

Open PhD student and postdoc positions

The Molecular Systems Biology group at the University of Groningen has a number of openings for enthusiastic and talented PhD students and postdocs. 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 89 (worldwide!) in the recent Times Higher Education Ranking).

The Molecular Systems Biology group aims at generating a systems-level understanding about the functioning of (microbial) metabolism with particularly zooming in on single cell behavior. Towards this goal, the group combines classical and systems biology approaches exploiting latest state-of-the-art single cell technologies. Together, the members of the international and interdisciplinary team (i.e. people with backgrounds in biology, engineering or physics) create an inspiring research atmosphere, one whose ground we recently got a number of high profile stories published:

Kochanowski K et al. (2013) Functioning of a metabolic flux sensor in *Escherichia coli*. *PNAS*. 110, 1130-5.

Schütz et al. (2012) Multidimensional optimality of microbial metabolism. *Science*, 336, 601-604.

Huberts et al. (2012) A flux-sensing mechanism could regulate the switch between respiration and fermentation. *FEMS Yeast Research*, 12: 118-128.

Lee et al. (2012) Whole lifespan microscopic observation of budding yeast aging through a microfluidic dissection platform. *PNAS*, 109: 4916-4920.

The metabolic basis of bacterial dormancy in *E. coli* (one PhD student and one postdoc position)

Description: Using *E. coli* as a model, we recently found that an insufficient metabolic flux can trigger the entry into dormancy resembling a sort of hibernation state, in which the cells are tolerant against basically all antibiotics. In this project, we aim to further investigate this state of dormancy (using omics technologies), and to unravel molecular mechanisms that accomplish the entry and exit of this state (using different single cell analyses tools, molecular biology tools, etc).

Tools and methods: Molecular biological, genetics, single cell analyses, flow cytometry, fluorescence microscopy, microfluidics, proteomics, metabolomics, metabolic flux analysis

PhD student (4 yrs): required background: (molecular) biology, biochemistry, (bio)physics

Postdoc (3 yrs): required background: (molecular) biology, biochemistry, (bio)physics

Starting period: 01-10/2013

Engineering central metabolism of *E. coli* for improved caprolactam production (one PhD student and one postdoc position)

Description: In a collaborative project with two academic partners and an industrial partner we are aiming to develop an *E. coli* strain for the biotechnological production of a caprolactam (precursor for nylon production). Our task is to engineer carbon- and energy metabolism such that the precursors are supplied to the biosynthetic pathway in a high efficient manner.

Tools and methods: strain modification (genetics), genome-scale metabolic models, flux balance analysis, optimization, ¹³C metabolic flux analysis, HPLC

PhD student (4 yrs): required background: biotechnology or engineering

Postdoc (2.5 yrs): required background; biotechnology or engineering

Starting period: 04-10/2013

Investigating metabolism on the level of single yeast cells (PhD student position)

Description: This project is part of a European collaborative research and training network between eight partners, incl. the University of Oxford and ETH Zurich, offering interactions with many PhD students in other labs around Europe, including research stays in other labs. The aim of this project is to investigate the metabolic operation of single yeast cells, their behavior once it comes to dynamic environmental changes. In this project, latest state-of-the-art single cell technology (e.g. single cell metabolomics) can be used to answer appealing single cell questions. The actual direction of the project can be shaped by the respective candidate.

Tools and methods: microscopy, microfluidics, flow cytometry, single cell metabolomics

PhD student (4 years): required background: biology, engineering, (bio)physics

Starting date: asap

For this project, only students can be hired who have not lived in the Netherlands 12 months before taking up the appointment.

Flux-sensing in *S. cerevisiae* (one postdoc position)

We recently proposed that microbes can sense metabolic flux and use this information for regulation. In this project, we would like to explore this appealing concept in the yeast *S. cerevisiae* using a combination of molecular/biochemical and proteome/metabolome analyses. Depending on the qualifications of the postdoc, this position would come along with the possibility for co-supervision of two PhD students.

Tools and methods: biochemistry and molecular biology tools, microscopy, omics analyses

Postdoc (2 yrs with extension possibility): required background: biochemistry, molecular biology, microbiology

Starting date: asap

Additional information: this postdoc position could be developed into a junior group leader position

Towards a yeast glycolysis model 2.0 (one postdoc position)

Modeling the kinetics of glycolysis in yeast has a long tradition with several different models available today. Yet, all currently available models have severe limitations. In this project, together with the Teusink group in Amsterdam we aim to develop a “yeast glycolysis model 2.0”. For this, we will (i) draw on a large, unique experimental database, we will (ii) incorporate recently identified novel regulatory interactions and we will (iii) develop a novel methodological approach for developing such large biochemical model (in terms of parameter estimation and model discrimination). Next to deliver a new and unprecedented glycolysis model, to developing a new methodological modeling approach, we envision to retrieve highly interesting and novel biological insights through this modeling endeavor.

Tools and methods: kinetic modeling, parameter estimation, model discrimination

Postdoc (1 yr with extension possibility): required background: engineering, physics, (applied mathematics)

Starting date: asap

Excellent and highly motivated candidates should sent their application to Matthias Heinemann. These applications should contain: (i) a CV, (ii) information about grades and other measures of success, (iii) two letters of recommendation, (iv) a statement on how the candidate’s prior experience/expertise could be connected to one of the above mentioned projects.

University of Groningen

Prof. Matthias Heinemann

Groningen Biomolecular Sciences and Biotechnology Institute

Molecular Systems Biology

9747 AG Groningen

The Netherlands

jobs.msb@rug.nl

+31 50 363 8146 phone

About the group: <http://www.rug.nl/research/molecular-systems-biology/>

About Groningen: <http://www.rug.nl/about-us/who-are-we/discover-groningen/>