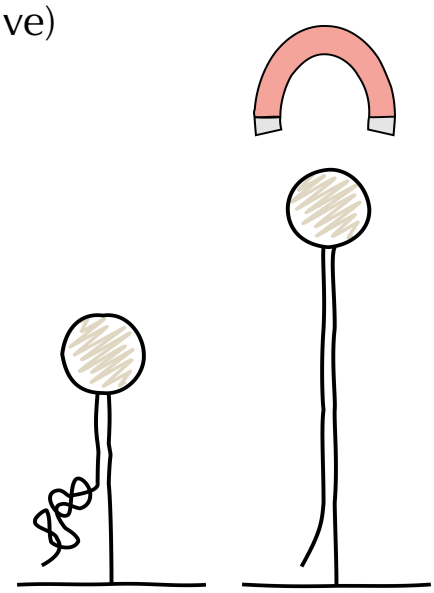
Single-molecule Imaging: Capturing Nanoscale Cellular Machines in Action

Fall 2021- 7.343 Advanced Undergraduate Seminars
Wednesdays, 3 – 5pm (tentative)

In this course, we will explore how cutting-edge single-molecule technologies are being used to reveal intrinsic details of fundamental cellular processes and structures such as DNA replication, transcription, and cytoskeletal elements of cells.



Depiction of DNA attached to a magnetic bead under magnetic force

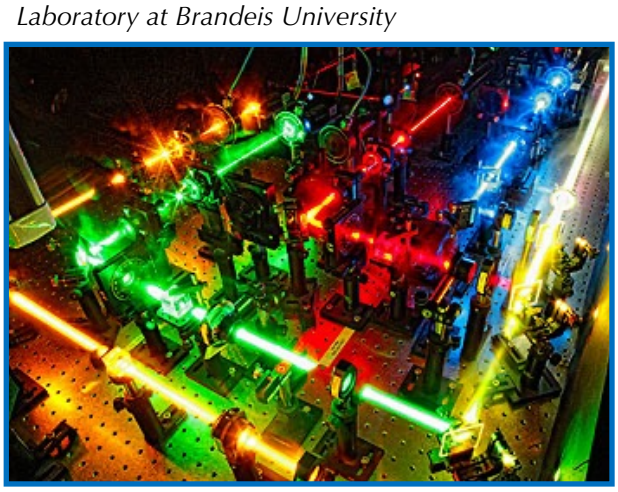
KI Public Galleries, 2019, Clare Harding from Lourido Laboratory, Super-resolution microscopy image of parasite Toxoplasma gondii infecting human cells

Techniques we will cover are:

Optical traps,
Magnetic tweezers,
Total internal reflection fluorescence microscopy (TIRF),
Super-resolution microscopy,
Confocal microscopy,

And their combinations with each other!

4-color laser TIRF microscopy setup in Jeff Gelles' Laboratory at Brandeis University



For more info, contact the instructor
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Email: koseh@mit.edu

Also:
https://biology.mit.edu/undergraduate/current-students/subject-offerings/advanced-undergraduate-seminars/