



Center for Soft Matter and Biological Physics  
Seminar

**Dr. Uli Dobramysl**  
(University of Cambridge)

**“How do cells sense direction?”**

Monday, April 15, 2019

4:00pm – 5:00pm

304 Robeson Hall

In many biological processes, in particular embryonic and brain development, cells need to follow chemical gradients to arrive at a precise location. To this end, they need to be able to determine the direction and position of a source releasing diffusing guidance cues from information gathered by receptor clusters located on the cell membrane. We develop an analytical model and an efficient numerical simulation procedure to calculate the particle fluxes to receptors and determine the limits of direction sensing in different environments. We find that the cell needs three or more receptor clusters to enable reconstruction of the exact source position from measured particle fluxes. We develop simulations of cells navigating in a chemical gradient based on these findings and show that cells are indeed able to find their targets.

