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## Applied mathematics and Computational Biology

The group of D. Holcman dedicated to Applied Mathematics and Computational biology offers position at various levels: Master, PhD and Postdocs.

**Our goal** is to develop physical modeling, mathematical analysis, simulations and data analysis methods to understand, quantify and simulate processes in molecular and cellular biology. Examples are memory, encoded in the neuronal network, single photon detection by rod photoreceptors and the noise generation or cell nucleus organization using polymer physics.

**Research:** In the past, we develop several concepts such as the narrow escape theory in probability and partial differential equations, which is the asymptotic computation for the mean time a hidden target is found by a Brownian particle. We develop analysis of superresolution trajectories to extract features from tens of thousands of trajectories. We presented a complete model of phototransduction and developed stochastic simulations of polymer model to study gene activation in the nucleus.

**Projects:** involved mathematical analysis and modeling and the analysis of various sort of data such as electrophysiological data, live cell imaging, chromosomal capture data and many others.

**Collaborations:** Our collaborators are A. Cohen (Harvard), R. Yuste (Columbia) and Z. Schuss (Tel Aviv University) or E. Heard (Curie Institute), K. Burrage (Oxford) and many others.

### References:

D. Holcman Z. Schuss, the Narrow Escape Problem, *SIAM Rev* 56 no. 2, 213–257 2014.  
D. Holcman Z. Schuss, Control of flux by narrow passages and hidden targets in cellular biology, *Reports on Progress in Physics* 76 (7):074601. (2013).

**Jobs:** members of the group get jobs at postdocs level or assistant, associate professor level, at international places, including Berkeley, Bristol, ETZ, INSERM, MIT, Pasteur institute, Technion.

**Candidate:** candidates are expected to be strongly motivated by mathematical sciences, biophysics and biological sciences. He/she should have some background in stochastic processes, partial differential equations and numerical simulations. The candidate should be passionate by her/his research. Students are encouraged to write a publication at the end of the training period. We strongly encourage motivated master students to continue on a PhD thesis. The group has a strong tradition in training students at an international level. Applicants should send

- a letter of application, - curriculum vitae, - two letters of recommendation addressed directly to:

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