1176-35-17 **Mykhailo Potomkin*** (mykhailp@ucr.edu), 237 Skye Hall, University of California, Riverside, Riverside, CA 92507. *A PDE model of a biological micro-swimmer in a liquid crystal.*

Liquid crystallinity and mechanical shear can control bacteria penetration in mucus. Understanding how a bacterium navigates itself in such an environment is important for treatment strategies of many infectious diseases. To elucidate how the orientation order of liquid crystal affects the motion of an individual bacterium, a nonlinear PDE system coupling liquid crystal hydrodynamics with the model of active micro-swimmer is introduced. In this talk, I will present this PDE system and show that the micro-swimmer's shape and its surface anchoring strength affect the swimming direction and can lead to reorientation transition. Next, I will demonstrate that for large propulsion speeds active micro-swimmers generate topological defects in the bulk of the liquid crystal. Finally, I will discuss collective swimming in liquid crystal and how it can be described with the help of homogenization theory. This is joint work with I. Aronson (Penn State U.), L. Berlyand (Penn State U.), H. Chi (Penn State U.), A. Yip (Purdue U.), and L. Zhang (Shanghai Jiao Tong U.). (Received December 27, 2021)