

INTERNSHIP PROPOSAL

(One page maximum)

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Internship location: 24, rue Lhomond 75005 Paris

Thesis possibility after internship: YES

Funding: NO

If YES, which type of funding:

Towards a global model of cell size control in the rod shape bacteria *E. coli*

Bacterial size is tightly controlled to ensure that the genetic material is well distributed among the two daughter cells. Many models (adder, sizer, timer) have been put forward to explain the homeostasis of bacterial cell size. However, recent experiments performed in the lab tend to challenge these models. The work, we propose, aims at collecting data in a large range of experimental conditions to build a model that would be robust to variations in culture conditions. The student will perform timelapse videomicroscopy on single cells and develop image analysis to track bacterial divisions on agar pads. In addition to varying environmental conditions, we also propose to study cell size control not only in the canonical exponential phase of the culture growth, but also at the entry in stationary phase and in the lag phase, where bacterial cell size is not at steady state.

Reference: [Taheri-Araghi *et al.*, Cell-Size Control and Homeostasis in Bacteria. Current Biology 2015](#)

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics:	NO	Soft Matter and Biological Physics:	YES
Quantum Physics:	NO	Theoretical Physics:	YES