In celebration of

**NATIONAL CHEMISTRY WEEK**

 **THE HUDSON-BERGEN CHEMICAL SOCIETY and**

**THE CHEMISTRY, BIOCHEMISTRY AND PHYSICS DEPARTMENT OF**

**FAIRLEIGH DICKINSON UNIVERSITY**

Invite you to the lecture

**Activation and Incorporation of Rare Sugars into Bacterial Surfaces**

Presented by Dr. Tania Lupoli

 Assistant Professor, Chemistry Department, New York University



Abstract: Our planet is inhabited by trillions of bacteria that live inside and outside of humans. The “skin”, or surface, of bacteria is called the cell envelope, which mediates infection of the host and protects bacteria from host immune defense tactics.  While Gram-negative bacteria contain a protective outer membrane layer absent in most Gram-positives, almost all bacteria contain polymers composed of unique monosaccharides that extend from the cell surface.  Gram-negative bacteria typically contain lipopolysaccharide (LPS) in the outer leaflet of the outer membrane with attached polysaccharides called O-antigens that help mediate interactions with the environment.  O-antigens are composed of repeating oligosaccharides that define particular bacterial serotypes, which distinguishes bacterial strains within a single species. Foundational chemical biology work has contributed to our understanding of eukaryotic cell surface composition.  However, we still lack a clear understanding of assembly of bacterial surface glycan polymers that contain prokaryote-specific or “rare” sugars.  Here, we describe synthetic and chemoenzymatic methods to construct rare nucleotide sugars to study substrate recognition by bacterial glycosyltransferases that build O-antigens.  We identify key regions in sugar substrates that are required for substrate binding and activity, and we use this knowledge to design chemical probes that will be used for the construction of synthetic O-antigens and small molecule inhibitors that will stall O-antigen synthesis.  This work will expand our understanding of cellular mechanisms underlying bacterial polysaccharide synthesis, and will teach us about the roles that rare sugars play in bacterial cellular interactions.

Bio: Tania was born and raised in New York and graduated from NYU in 2005 as a chemistry major.  Training in Chemistry/Chemical Biology and Microbiology departments, she received a Ph.D. in Chemistry from Harvard University and completed a postdoctoral fellowship in Biochemistry and Infectious Disease at Weill Cornell Medicine. In the summer of 2018 Dr. Lupoli returned to NYU Chemistry where she has been teaching and using interdisciplinary approaches to answer lingering questions in the field of infectious disease.

 **Date**: Thursday, October 24, 2024

 **Times**: 5:00 p.m. Pizza and refreshments

 5:30 p.m. Lecture

 **Place**: Dickinson Hall Rm. 4468, Fairleigh Dickinson University, Teaneck, NJ 07666

 **Free.** Reservations required by October 19, 2024, Dr. Mihaela Leonida mleonida@fdu.edu, or

Dr. Ish Kumar ikumar@fdu.edu