

A Two-Part MBM Advanced Biofilms Workshop

Part I: Imaging Biofilms with Optical Coherence Tomography (OCT)

Confocal microscopy is widely used in biofilm imaging but is limited in that it requires sample fluorescence and can image only 10-40 μm into most biofilms. This is problematic because many biofilms are not fluorescent and most grow to thicknesses well beyond the penetration depth of confocal microscopy. Optical coherence tomography (OCT) is a label-free, noninvasive imaging technique that provides resolution comparable to confocal microscopy, but at tissue penetration depths on the order of several millimeters.

In this half of the workshop, you will learn the history and fundamentals of OCT as well as a comprehensive review of biofilm-related OCT applications. You will then be provided hands-on training of an OCT instrument that was recently acquired in the CBE. We will image both microbial biofilms as well as 3D-printed hydrogels. A brief summary of 3D printing in the context of biofilm engineering will also be provided.

Part II: Developing Ontology for Biofilm Researchers

An ontology defines concepts and their relationships to describe an area of concern by formally naming and defining entities, properties and their interrelationships. As part of the NSF-funded Biofilm Research and Information Database (BRaID) project, a new biofilm ontology is being developed collaboratively between The Center for Biofilm Engineering, The Gianforte School of Computing at Montana State University and The National Center for Genome Resources (Santa Fe, NM). The ontology will allow us to organize, identify, describe and retrieve terms relating to biofilm research so that all biofilm researchers may have a common, standardized vocabulary with shared understanding.

By the end of this workshop, participants will (1) understand the values of ontologies in research, (2) understand the process of building an ontology using a webtool and (3) contribute to a new ontology that will be valuable to the entire biofilm community.

This will be an interactive, discussion-based, and hands-on workshop. Computers will be provided.