



Department of
Biomedical Engineering
UNIVERSITY OF WISCONSIN-MADISON

Spring 2019 Seminar Series

Engineering New Tools to Understand Mucus Function and Dysfunction

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Mucus is a biological gel that coats and protects epithelial surfaces in tissues throughout the body. Alterations in the viscoelastic properties of the mucus gel is a hallmark of many diseases, particularly of the lung such as asthma, cystic fibrosis, and chronic bronchitis. However, reliable mucus biomarkers to track changes in these properties as a function of disease have yet to be established. In addition, the process by which mucins create this structure and how it may be altered in the context of disease is poorly understood due to the lack of suitable model systems. Towards this end, I will describe in this talk the development of (i) a nanoparticle-based detection scheme to assess disease-associated mucus defects and (ii) a physiologically relevant mucin-based hydrogel platform. Together, these tools may provide the means to fundamentally understand the role of mucus in the progression of diseases and more effectively diagnose patients.

Dr. Gregg Duncan earned his Ph.D. in Chemical Engineering under the guidance of Michael Bevan at Johns Hopkins University. He then completed his postdoctoral training at Johns Hopkins School of Medicine in the Center for Nanomedicine directed by Justin Hanes. Dr. Duncan was appointed as an Assistant Professor in the Fischell Department of Bioengineering at the University of Maryland in 2017 and is an affiliate faculty member in the Biophysics program. His current research is focused on using nanotechnology and bioengineering as tools to broaden understanding of the lung airway microenvironment with the ultimate goal of developing new and/or improved treatments and diagnostics. He is the recipient of several honors and awards including the Burroughs Wellcome Fund Career Award at the Scientific Interface and the ORAU Ralph E. Powe Jr. Faculty Enhancement Award.



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