

**“Engineered Extracellular Matrices:
Development of Epithelial Tissue
Microphysiological Systems”**

Friday, May 12th, 2023
12:00 – 1:00 p.m.

McDonnell Douglas Auditorium

Reception: 4:00 – 5:00pm
Natural Sciences II, 3rd Floor Lobby



Danielle Benoit, Ph.D.
University of Oregon

Abstract: The Benoit Laboratory for Therapeutic Biomaterials specializes in the rational design of polymeric materials for regenerative medicine and drug delivery applications. Our work has provided insights into the translation of tissue engineering strategies for bone allograft repair, development of pH-responsive nanoparticles for nucleic acid and small molecule delivery, novel targeting strategies for bone-specific delivery of therapeutics, and, the focus here, development of microphysiological systems (MPS). Poly(ethylene glycol)(PEG)-based hydrogels can be engineered to control tissue morphogenesis, differentiation, and tissue evolution to develop MPS for mechanistic and drug screening studies. Leveraging these microenvironments together with unique microbubble array technology, we have developed salivary gland tissue mimetics (SGm) to identify novel drug candidates that protect the salivary gland from off-target effects of ionizing radiation. Additionally, we have exploited the knowledge gained from the SGm technology to develop a physiologically relevant model of the outer blood retina barrier (oBRB). Development of these MPS models will be a focus together with current experiments utilizing microfluidic chambers to enable co-integration of perfused vasculature and innervation to realize more robust tissue mimetics.

Biography: Danielle S.W. Benoit is the Lorry Lokey Chair of the Department of Bioengineering and Professor in the Department of Bioengineering at the University of Oregon. Prof. Benoit directs an internationally recognized research program focused on therapeutic biomaterials with emphasis on challenging clinical problems and translational solutions involving cell transplantation and drug delivery. As a leader in the field of therapeutic biomaterials, her work has provided insights into development and translation of engineered extracellular matrices for bone allograft repair, hydrogel depots for sustained release of peptides, nucleic acids, and small molecule drugs, pH-responsive nanoparticles for nucleic acid and small molecule drug delivery, novel targeting strategies for bone-specific delivery of therapeutics, and development of tissue mimetics for the salivary gland and macula. Prof. Benoit has been recognized by numerous awards and accolades for her research program including 2019 Class of AIMBE Fellows, the 2018 University of Maine Distinguished Alumni Award, the 2016 Kate Gleason Young Engineer of the Year Award, a 2015 Young Innovator Award in Cellular and Molecular Bioengineering, an NSF CAREER Award, and Alex's Lemonade Stand Young Investigator Award. She is also a standing member of the NIH Biomaterials and Biointerfaces Study Section. Prof. Benoit received her undergraduate degree in Biological Engineering from the University of Maine and M.S. and Ph.D. in Chemical Engineering from the University of Colorado, where she was mentored by Dr. Kristi Anseth. She then trained at the University of Washington where she was a Damon Runyon Cancer Research Foundation Postdoctoral Fellow, working with Drs. Patrick Stayton and Allan Hoffman. Prof. Benoit joined the faculty at the University of Rochester in 2010.