

CHEMICAL & BIOMOLECULAR ENGINEERING  
Center for Biomanufacturing Science & Technology

# CBST SEMINAR

Tuesday, October 15, 2019

366 Colburn Lab

1:00 p.m.



*“Systems Biomedicine and  
Pharmaceutics:  
Multiscale Modeling of Tissues,  
Treatments, & Toxicology”*

The Systems Biomedicine and Pharmaceutics research lab at Oklahoma State University led by Dr. Ford Versypt focuses on developing and utilizing multiscale systems engineering approaches including mathematical and computational modeling to determine and understand the mechanisms governing physiological effects of various chemicals, e.g., pharmaceutical drugs, toxins, metabolites, and hormones, on human and animal tissues. We specialize in modeling the transport processes and chemical interactions related to both natural and engineered biomedical and pharmaceutical systems. We also develop and refine the computational software elements to support multiscale modeling of such systems. We draw from an interdisciplinary skillset in chemical engineering, pharmaceutics, physiology, applied mathematics, and computational science. In this seminar, vignettes of four different lines of research from the lab will be highlighted including (1) macromolecule transport through biodegradable polymeric drug delivery devices, (2) the immune system interplay with tuberculosis granulomas, (3) metastatic cancer spread, and (4) glucose-stimulated damage to kidney cells in diabetes and preventative pharmaceutical treatments. The latter area has recently been funded by an NSF CAREER award and exemplifies the integration of teaching, research, and outreach.

## Ashlee Ford Versypt

Assistant Professor  
Oklahoma State University

Dr. Ford Versypt holds three degrees in ChE: a B.S. from the University of Oklahoma and an M.S. and a Ph.D. from the University of Illinois at Urbana-Champaign. During graduate school, she was awarded the Department of Energy Computational Science Graduate Fellowship (DOE CSGF) and the NSF Graduate Research Fellowship. In 2013, she was recognized as the Frederick A. Howes Scholar in Computational Science, which is awarded annually to a recent alumnus of the DOE CSGF for outstanding leadership, character, and technical achievement. In 2012–2014, she was a postdoctoral research associate with Richard Braatz in the Department of Chemical Engineering at the Massachusetts Institute of Technology. Currently, she is an assistant professor in the School of Chemical Engineering at Oklahoma State University (OSU). She is a member of the Harold Hamm Diabetes Center and the Stephenson Cancer Center at the University of Oklahoma Health Sciences Center, the Interdisciplinary Toxicology Program at OSU, and the Oklahoma Center for Respiratory Infectious Diseases. She has received a number of awards for her research and teaching including the NSF CAREER Award in 2019, AIChE 35 Under 35 for 2017, and the OSU College of Engineering, Architecture and Technology Excellent Teacher Award in 2017. She has mentored 7 graduate students and 31 undergraduate students at OSU since 2014. Her research is currently funded by the NSF, NIH, and the Oklahoma Center for the Advancement of Science and Technology.



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