



PhD Thesis Defense by Thomas LeFevre

Chemical and Biological Engineering

Friday, November 19, 2021, at 2:00pm
Roberts 319 and via WebEx
Montana State University

“Colloids and Diagnostics”

Abstract:

My dissertation defense will focus on two distinct projects. In the first project, I will describe a new measurement tool for characterizing colloid-surface interactions, which govern the physical properties of soft and biological materials. The fluorescence centrifuge force microscope (CFM) is a miniaturized microscope placed inside a centrifuge, which can perform hundreds of colloid-surface force measurements in parallel over a wide force range (10⁻² to 10⁴ pN) while imaging both fluorescence and brightfield. To demonstrate the capability of the F-CFM, we measure the force required to detach hundreds of electrostatically stabilized colloidal microspheres attached to a glass surface as a function of ionic strength and compare the resulting force distributions with an approximated DLVO theory.

In the second project, I will describe the design of a fluorescence-based, saliva, point-of-care, isothermal nucleic amplification diagnostic assay for SARS-CoV-2. Our assay prioritizes ease of use, low cost, and scalability to facilitate massively widespread testing for SARS-CoV-2 and other microbial pathogens.

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