



THE SALZBERG CHEMISTRY SEMINAR SERIES



The City College
of New York



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Valorization of Algal Biomass for Sustainable Energy, Environmental Remediation, and Sensing Technologies

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Abstract: Algal biomass offers a versatile and renewable platform for addressing critical challenges in sustainable energy production, environmental remediation, and contaminant detection. This presentation outlines an integrated research framework that explores the transformation of macroalgae and algal byproducts into functional materials through innovative green chemistry and environmental nanotechnology approaches. Key advances include the use of hydrothermal liquefaction (HTL) to convert macroalgae and plastic waste into bio-oil, with emphasis on catalyst development, reaction optimization, and energy recovery efficiency. Residual algal biomass is further utilized in the development of solid electrolytes and fuel cell membranes, leveraging algae-derived biopolymers for next-generation battery technologies. Additionally, the design and synthesis of functional nanomaterials, including graphene-based and magnetic nanohybrids—are presented for their application in heavy metal remediation from contaminated soils. Together, these efforts underscore the potential of algae as a low-carbon, circular bioresource for high-value applications.

Biography: Dr. Liz M. Díaz-Vázquez is a Full Professor and Chair of the Department of Chemistry at the University of Puerto Rico, Río Piedras Campus, and the 2025 President-Elect of the American Chemical Society Puerto Rico Section. She earned her B.Sc. in Chemistry in 2000 and her Ph.D. in Analytical Chemistry in 2005, both from UPR-Río Piedras. Dr. Díaz-Vázquez's research focuses on the detection and mitigation of emerging contaminants, as well as the sustainable development of nanomaterials derived from algae biomass and plastic waste. Her interdisciplinary projects include the fabrication of portable sensors for PFAS and microplastics, the study of nanomaterial interactions in marine systems, and the transformation of biomass into functional materials for energy storage, biomedical devices, and environmental remediation.

She serves as Director of the NSF-CREST Center for Innovation, Research, and Education in Environmental Nanotechnology (CIRE2N); Principal Investigator of the CAHREUS Resource Center; Co-Director of PR-SPRInT, a NASA-aligned workforce development program; and Education and Outreach Coordinator for the Center for the Advancement of Wearable Technology (CAWT). She also co-directs the UPR Climate Resilience and Climate Change Center (UPR-CRCC) and leads the UPR-RP component of the Vieques Environment Health and Community Action (VASAC) project. A passionate advocate for equity and representation in STEM, Dr. Díaz-Vázquez is the founder of the initiative *Empowering the Next Generation of Latinas in STEM* and plays an active role in the ACS Puerto Rico Section Women Chemists Committee, where she continues to mentor and inspire future generations of scientists across Puerto Rico and beyond.

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