Sep 26  Alex Mogilner, UC Davis

*Self-organizing microtubule asters in mitosis*

Mitosis is the process of segregation of chromosomes before cell division. This phenomenon is based on self-assembling molecular machine called mitotic spindle. The spindle consists of two asters made of microtubules, dynamic polymers that grow and shrink rapidly and repeatedly probing space and searching for the chromosomes. In the first part of the talk, I will address the problem of the self-organization and centering of the aster considering experiments and models of fragments of fish melanophore cells. In these fragments, pigment granules, coated with dynein molecular motors, move to minus ends of microtubules, and also alter microtubule dynamics. A positive feedback between granule transport and dyneins nucleating microtubules and stabilizing their minus ends leads to aster self-organization, while the spontaneous nucleation of microtubules causes aster centering. In the second part of the talk, I will describe experiments and computer models of the 'Search and Capture' process.