



UNIVERSITY OF DELAWARE

ENGINEERING

DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING



SEMINAR SERIES

OCTOBER 7, 2022

LYDIA CONTRERAS

THE UNIVERSITY OF TEXAS AT AUSTIN

Professor, Jim and Barbara Miller Faculty Fellow

Attend virtually: <https://udel.zoom.us/j/91314568641>

NOVEL INSIGHTS INTO BUILT-IN RNA SENSORY NETWORKS

Bacterial regulatory RNAs enable dynamic responses to stresses caused by changes in environmental conditions. These global regulators enable responses to diverse and rapidly changing environmental stimuli by affecting vast networks of targets at, frequently, multiple biological levels. Given their relevance to pathogenesis and their potential to manage global regulatory networks that affect biological production of industrially relevant compounds, understanding their functions is a goal in both medicine and metabolic engineering. Given the importance of molecular structural arrangements to RNA functioning, fundamental characterization of native RNA networks depend heavily on the understanding and design of their specific shapes and on the retargeting of specific binding partners. Specifically, knowledge of the RNA structural landscape supports identification of interfaces relevant to regulation. In this talk, we will describe our recent advances in developing high throughput approaches that allow for the simultaneous *in vivo* characterization of thousands of potential interacting interfaces in RNA molecules. We will describe how RNA structural insights obtained from this synthetic probing approach can be used in the basic characterization of newly discovered RNAs and in the discovery of novel RNA mechanisms. The talk will also highlight our use of these methods in conjunction with new biophysical model and machine learning approaches for expanding our understanding of sRNA-regulation in bacteria.

ABOUT THE SPEAKER

Dr. Lydia M. Contreras is a Professor (and Jim and Barbara Miller Faculty Fellow) of Chemical Engineering at the University of Texas-Austin; she is also a member of the Institute of Cell and Molecular Biology. She teaches Introduction to Chemical Engineering Computing, Thermodynamics, Introduction to Chemical Engineering Analysis, and Fundamental and Applications of Cellular Regulation. Dr. Contreras obtained a B.S.E. in Chemical Engineering from Princeton University in 2003, where she graduated Cum Laude. She completed her PhD in Chemical Engineering from Cornell University in 2008, focusing on engineering bacterial cells for improved production of therapeutic proteins. As a postdoctoral associate at the Wadsworth Center (New York State Department of Health), she focused on understanding mechanisms of infection in pathogenic bacteria. She began her career at the University of Texas-Austin in 2011, where she leads a research team focused on RNA biochemistry to study gene regulation mechanisms associated with stress-responses for applications in health and biotechnology. She has received several academic, teaching and service awards including: an NSF CAREER, ACS BIOT Young Investigator Award, American Institute of Chemical Engineers (AIChE) Food, Pharmaceutical and Bioengineering Division Early Career Award Biotechnology and Bioengineering Daniel I.C. Wang Award, Department of Thrust Reduction Agency (DTRA) Young Investigator, Airforce Office of Scientific Research Young Investigator, Health and Environmental Institute (HEI) Walter E. Rosenblith New Investigator, Norman Hackerman Advanced Research Program (NHARP) Early Career, Society of Hispanic Professional Engineers (SHPE) Young Investigator Award, and an Innovative Early-Career Frontiers of Engineering Educator. She lives in Austin, Tx and is a proud mom to 5 year old twins.