



APPLIED MATHEMATICS COLLOQUIUM: Microswimmers propelled by flagella: Modeling, Simulations and Analysis

Sookkyung Lim

Professor, Department of Mathematical Sciences
University of Cincinnati

Date:
9/23/2020

Time:
3:00 PM-5:20 PM

Location:
SSB 170

About The Speaker:

Professor
Department of Mathematical Sciences
University of Cincinnati
4199 French Hall West
Cincinnati, OH 45221-0025

RESEARCH INTERESTS

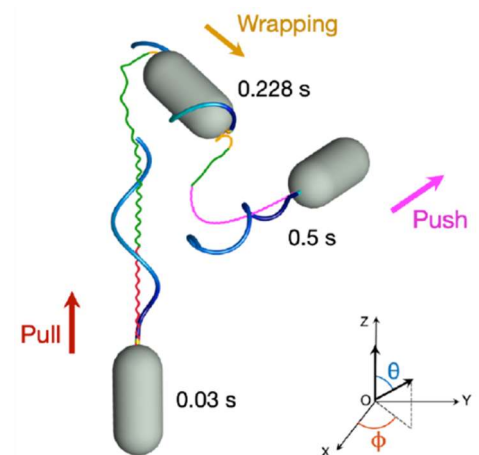
Mathematical Biology, Computational Fluid Dynamics,
Scientific Computing,
Biomechanics, Mathematical Modeling, Dynamical Systems,
Systems Biology.

EDUCATION

May 2003 Ph.D. Mathematics, Courant Institute, NYU, USA.
Feb 1996 M.S. Mathematics, Ewha Women's University,
South Korea.
Feb 1994 B.A. Mathematics, Ewha Women's University,
South Korea.

EMPLOYMENT

2017-present Professor, Department of Mathematical
Sciences, UC.
2012-2017 Associate Professor, Department of
Mathematical Sciences, UC.
2006-2012 Assistant Professor, Department of
Mathematical Sciences, University of Cincinnati.
2003-2006 Postdoctoral researcher, Mathematical
Biosciences Institute, Ohio State University.
2000-2003 Junior Research Scientist employed by Dr.
Charles Peskin, New York University.



Abstract:

Swimming bacteria with helical flagella are self-propelled microswimmers in nature, and the swimming strategies of such bacteria vary depending on the number and the position of flagella on the cell body. In this talk, I will introduce three different species of microorganisms; monotrichous, lophotrichous, and peritrichous bacteria. The Kirchhoff rod theory is used to model the elastic helical flagella and the neutrally buoyant rigid body dynamics theory is developed to describe the motion of the rod-shaped cell body that can translate and rotate. The hydrodynamic interaction between the fluid and the bacteria is described by the regularized version of Stokes flow. I will focus on how bacteria can swim and reorient swimming course for survival and show how Mathematics can help to understand the swimming mechanism of such bacteria.

For more information, contact : Shilpa Khatri
skhatri3@ucmerced.edu