



Laboratoire TIMC-IMAG

UMR 5525

Université Grenoble Alpes – CNRS

*Techniques de l'Ingénierie Médicale et de la Complexité -
Informatique, Mathématiques et Applications, Grenoble*

Funded PhD in Polymer Physics of bacterial DNA

Engineering genetic information requires having a good understanding of the physical structuring of genomes. In bacteria, this structuring is affected at multiple physical scales, from base pair pairing to the spatial organization of chromosome, by the underwinding of DNA – called negative supercoiling. *In vivo* DNA supercoiling thus plays a crucial role in multiple fundamental processes such as gene transcription, DNA replication and the segregation of replicated chromosomes. This ubiquity nevertheless makes difficult to consider the impact of DNA supercoiling quantitatively.

In this context, the PhD will consist in developing a multi-scale polymer physics framework by combining various coarse-graining techniques developed in the groups of [Ralf Everaers](#) (ENS Lyon, France), [Angelo Rosa](#) (SISSA, Trieste, Italy) and [Ivan Junier](#) (TIMC-IMAG, Grenoble, France) and by integrating data about the functional organization of the bacterial genome. The PhD will be realized in close collaboration with experimental groups working on various aspects of gene regulation and chromosome structuring in bacteria, more particularly with the group of [Frédéric Boccard](#) (I2BC, Paris-Saclay, France).

Candidate's profile: we are looking for a highly motivated candidate with a strong background in statistical or/and polymer physics, with an interest to apply computational tools to understand the functioning of living organisms. Advanced skills in programming are required and a previous interdisciplinary experience in connection with biological issues is a plus, although not necessary.

Contacts: to apply, please send your CV, a motivation letter, and the names and contact information of two references to Ralf Everaers and Ivan Junier.

Ralf Everaers: ralf.everaers@ens-lyon.fr

Ivan Junier: ivan.junier@univ-grenoble-alpes.fr