for over 200 generations under OWA conditions, we elucidate how microbiome dynamics are shaped by long-term exposure to future environmental regimes. Our preliminary data presents how non-additive responses to thermal and pH stress can result in distinct microbiome configurations, which in some cases can become canalized due to sustained abiotic stress. In pairing these results with forthcoming transcriptional and genomic data, our work represents an unprecedented opportunity to not only capture the development of fitness trajectories in real time, but also ascertain the potential role of the microbiome in shaping said outcomes, ultimately providing insights into the resilience of copepods under climate change.

Appendix II Poster Presentation Abstracts (organized by theme)

Clean Waters & Healthy Watersheds

1. *Spatial and Temporal Trends of Heavy Metal Contamination in Bridgeport and Black Rock Harbor Surface Sediments, Fairfield County, Connecticut*; **Autumn Smith, Vincent Breslin**; Southern Connecticut State University, Environment, Geography and Marine Sciences Black Rock (BRH) and Bridgeport (BPH) harbors have extensive industrial histories with known adverse consequences to their central Long Island Sound sediment environments and estuary ecosystems. This thesis determined both spatial and temporal trends in surface sediment heavy metal contamination in BPH and BRH to make informed recommendations about current and future sediment quality. Sediment samples were collected on two occasions in 2022 and 2023 in each harbor to determine the sediment physical (grain size and organic carbon content) and chemical (copper, iron, zinc, and mercury) properties. Sediment metals within BPH and BRH exhibit a decreasing trend from north to south within each respective harbor. Copper ranged from 886 to 20.4 mg/kg in BPH, and 610 to 32.4 mg/kg in BRH, zinc from 1,090 to 29.8 mg/kg and 819 to 28.0 mg/kg, and Hg from 1.25 to 0.05 mg/kg and 0.77 to 0.06 mg/kg, respectively. Spatial variations in sediment metal concentrations in both harbors are attributed to differences in the physical characteristics of sediments and/or their proximity to effluent point sources. Previous government agencies and SCSU reports were used along with results of this study to examine temporal trends in sediment contamination. Temporal trends in sediment metal contaminants show a general decreasing trend from 1973 to the 1990s where it then plateaus for all metals and harbor sections of each harbor. A plateau in sediment metal concentrations since the late 1990s indicates an equilibrium that has been reached between the current inputs of metal contamination and sediment burial and flushing.
2. *Bottom roughness length scales for modeling Long Island Sound;* **Grant McCardell, James O'Donnell, Alejandro Cifuentes-Lorenzen, Mehrnoosh Abbasian, Todd Fake, Kay Howard-Strobel**;University of Connecticut Bottom stresses are an important aspect of the benthic environment in Long Island Sound (LIS), affecting sediment and biological distributions. FVCOM (and other hydrodynamic models) parameterize bed stresses through the uses of a bottom roughness length scale, z0. This parameter arises from boundary layer log-law theory and corresponds to an idealized height above the bottom where viscous drag reduces the overlying flow to zero. This bottom roughness parameter is also commonly used in modeling as a

"tuning" parameter to match bulk flows in the model to observed flows by increasing drag within the model. The z0 values used for this tuning are often considerably larger than z0 values measured in situ and represent unrealistically large local bed stresses. To avoid this overestimation, we estimate the bed stresses from a tuned model by using the 1m bulk flow with a quadratic drag formulation. The results we obtain in this manner show good agreement with in situ bed stress observations. Vertical mixing fluxes, however, can be overestimated by the model in the western LIS. We hypothesize that the additional shear production in the model due to large z0 values results in unrealistically large eddy diffusivities.

3. *Seasonal variability of Carbonate Parameters in Western Long Island Sound (August 2024-December 2025)*; **Erich Nitchke, Penny Vlahos, Samantha Wilder, Evelyn Powers;** University of ConnecticutBeginning in August 2024, in collaboration with the Interstate Environmental Commission, the Environmental Chemistry & Geochemistry Lab at UConn has processed water samples from Western Long Island Sound (WLIS). Laboratory analysis is conducted for total alkalinity (TA), dissolved inorganic carbon (DIC), and pH measurements, with the purpose to observe long-term trends on coastal acidification in Long Island Sound using standardized methods. Projected trends in increased atmospheric CO_2 pose a threat to marine ecosystems as a primary driver of coastal acidification. These changes are expected to alter water column stratification and circulation within marine ecosystems and intensify seasonal acidification, particularly in WLIS. This is especially concerning for calcifying organisms such as shellfish. These organisms utilize calcium carbonate for shell and skeleton creation. Aragonite saturation is a key indicator to measure whether conditions are favorable for these organisms. An increase of DIC and decrease in pH causes a reduction in carbonate ions, resulting in a lower aragonite saturation state while total alkalinity represents the buffering capacity of seawater or its ability to resist changes in pH. The data show seasonal changes in carbonate chemistry with severe Ωar undersaturation coinciding with seasonal hypoxia in August 2024. These results support an important baseline time series to inform WLIS water quality. Measuring these parameters helps estimate the long-term buffering capacity and resilience of Long Island Sound. This research helps inform risk assessment to shellfish populations and other calcifying organisms important to the Sound's ecosystem and economy. Through continued measurements, important trends and patterns within the Long Island Sound will help guide strategic management.
4. *Ranking macroalgae for nitrogen bioextraction potential;* **Amanda Shore, Peter J. Park**; SUNY Farmingdale, Over the past several decades, runoff from lawn care, agricultural production, septic systems, and sewer lines have negatively impacted

the water quality of Long Island Sound (LIS), in part by adding excessive amounts of nitrogen. Seaweeds readily absorb nutrients; and thus, the commercial cultivation and removal of seaweed may be a viable option to reduce nitrogen load in LIS waters. This project aimed at exploring which seaweeds would be most useful for bioextraction of nitrogen. First, a systematic literature search was conducted to gather information on growth, nitrogen uptake, and habitat preference for 24 seaweeds found in LIS. Next, a spatial model of habitat availability for each seaweed was built in order to quantify the areas within LIS suitable for year-round growth and survival of each seaweed. Finally, this information on nitrogen uptake rates, growth rates, and potential habitat availability was combined to rank each seaweed on their potential to improve LIS water quality through bioextraction of nutrients. Seaweeds in the genera Ulva and Chondrus ranked high both in terms of growth rates and potential nitrogen uptake rates. Other seaweeds that are currently being cultivated for commercial harvest, such as Saccharina latissima, ranked lower than expected, primarily due to summer temperature in many parts of LIS being close to or above the upper thermal limit of this species. These findings highlight the importance of considering future climate impacts on LIS as we continue invest and promote commercial cultivation of seaweed as a tool for improving water quality and ocean health.

5. *Quantitatively Assessing Photodegradation of Domoic Acid in Coastal Waters;* **Rachel Spera, Quin Zabel, Dianne Greenfield, Penny Vlahos**; University of Connecticut, Domoic acid (DA), a potent neurotoxin produced by the diatom Pseudo-nitzschia, causes amnesic shellfish poisoning and can persist in marine environments long after harmful algal blooms (HABs) subside. Accurately predicting DA longevity in coastal systems requires a deeper understanding of in situ biogeochemical conditions that regulate its photodegradation rate. To isolate the impacts of organic matter, nutrients, and carbonate chemistry, a toxin breakdown time series will be conducted using deionized water, artificial seawater, and natural seawater. Utilizing natural seawater samples collected from different regions of Long Island Sound will allow for direct comparison in regional photodegradation rates, especially between coastal and open water environments. Assessing complex biogeochemical dynamics in each region, including the potentially protective role of dissolved organic matter, provides insight into seasonal variability that influences both bloom initiation and toxin breakdown processes. Degradation rates will be determined by dividing samples into light/dark treatment groups. Each sample will be spiked with a known initial DA concentration to mimic toxin release during a harmful algal bloom at environmentally relevant concentrations. At regular intervals, samples will be processed through solid phase extraction (SPE) cartridges

to isolate DA and quantitatively analyzed using liquid chromatography-mass spectrometry (LCMS). Comparing degradation rates across environmental conditions will help reveal how biogeochemical factors influence DA photosensitivity and regional exposure differences. These findings will support ongoing research efforts to understand the causes and environmental impacts of HABs, and they will provide insight into toxin persistence in coastal ecosystems across the Long Island Sound.

6. *Beyond the 3 mg/L Threshold: A Recurrence-Based Risk Indicator for Coastal Hypoxia Assessment*; **Reza Badpa, Kamazima M.M. Lwiza,** School of Marine and Atmospheric Sciences (SoMAS), Stony Brook University, Coastal hypoxia poses significant threats to ecosystem services, fisheries, and the socio-economic benefits provided by estuarine environments. However, most hypoxia assessments focus on extent, duration, or average conditions, which are inadequately aligned with a management question pivotal to sustainability: whether detrimental hypoxic episodes are becoming less frequent and less severe at locales where ecological recovery is critically important. In this work, we introduce a recurrence-based framework for assessing hypoxia risk, monitoring recovery, and identifying transition zones where incremental environmental changes can cause systems to shift across ecological risk classifications. Using non-stationary extreme value analysis of annual summer bottom-water dissolved-oxygen minima, we derive return periods for hypoxic events in Long Island Sound. The framework resolves persistent spatial gradients in hypoxia recurrence while concurrently identifying monitoring stations where risk abruptly changes relative to threshold severity, thereby highlighting vulnerable transition zones. In Long Island Sound, our analysis additionally indicates that regional trends in hypoxia do not uniformly correspond to local recovery: certain western stations show a distinct lengthening of return periods, while others remain at near-annual recurrence intervals. These findings demonstrate that recurrence-based indicators can complement traditional hotspot mapping and mechanistic models by establishing benchmarks for recovery, prioritizing high-resolution monitoring in areas where risk is particularly susceptible, and facilitating more localized assessments of the effectiveness of hypoxia mitigation strategies.
7. *Investigating Coastal Sedimentation, Trace Metals, and Carbon Burial along the Connecticut coast in association with the USDA-NRCS LIS CZSS*; **William Ouimet, Preston Senderoff, Saranya Gautam**; University of Connecticut, In this presentation we provide a summary of activities that UConn has participated in in collaboration with the USDA-NRCS LIS Coastal Zone Soil Survey. The dataset consists of subaqueous vibracores collected in the nearshore environment at <4m

water depth and salt marsh push cores, all collected between 2022 and 2024. In total, there are over 700 new sites with stratigraphic information about coastal sedimentation that preserve different combinations of a three phase geologic history of the coast: the initial deposition of glacial and early postglacial sediments when sea-level was low; the deposition of Holocene deposits on top of the post-glacial landscape (wetlands, floodplains, etc.); and the progressive inundation of the coastal landscape by rising sea-levels and deposition of sand, mud and salt marsh organics associated with modern coastal processes. To support this geologic story we discuss 72 new radiocarbon dates that highlight the timing of these phases and rates of sediment accumulation from ~6000 years to present. We also investigate organic carbon accumulation, finding that carbon burial rates and efficiency vary with depositional setting — with enhanced preservation in low-energy, sediment-focusing environments and in estuarine locations. Trace metal analyses (Pb, Cu, Zn) reveal spatially heterogeneous patterns of recent sedimentation, with some sites preserving clear geochemical signatures of post-industrial anthropogenic input and others reflecting erosion or negligible accumulation over that time. Together, these results demonstrate that nearshore sediments function simultaneously as archives of postglacial coastal evolution and as physically influenced, long-term reservoirs of carbon and contaminants whose storage capacity is tightly coupled to geomorphic stability and sediment supply. Incorporating this information into broader coastal carbon and pollution frameworks is essential for improving regional budgets and evaluating the resilience of coastal systems under changing environmental conditions.

8. *Impacts of Summer Hypoxia on Bacterioplankton Abundance and Diversity in Hempstead Harbor, Long Island Sound*; **Alexia Gulino, Clara Strehle, Indranil Mukherjee, Luciana Santoferrara;** Department of Biology, Hofstra University, Located in western Long Island Sound, Hempstead Harbor experiences hypoxia every summer. The goal of this study was to analyze changes in abundance, diversity and taxonomic composition of bacterioplankton (Bacteria and Archaea) through summer 2025. We recorded environmental parameters (temperature, salinity, dissolved oxygen, pH) and collected surface and bottom water samples in five stations along the harbor about weekly from June to September (total of 62 samples). In the lab, we estimated chlorophyll a concentration (fluorometry), bacterioplankton abundance (flow cytometry) and bacterioplankton diversity (Illumina DNA sequencing). Bacterioplankton abundance was significantly higher during hypoxia than before or after this period (Kruskal-Wallis and Dunn's tests, p-value < 0.05), while the Shannon diversity index was significantly and negatively correlated with dissolved oxygen (Pearson's test, p-value < 0.01). These results

suggest that periods of lower oxygenation stimulate higher bacterioplankton abundance and diversity, possibly due to the coexistence of aerobic, microaerophilic and facultative or obligate anaerobic species. Indeed, the bacterioplankton taxonomic composition changed significantly before, during and after hypoxia (ANOSIM, p-value < 0.05), suggesting community re-assembly in parallel to changes in oxygen levels and other seasonal factors. Our study contributes to a multi-annual analysis of the role and responses of microbial communities in urban coastal waters during hypoxia.

9. *Phytoplankton Abundances Across Long Island Sound Point-Source Inputs;* **Julia M. Sandke, Erin Schneider, Victoria Vossler, Melissa Celik, Julie Granger, Craig Tobias, Penny Vlahos, Dianne I. Greenfield**; School of Earth and Environmental Sciences, Queens College, City University of New York, The Long Island Sound (LIS) estuary receives excess nutrient inputs (especially nitrogen (N)) from point and nonpoint sources, including stormwater outfalls, wastewater outfalls, atmospheric deposition, and both groundwater and fluvial discharge. Elevated N concentrations have caused eutrophication, summer hypoxia, and harmful algal blooms (HABs). HABs can threaten humans, ecosystems, and local wildlife through toxin production, shading, and increased acidification. HABs form along both the New York (NY) and Connecticut (CT) shorelines and include dinoflagellates, as well as newer reports of the domoic acid-producing diatom, Pseudo-nitzschia. One goal of this research is to determine the spatio-temporal distribution of HABs of emerging concern in relation to point-source inputs and co-occurring environmental stressors. During 2025, water samples were collected from shore sites at increasing distances from wastewater and stormwater inputs along the CT and NY shorelines, as well as from mid-channel surveys conducted by the Connecticut Department of Energy and Environmental Protection as part of long-term water quality monitoring. This presentation addresses how LIS phytoplankton biomass varies with proximity to point-source N inputs, using chlorophyll a as a proxy for biomass, and describes initial biogeochemical, physical water quality, and phytoplankton community composition observations. Study results will help local water quality and shellfish managers make more informed decisions regarding public safety, as well as advance policy frameworks for improving wastewater discharge and the health of LIS.
10. **Sound, satellites, action: Optimized and accessible water quality products for Long Island Sound from space**; Kyle J. Turner, Joshua Harringmeyer, Tong Lin, Maria Tzortziou, Joaquim Goes, Helga Gomes, Jinghui Wu, Luka Catipovic; The City College of New York, CUNY, Long Island Sound (LIS) and surrounding waters are subject to diverse threats to water quality (WQ). Wastewater outflows from the

urbanized NYC-metro region and nutrient runoff from agricultural land can trigger harmful algal blooms (HABs), reductions in water clarity, and hypoxia, adversely impacting ecosystem health. Several programs, including state and local agencies and non-profits, monitor WQ across LIS through water sampling and in situ measurements. While essential, discrete measurements leave many areas regularly "unseen" and cannot provide a complete picture of dynamic WQ shifts. Satellite remote sensing enables frequent ecosystem-scale monitoring of surface WQ conditions that can fill the spatial and temporal gaps left by in situ measurements, particularly expanding coverage in nearshore bays, rivers, and lakes. Over the last decade, we have collaborated with organizations such as Riverkeeper, CT DEEP, and NYC DEP to develop locally optimized water quality mapping for LIS. Leveraging data from multiple satellite platforms — including Sentinel-2/MSI, Sentinel-3/OLCI, and Landsat-8 and 9/OLI — we can now accurately monitor essential parameters such as chlorophyll-a (Chl-a), colored dissolved organic matter (CDOM), and suspended particulate matter (SPM). Our new online data portal (www.lisoceancolor.org) provides easy access to daily imagery, allowing users to view, download, and analyze data through integrated browser-based tools. More products (e.g., SST, HAB indicators) and additional sensors will be added in the future. We encourage everyone, from students to program managers, to harness the unique capabilities of near-real-time satellite imagery for targeted sampling, geospatial analysis, and other applications, and to provide feedback for additional needs and improvements.

11. *Tidal marsh mediation of nutrient dynamics in Long Island Sound* ; **Alexandra Frenzel, Craig Tobias, Peter Ruffino;** University of Connecticut, Department of Marine Sciences, The measurable impact marshes exert on Long Island Sound (LIS) water quality is determined by the balance between their nutrient sinks and sources. Marshes can help alleviate the stress of excess nutrients through sinks like burial in sediments and removal via denitrification. Whereas lateral export via porewater drainage supplies nutrients to adjacent waters. LIS ecosystem modeling efforts lack the observations necessary to evaluate marsh mediated nutrient dynamics at the spatial scales relevant to management. The aim of this study is to quantify the magnitude of these sinks and sources across a range of marshes with varying tidal amplitudes and background nutrient concentrations in LIS. Four marshes sites were developed with monitoring wells spanning from the creekbank to interior marsh, multi-level creekbank piezometers, and nearby creek tide gauges to calculate hydraulic gradients and nutrient fluxes. Meter long triplicate sediment cores were collected and sectioned at 1cm intervals for carbon and nitrogen density along with 210Pb geochronology. Preliminary results yield accretion rates of 0.21 cm yr-1 and when combined with carbon and nitrogen sediment densities, LIS marshes

are found to have burial rates ranging from 42 to 126 gC m-2 yr-1 and 4 to 13 gN m-2 yr-1 for carbon and nitrogen, respectively. Porewater drainage fluxes will be calculated and compared across sampling sites whose tidal amplitudes range from 34 to 74cm. The compilation of these results will help to constrain the magnitude of marsh mediated nutrient dynamics to support modeling efforts and policy decisions for LIS.

12. *Contrasting biogeochemical trajectories in adjacent estuaries: Interdecadal trends in water quality in Hempstead Harbor and Cold Spring Harbor, NY*; **Andy Huang, Ryan B. Wallace**; Adelphi University, Long-term monitoring datasets provide a rare opportunity to evaluate how estuaries respond to shared climate forcing while experiencing distinct local stressors. Here, we analyzed multi-decadal water quality datasets from multiple stations across Hempstead Harbor and Cold Spring Harbor, two adjacent estuaries on the North Shore of Long Island, NY. Both estuaries have experienced significant warming over the past two decades, with Cold Spring Harbor exhibiting the most rapid temperature increase, approaching thresholds associated with thermal stress in estuarine biota. Estuary-wide surface and bottom pH declined at comparable rates in both systems, consistent with regional acidification driven by rising atmospheric CO2 concentrations. Dissolved oxygen (DO) trends diverged markedly, with bottom DO declining in Hempstead Harbor while increasing in Cold Spring Harbor, despite common large-scale environmental drivers affecting these systems. DO and pH were strongly coupled in Hempstead Harbor, indicating biologically mediated regulation consistent with primary production and respiration. In contrast, DO–pH decoupling in Cold Spring Harbor suggests a greater influence of physical drivers; restricted tidal flushing and local groundwater inputs are proposed as contributing mechanisms and warrant further investigation. Despite geographical proximity and shared climate pressures, these two estuaries exhibit distinct biogeochemical trajectories, demonstrating that local physiochemical and anthropogenic drivers may modulate estuarine responses to regional warming and acidification, with implications for coastal vulnerability assessments and estuarine management under projected climate scenarios.
13. *Grain Size Analysis and Spatial Distribution of Heavy Metals within the Bladen's River Dam Impoundment (Seymour, Connecticut);* **Gary Hoehne, Nicholas Fedorchuk, Vincent Breslin, Katelyn Alix, Jam Hayton, Kayla Balbachan;** Southern Connecticut State University, Sediments play a critical role in maintaining aquatic ecosystem health, functioning as both sinks and secondary sources of contaminants, particularly heavy metals. The accumulation of these pollutants behind dams, such as the Bladen's River Dam in Seymour, Connecticut, can have lasting effects on water quality and aquatic life. This study investigates the spatial

distribution of arsenic (As), cadmium (Cd), copper (Cu), iron (Fe), lead (Pb), and zinc (Zn) in surface sediments collected from the Bladen's River Dam impoundment. Sediments were analyzed for grain size and organic matter content using loss on ignition (LOI) and evaluated according to established geochemical and ecotoxicological criteria. Results revealed significant spatial variability in sediment characteristics, with finer-grained, organic-rich sediments concentrated within the impoundment, conditions favorable for metal accumulation. The SEY-4 sample exceeded the Probable Effects Concentration (PEC) for all analyzed metals, identifying it as a localized contamination hotspot. However, none of the sampling locations exceeded Threshold Effects Concentration (TEC) guidelines, indicating limited immediate ecological risk. Although elevated concentrations at SEY-4 suggest potential long-term impacts if sediments are disturbed, overall contamination levels across the site were relatively low. Given the limited volume of material retained behind the dam, any metals mobilized during potential dam removal would likely undergo substantial downstream dilution. Collectively, these findings support the environmental feasibility of dam removal with appropriate sediment management and monitoring strategies.

14. *Effect of improved water quality on molluscan communities in Long Island Sound;* **Gregory P. Dietl, Matthew J. Pruden, John C. Handley;** Paleontological Research Institution, Excess nitrogen input has driven recurring summer hypoxia in Long Island Sound (LIS), with long-term impacts on benthic macroinvertebrate communities. In 2001, Connecticut and New York adopted a Total Maximum Daily Load (TMDL) strategy to reduce nitrogen pollution and hypoxia, with expected ecological benefits including improved benthic habitat conditions. Although TMDL targets were met by 2016, the lack of consistent benthic monitoring limits assessment of management success. Time-averaged molluscan death assemblages (DAs), which accumulate in sediments, provide a means to reconstruct past habitat conditions. We analyzed dead mollusk shells from 10 benthic grab samples collected during the 2020 EPA National Coastal Conditions Assessment to evaluate benthic community response to TMDL implementation. We hypothesized that habitat condition—measured using the AZTI Marine Biotic Index (AMBI)—improved as water quality improved, indexed by reduced frequency of summer hypoxia. Bomb-pulse radiocarbon dating indicates that DAs reflect pre-TMDL conditions (mean median age ~1985 CE). Results show improved benthic conditions in eastern LIS (lower AMBI scores) following reductions in hypoxia, whereas western Narrows sites showed no improvement, likely due to persistent sediment quality issues. These findings demonstrate that molluscan DAs collected

through standard sampling can provide a cost-effective, retrospective tool for assessing restoration outcomes when long-term monitoring data are unavailable.

15. *Evaluating the role of vertical mixing in modulating hypoxia in western Long Island Sound*; **Mehrnoosh Abbasian, James O;Donnell, Alejandro Cifuentes-Lorenzen, Craig Tobias**; University of Connecticut,
The western Long Island Sound (WLIS) experiences seasonal summer stratification that limits vertical mixing and promotes hypoxia. This study investigates how vertical mixing regulates stratification and oxygen variability using a combination of modeling and observations, including dissipation rates (ε), shear, momentum fluxes, atmospheric forcing and measurements of near-surface and bottom temperature, salinity and dissolved oxygen. Combining model simulations using the General Ocean Turbulence Model (GOTM) and local observations we track the depth of the pycnocline in terms of the density and temperature profiles. We identify the pycnocline depth from density and temperature profiles, and its evolution, together with buoyancy frequency (N^2), is used to distinguish between stratified and well-mixed conditions. These insights were dynamically constrained from observations and model outputs identifying enhanced turbulence from elevated dissipation rates and enhanced turbulent kinetic energy (TKE) indicate vertical mixing. Model outputs are used to directly assess the effect of the enhanced turbulence in the local eddy diffusivity (Kz). To further characterize the nature of the mixing (i.e., its vertical extent and temporal scales), we track the vertical heat flux between the surface and the pycnocline, providing a diagnostic measure of how mixing and stratification modulate vertical exchange in the water column. We further suggest that these same mixing processes regulate oxygen dynamics by promoting the downward transport of oxygen from the surface. Consequently, surface oxygen concentrations decrease, while bottom oxygen concentrations increase slightly. Overall, our results show that vertical mixing redistributes oxygen and drives heat transport across the pycnocline, regulating stratification in WLIS.
16. *Investigating the Effects of Acute and Long-term Exposure to PFAS on Temperature Stress in Long Island Sound Phytoplankton* ; **Niko DeSousa, Colin T. Kremer, Hagen Klobusnik, Brandon Chan, Sophie Provencher**;University of Connecticut EEB, Per- and polyfluoroalkyl substances (PFAS) are contaminants of emerging concern and are likely to bioaccumulate and bio-magnify. Current studies on PFAS are commonly done in higher trophic-level organisms such as macroinvertebrates and fish. While phytoplankton and their interactions with PFAS are hardly understood, these organisms are the base of marine food webs, serving as important entry points for contaminants into the food web. As water temperatures rise, phytoplankton may also be experiencing thermal stress, which may be

exacerbated by contaminants. We conducted a factorial experiment to test for the interactive effects of PFAS (perfluorooctanoic acid, PFOA, and perfluorooctane sulfonate, PFOS) exposure across temperatures (8°C - 32°C) in two phytoplankton species from the Long Island Sound (LIS) and one lab-cultivated species (Desmochloris halophila, Thalassiosira spp., and Phaeodactylum tricornutum, respectively). We hypothesized (1) that as PFAS concentration goes up, growth of phytoplankton will be negatively impacted, (2) as temperature increases past the thermal optimum, phytoplankton growth will decrease (3) as PFAS concentration increases, the thermal tolerance of phytoplankton will decrease, and (4) if PFAS exposure is chronic (two-weeks) rather than acute (one-day), phytoplankton growth will be inhibited more. Overall, however, we found no negative effects of PFOA/PFOS. If PFAS is also accumulating in the phytoplankton, something we are in the process of testing, then PFAS could be readily biomagnifying at the base of our marine food webs. We sought to then quantify the PFAS cellular concentration at the end of the experiment for our common LIS diatom, Thalassiosira, at common LIS temperatures (12, 20, 27°C).

17. *Water as a Common Good: Monitoring the Quality of our Local Watersheds*;**Al-Warith Mallick, Parinita K. Datta, Diana Garcia Melgar, Fernando Nieto, Duncan Quarless**; SUNY College at Old Westbury, Water is a vital yet vulnerable resource. While local communities may take water availability for granted, global trends highlight growing threats from contamination and scarcity. As part of the Water as a Common Good (WCG) project at SUNY Old Westbury, we are monitoring the water quality and microbial makeup of the Town of Hempstead Watershed. Over the past year, we have sampled 17 sites across five locations, including two in a freshwater stream draining into the bay at Wantagh Park. At each site, we measured temperature, salinity, dissolved oxygen, ammonia, nitrate, pH, and turbidity. Water was filtered through 0.22-micrometer membranes, DNA was extracted using a Qiagen PowerWater Kit, and 16S barcodes were sequenced and analyzed using QIIME2. Analysis revealed that microbial communities are site-specific. Alpha diversity was generally high across all sites, and beta diversity ordination showed clustering by location, suggesting site-specific factors drive microbial composition. A notable finding was the FCCP location, which emerged as an outlier on all metrics. Alpha diversity at FCCP was highly variable, with some samples showing low evenness and uneven bacterial abundance. One FCCP site also displayed a distinct taxonomic composition: approximately 71% of its taxonomy consisted of Proteobacteria, Bacteroidota, and Cyanobacteria, compared to an average of ~82% for those same phyla across all other sites. These findings establish a benchmark for current water quality and microbial communities within the Hempstead

Watershed, supporting long-term monitoring efforts and providing a framework for assessing future environmental impacts.

18. *Data-Driven Forecasting of Bottom Dissolved Oxygen in Western Long Island Sound;* **Reza Badpa, Kamazima M.M. Lwiza;** School of Marine and Atmospheric Sciences, Coastal dissolved oxygen (DO) variability strongly influences ecosystem health, water quality, and the sustainability of estuarine resources, yet forecasting its variability remains challenging because it involves interacting physical and biogeochemical processes across multiple timescales. Here, we present machine learning and deep learning models to forecast bottom DO at the Execution Rocks Station in western Long Island Sound using high-frequency observations and environmental forcing data. The dataset has mooring data with 15-minute temporal resolution and includes predictors describing hydrographic structure and external forcing, including temperature, salinity, density, Connecticut River discharge, wind observations from LaGuardia Airport, and tidal data from Kings Point. We apply Extreme Gradient Boosting, encoder-only Transformer models, and Temporal Fusion Transformer (TFT) across multiple forecast horizons. At hourly resolution, forecasts are generated 12, 24, and 48 hours ahead, while at daily resolution forecasts are produced 7, 14, 21, and 28 days ahead. Deep learning models consistently outperformed or matched alternative approaches and achieved average forecast performance above 0.9 across a range of prediction horizons. These results show that transformer-based forecasting frameworks can skillfully predict bottom DO from sub-daily to multi-week timescales and offer strong potential for early warning of low-oxygen conditions in western Long Island Sound.
19. *Oyster health and restoration in Long Island Sound - Understanding population dynamics of natural and unmanaged oyster beds;* **"Sarina Dery, Kyra J. Lenderman, Mariah L. Kachmar, Genevieve Bernatchez, Isaiah Mayo, Samuel Gurr, Kelly Roper, Mark Dixon, LTJG Tyler Houck, Barry Smith, Lydia M. Bienlien, Gary H. Wikfors, Lisa Milke, Meghana Parikh, and Katherine McFarland;** NOAA Fisheries, In Long Island Sound (LIS), the Eastern oyster, Crassostrea virginica, is both economically and ecologically valuable to coastal communities. Increasing shellfish production from aquaculture and restoration is an ecosystem target for the LIS Partnership, a national estuary program dedicated to restoring and protecting the Sound's waters and watershed. Expanding existing natural beds presents a desirable opportunity to increase oyster-related ecosystem services; however, little is known about how expansion may affect the proliferation and transmission of oyster pathogens between restored and harvested populations. Our goal is to establish a standard methodology for incorporating disease burden in oyster population health assessments to inform future restoration projects.

For this five-year study, we are monitoring the health and disease burden of natural and restored oyster populations in the Long Island Sound. Our data collection takes a comprehensive look into three oyster beds in LIS with continuous water quality monitoring, monthly oyster sampling for disease and reproductive analysis, bed characteristics, and biannual population surveys to capture changes in density, size distributions, and natural mortality events. Preliminary results focus on observed population dynamics and overall oyster health.

20. *Leveraging High-Resolution sensors for Fine-Scale Chlorophyll-a Dynamics in Complex Urban Waterways*; Tong Lin, Maria Tzortziou, Kyle Turner; City University of New York, High-spatial-resolution satellite sensors, including Sentinel-2/MultiSpectral Instrument (MSI) and Landsat-8/9 Operational Land Imager (OLI), offer unprecedented opportunities to monitor ecosystem processes in small-scale estuarine environments. However, accurate retrievals in highly urbanized estuaries remain challenging due to extreme atmospheric and optical complexity. This study evaluates and optimizes chlorophyll-a (Chl-a) retrieval algorithms across the Long Island Sound (LIS) by leveraging a comprehensive seven-year in-situ bio-optical dataset. We specifically focus on algorithm performance in the Sound's most vulnerable and optically complex regions, including the Western Narrows and Jamaica Bay. Chl-a was most successfully retrieved using a piecewise algorithm and machine learning (ML) random forest model for MSI and OLI, respectively. Validation results demonstrate high consistency between satellite-derived Chl-a and in-situ observations across multiple years and sensors. Time-series analysis at key monitoring stations reveals that optimized MSI and OLI retrievals successfully capture seasonal biomass peaks and rapid biogeochemical transitions previously unresolved by coarser-resolution sensors. These high-spatial-resolution (10-60 m) datasets allow for a detailed characterization of phytoplankton spatial distributions and temporal trends in narrow tributaries and harbors heavily impacted by riverine discharge and urban nutrient loading. By bridging the gap between algorithm development and long-term ecological monitoring, this work provides a robust framework for tracking water quality dynamics in urbanized coastal zones.
21. *Testing Phytoplankton Community Responses to Nitrogen Form Along an Urban-Exurban Gradient in Long Island Sound*; **Victoria Vossler, Julie Granger, Craig Tobias, Julia Sandke, Erin Schneider, Georgie E. Humphries, Dianne I. Greenfield;** School of Earth and Environmental Sciences, Queens College, City University of New York, Long Island Sound (LIS) is an urban estuary that receives anthropogenic nitrogen (N)-loading from stormwater and wastewater point-source inputs along the New York (NY) and Connecticut (CT) shorelines. Wastewater

effluent enriches LIS with a variety of nutrient forms, including dissolved inorganic N (DIN) and dissolved organic N (DON). Since dinoflagellate harmful algal blooms (HABs) tend to proliferate mid-spring to early fall, it is conceivable that these point-source N-inputs accelerate HAB development. Here we describe initial findings from a series of N-addition bioassay experiments that were conducted late summer-fall 2025 using nearshore water from both NY and CT shores of LIS collected from varying proximities to point source inputs. Treatments were spiked with various forms of DIN and DON (nitrate, ammonium, or urea) as well as phosphorus (P), then incubated in 2 L polycarbonate bottles for a 72 hr period. Phytoplankton community composition and biomass (as chlorophyll a concentrations) were then determined using microscopy and fluorometry, respectively. Nutrient samples were also collected before and after incubation. Results from these experiments will be used to inform future experiments that measure phytoplankton N-uptake rates and therefore inform ecophysiological processes. Since discharges often increase following storms, which may in turn affect N-delivery, these data will be important for informing water quality management in LIS.

22. *Focusing on Fertilizer: A new tool to help target lawn fertilizer outreach*; **Qian Lei-Parent, David Dickson, Robert Johnston, Jamie Vaudrey, David Newburn, Tom Ndebele, Haoluan Wang, Kaichao Chang, Derek Wietelman**, University of Connecticut, Nitrogen from residential lawn fertilizer is one of the most challenging and persistent problems impacting the health of Long Island Sound (LIS). An interdisciplinary team of researchers from Clark University, the University of Connecticut, the University of Maryland, and the University of Miami collaborated on an effort to develop a LIS Lawn Fertilizer Outreach Targeting Tool. Combining social science with two tools that model nitrogen interactions with the landscape (i.e. LIS Nitrogen Loading Model and N-Sink), the resulting data and tool can help inform lawn fertilizer education and outreach campaigns to target areas that are likely to have a significant impact on water quality. Results are presented in a novel web tool that allows users to explore: (1) predicted nitrogen loads from lawn fertilizer use for neighborhoods across coastal areas of LIS, (2) hot and cold spots for lawn fertilizer transport to LIS, and (3) predicted impacts of behavior-change campaigns on lawn fertilizer applications. This presentation will walk through the methodology behind the tool and demonstrate how it can be used to inform outreach efforts. The tool is available at https://s.uconn.edu/nfert.
23. *Microplastic Dispersal Driven by Lagrangian Coherent Structures*; **Sunghwan "Sunny" Jung**; Cornell University, The distribution of microplastics in large water bodies depends heavily on complex, often hidden flow patterns. This study presents

a generalized framework for identifying pollution transport regimes by employing backward Finite-Time Lyapunov Exponent (FTLE) fields and Lagrangian particle tracking. By analyzing Mean Square Displacement (MSD), we identify distinct kinematic regimes—ranging from early-time diffusion to late-time ballistic advection—that govern particle spread. This quantitative approach confirms that the physical location of a source significantly dictates the total distance traveled, creating a clear contrast between high-transport coastal jets and low-transport retention zones. Coastal jets act as regional exporters of micro-plastics, and retention zones serve as local accumulators of urban waste. This methodology provides a robust tool for predicting plastic accumulation and informing management strategies in diverse aquatic environments, including the Long Island Sound.

24. *Occurrence and Characterization of Per- and Polyfluoroalkyl Substances (PFAS) in Historical Long Island Sound Sediments;* **Martin Castro, Nicholas Ring, Pengfei Zhang, William Ouimet, Zhongqi Cheng, Yuemei Ye**; Lehman College, Per- and polyfluoroalkyl substances (PFAS) are persistent contaminants that accumulate in aquatic sediments and may contribute to long-term exposure in estuarine ecosystems. Long Island Sound (LIS), a semi-enclosed estuary of major ecological and economic importance, receives PFAS inputs from wastewater and stormwater, but PFAS in LIS sediments remain poorly documented. Our lab has established EPA Method 1633 for PFAS analysis and developed a sediment workflow that combines accelerated solvent extraction, solid-phase cleanup, and LC-MS/MS, with recoveries greater than 82% for most target analytes. The method targets 39 PFAS, including ultrashort-, short-, and long-chain compounds.
Initial results show that both short- and long-chain PFAS were present in sediments collected from Manhasset Bay in 2005, including perfluorohexane sulfonate and perfluoroheptanoic acid. We are applying this method to surficial sediments collected in 2005–2006 from eight LIS sites to establish a historical baseline and compare these data with more recent samples from similar locations. In addition, we will pair surficial sediments with dated cores along a source-to-offshore gradient to examine spatial and temporal trends, drawing on planned USDA NRCS coring, existing Connecticut-side cores, and historical shallow cores from the New York side of LIS. This work will improve understanding of PFAS occurrence, persistence, and potential source changes in LIS sediments, provide a foundation for future studies of remobilization and bioavailability, and inform LIS contamination monitoring and management.
25. *PFAS in Archived Fish: Insights from Preserved Biological Specimens*; **Kevin W. Shaffer, Oliver N. Shipley, Yi Zhang, Ashley Nicoll, Thi Anh Nguyen, Euna Kim,**

Yong Chen, Elsie M. Sunderland, Nicholas S. Fisher, Michael G. Frisk, Christopher J. Gobler, Lokesh P. Padhye; New York Center for Clean Water Technology, Stony Brook University, Per- and polyfluoroalkyl substances (PFAS) are persistent contaminants that are now widely detected in aquatic environments. While early research focused primarily on legacy compounds such as PFOS and PFOA, regulatory phase-outs have driven a shift toward alternative PFAS, including short-chain compounds, fluorotelomer sulfonates, and sulfonamides. However, long-term records that capture how PFAS profiles have changed over time remain limited. This presentation explores a bio-archival approach for reconstructing historical PFAS exposure using specimens from the Hudson River Biological Monitoring Program (HRBMP), one of the world's most extensive fish archives. The collection includes formalin- and ethanol-preserved specimens, as well as preservative-free fish scales, offering a unique opportunity to evaluate multiple archival matrices. Of particular interest are striped bass (Morone saxatilis) scales, which are nonlethal to collect, collagen-rich, and potentially capable of retaining PFAS signatures over time. We analyze preserved fish and archived striped bass scales collected between 1990 and 2023, including fish linked to areas influenced by aqueous film-forming foam (AFFF) sources, and assess how preserved specimens may complement this reconstruction. Together, these materials offer a promising multi-matrix framework for tracking long-term PFAS exposure and compositional change in the Hudson River and connected coastal ecosystems.

26. *Context-dependent water clearance by aquacultured eastern oysters, Crassostrea virginica, assessed by valve gape monitoring*; **Bryanna Porter-Pompey, Ian Dwyer, Nils Volkenborn**; Stony Brook University, School of Marine and Atmospheric Sciences, The cascading ecological effects of eutrophication may be devastating for coastal ecosystems, consequently, many state and local governments aim to mitigate the extent of eutrophication through management strategies. This project aims to apply hall effect valve gaping sensors in the in-situ estimation of the environmentally-mediated rate of biodeposition in the eastern oyster, Crassostrea virginica, through two metrics of valve gaping: (a) the percent of time open hr-1 and (b) the partial closure frequency hr-1. To date, the investigation found a strong positive relationship between the biodeposition rate and percent of time open hr-1 (R2 = 0.87, high algae supplementation; R2 = 0.85, no algae supplementation). With a mixed feeding regime of the algae Tetraselmis and kaolinite clay, the relationship between the two parameters was even stronger (R2 = 0.94) when compared to the algae-only (R2 = 0.80) and kaolin-only (R2 = 0.82) treatments, possibly suggesting greater water clearance efficiency when exposed to a mixed feeding regime with kaolinite clay. In-situ deployments were conducted at various sites within the

Peconic Estuary, Long Island, New York, in which oysters fitted with valve gaping sensors were deployed in coalition with environmental loggers. This revealed visually distinct behavioral patterns considering both (a) the type of aquaculture practice, and (b) the influence of the environmental parameters current speed, dissolved oxygen concentration, chlorophyll α concentration, and temperature. This work has potential to inform aquaculture practices and expansion in the Peconic Estuary as well as support management and policy initiatives instrumentalizing oysters in biological in-situ eutrophication mitigation.

27. *The Long Island Sound Clearinghouse—an online platform that directs users to publicly available information for the basin*; **Harper Beckers, Gina Groseclose, Milan Liu, Erik Myers, Mark Poe, Christopher Schubert**; U.S. Geological Survey, The volume of data generated from studying Long Island Sound and its watershed prompted the U.S. Geological Survey (USGS) to work with the U.S. Environmental Protection Agency (EPA) and Long Island Sound Partnership to develop an online clearinghouse to identify and direct users to this information. Many states and other entities conducting studies in this basin maintain publicly accessible data repositories; however, the information is spread across several databases. Centralizing information in this clearinghouse provides a single platform where details of studies throughout the basin can be accessed to promote collaboration, identify data gaps, reduce duplication, and improve efficiency.

    The Long Island Sound Clearinghouse (https://ny.water.usgs.gov/HydrologyHydraulics/lis-clearinghouse/) does not host or maintain data repositories. Instead, it compiles and presents metadata from publicly accessible databases and layers served by data generators. Within the clearinghouse there are currently 847 layers organized within 14 categories and 34 subcategories. Layers include metadata from the Water Quality Portal (WQP), which integrates publicly available water-quality data from the USGS, EPA, and over 400 other entities. The WQP search functionality is integrated into the clearinghouse which enables filtering for site type, sample media, characteristic group, state, and start and end dates without leaving the clearinghouse. The clearinghouse provides two tools, a metadata mapper and a search tool, which use map- and list-based approaches to visualize and (or) identify metadata. Both tools include several features that allow users to search and filter available layers and export metadata. This presentation will introduce the clearinghouse and provide a demonstration of its capabilities.

28. *Impacts of a near shore wastewater outfall on carbonate chemistry*; **Hanaan Yazdi, Roy Price, Tyler Menz;** Stony Brook University, School of Marine and Atmospheric

Sciences, Ocean outfalls are a significant form of point-source pollution for near-coastal areas. The wastewater that is released typically contains high concentrations of nutrients that can drive local eutrophication events. While the impact of nutrient loading and eutrophication in waters around Long Island has been documented, less is known about the impact of wastewater on coastal acidification and carbonate chemistry. This year-long monitoring project focused on an outfall off the south shore of Long Island that currently releases ~50 million gallons a day of secondarily treated effluent 4 km offshore at ~15 m water depth. Waters from around this outfall were sampled for carbonate chemistry parameters (DIC, TA, pH, and aragonite saturation state). Data collected over 9 cruises show areas of depressed salinity, higher DIC, lower pH, and lower aragonite saturation state at the surface in the areas closest to the release point of the effluent. Acidification in coastal areas threatens marine organisms sensitive to changes in pH and carbonate availability. Outfalls alter water chemistry by releasing effluent with lower salinity, lower pH, and higher dissolved inorganic carbon (DIC) than the surrounding waters. However, mixing calculations suggest that areas around the outfall experience acidification at levels that cannot be attributed to CO2 uptake alone. We suggest the effluent released by outfalls can cause changes to biological activity, specifically increases in microbial respiration, that alter carbonate chemistry through the generation and release of carbon dioxide. This project focuses on better understanding the contributions of wastewater effluent on coastal acidification around Long Island.

29. *Dark Side of the Bloom: Characterizing Population Dynamics of a Toxic Dinoflagellate (Alexandrium catenella)*; **Charlotte Melnitsky, Hagen Klobusnik, Colin T. Kremer**; University of Connecticut, Harmful algal blooms (HABs) are the rapid accumulation of toxin-producing phytoplankton that worsen water quality and impair ecosystem function. The dinoflagellate, Alexandrium catenella, forms HABs and releases toxins that bioaccumulate in shellfish across Long Island Sound (LIS) and the US Northeast causing Paralytic Shellfish Poisoning. Accurate bloom predictions are important for fisheries managers and other local stakeholders, and data linking abiotic conditions to species' traits support these efforts. Fluctuations in the thermal and nutrient landscape of LIS due to climate change and pollution may alter the growth and dormancy cycles of A. catenella, and understanding these dynamics is imperative for improving HABs forecasting. To this end, we are investigating how temperature and nitrate availability impact growth rates and germination success in A. catenella. Based on prior work, we predict low-nitrate regimes will shift the thermal optimum for A. catenella cooler, and ultimately, shrink the range of temperatures at which the dinoflagellate can grow. Our preliminary

experiments indicate that at 16°C, well within the species' thermal niche, population growth requires high nitrate concentrations of at least 20 μM-NO3. We also discovered pre-dormancy planozygotes and dormant cells in treatments with the most deplete nitrate concentrations, supplying additional evidence that thermal and nutrient stress triggers dormancy in phytoplankton. These findings have important implications for the timing, intensity, and persistence of HABs. Ongoing work will capture growth rates of A. catenella at eight temperatures and nine nitrate concentrations, providing insight into the interactive effects of temperature and nutrients on a LIS-relevant HAB species.

30. *Meeting Energy Demands While Maintaining Healthy Watersheds and Thriving Habitats*; **Devan Nichols, Thomas Gillen**; ASA Analysis and Communication Inc, Large quantities of water are used across the U.S. for various forms of energy production at thermal power stations. Non-contact cooling water, water that is circulated through a cooling system to absorb and remove heat to maintain optimal temperatures in various industrial processes, can have negative environmental impacts if not properly regulated. The Clean Water Act (CWA) regulates discharges of pollutants into the waters of the US and sets quality standards for surface waters. Section 316 of the CWA specifically regulates the withdrawal and discharge of cooling water. Under section 316(a) a discharger must comply with applicable thermal water quality standards or demonstrate that alternative standards (a variance) would still maintain a balanced indigenous community of fish, shellfish, and wildlife in the receiving waterbody. Increasing ambient water temperatures and increases in energy production (to meet increased demand) are necessitating new thermal variances or modifications to existing thermal variances. This presentation will provide an overview of USEPA guidelines for preparing a CWA 316(a) Demonstration Study, step through a case study, and discuss how the LIS community might balance the need for additional energy while maintaining environmental integrity in LIS waters. We expect the regulatory community, power plant staff, and consultants involved in State Pollutant Discharge Elimination System (SPDES) compliance would benefit from this talk.
31. *Otolith and eye lens biomarkers for tautog and winter flounder in Long Island Sound*; **Ryan A. Wagner, Karin E. Limburg**; SUNY ESF, In recent years, efforts by the Long Island Sound (LIS) Partnership have led to significant reductions in pollution and hypoxia. However, demersal and benthic communities are still impacted by hypoxia and legacy contaminants (e.g., mercury and arsenic). The LIS provides habitat for the commercially important and historically overfished tautog (Tautoga onitis) and winter flounder (Pseudopleuronectes americanus). In this study, we use LA-ICP-MS to measure trace element biomarkers in the sagittal otoliths and eye lenses of these

species to estimate age, growth, metabolic rate, movement through salinity gradients, and exposure to stressors (e.g., hypoxia, methylmercury, and arsenic). We ran preliminary linear mixed models on our lifetime proxy data. Our results indicated that winter flounders were exposed to more hypoxia and accumulated more arsenic than tautogs but occupied less saline habitats and accumulated less methylmercury. However, when our hypoxia proxy (Mn:Ca) is normalized for somatic growth (Mn:Mg) there is no significant difference between species. The tautog with high methylmercury were mostly caught near New Haven harbor in shallow (5m to 9m), muddy bottom habitats. Surprisingly, we did not detect any significant difference in hypoxia exposure, arsenic accumulation, or mercury accumulation between winter flounder captured in eastern LIS versus western LIS. However, all statistical tests were performed on lifetime exposure data and may not reflect our final results and conclusions. Further work will resolve annual variations in otolith chemistry and should provide better insight into timing, frequency, and duration of exposure events experienced by each individual.

32. *Remediation of water and soil contaminated by per- and polyfluoroalkyl substances;* **Yanna Liang, Tao Jiang, Nahid Perez, Aswin Ilango**; University at Albany, Per- and polyfluoroalkyl substances (PFAS) are nearly ubiquitous emerging contaminants in the environment. Due to the extremely strong C-F bonds, PFAS are resistant to degradation by physical, chemical and biological approaches. To treat vast volume of drinking water, surface water, stormwater and groundwater contaminated by PFAS, sorption followed by destruction has been recognized as a feasible treatment train. Regarding soil polluted by PFAS, stabilization through adding an immobilizing reagent has been proven to be effective. In this talk, Dr. Liang will present and discuss innovative materials synthesized in her lab for remediating water and soil containing PFAS (1-4).

Informed and Engaged Public

33. *Insights from the Economic Contribution of Connecticut's Aquaculture Sector, 2016-2023;* **Tessa L. Getchis; Christopher Laughton; Rigoberto A. Lopez; Luis Seoane Estruel; Angela Zhang**; CT Sea Grant and University of Connecticut, Aquaculture is a longstanding part of Connecticut's maritime economy, with oysters and clams farmed commercially for over a century. In recent years, however, the sector has faced major disruptions. COVID-19 sharply reduced demand, while extreme storms and rainfall driven shellfish bed closures further constrained production and raised costs. These disruptions affected sales, jobs, and supply chains, underscoring the need to assess the sector's broader economic contribution to inform resilience planning and investment. This study estimates

Connecticut aquaculture's economic contribution from 2016 to 2023 using input output modeling. It combines administrative shellfish sales data with federal survey information for other aquaculture activities and reports results in constant 2023 dollars to provide a transparent picture of the sector's trajectory over time. Although sales of oysters have been more stable, particularly since 2017, clam sales declined by 84% between 2016 and 2023, reflecting lower volumes of harvest. Both clam and oyster sales fell in 2020, when stay-at-home-orders, restaurant closures, and consumers' fear of COVID infection reduced demand and disrupted key marketing channels for local shellfish. Using IMPLAN, we estimate aquaculture's economic impacts for 2022, the year with the most complete data. In that year, Connecticut aquaculture generated $33.5 million in statewide output and supported 482 jobs, with most activity stemming from shellfish, especially oysters. More broadly, shellfish aquaculture contributed about $55 million and 752 jobs in 2016, compared with $28 million and 377 jobs in 2023. These findings inform resilience planning and public understanding of aquaculture's economic contribution in Long Island Sound communities.

34. *Mixed Methods Process for Long Island Sound Schools Network Improvement*; **Ashley Morrell, Diana Payne**; Connecticut Sea Grant, The Long Island Sound Schools Network (LISSN) has supported CT and NY schools in the LIS watershed to implement locally important action projects that engage students, families, and the public since 2023. Schools develop projects that foster positive environmental actions for a healthy watershed, introduce communities in ocean literacy topics, establish lasting local partnerships, and continue to sustain this initiative beyond the life of the grant. Projects include but are not limited to oyster health, water quality, and marine debris removal. This year, feedback was collected through teacher engagement in the form of facts, opinions and experiences to assess strengths and challenges to improve future Long Island Sound Schools. Six participants from Connecticut and New York shared their experiences to augment program quarterly reports and feedback. The LISSN are part of USA Blue Schools and funded by the Long Island Sound Partnership. Learn how this program has developed a network of environmental stewards and citizen scientists, in addition to program accomplishments, limitations, and ideas for implementation.
35. *The SAFER Mobile App: An Interactive Tool for Coastal Storm and Power Outage Preparedness, Adaptation, and Recovery;* **Carolyn A. Lin;** University of Connecticut, Severe weather events can cause serious damage to homes and infrastructure, creating health hazards and financial losses for communities and their residents. This work aims to examine environmental psychology and human–computer interaction factors that catalyzed the development of an innovative mobile app—

Storm Assistance for Emergency Resilience (SAFER, Figure 1)—in order to create a theoretical framework for updating the app. This framework will explain the implementation of the new design features—the power outage and the augmented reality modules—which aim to elicit positive cognitive, affective, and behavioral responses to the new SAFER app. This work will draw on past empirical research, which identified two cognitive pathways linking storm-risk communication to perceived (1) storm-risk severity and (2) storm-preparedness response efficacy. These pathways shape the perceived usefulness and usability of the original Long Island Sound, location-based SAFER app design (Figure 2). Conceptually, the new version of SAFER is being developed by extending protection motivation theory—the theoretical anchor for the original SAFER app—to incorporate technology fluidity theory, flow theory, and social presence theory. The updated theoretical framework will explain the information architecture and interface design of the power outage (tips, quizzes and game) and the AR features. Specifically, the latter enables users to engage in virtual spatial interactions with wind, rain, and flood damage—as well as personal health threats—in and around their own home and property. All told, the new SAFER app aims to educate and enhance the property and personal safety of Long Island Sound residents.

36. *Developing hands-on lessons to increase the public's knowledge of and impact their perceptions towards local seafloor ecology*; **Zoe Kendall, Chris Conroy, Ivar Babb;** University of New Haven, The Long Island Sound Seafloor Habitat Mapping Initiative (LISSHMI) provides data and map products to support the sustainable management of the Sound. State, federal, and academic partners work together to characterize the physical environment and ecology of the seafloor for this purpose. The information that LISSHMI collects is made available to the public in the form of data, published reports, and maps, and is used to inform management efforts (e.g., LIS Blue Plan). While many stakeholders utilize these resources, the wider public does not. Within LISSHMI, there is a goal of increasing public knowledge of the seafloor and impacting perceptions about the importance of these habitats. This will be accomplished by developing and delivering hands-on lessons centered on LISSHMI's work and partnering with local schools and community outreach programs to broaden the reach of these efforts. Curricula will align with environmental literacy (EL) best-practices, next generation science standards, and ocean literacy principles. Connecticut's Environmental Literacy Plan acknowledges the importance of EL to people's engagement with environmental conservation and policy. Pre- and post-surveys will be used to assess lesson impacts. During the poster session, a mock lesson exploring LISSMHI's efforts will be presented.

37. *A Case Study of the COASTS program: Community Opportunities for Accessing Science Training on the Sound (COASTS)*; **Karin Jakubowski, Sarah Novarro, Christian Conroy, Jean-Paul Simjouw, Amy Carlile;** University of New Haven COASTS Program, The Community Opportunities for Accessing Science Training on the Sound (COASTS) Program was developed to train community scientists and foster greater appreciation and connection to Long Island Sound. A total of 32 participants were trained as volunteers in the first three years. Volunteers completed a comprehensive three-month training course led by marine science faculty from the University of New Haven, CT State Community College, and other interdisciplinary experts. Through this program, participants developed field skills and techniques for assessing marine water quality, flora, and fauna. The training also emphasized effective science communication strategies for engaging the public, as well as an introduction to marine policy. Upon completion, volunteers contributed to community education initiatives, including public programs, teacher training workshops, and interactive field experiences at local sites and the marine science center at Canal Dock. To evaluate the program's effectiveness, semi-structured interviews were conducted with COASTS volunteers. The findings assessed whether this pedagogical framework successfully fostered increased knowledge, positive attitudes, and pro-environmental behaviors related to the Long Island Sound watershed. Overall, the results highlight both the successes and challenges of the program. The COASTS model demonstrates strong potential for supporting environmental awareness and building resilience in coastal communities.
38. *Surface currents and coastal connectivity: Drifter-based insights for a Mid-Atlantic Bight offshore wind project*; **Meg Shah, Michael M. Whitney**; University of Connecticut, The Vineyard Wind project encountered 2 turbine blade failures in July 2024. Within days, blade debris washed up on nearby beaches in Martha's Vineyard, Nantucket, and coastal Massachusetts. These materials are potentially hazardous to coastal communities and wildlife and can impair beach use and coastal access. Assessing surface flow pathways within and surrounding Offshore Wind (OFW) project zones is essential in emergency tracking and material recovery after turbine breakage. OFW turbine installation is currently underway in the Cox Ledge leased area in Rhode Island Sound. Four to six custom-built, biodegradable surface drifters with SPOT Trace GPS tracking devices were deployed throughout the project area in September, October, February, and May (2024-2025) to characterize surface flow pathways, drifter dispersion, and residence times. Observational drifter tracks exhibit seasonal and/or event-based differences in path velocities, directions, and extent. Modeled drifter trajectories were simulated in LTRANS (Larval TRANSport)

v.2 model coupled with ROMS (Regional Ocean Modeling System) surface flow pathways connecting the leased area to local coastlines. Seasonal variability was evident, and results suggest that the initial response window within the wind farm is short (hours–days), while coastal cleanup response planning should assume debris arrival on week-long timescales. Both observed and modeled data can validate and refine debris retrieval models, such as NOAA Office of Response and Restoration spill model utilized in the Vineyard Wind incident.

39. *Developing a GIS data directory to support decision-making in Long Island Sound;* **Carlee Dunn, Karen Aerni, Peter Auster, Ivar Babb, Christian Conroy, James O'Donnell, Kaylan Randolph, Roman Zajac, Catherine M. Matassa**; University of Connecticut Avery Point, Decisionmakers require a range of scientific data to inform marine spatial planning. Often, the necessary datasets are collected and/or hosted by different institutions, each with its own data formatting, search functionality, visualization tool, etc. Using Long Island Sound (LIS) as a test case, we identified challenges decisionmakers and stakeholders face when using LIS data and ways to support the acquisition of such data. We found that the network of institutions providing different data types or decision support tools remained elusive to end-users and that not knowing "where to look" posed an obstacle for new data-users. To address these challenges, we developed a centralized, query-able directory of web-based data repositories, visualization tools, maps, and other spatial data relevant to LIS marine resources, emphasizing seafloor habitats. The "LIS Data Navigator" allows users to filter datasets across 50+ host websites and includes >1,000 GIS layers. Each dataset is labeled with metadata, including data format, host agency, and host website URL. Datasets are tagged with keywords to improve findability within the directory. Importantly, development of the LIS Data Navigator involved iterative feedback from end users. Hosted by the LIS Mapping and Research Collaborative (LISMaRC) and the University of Connecticut, the LIS Data Navigator will be regularly updated with new data and interpreted map products generated by the ongoing efforts of LISMaRC and others to better inform decision-making in LIS. Designed as a user-friendly tool for locating data, the LIS Data Navigator aims to support decisionmakers while offering a model for other coastal communities.
40. *Developing A Higher Education Aquaculture Pathway In Connecticut To Increase Aquaculture Workforce Development*; **Emma Cross, Alysa Mullen, Tessa Getchis**; Southern Connecticut State University, Connecticut's aquaculture industry includes cultivation of seaweed, shellfish, and finfish for food consumption, the production of ornamentals, salmonid hatcheries for recreational stock enhancement, as well as mitigation strategies to help combat climate change. To help support this growing

industry, workers who have post-secondary training and specialized skill sets are needed. Connecticut's Vocational Agricultural High School Programs are deeply invested in career and technical education as well as preparing students for competitiveness in post-secondary education. Those students who follow the aquaculture strand have the opportunity to learn hands-on aquaculture education in fully functioning fish production laboratories. Despite Connecticut having these impressive high school programs, there is a lack of post-secondary aquaculture education pathways offered and in turn students with this training are leaving to seek established pathways in other states. As part of a CT SeaGrant award, we discuss an aquaculture pathway being developed at Southern Connecticut State University (SCSU). This includes the state's first Early College Experience (ECE) courses in aquaculture that have been collaboratively developed by The Sound School and SCSU. These classes are being taught to senior high school students at The Sound School and to freshman and sophomores at SCSU. Through this initiative, high school students gain 8 college credits whilst at high school. The goal of this aquaculture pathway is to increase recruitment of highly skilled students from Connecticut's Vocational Agricultural High School Programs at a CT higher education institution to further prepare the next generation for a diverse, highly skilled aquaculture workforce.

Sustainable and Resilient Communities

41. *"We live here": Coastal Retreat and Policy Adaptation*; **Emmanuel Xon;** Southern Connecticut State University, Not all coastal policy contestation and failure come from engineering oversight. Even policies that are structurally feasible and sustainable are still contested due to the social negligence that arises from not factoring in the deep connections people have with their homes. When relocation policies are viewed purely through a risk lens, they overlook the social connectivity that ties communities to where they live, ultimately undoing those relationships in the process. This paper examines how sense-making processes, shaped by place attachment, historical experience, and perceived inequalities, influence how communities along Connecticut's Long Island Sound respond to retreat policies. Drawing on the case-based evidence from East Haven and Milford alongside peer-reviewed scholarship, the paper argues that repeated exposure to coastal hazards does not automatically produce acceptance of relocation. Instead, residents interpret retreat through deeply embedded meanings of home, identity, and trust in institutions, as shown by similar cases from Staten Island, New York, and Isle de Jean Charles, Louisiana. The study further explores how voluntary retreat policies

can reproduce inequalities, with wealthier residents retaining the capacity to adapt in place while economically vulnerable populations face greater pressure to relocate. Integrating Connecticut's case-study evidence with comparative insights from other U.S. coastal regions, this paper reframes retreat as a socially contested and politically negotiated process rather than a purely technical solution. The findings make the case for adaptation policies that engage community sense-making, address historical injustices, and prioritize equitable participation in decision-making along the Sound and beyond.

42. *Simulating Compound Flooding from Coastal and Pluvial Processes in New Haven, CT, using Super-Fast INundation of CoastS (SFINCS)*; **Leah Topping, Liv Herdman, Salme Cook;** U.S. Geological Survey, Coastal communities face significant threat due to flooding caused by the compounding of pluvial, fluvial, soil moisture, and coastal processes. It is challenging to predict compound flooding extents because of the spatial and temporal variability in these processes. Flood information including extent and depth can help to inform these communities on how to prepare and mitigate flooding. Predicting flood inundation using processed based models can present clear and concise information to communities who face these compound flood challenges. For this study we use Super-Fast INundation of CoastS (SFINCS), to simulate compound flooding in the city of New Haven, Connecticut. First, we simulated the effects of post-tropical cyclone Sandy over a 12 day period (October 24 - November 5, 2012). Model results were compared to 21 high water marks to show where the model represents water depth well and provide context for where the model can be improved (U.S. Geological Survey, 2012). Sandy showed promising results (RMSE: 0.47 m, MBE: -0.01). Second, we use a series of scenarios to evaluate flood drivers separately with univariate scenarios and then together with a set of compound scenarios. The univariate and compound scenarios were simulated with 0.1, 0.04, and 0.01 annual exceedance probability events (rainfall and storm surge) with varying antecedent soil moisture conditions to determine the areas most susceptible to flooding. Results show that while the compounding of rainfall and surge can affect the communities along the coastline, the dominant compound flood drivers were the effects of soil moisture and rainfall.

43. *Evaluating Flood Extent in Long Island Tidal Marsh Using the HYDRAFloods Tool, SAR, and Ocean-Color Instruments*; **Britnay Beaudry, Dr. Joshua Herringmeyer, Dr. Brian Lamb, Dr. Maria Tzortziou;** CUNY City College, Tidal salt marshes along Long Island Sound provide critical ecosystem services including flood attenuation, habitat protection, and water quality improvement, yet these systems face increasing threats from sea level rise and intensifying storm conditions. Accurate flood extent mapping is essential for resilience planning and resource management,

but monitoring inundation in vegetated tidal marshes remains challenging due to complex interactions between shallow water, dense vegetation, and changing tidal conditions. This research evaluates multiple satellite-based flood extent methods at Wheeler Marsh in Milford, Connecticut, using the HYDRAFloods tool created by NASA's SERVIR-Mekong program to process Sentinel-1 SAR, Sentinel-2, and Landsat imagery through Google Earth Engine. Results were validated against 10 in-situ HOBO tidal gauges across a four-month tidal cycle and compared to a DEM-based bathtub inundation model. Results indicate that satellite water extent products generally outperform the bathtub model across multiple sensor types. Common classification errors follow physical patterns tied to marsh elevation and tidal stage, with shallow inundation beneath emergent vegetation posing the greatest detection challenge. These findings provide practical guidance for flood monitoring in tidal marshes surrounding Long Island Sound, and demonstrate how accessible, multi-sensor satellite tools can support community resilience planning by improving the spatial and temporal characterization of coastal flood hazards.

44. *Patterns in Emergent and Epifauna Distribution in Long Island Sound's Central Basin;* **Faith Chepchirchir, Chris Conroy, Catherine Matassa, Roman Zajac, Ivar Babb, Peter Auster, Kate Randolph**; University of New Haven, While the benthic communities of Long Island Sound's Central Basin have been the subject of multiple types of sampling surveys for decades, recent changes in dominant seafloor taxa documented in the Eastern Sound and around Stratford Shoal provide evidence of broad changes in these communities. In Summer 2023, sampling operations were conducted in a ~280km2 area with the goal of characterizing these benthic communities in support of the Long Island Sound Seafloor Habitat Mapping Initiative (LISSHMI). Orthogonal images of the seafloor were collected during 65 seafloor transects using the U.S. Geological Survey's SEABOSS sampling platform. Transects were plotted on multibeam bathymetry and backscatter to ensure representative sampling of available depths and substrates. Organisms in the images were identified to the lowest possible taxa and quantified as percent cover. Benthic communities were characterized using multivariate approaches, and community composition and spatial distributions were linked to variation of physical features across the landscape. For example, Atlantic slipper snail *Crepidula fornicata* were densely aggregated throughout fine sediment habitats at the sites located closest to New Haven Harbor, reflecting recent changes in epifaunal taxa observed throughout Central and Eastern LIS based on past surveys.
45. Places *to Sea: An investigation of coastal access and community resilience*; **Alyssa Pfitzer Price, Harrison Bohrer, Giovanna McClenachan, David Taylor, Mary Collins, Melissa Finucane**; Stony Brook University, Natural coastal areas are

dynamic sites providing myriad ecosystem and social services which mitigate climate change impacts. Despite their importance, nearshore nature like salt marshes, coastal forests, and beaches are increasingly threatened directly by human development and indirectly by rising sea levels or storms. Studies focusing on disaster resilience have shown that we tend to monitor, protect, and restore natural sites that we feel connected to. In order to conserve and restore these coastal places, we must better understand how community access and use impacts connection to these areas. This project assesses the intersections of public infrastructure and community attachment to nearshore sites of Long Island, New York. We hypothesize that natural coastal places with positive public infrastructure, like public transportation access and free restrooms, may enhance use and exposure to blue space, thus strengthening emotional value and promoting protection of these places. These physical and intangible factors may contribute to the resilience of natural places themselves and nearby human populations. In order to investigate these connections, we are conducting an anonymous, opportunistic survey at Stony Brook University on the ArcGIS Survey123 platform to collect information on people's favorite natural coastal places. We characterize these "favorite places" through physical amenities present, common activities completed, frequency of visits, commuting options, associated financial costs, and feelings of connection to nature. This comprehensive assessment will aid in natural coastal habitat protection by fostering a balance between human and ecological needs.

46. *Sediment addition to submerging marshes: Flooding frequency controls generation of acid sulfate soils in salt marsh sediment*; **Rachel Biton, Graham Bornhorst, Sage Ganshirt, Chris S. Elphick, Min T. Huang, Jacob Isleib, Beth A. Lawrence, Itamar Shabtai, Blaire Steven, and Ashley M. Helton**; University of Connecticut, Sediment addition to salt marsh surfaces is an increasingly popular management strategy to increase elevation and coastal resilience in the face of accelerated sea-level. However, dredged materials are often potential acid sulfate soils (PASS), which under oxidizing conditions can produce sulfuric acid and inhibit vegetation recovery. To enhance restoration outcomes associated with sediment addition, we set up an experiment to determine hydrological conditions and specific soil characteristics (texture and chemistry) that can lead to acidification. In our experiments, we collected soils previously identified as PASS (12 marsh surface and 11 subaqueous soils). Soils were exposed to three hydrologic treatments that mimic low to high marsh tidal flooding regimes (daily, weekly, and biweekly flooding) with three replicates of each (n = 201 experimental units) and soil pH was measured weekly for 12 weeks. Daily flooding treatments suppressed generation of acidity

(mean final pH 7.31±0.49), relative to weekly (5.07±1.31) and biweekly (4.85±1.16) flooding. Only four marsh and three subaqueous soils under the biweekly treatment decreased to a final pH of ≤5.5 by week 12, even though all had been previously identified as PASS. Soils that became acidic spanned a wide range of textures and classifications, ranging from 3-26% organic matter, 0.07–1.15 g/cm^3 bulk density, and 9.6-85.7% sand. Our findings suggest that sediment additions are most likely to become active acid sulfate soils in more infrequently flooded environments, such as when the goal is to create high- marsh habitats, and can occur across a diverse group of soil characteristics.

47. *High-resolution compound flood modeling and mapping framework for Long Island Sound*; **Chris Lashley, Shima Kasaei, Gwen Macdonald**; Stantec, Coastal communities are increasingly exposed to both coastal (storm surge, tides) and pluvial (rainfall-driven) flooding due to climate change and ongoing urbanization. While these drivers are often considered independently, their interaction can lead to compound flooding, where nonlinear processes such as backwater effects and limited drainage capacity amplify flood impacts beyond the contribution of individual drivers. Despite growing recognition of this risk, compound flooding remains underrepresented in operational flood mapping and planning frameworks. This study presents a preliminary investigation of compound flooding across the Long Island Sound (LIS) region using a high-resolution, physics-based modeling framework. The Delft3D, XBeach, and Super-Fast INundation of CoastS (SFINCS) models are coupled to simulate the combined effects of coastal water levels and rainfall-driven runoff under present-day and potential future conditions. The framework is designed to evaluate how coincident drivers influence flood extent, depth, and dynamics at neighborhood-scale resolution.
   Building on this modeling and mapping effort, the project envisions the development of an interactive, web-based compound FLOod Mapping And Prediction (cFLOMAP) tool to facilitate access to spatial flood information and scenario-based exploration by planners, engineers, and floodplain/stormwater managers. While still in an early stage, this work aims to contribute to a better understanding of compound flood processes in urban estuarine environments and to support more integrated approaches to flood risk assessment and resilience planning across the LIS region.
48. *Embodied Coastal Blue Spaces: Sensorimotor Engagement and Affect;* **Jefferson A. Ikediuba, Professor Bryce DuBois**; University of New Haven, This proposed study advances a multilevel, socio-psychological framework for understanding how coastal blue spaces influence psychological wellbeing, with particular attention to embodied engagement, social meaning, and structural inequality. While existing

scholarship establishes a broad consensus regarding the mental health benefits of blue spaces, significant gaps remain in explaining how these benefits are mediated by lived experience, contextual perception, and differential access. This research addresses these gaps by integrating spatial analytics with psychometric and behavioral data to produce a more nuanced account of human–environment interaction. Focusing on coastal communities in New Haven County, Connecticut, the study will employ a mixed-methods-informed quantitative design combining GIS-derived exposure metrics—such as proximity, accessibility, and visibility—with survey-based measures of wellbeing, engagement patterns, and perceived environmental quality. The research will test three central propositions: that patterns of coastal engagement mediate wellbeing outcomes; that socially constructed meanings of coastal spaces moderate these relationships; and that structural inequalities shape the distribution and magnitude of benefits. By foregrounding sensorimotor interaction and affective experience alongside spatial and socioeconomic variables, this project seeks to move beyond reductive exposure models toward a more integrative understanding of blue space wellbeing effects. The anticipated contribution lies in refining conceptual and methodological approaches within environmental health research while generating policy-relevant insights for equitable coastal planning and public health interventions.

49. *Monitoring Salt Marsh Resilience: Sub-Pixel Vegetation Composition Mapping in Long Island Sound Salt Marshes Using Dense Landsat Time Series*; **Ashley Grinstead, Beth Lawrence, Chris Elphick, Ashley Helton, Xiucheng Yang, Shi Qiu, Zhe Zhu**;University of Connecticut, Tidal marshes face escalating press and pulse disturbances, yet methods to continuously monitor marsh resilience remain limited. Vegetation indices like NDVI can capture shifts in marsh conditions (i.e., degradation and recovery), but not changes in marsh structure (i.e., species composition). Understanding which plant communities occupy a marsh and how they are arranged is critical for measuring resilience. This study develops a spectral-temporal unmixing framework, leveraging harmonic regression coefficients from the DECODER (DEtection and Characterization Of the tidal wEtland and Recovery) algorithm and dense Landsat time series(1985-2024) across the Long Island Sound (LIS) coastline to estimate annual fractional cover of six classes at 30m resolution: high marsh, low marsh, Phragmites australis, water, barren, and other vegetation. Pure pixel endmembers are selected from field data underlying a 3m coastal vegetation cover map, NOAA C-CAP, and annual NLCD land cover classes, rasterized to 30x30m pixels, and identified at ≥75% class cover. DECODER coefficients, representing spectral and temporal information across Landsat spectral bands and their derived vegetation indices, are extracted for the stable

endmember pixels, synthetically mixed for calibration, and used to train and test four unmixing models: fully constrained linear spectral unmixing, support vector regression (SVR), random forest, and XGBoost. Fractional cover predictions were generated across the LIS coastline using the best performing model, SVR. This subpixel fractional cover product forms the foundation for a Marsh Resilience Index that will track vegetation composition trajectories through time and evaluate the structural response of LIS marshes to disturbances such as restoration, hydrologic alteration, and hurricanes.

50. *Upper thermal regimes and quiescence in the temperate coral Astrangia poculata;* **Alina Tran, Sean P. Grace**; Southern Connecticut State University, While the effects of climate change on tropical corals is well documented, less is known about how temperate corals like Astrangia poculata respond to thermal stress. This species is known to experience a dormancy when winter temperatures stay below 5°C. In contrast, some temperate coral species in the Mediterranean experience a dormancy in response to warmer summer water temperatures where their tentacles no longer respond to stimuli. This study investigates how tentacle behavior in A. poculata changes under varying thermal conditions to better understand the coral's response to elevated temperatures and address whether it experiences a warm water dormancy as well. Colonies of A. poculata were collected from Rhode Island and exposed in the lab to a range of higher temperatures (18-19°C [control], 23°C, 26°C, and 30°C) based on historical and projected regional trends. Tentacle activity was observed and recorded every 10 minutes for 1 hour following daily feedings over the course of 6 days and responsiveness was tested using a probe. The same procedure was repeated to observe tentacle behavior and response as temperatures decrease and stay at the control temperature. To account for any potential day-night (circadian) rhythm patterns, 24-hour video recordings were collected to assess whether tentacle behavior follows a pattern which may influence responsiveness. Data was analyzed to assess the relationship between temperature and tentacle behavior. Findings will clarify how rising temperature influence tentacle behavior in A. poculata and will provide important insight into the thermal tolerance and resilience of temperate corals in warming conditions.

Thriving Habitats and Abundant Wildlife

51. *Can we use remote sensing to improve our understanding of tidal flooding risk in coastal marshes?*; **Emily Feng, Emily Winslow, Maya Ray, Zhe Zhu, Chris Elphick;** University of Connecticut, Coastal marshes of Long Island Sound are receding

under rising sea levels. Conservation managers need detailed information on where tidal flooding is increasing to protect these habitats, and the coastal wildlife and communities that depend on them. Managers often rely on estimates of tidal flooding from tide gauges, but with only five long-term monitoring stations in the Sound, managers in this region are constrained by spatially imprecise information. Remotely sensed data provide more spatial detail on tidal marsh flooding, but it is not yet known how well they scale across marshes with different vegetation and tidal regimes. We are developing a study to test whether remotely sensed data can be used to map flood patterns and their historical trends within tidal marshes of Long Island Sound. These maps would help identify priority areas of habitat where tidal flooding is increasing the most. First, we are building a model that uses remotely sensed elevation, vegetation characteristics, and flooding frequencies to explain spatial variation in flood patterns within marshes of Long Island Sound. To maximize our predictive accuracy, we are training and evaluating this model using flood pattern data collected in the field at over 200 locations across 44 marshes in the northeastern USA. We will then use this model to map annual flooding patterns across tidal marshes in the Sound. We report our preliminary methods and findings and discuss the implications of this research for conservation planning in the Sound.

52. *Investigating how tidal restoration and Phragmites management affect carbon stocks in Long Island Sound salt marshes*; **Evelyn Hall, Nicolette Nelson, Chris S. Elphick, Molly McCann, Ashley M. Helton, Beth Lawrence**; University of Connecticut, Salt marshes are carbon-dense ecosystems with a long history of anthropogenic disturbance, including ditching, invasive species, and tidal restriction, which can alter hydrology and organic matter dynamics. While restoration efforts to reverse these effects have increased in the last 50 years, we lack an understanding of how different interventions affect salt marsh carbon stocks. The two most common restoration techniques in Long Island Sound are tidal restoration and direct Phragmites australis control. We hypothesize that Phragmites control will reduce carbon stocks, as this species has high sequestration rates, and that tidal restoration will increase carbon stocks, as increased inundation slows decomposition of organic matter. Further, we hypothesize that ditching density at different scales will alter salt marsh carbon stocks. We are using a chrono-sequence approach to test these hypotheses across 46 salt marshes (16 unrestored references, 15 Phragmites control sites, 15 tidal restorations) along the LIS coastline. We stratified restored sites by time since restoration to investigate how long carbon stock recovery may take. At each site, we are quantifying sediment depths and taking cores to estimate soil bulk density and carbon content, allowing

for approximation of carbon stocks to full soil depth, which typically has been limited to the top meter or less. We will compare our carbon stock estimates to regional estimates (e.g., NRCS, NROC) to investigate how accounting for depth affects stock estimates. Our findings can inform salt marsh management by clarifying how common restoration techniques affect carbon stocks in Long Island Sound's coastal wetlands.

53. *Using hydrologic- and population dynamic-modeling to forecast impacts of droughts and land development on river herring populations: Year 1 Results*; **James Knighton, Matt Sobota, Griffin Noak, Adrian Jordaan, Reese Dorroh, Kevin Job, Katherine Helmer, Eric Schultz;** University of Connecticut, Alewife populations along the CT coastline rely on stable water connections between freshwater spawning ponds and the marine ecosystem. The juvenile rearing period for alewife overlaps with the seasonality of drought and the loss of flow in coastal tributaries. Our research investigates how drought and land cover impact the outmigration potential of juvenile alewife leading to effects on yearclass strength. We specifically are investigating how alewife populations exposed to drought and non-drought conditions contribute to the overall adult population. This research presents preliminary findings from the first year of a 2 year project. During our first year of field data collection, we observed a substantial drought spanning approximately 6 months that resulted in a prolonged period where juvenile alewives were not capable of emigrating. We present a suite of hydrologic, water chemistry and biological data with some preliminary conclusions on the impact of drought on a coastal alewife population in the summer of 2025.
54. *The utility of continuous imaging of microscopic particles in deepening our understanding of phytoplankton in Long Island Sound;* **Zofia Baumann, Kaylan Randolph, Nicholas Beckles, Hazel Levine, Kristine Prelich;** Department of Marine Sciences, University of Connecticut, Phytoplankton are the foundation of Long Island Sound ecosystem: producing oxygen, removing excess nutrients and feeding the primary consumers. Among other factors, temperature, nutrients, and light availability shape the phytoplankton community. While our understanding of phytoplankton patterns has increased over the last decades, supported through a monitoring program led by CT DEEP and UCONN scientists, the monthly or biweekly sampling, generates a coarse timeline. Microscopy-based sample assessment by an expert taxonomist is time intensive and limits data output. Recent technological developments have delivered imaging instrumentation that increase the temporal resolution for phytoplankton and enrich the taxonomic data with additional information on the size composition of the phytoplanktonic community. Images of fluorescing cells captured in seawater sampled every 25 minutes by the Imaging

Flow Cytobot are processed using automated routines to estimate cell diameter, surface area, biovolume, and biomass for each cell. Thus, cell counts are automatically generated and can be further classified according to these metrics. Long term high-resolution data series on size distribution is critical for understanding the ecological shifts within the phytoplankton assemblage, the impacts on their consumers, and other functions of the Sound, including nutrient, pollutants and oxygen regulation. We describe that while the promise of imaging instruments and automated data processing routines is immense, their limitations must be well understood and accounted for to allow for the delivery of accurate metrics, including cell concentrations and biomass for the full-size spectrum of cells present in Long Island Sound.

55. *A Database Documenting Saltmarsh Restoration History in the Long Island Sound Region*; **Molly McCann, Nicolette Nelson, Evelyn Hall, Beth Lawrence, Ashley Helton, Chris Elphick**; University of Connecticut, Saltmarsh restoration techniques have been employed in the Long Island Sound region for decades to alter and improve coastal wetland conditions. Restoration history continues to shape the saltmarsh environment today due to past interventions such as hydrology modification, marsh surface reconstruction, and invasive plant management. Restoration interventions are likely to impact long-term ecological outcomes and future marsh resilience. While many restoration projects have been documented since the 1950s, a comprehensive record of saltmarsh management history in the region has not yet been created. We aim to better understand the history of saltmarsh restoration in the Long Island Sound area through the compilation of information about all known projects into a single database. The database includes specific details on each project, categorizes the restoration techniques used, and provides critical temporal and spatial context. The information will be used to analyze the effects of historical management on the resilience of plant communities, avifauna, and soil carbon and nitrogen microbial processes.
56. *More Than a Grain of Salt: Re-assessing Floristic diversity in an overlooked Westchester County Salt Marsh*; **Julie D'Onofrio**; Lehman College, An ongoing floristic survey of Marshlands Conservancy, the largest remaining salt marsh complex in Westchester County, has completed its first year of fieldwork. The goals are to document its vascular plant diversity and assess its conservation significance given the urgency of the habitat, which will be lost due to rising ocean levels associated with climate change. The survey includes rocky shorelines, maritime shrublands, brackish transition zones, and high and low salt marsh habitats. This study reveals a richer assemblage of vascular plants than previously recorded, including state-listed taxa considered critically imperiled, imperiled, rare and

uncommon in New York. Several taxa represent first reports for Westchester County, highlighting substantial gaps in previous documentation, illustrating that it has been historically under surveyed despite its ecological importance. Herbarium voucher specimens are being collected that include habitat, abundance, and associated vegetation data for institutional herbaria to ensure long-term documentation of the site. Moreover, this study establishes an important baseline for future monitoring and habitat management and allows contrast with other nearby salt marshes. Work such as this shows the need to continue surveying even well-known sites by highlighting the persistence and resilience of rare plants in suburban regions.

57. *Impacts of Seaweed Aquaculture on Water Quality and Zooplankton Abundance and Diversity in Guilford, Connecticut*; **Kaitlin Wagner, Jon McGee, Dr. Emma Cross;** Southern Connecticut State University, Seaweed aquaculture is rapidly expanding in the Northeast of the United States as a potential solution to improve coastal sustainability. Sugar kelp can remove nitrogen and phosphorus from water, which may help to improve local water quality in coastal systems by reducing eutrophication. Sugar kelp farms can also provide habitat for marine species providing support for increased biodiversity. This has the potential to provide economic benefits through seafood production and job opportunities for coastal communities. As sugar kelp farming expands across New England, it is important to study its potential effects on marine biodiversity and water quality in estuarine environments. This study investigated the effects of sugar kelp aquaculture on zooplankton abundance and diversity, and water quality off the coast of Guilford in Long Island Sound, USA. Biodiversity will be measured through zooplankton tows, while water quality will be measured through multi-parameter probes. Zooplankton tows were conducted monthly at New England Sea Farms two-acre sugar kelp farm and at the reference site with no aquaculture activity located 100m away from the farm site from October 2024 through September 2025. Water quality parameters were measured through continuous unattended multi-probes at the sugar kelp farm and reference site. The preliminary data analysis suggests the zooplankton diversity was generally higher at the seaweed farm than the reference site, while the water quality parameters followed typical seasonal trends observed in Long Island Sound, USA. This research will help the expansion of sugar kelp aquaculture in New England's coastal waters by informing evidence-based management strategies.
58. *Creating a ranked list of salt marsh elevation change drivers to support restoration and management in Long Island Sound*; **Nicole E. Woosley (presenter), Sarah C. Crosby, Giovanna McClenachan, Therese Apuzzo, Marisa Fajardo, Jared Kannel, GraceAnne Piselli, Nesy Oja, Rebha Raviraj, Domenic Romanello, Danielle Schwartz, Justin P. Susarchick, Abigail S. Tripler**; The Maritime Aquarium at

Norwalk, Salt marshes are an important coastal ecosystem in Long Island Sound, increasingly threatened by shoreline development and climate change, specifically sea level rise. Marshes in this region rely on sediment accretion to gain elevation equal to or greater than relative sea level, as there is minimal space for upland migration due to coastal development. Surface elevation tables (SETs) are used to measure elevation gain at a fixed point in salt marshes. These SETs are monitored by governmental agencies, non-profits, and academic institutions. Because these institutions have unique research objectives and do not always coordinate their efforts, there is a lack of data synthesis on a regional scale. By consulting with SET monitoring scientists in CT and NY, we bridge the gaps to evaluate marsh elevation gain and loss in Long Island Sound. We aggregate 10 long-term datasets from 10 marshes and conduct field sampling to measure above and belowground biomass, decomposition rates, submergence frequency, sediment grain size, soil compaction, and shear strength as these factors contribute to the accretion or subsidence of marshes. Field data will be paired with digital elevation models and vegetation classification maps created from aerial imagery captured in 2025 to gain a greater understanding of elevation change. We expect to use the findings of this study to provide a ranked list of elevation change drivers to site managers and restoration practitioners at each of the 10 study sites. This list will provide actionable guidance, allowing for the implementation of tailored planning and management techniques.

59. *Combining long-term datasets, remote sensing techniques, and field sampling to advance salt marsh restoration and management in Long Island Sound;* **Therese Apuzzo, Giovanna McClenachan, Sarah Crosby, Nicole Woosley**; Stony Brook University, Salt marshes are valuable intertidal wetlands that aid in flood protection, carbon sequestration, habitat for important fisheries, and water filtration. Salt marshes rely on sediment accretion to maintain their elevation in the tidal frame. Their ability to accrete is currently threatened by sea level rise and coastal development. Here, we present an ongoing study analyzing the accretion and subsidence of 11 marshes in the Long Island Sound. Each of these marshes are fitted with surface elevation tables (SETs), long-term datasets of elevation change with over seven years of data. We aggregated landscape variables for use with the SET data to quantify which factors are contributing most to elevation change in these marshes. We are creating vegetation classification maps of each marsh from multispectral imagery collected via unmanned aerial vehicle and satellite in the summer of 2025. We are analyzing these vegetation maps with the addition of digital elevation models, land change estimates, nutrient loads, and suspended sediment concentrations. This data will be combined with field measurements taken from

these same sites to provide land managers with site-specific guidelines and a ranked list of drivers of marsh accretion or subsidence. In addition, this data can be used for broader analysis of salt marsh health in the Long Island Sound.