university of groningen

Two PhD student positions in systems biology

The Molecular Systems Biology group at the University of Groningen (Netherlands) has two openings for enthusiastic and talented PhD students. The University of Groningen, located in the north of the Netherlands, enjoys an international reputation as one of the oldest and leading research universities in Europe (position at rank 80 (worldwide) in the recent Times Higher Education Ranking).

The Molecular Systems Biology group (Prof. Matthias Heinemann) aims at generating a systems-level understanding about the functioning of metabolism. Towards these goals, the group members combine classical and systems biology approaches exploiting latest state-of-the-art single cell technologies (such as microfluidics and optogenetics). Together, the members of the international and interdisciplinary team (i.e. PhD students and postdocs with backgrounds in biology, engineering, physics and mathematics) create an inspiring research atmosphere, on whose ground we recently published a number of high profile stories:

- Niebel *et al.* (2018) An upper limit in Gibbs energy dissipation governs cellular metabolism. ***Nature Metabolism***, accepted
- Papagiannakis *et al.* (2017) Autonomous Metabolic Oscillations Robustly Gate the Early and Late Cell Cycle. ***Molecular Cell*** 65:285-295
- Radzikowski *et al.* (2016) Bacterial persistence is an active σS stress response to metabolic flux limitation. ***Molecular Systems Biolology***. 12:882

PhD Position 1: How does the metabolic oscillator influence the eukaryotic cell cycle?

Description: We recently found that metabolism in yeast is an oscillator, which also seems to exert cell cycle control. The next challenge is now to identify the nature of this oscillator and to unravel the molecular connection to the cell cycle machinery. To address these challenges, we will use microfluidics, time-lapse microscopy, optogenetic tools and mathematical modeling to untangle the intricate interaction between these oscillators.

Tools and methods: microscopy, microfluidics, flow cytometry, optogenetics, modeling

Requirements: The project can largely be shaped by the applicant. Candidates can have a background in either biochemistry, molecular biology, biophysics or engineering. Ideally, candidates with only wet lab experience would also get into mathematical modeling, and candidates with only modeling/computational experience would also perform experiments. The candidates should have good command of English (oral and written) and possess good communication and excellent collaboration skills.

Starting time: as soon as possible

PhD Position 2: A powerful new method for ^{13}C metabolic flux analysis

Description: We recently developed a new method for flux balance analysis (FBA), with which we can make much better predictions that with classical FBA. We now would like to combine this new method with ^{13}C labeling experiments to unravel intracellular metabolic fluxes with unprecedented accuracy. We hope that this new method will also allow to determine metabolic fluxes. Here, we will develop and use different computational tools and methods.

Tools and methods: stoichiometric models, flux balance analysis, ^{13}C flux analysis

Position requirements: Candidates should have a background in either biotechnology, engineering, computer science or physics. Basic knowledge in metabolism is a plus. The candidates should have good command of English (oral and written) and possess excellent communication skills.

Starting time: as soon as possible. For this project, only students can be hired who have not lived in the Netherlands 12 months before taking up the appointment.

Application

Excellent and highly motivated candidates should send their application to Prof. Matthias Heinemann (m.heinemann@rug.nl). The application should contain: (i) a CV, (ii) information about grades and other measures of success, (iii) two letters of recommendation (these can also be emailed directly), and (iv) a statement on how the candidate's prior experience/expertise could be connected to one of the above mentioned project. The position will be filled as soon as an excellent candidate is identified.

About the group: http://www.rug.nl/research/molecular-systems-biology/
About Groningen: http://www.rug.nl/about-us/who-are-we/discover-groningen/