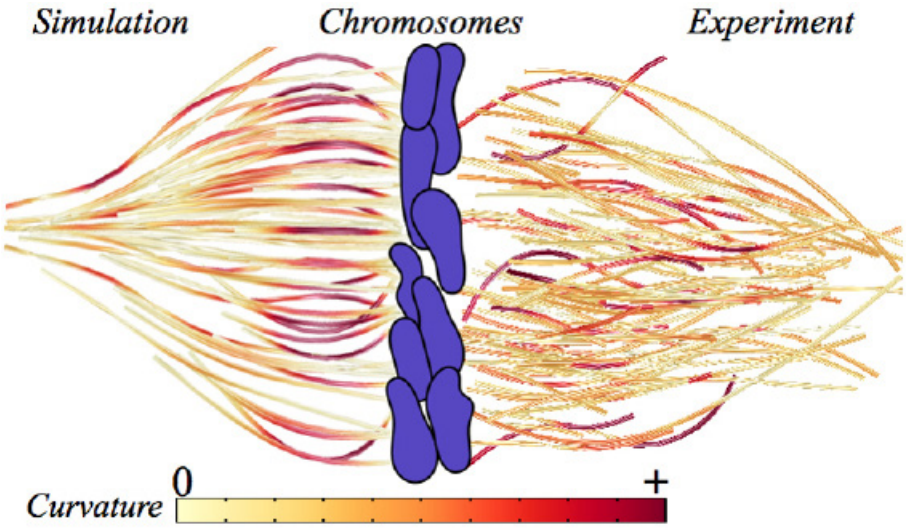
COLUMBIA | ENGINEERING
The Fu Foundation School of Engineering and Applied Science

Distinguished Colloquium in Interdisciplinary & Applied Mathematics

Michael Shelley

Applied Math Lab, Courant Institute, NYU, and Center for Computational Biology, Simons Foundation

The Dynamics of Microtubule/Motor-Protein Assemblies



Many important processes in the cell are mediated by microtubule polymers, their interactions with their environment, and the active motor proteins moving on them. This includes the transport of subcellular structures (nuclei, chromosomes, organelles), and the self-assembly and positioning of the mitotic spindle. Little is understood of these processes, all of which are fascinating problems in cell mechanics, and the physics of active matter. Microtubules and motor proteins are also the building blocks of new biosynthetic active materials driven by motor-protein activity. These reduced systems can be probed—and modeled—more easily and have their own aspects of self-assembly and dynamics that shed light on biological processes. I review recent work modeling such systems as fluid-structure interaction problems and as internally-driven multiscale complex fluids.

Michael Shelley is an applied mathematician who specializes in the modeling and simulation of complex systems arising in physics and biology. Recently he joined the Simons Foundation as Group Leader in Biophysical Modeling at their Center for Computational Biology. He is also the Lilian and George Lyttle Professor of Applied Mathematics at the Courant Institute of NYU, which he joined in 1992, and where he co-founded and co-directs its Applied Mathematics Laboratory. He holds a Ph.D. in applied mathematics from the University of Arizona, and was a postdoctoral researcher at Princeton University and a member of the mathematics faculty at the University of Chicago, before joining NYU. Shelley has received the François Frenkiel Award from the American Physical Society and the Julian Cole Lectureship from the Society for Industrial and Applied Mathematics, and he is a fellow of both societies.

Wednesday, November 30, 2016

3:00 pm, 750 CEPSR (Costa Engineering)
530 West 120th Street
(Refreshments in 200 Mudd at 4:15 PM)