

The University of Groningen, located in the north of the Netherlands, belongs to the top-100 universities in the world. The Molecular Systems Biology group (led by Matthias Heinemann) has an opening for enthusiastic and talented PhD student candidate.

PhD student position: Exploring the dynamic cytoplasm and its connection with metabolism

The cellular cytoplasm is a highly crowded environment, with proteins and other biomolecules packed tightly together. This raises an intriguing question: How do vital biomolecular processes continue to function in such a dense environment, where molecules are constantly interacting and might just clump together? The key might lie in the constant energy conversion through metabolism, which might keep molecules in motion. In fact, the cytoplasm is often referred to as ‘active matter,’ and we have recently proposed that metabolism plays an essential role in ‘agitating the cytoplasm’ (<https://doi.org/10.15252/msb.202110822>).

The challenge is thus to understand how cellular metabolism organizes the structure of the cytoplasm presents, which is an exciting scientific opportunity. This project seeks to combine biochemistry and biophysics to investigate this crucial question. The results could not only advance our understanding of diseases such as Huntington’s and Alzheimer’s, but also offer new insights for biotechnology and metabolic engineering.

In this project, you will have the chance to use cutting-edge techniques, including super-resolution microscopy (PALM, Smdm), single-particle tracking, machine learning, and latest state-of-the-art biochemical analysis tools. You will explore how active enzymes drive cytoplasmic motion and how this influences cellular function and life itself.

This is a unique opportunity to embark on a truly fascinating scientific journey. You can shape the direction of the project based on your own expertise and interests. You will be working at the forefront of scientific discovery while receiving strong support from our excellent lab environment.

We are looking for a highly motivated and creative candidate who is eager to contribute to this exciting field of research. If you are passionate about exploring the mysteries of cellular biology, we encourage you to apply!

Application

Candidates should send their application to Prof. Matthias Heinemann (m.heinemann@rug.nl). The application should contain (i) a cover letter, (ii) a CV, (iii) two letters of recommendation (these can also be emailed directly), or names of potential references, and (iv) a short statement on how the candidate’s prior experience/expertise could be connected to one of the above mentioned projects. Deadline: March 18th, 2025.

About the research group: <http://www.heinemannlab.eu>

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