

## BIOPHYSICS OF BACTERIAL BIOFILM COMMUNITIES

K. Drescher<sup>1,2,3</sup>, C.D. Nadell<sup>2</sup>, H.A. Stone<sup>3</sup>, N.S. Wingreen<sup>2</sup>, B.L. Bassler<sup>2</sup>

- (1) Max Planck Institute for Terrestrial Microbiology, Marburg, Germany
  - (2) Department of Molecular Biology, Princeton University, Princeton, USA
  - (3) Department of Mechanical Engineering, Princeton University, Princeton, USA
- (e-mail: k.drescher@mpi-marburg.mpg.de)

Bacteria frequently occupy densely populated surface-bound communities, known as “biofilms”. It is largely unknown how bacteria organize their behavior inside biofilms, and how biofilms behave in natural environments. In this presentation, I will focus on how physical aspects of the biofilm lifestyle solve a classical evolutionary theory problem, the public goods dilemma [1], and how fluid physics shapes the dynamics of biofilms in complex environments [2]. I will also show how biofilm communities avoid invasion by members of their own species and other species [3], to illustrate the rich interplay of bacterial cooperative behaviors in biofilm communities and physics.

[1] K. Drescher, C.D. Nadell, H.A. Stone, N.S. Wingreen, B.L. Bassler, *Curr. Biol.* **24**, 50-55 (2014).

[2] K. Drescher, Y. Shen, H.A. Stone, B.L. Bassler, *PNAS* **110**, 4345-4350 (2013).

[3] C.D. Nadell, K. Drescher, N.S. Wingreen, B.L. Bassler, *ISME J.*, in press (2015).