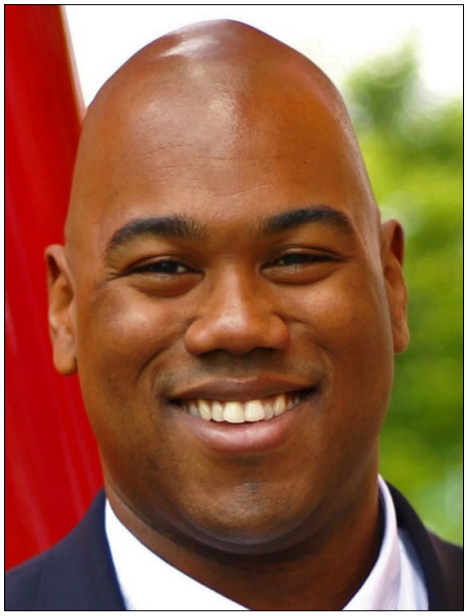
UNIVERSITY OF DELAWARE

CENTER FOR BIOINFORMATICS & COMPUTATIONAL BIOLOGY



CBCB SEMINAR
3/29/2021

3:30 PM
ZOOM: https://udel.zoom.us/j/91240820848 (Passcode: BINF865)

bioinformatics.udel.edu

BIOINFORMATICS SEMINAR

KEVIN SOLOMON

Assistant Professor, Chemical & Biomolecular Engineering

UNIVERSITY OF DELAWARE

GENOMICS-POWERED APPROACHES TO DOMESTICATE ANAEROBIC FUNGI FOR DIRECT BIOMANUFACTURING FROM RENEWABLE PLANT BIOMASS

Microbial metabolism offers a rich chemical toolbox for the sustainable manufacturing of needed medicines, materials, and energy sources. Much of this chemical diversity, however, remains uncharacterized in the millions of non-model species that have yet to be domesticated for life science research. Systems biology approaches now promise to close that gap and accelerate the elucidation of novel biosynthetic pathways from nature. RNASeq approaches provide insight into enzymes, proteins, and pathways correlated with phenotypes of interest while genome acquisition provides needed genomic context to infer evolutionary origin and function, and serve as a source of genetic tools for manipulation. In this talk, I will illustrate these principles in our work on the challenge of plant biomass conversion for sustainable biomanufactuing. We study anaerobic fungi from the digestive tracts of large herbivores that exhibit efficient strategies for degradation of hemicellulose and cellulose, which are unique among the fungal kingdom. Their AT-rich genomes (>80%) pose unique hurdles to common sequencing approaches, which we have recently overcome with chromatin capture. I highlight bioinformatically-derived insights into lignocellulose degradation, which we have experimentally validated, and discuss how we are building on these rich data sets to assemble a genetic system for these nonmodel species.

BIOGRAPHY

Dr. Kevin Solomon is an Assistant Professor of Chemical & Biomolecular Engineering at the University of Delaware. He holds a bachelor's degree in Chemical Engineering and Bioengineering from McMaster University (Canada), an MS in Chemical Engineering Practice from MIT, and a PhD in Chemical Engineering from MIT. His work focuses on identifying and developing non-model microbes, microbiomes and viruses from the environment via systems biology and synthetic biology approaches that are well-adapted for applications in sustainability, materials, and health. He has received several academic, teaching, and service awards including the US Department of Energy Early Career Award in 2019, and an Outstanding Faculty Award from Purdue Residences in 2018. He has provided expert testimony before the 116th US House of Representatives on the convergence of engineering and biology and has coauthored technology roadmaps for engineering biology. He has also been featured in Forbes magazine. Dr. Solomon's work is supported by the NSF, DOE, private trusts and industry.

College of Engineering
CENTER FOR BIOINFORMATICS & COMPUTATIONAL BIOLOGY