



# BIOLOGICAL ENGINEERING

## Graduate Seminar Series

### Title

*“Detection of Fungal Infections Using SERS.”*

### Presentation by



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**Date:** October 19<sup>th</sup>, 2016

**Time:** 1:30 – 2:30 PM

**Place:** ENGR 406

### Abstract

Climate change, mass production of feedstocks, improved survival rates for patient with serious autoimmune diseases and cancers have increases the risk of fungus-caused infections in geographic areas previously thought safe. Most serious, are aggressive fungal infections that create difficult to treat pneumonias that lead to organ failure and death. Immune-compromised individuals need to initiate medication treatment as early as possible to have a chance of survival. Normally healthy individual may spread the infection unknowingly, since in the early stages their symptoms may appear to be no more than a common cold. With the change in climate, atypical fungal species will become prevalent, some of which respond weakly to existing drugs, so earlier interventions are likewise important.

We are developing a specialized sensor for the detection of fungal infections based on the Surface Enhance Raman (SERs) sandwich immunoassay. This sensor employs the unique material science features of gold nanoparticles, and surfaces, to accentuate the Raman scattering signal from specialized probe molecules. Because one of the properties of fungal infections is to evade the human immune system, there are few antibody targets that can be used in the immunoassay. Instead we are using a different class of recognition molecules, lectins, to target the polysaccharide molecules characteristic of fungal cell bodies. These molecules are more complex than antibodies and have a unique “slip and stick” feature that make them uniquely suited for use in automated microfluidic systems. Studies with this system are presented.