



Biofluids Laboratory (Principal Investigator: Dr. Sang Hyun Lee)

Prof. Sang Hyun Lee's lab (<http://sanghlee.com>) at the University of Massachusetts (UMass) Amherst in Microbiology Department is looking for a **postdoc** and a **Ph.D. student** in the area of 1) biofilm formation and microbial transport in porous media and 2) a fungi enhanced bioremediation. The postdoc position is available for Fall 2024 and the PhD position is available for Fall 2025. The positions are fully funded with competitive salary and benefits.

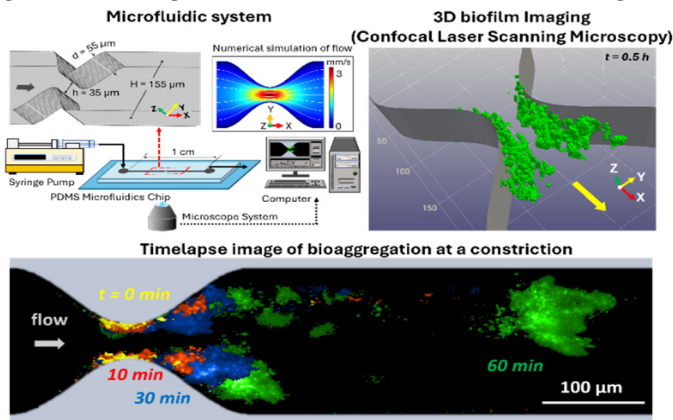
What we do: In the Biofluids Laboratory, we explore the intricate dynamics of **microbe-fluid interactions** across diverse systems. Using cutting-edge tools such as **microfluidics** (Lab-on-a-chip), **molecular biology**, and **numerical simulations**, we aim to enhance our fundamental understanding of microbe-fluid interactions. Moreover, we are dedicated to translating these insights into practical solutions by **developing innovative biotechnologies**.

Research Focus Areas:

We specialize in fabricating microfluidic chips that mimic real systems (e.g., rock-on-a-chip) and visualizing microbe-fluid interactions to directly monitor microbial processes at the biofilm and single-cell level. Current research areas include:

Biofilm formation in porous media:

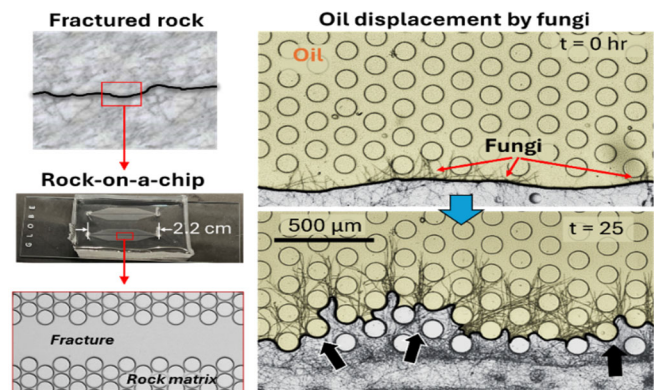
Biofilms can significantly impact fluid flow and vice versa, causing issues like clogging water treatment filters and contamination of medical devices. Our research delves into how flow dynamics and channel geometry affect chemotaxis, cell attachment, quorum sensing, and biofilm growth, aiming to advance biofilm control technologies.



Flow at channel constrictions causes *E.coli* cells to aggregate.

Bioremediation & more:

Remediating oil spills is challenging due to the entrapment of oil contaminants in low permeability regions. Our research investigates how microbes maneuver through subsurface pore spaces, locate, and interact with oil contaminants utilizing microchips. This understanding serves as a foundation for developing innovative technologies (e.g., bioremediation, oil recovery)



Hydrophilic fungi can 'push out' oils from rock pores.

Who are we looking for: Successful candidates should have a degree in microbiology, environmental/bio- engineering, or a related field. Strong background in microfluidics and fluid mechanics are preferred and experience in coding and numerical simulation is encouraged. If interested, please email Dr. Lee (sanghyunlee@umass.edu) with cover letter, your CV, transcripts, and contact info of two references. The application procedures for the PhD position can be found here:

<https://www.micro.umass.edu/graduate/program-overview>

About UMass Amherst Microbiology: UMass Amherst, the Commonwealth's flagship campus, is a nationally ranked public research university (R1) offering a full range of undergraduate, graduate and professional degrees. The University is part of the Five Colleges (including Amherst College, Hampshire College, Mount Holyoke College, and Smith College), which adds to the intellectual energy of the region. The Department of Microbiology in the College of Natural Sciences (<https://www.micro.umass.edu/>) has a strong commitment to microbiology research and to graduate and undergraduate education with strengths in pathogenic microbiology, environmental microbiology, and microbial biotechnology. The Department of Microbiology is housed in modern research facilities and also has excellent core facilities (<https://www.umass.edu/ials/core-facilities>) that include a Nikon Center of Excellence, Nanofabrication Cleanroom, and Massachusetts Green High Performance Computing Center.