

# Graduate Student Research Seminar

## Spring 2025

### Separation of Particles by Impact Stress-responsive Materials

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**Monday, February 10<sup>th</sup>**  
**3:00 pm (EST) – 132 Fluor Daniel Building**

### Abstract

Extreme immune response to bloodstream infection (BSI) can be life-threatening. One key obstacle to high chances of recovery is delayed detection of the BSI. However, the current state-of-the-art BSI identification method has a very time-consuming sample concentration stage. Although integrated sample detection systems such as a lab-on-chip (LOC) device can be rapid and very effective, only a few compatible sample concentration processes exist for an integrated LOC. This study mainly focuses on the study of parameters of a micro-particle separation system based on an impact stress-responsive material interface in a centrifugal device that can aid in rapid sample concentration for LOC devices. Experiments are conducted using polystyrene microspheres, mimicking the pathogen cells and different concentrations of Iota-carrageenan gel, a member of the Bingham Plastic family, as the impact stress-responsive material. Microscopic images of the displacement of microspheres in a centrifugal device are analyzed to validate a proposed analytical model.



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