



Phd Position on Randomized methods for eigenvalue problems
Part of ERC Synergy project EMC²
<https://erc-emc2.eu/>

Supervisor: Laura Grigori, Director of research, Inria Paris and Sorbonne University

Contact: Laura.Grigori@inria.fr

Ecole doctorale: ED 386, Ecole Doctorale de Sciences Mathématiques de Paris Centre, SU

Context:

This project takes place in the context of ERC Synergy project EMC2, which is an interdisciplinary project that carries out innovative and cutting-edge research at the interface of physics/chemistry, computer science, and mathematics. Molecular simulation is an active field of research with applications ranging from drug design to material science and nanotechnology. However, molecular simulation still has strong limitations. In particular, the simulation of very large molecular systems remains out of reach today. Overcoming these limitations is difficult and provides mathematicians with a range of challenging and exciting problems to solve.

Description of the project:

The specific topic of interest is the usage of randomization techniques for solving eigenvalue problems and linear systems of equations arising in particular in molecular simulations. These problems are characterized by large scale, high dimensions, and high ranks. Randomization is a powerful technique that allows to represent high dimensional vectors by their low dimensional random projections while preserving some geometry. In collaboration with other members of the project, the developed methods and algorithms will be validated on several applications of interest.