UNIVERSITY OF RHODE ISLAND
Department of Chemistry
ONLINE SEMINAR

ONLINE AT:
https://uri-edu.zoom.us/j/99915467581?pwd=b3I0M2dTdzJTODJqd0hJbUVGb2EwZz09

3:00 PM, Monday, January 23, 2023

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"Glycoengineering for a cleaner, healthier, & sweeter future"

HOST
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Glycoengineering for a cleaner, healthier, & sweeter future

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Abstract: Carbohydrates (or glycans) are the most abundant class of biomolecules on the planet that are known to play critical metabolic, structural, and functional roles in all biological systems. Given the dense coating of diverse glycan molecules on essentially all cell membrane (e.g., O-linked glycoconjugates displayed on the glycocalyx of mammalian cells or polysaccharides embedded within plant cell walls) and biomolecule surfaces (e.g., N-linked glycoproteins), it is not surprising that glycans play a critical role in cell biology such as mediating interfacial interactions of host cells with infectious or symbiotic agents (e.g., bacteria, viruses), drugs, antibodies, hormones, enzymes, and intercellular signaling receptors amongst numerous other functions. But we are still far from elucidating the role of glycans in the design, engineering, and regulation of biological systems spanning from the molecular to organismal level, unlike other fields like genomics and proteomics. The role of glycans in living systems can be better understood by creating robust biotechnology and analytical toolkits that can uncover the '*sweet*' rules of life governing the biosynthesis, organization, and ultimately deconstruction of these complex biomolecules.

The Chundawat Research Group is developing advanced protein and glycan engineering (or broadly *glycoengineering*) toolkits along with applying novel bioprocessing and biophysical techniques to address fundamental scientific and engineering problems relevant to healthcare, bioenergy, and biomaterials research. Here, the speaker will highlight key advances being made in the broader areas of glycoengineering and biomanufacturing using Carbohydrate-Active enZymes (CAZymes) at Rutgers University. He will specifically highlight some novel strategies being developed in his group using engineered CAZymes for chemoenzymatic synthesis of designer oligosaccharides as prebiotics/antibiotics, autonomous N-linked glycoproteins characterization for enabling continuous biological drugs manufacturing, single-molecule imaging & visualization of how CAZymes/cells assemble and deconstruct cell walls, and using supercharged CAZymes for efficient saccharification of waste cellulosic biomass to fermentable sugars for biofuels production.

References:

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