UNIVERSITY OF DELAWARE

DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

Arnold D. Kerr Lecture

in Engineering Mechanics and Design

DR. ARNOLD D. KERR

The Kerr Lecture Series honors Dr. Arnold D. Kerr, Professor Emeritus of Civil Engineering at the University of Delaware. The series brings distinguished scientists and engineers to the University of Delaware each year to speak on topics in engineering mechanics and design. An endowment established in Kerr's name upon his retirement in 2004 provides funds for the lectureship.

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UNIVERSITY OF DELAWARE ENGINEERING

ARNOLD D. KERR LECTURE

MATERIAL INNOVATION THROUGH ENVIRONMENTAL DESIGN

Desirée Plata, PhD

School of Engineering Distinguished Professor of Climate and Energy

Civil and Environmental Engineering

Massachusetts Institute of Technology (MIT)

NOVEMBER 10, 2025

3:00 P.M. LECTURE | TRABANT THEATRE
RECEPTION IMMEDIATELY FOLLOWING IN TRABANT MULTIPURPOSE ROOM A

ABSTRACT

Chemical and material innovation has long occurred with a focus on cost and functional performance, where incorporation of environmental objectives in the design process has been very limited. This can lead to undesirable environmental outcomes and high burdens of cost to remediate the environment and redesign the commercial material or process. As machine-enhanced chemical design and experimentation accelerates the rate of novel material production, environmental engineers and their optimization schemes are further challenged to keep pace. This talk will emphasize the role of high throughput discovery, where computation can and cannot support sustainable design, and experimental systems to accelerate the collection of intercomparable data in the physical sciences via two vignettes: (1) polymer fate in natural systems and (2) methane emissions mitigation using natural materials and green chemistry. Ultimately, the mission of the work seeks to change the way we invent materials and processes, such that environmental performance is considered, contributes to reduced long-term cost, and enhances innovation to meet challenges at the global scale.

BIOGRAPHY

Desirée Plata's research seeks to maximize technology's benefit to society while minimizing environmental impacts in industrially important practices through the use of geochemical tools and chemical mechanistic insights. Plata earned her doctoral degree in Chemical Oceanography and Environmental Chemistry from the Massachusetts Institute of Technology and the Woods Hole Oceanographic Institution's Joint Program in Oceanography (2009) and her bachelor's degree in Chemistry from Union College in Schenectady, NY (2003). Plata is an NSF CAREER Awardee (2016), an Odebrecht-Braskem Sustainable Innovation Awardee (2015), a two-time National Academy of Engineers Frontiers of Engineering Fellow (2012, 2020), a two-time National Academy of Sciences Kavli Frontiers of Science Fellow (2011, 2013), a Caltech Resnick Sustainability Fellow (2017), and winner of MIT's Junior Bose Teaching Award (2019), Edgerton Faculty Achievement Award (2021), and Perkins Graduate Advising Award (2021). Having previously served as John J. Lee Assistant Professor of Chemical and Environmental Engineering at Yale University and Associate Director for Research at the Center for Green Chemistry and Green Engineering at Yale, Plata is now Professor of Civil and Environmental Engineering at MIT, Director of the MIT Climate and Sustainability Consortium, Director of the Parsons Laboratory for Environmental Science, and co-director of the MIT Superfund Research Program. Plata directs MIT's Methane Network, serves on the Scientific Advisory Board of Spark Climate, and served on the National Academy of Science Engineering and Medicine's Atmospheric Methane Removal study (recused). Plata is co-founder of Nth Cycle (nthcycle.com), co-founder and President of Sustainable Chemical Resource Advisors LLC, and co-founder and President of Moxair Inc.