



As part of our “Nano & Micro-environments for Cell Biology” seminar series, we are delighted to invite you to attend this seminar to be given in english by :

## Prof Alex MOGILNER

Department of Neurobiology, Physiology and Behavior  
& Department of Mathematics  
University of California, Davis (USA)



Monday 10 September 2012  
11am

### Cells and cytoplasmic fragments utilize electrophoresis and competing pathways to move oppositely in electric field

Amphithéâtre de l'Accueil du CEA  
(Aucun badge d'entrée requis)  
17 rue des martyrs - 38000 GRENOBLE

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### Cells and cytoplasmic fragments utilize electrophoresis and competing pathways to move oppositely in electric field

*Both direction-sensing and motility are required for cell migration, but their integration is elusive. Cytoplasmic fragments are the simplest motile units, but are they directional? We found that cytoplasmic fragments of fish keratocytes move to anode in electric field, while whole cells migrate to cathode.*

*Myosin is essential for galvanotaxis of fragments but not for cells, while PI3K is essential for cells but not fragments. Direction sensing is independent of the cell/fragment sizes and ion fluxes. Mechanical force and electro-osmotic flows do not direct the cells. Galvanotactic response is sensitive to pH and viscosity.*

*We conclude that two signal transduction pathways compete to orient motile cells in the electric field. Our data argues against hypotheses that primary sensor for the electric field in keratocytes is either a sensor of electric force, or electro-osmosis, or gradient of membrane potential, but is consistent with electrophoresis of charged proteins in the cell membrane.*

#### About Pr Mogilner's research:

*Prof Mogilner's lab adopts a computational approach to the study of cytoskeletal dynamics, by developing mathematical and computer models, in combination with theoretical biophysics and systems biology tools, to simulate models of cytoskeletal processes.*

*During his career Prof Mogilner has received numerous prestigious grants from the American NIH (National Institutes for Health) and NSF (National Science Foundation), which have facilitated his cutting-edge research. The impact of Prof Mogilner's work can be seen in his numerous publications in noted journals such as Nature, Nature Cell Biology, Science and Cell.*

More info: [www.math.ucdavis.edu/~mogilner/](http://www.math.ucdavis.edu/~mogilner/)

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