M2 internship project

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Signaling noise in cell-fate specification during organogenesis in C. *elegans*

Location: Institut Pierre-Gilles de Gennes / Institut Curie, 75005 Paris
Team/Lab: Quantitative Developmental Biology / UMR168 Physico Chimie Curie
Supervisors: Wolfgang Keil / Ismail Hajji
Duration: 6 months
Desired starting date: as soon as possible

Our team studies how cells make decisions during development - the process by which the fertilised egg, a single cell, transforms into a fully functional multicellular organism. We use an interdisciplinary strategy at the interface between physics and biology, employing both experimental and theoretical approaches. We use as model system is the small roundworm Caenorhabditis elegans (C. elegans), a simple multicellular organism with ~1000 cells.

The goal of this internship project is to study the role of biological noise during cell fate specification. We are going to use an ERK-biosensor (de la Cova et al. 2017) in vulval precursor cells of C. *elegans* to measure noise in ERK activity and compare it to a mathematical model recently proposed (Corson, Siggia 2017). During the internship the candidate will learn how to acquire and analyse confocal microscopy images to monitor real-time signaling activity of multipotent precursor cell during fate acquisition. The last part of the internship would be dedicated to interpret the data and relate them to the model.

This project is highly interdisciplinary, at the interface between Developmental/Cell biology, Physics, and image analysis. The host laboratory at Institut Curie and Institut Pierre-Gilles de Gennes will give the candidate the opportunity to interact with scientists from different backgrounds in a highly international environment.

Applications, in English, should include a short cover letter, a CV, the names of two references and should be sent to **wolfgang.keil@curie.fr** with the subject M2 internship-biosensor.

Recommended readings

de la Cova, C., Townley, R., Regot, S., & Greenwald, I. (2017). A Real-Time Biosensor for ERK Activity Reveals Signaling Dynamics during C. elegans Cell Fate Specification. Developmental Cell, 42(5), 542-553.e4. https://doi.org/10.1016/j.devcel.2017.07.014

Corson, F., & Siggia, E. D. (2017). Gene-free methodology for cell fate dynamics during development. ELife, 6, 1–25. https://doi.org/10.7554/eLife.30743