

**PhD and positions in Computational Systems Biology in Basel, Switzerland:
Transcriptional and epigenetic regulatory networks in cellular differentiation.**

PhD positions in computational systems biology are available in the groups of Prof. E. van Nimwegen and M. Zavolan (Biozentrum of the University of Basel and Swiss Institute of Bioinformatics) as part of a large systems biology project that aims to decipher the transcriptional and epigenetic regulatory circuitry of cellular differentiation in mammals. The CellPlasticity project, part of the Swiss SystemsX.ch initiative, is a collaboration between a number of experimental and theoretical groups at the Biozentrum, the center for biomedicine of the university of Basel, and the Friedrich Miescher Institute. The topic of CellPlasticity is the study of gene regulatory networks that control cellular differentiation in mammals. We are interested in particular to unravel how the interplay between sequence-specific binding of transcription regulators, and epigenetic changes to the state of the chromatin implements cellular differentiation. Using next-generation deep sequencing technology we will obtain genome-wide time courses of RNA expression, DNA methylation, and histone modifications for a number of mouse systems in which stem cells differentiate into well-specified cellular differentiation states. The available PhD positions concern the theoretical and computational study of these data with the aim of developing quantitative models of how regulatory signals in the DNA, transcription factor binding, and chromatin modifications, together control the gene expression dynamics in these systems (see Nat Genet. 2009 May;41(5):553-62 for initial work from our groups in this area). There will be a close collaboration between the theoretical and the experimental groups, and theoretical predictions will be followed up on experimentally with the eventual goal of engineering cells to trans-differentiate from different initial states into desired end-states.

Our computational biology research groups are highly interdisciplinary, involving application of methodologies from theoretical physics and computer science to problems in molecular systems biology. We are looking for candidates with a strong background in mathematics and programming. Requirements are a master's diploma or equivalent, preferably in physics, applied mathematics or computer science, but applications from students with a diploma in molecular biology that can demonstrate extraordinary mathematical knowledge and programming experience will also be considered. Working knowledge of mathematical techniques from dynamical systems theory, stochastic processes, statistical mechanics, probability theory and Bayesian statistics is highly desirable.

Candidates should have experience in computer programming, preferably in C/C++ and a scripting language like Perl or Python. Finally, applicants should have familiarity with the basics of molecular biology and should have a strong desire to learn in this field. Although a formal training in molecular biology is not required the successful candidates will be expected to collaborate closely with experimental colleagues and good communication skills will be highly desirable.

Successful applicants will work in a highly stimulating research environment, and will be offered training in theoretical and practical techniques. All member laboratories lie in close proximity within Basel, Switzerland, a city boasting academic and cultural excellence, located in the heart of Europe. For further information visit our website www.cellplasticity.org. Applicants should send an application letter, CV and the names of two or three references to

cellplasticity@fmi.ch and/or erik.vannimwegen@unibas.ch

Review of applications will start December 15, 2009