

Postdoctoral position in mathematical modeling of biological networks

Title Dynamic modeling of iron-linked redox perturbations in Acute Myeloid Leukemia

Context Acute Myeloid Leukemia are a class of deadly hematopoietic diseases with an astonishing large variety of driver mutations. Diagnosis usually occurs during a blast crisis whereby leukemic clones escape the bone marrow and invade peripheral blood. The general objective of the project, funded by the french *Plan Cancer (Cancer Systems Biology program)*, is to sort out the main molecular differences between normal and leukemic cells so as to identify new and innovative therapeutic targets.

Project The successful candidate will be in charge of developing models of energy-related networks involved in Acute Myeloid Leukemia (AML). Several modules are envisioned, such as iron homeostasis, control of cell cycle, hypoxia responsive network. New computational methods to perform *set-based simulations* will be developed in collaboration with one of the partners of the project (Verimag lab). We use these techniques to cope with the large uncertainties in model parameters. Recent methods for model reduction will be assessed, and possibly new ones developed. He/she will also interact with biologists to integrate experimental data generated in the frame of the project, and extract biological knowledge from the models.

Profile Good knowledge in at least some of the following topics: modeling methods (sensitivity analysis, parameter search, model reduction), numerical methods, optimization, bayesian statistics. Good programming skills (in e.g. python, julia). Basic knowledge of molecular biology is desirable. A previous interdisciplinary experience in connection with biology would be a clear advantage.

Scientific environment The successful candidate will be part of an interdisciplinary consortium called 'Dynamical Modeling of LAMs' involving four labs and gathering biologists, physicians, modellers, computer scientists, and physicists. She/He will also benefit from the excellent scientific environment of the TIMC-IMAG laboratory (CNRS & UGA) which gathers scientists and clinicians towards the use of computer science and applied mathematics for understanding and controlling normal and pathological processes in biology and healthcare. The TIMC-IMAG laboratory is located in Grenoble, one of the biggest academic cities in France, with the French Alps nearby.

Duration 21 months

Application Send your CV, a motivation letter, and the name of two references to Eric Fanchon, eric.fanchon@univ-grenoble-alpes.fr

Eric Fanchon
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