Post-doctoral position in computational and systems biology available in Lille, France: modeling of the circadian clock of the microscopic alga Ostreococcus tauri

**Job description** The "Dynamics of biological networks" team of the Laboratoire de Physique des Lasers, Atomes, Molécules at Université Lille 1, led by Marc Lefranc, is seeking a post-doctoral researcher to work on the dynamics of regulatory networks underlying circadian clocks and their design principles. The research will be focused on the mathematical modeling of the circadian clock of the microscopic green alga Ostreococcus tauri and will be conducted in close collaboration with the group of François-Yves Bouget at Observatoire Océanologique de Banyuls/mer, in the south of France. The Banyuls group has identified the first two Ostreococcus clock genes and has developed a comprehensive molecular toolbox, including luciferase reporters, gene overexpression or knockdown, and an inducible promoter system.

Candidates are expected to have a strong background in nonlinear dynamics as well as in computational or systems biology, in the context of cellular regulatory networks. An significant programming experience is also required (preferably C/C++ or Fortran under a linux environment). The post-doctoral researcher will base its research on an extensive set of experimental time series recorded in Banyuls to extend the current knowledge about the molecular networks of Ostreococcus clock. The main objectives will be (1) to identify the light input pathways which synchronize the clock to the day/night cycle and (2) to analyze the dynamical properties of the molecular network to understand its design principles. The results obtained in this project will be of high significance for the circadian biology field, because: (1) Ostreococcus clock appears to be closely related to that of Arabidopsis thaliana but with a simpler architecture, (2) previous mathematical modeling of this clock has revealed a very interesting strategy to buffer fluctuations in daylight intensity. A complete mathematical model of the clock would therefore provide a simple example of a robust clock network.

The contract is for one year, extendable for 10 additional months. The monthly net salary (after social security taxes but before income tax) is about 2200 euros.

**How to apply?** Candidates should send as soon as possible a cover letter stating their motivations and CV to Marc Lefranc\(^1\), preferably before June 1st, 2013. They should also arrange for two reference persons to send simultaneously recommendation letters to the same address. Before applying, candidates are advised to check whether the position is still available at

http://www-phlam.univ-lille1.fr/perso/lefranc/postdoc.html

**Human and geographical context**

The "Dynamics of Biological Networks" team comprises three permanent researchers (Marc Lefranc, Quentin Thommen and Benjamin Pfeuty). The research aims at under-

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standing the dynamical behavior and design principles of biological networks, in particular signaling cascades and genetic oscillators (circadian clocks, cell cycle,...), using the tools of nonlinear dynamical systems theory and statistical physics. The activity is theoretical but features strong interactions with experimentalists, so as to identify biologically relevant questions, and puts emphasis on the analysis of experimental data and time series in connection with mathematical modeling and theoretical investigations.

Lille is the main city of Northern France, close to the Belgian border, at the center of the Paris-London-Brussels triangle. With around 1.2 millions inhabitants, it is the core of the fourth urban area in France after Paris, Lyon and Marseilles. Lille can be reached easily from anywhere in the world, as it is connected by high-speed trains to Paris (60 min.), London (80 min.) and Brussels (40 min.). In particular, it takes only 50 minutes from Lille downtown to reach the train station inside terminal 2 of Roissy Charles de Gaulle airport, the most active French airport and the second European one after London Heathrow. With a lively atmosphere and a reasonable cost of living, Lille is an attractive place to stay.

**Relevant bibliography**


