

University of Mississippi

Nano-Bio and Immunoengineering Consortium (NIEC) Seminar

June 7, 2022 @ 3 PM

Virtual: <https://olemiss.zoom.us/j/93331383402>



Transforming Disease Management with Engineered Nanoparticles



Emily Day, PhD

Associate Professor of Biomedical Engineering
University of Delaware

Dr. Emily Day obtained her B.S. in Physics with a Minor in Mathematics from the University of Oklahoma in 2006, graduating *summa cum laude*. She then moved to Rice University to pursue a Ph.D. in Bioengineering under the guidance of Dr. Jennifer West. There, she developed nanoparticle-mediated photothermal therapy to treat glioblastoma, a lethal form of primary brain tumor. During her time at Rice University, Dr. Day received a National Science Foundation Graduate Research Fellowship, a Rice President's Graduate Fellowship, and was also named a Howard Hughes Medical Institute Med-Into-Grad Fellow. Upon completing her Ph.D. in 2011, Dr. Day joined the laboratory of Dr. Chad Mirkin at Northwestern University, where she developed RNA-gold nanoparticle conjugates known as spherical nucleic acids to treat glioblastoma through gene regulation. Dr. Day received an International Institute for Nanotechnology postdoctoral fellowship and a National Institutes of Health F32 Ruth L. Kirschstein National Research Service Award during her time at Northwestern University.

Dr. Day joined the faculty in the Department of Biomedical Engineering at the University of Delaware in 2013, and was promoted to Associate Professor in 2020. Her research builds upon the theme of engineering nanoparticles for high precision therapy of disease developed during her graduate and postdoctoral work. She has received several notable grants and awards for her independent research, including the 2018 Rita Schaffer Award from the Biomedical Engineering Society, an NSF CAREER Award, Young Innovator/Emerging Investigator awards from three journals (Cellular and Molecular Bioengineering Journal, Nano Research Journal, and Journal of Materials Chemistry B), the 2018 Gerard J. Mangone Young Scholar Award from the Francis Alison Society, an NIH R35 Grant, an NIH R01 Grant, and a W.M. Keck Foundation Science and Engineering Grant. Additionally, she was an invited participant in the 2019 National Academy of Engineering Frontiers of Engineering Symposium and in 2022 was named a Fellow of the American Institute for Medical and Biological Engineering.

Abstract:

The Day Lab engineers nanoparticles to enable high precision treatment of cancers, blood disorders, and maternal/fetal health conditions and elucidates how nanoparticle architecture impacts function by studying nano/bio interactions from the subcellular to whole organism level. Our nanoparticles enable high precision therapy by: (1) delivering antagonistic antibodies or nucleic acids to cells to inhibit genes that drive disease progression, (2) supplying heat or other agents to diseased cells upon activation with tissue-penetrating near-infrared light, or (3) using cell-derived membranes as coatings to avoid immune recognition and provide cell-specific payload delivery. In this presentation, I will discuss my group's recent advances in these areas. Collectively, our studies have shown that nanoscale architecture plays a critical role in how cells perceive and respond to therapeutic nanomaterials, informing the future development of improved treatment strategies.

Sponsored by the Department of Biomedical Engineering and Interdisciplinary Research at the University of Mississippi (IDRUM)