



*The Fraunhofer-Chalmers Research Centre for Industrial Mathematics (FCC) is offering contract research, services, algorithms and software based on advanced mathematics within Modeling, Simulation, Optimization, and Data Analysis, which provides a significant leading edge in industrial innovation of products and production systems. Since the start in 2001, the centre has successfully proved this together with more than 200 clients in over 500 industrial and public projects together with the automotive and vehicle, metrology, pharmaceutical, wood and paper, and electronics industries.*

We have an open position for an ambitious and talented

## PhD/LicEng Student – Learning Dynamical Systems in Drug Discovery

### About us

FCC's department of systems and data analysis conducts research, application and development of computational methods, software tools, data analysis, and dynamic systems modeling on different levels of abstraction utilizing time and spatially resolved measurement data. Our vision is to employ mathematics as a technology to improve product and process development by utilizing the ever-increasing amounts of industrial data and leverage on a thorough mathematical understanding of algorithms and methods for machine learning and artificial intelligence. We are located in modern premises at the Chalmers Science Park, campus Johanneberg, Gothenburg, Sweden.

### PhD Project

To assess the effect of novel therapies in drug discovery it is important to know the *baseline* of a physiological condition under study or the baseline of a biomarker linked to such a physiological condition. In many cases baselines in both healthy and diseased states are approximately constant and an assessment of effect is just a simple comparison of how much a therapy shifts the disease baseline to more healthy levels. However, there are also more challenging situations with oscillatory or even non-existing baselines, e.g., physiological signals related to circadian rhythm or inflammatory conditions. For non-existing base-lines so called challenge designs are often applied in which a disease effect is artificially induced. The aim of the project is to develop and apply novel numerical methods and algorithms to learn dynamical systems from population time-series data obtained from therapies applied to studies with oscillatory baselines or challenge designs.

Methodologies that may be employed during the course of the project are particle Markov Chain Monte Carlo methods, Gaussian process learning, and probabilistic programming.

The student will be employed by the Fraunhofer-Chalmers Center, and enrolled at the research school in applied mathematics and mathematical statistics at the Department of Mathematical Sciences, Chalmers University of Technology. The project is carried out as part of an existing collaboration between FCC and Grünenthal. Furthermore, Grünenthal supports the project with data and challenging applied problems and there will be opportunities for shorter or longer visits to the company during the course of the project. The position leads to a licentiate in engineering (LicEng) exam with a total time of 2 years including 10% teaching duties. Prolongation of the project leading to a PhD degree will be considered based on interest and available funding.

### Your Profile

You have a Master of Science, or equivalent, and a strong background in mathematics. Concurrent method development and implementation of algorithms is integral to the applied research carried out at FCC and good programming skills (e.g., Python, Mathematica, R) are therefore required. You will work together with a team of researchers and engineers with a thorough understanding of both applied mathematics, statistics, and pharmaceutical applications. You are a team player with strong interest in industrial applications, but also expected to work autonomously, develop your own ideas and communicate results to the scientific community.

### Interested?

Welcome to submit your electronic application including cover letter, CV, course grades and other relevant work such as master thesis, no later than March 17 to: [recruit@fcc.chalmers.se](mailto:recruit@fcc.chalmers.se)



**FRAUNHOFER CHALMERS**  
RESEARCH CENTRE FOR INDUSTRIAL MATHEMATICS

We aim for a project start June 1, 2019, but you could still apply if you finalize your master thesis during the spring term. For questions about the position, please contact head of department Mats Jirstrand, [mats.jirstrand@fcc.chalmers.se](mailto:mats.jirstrand@fcc.chalmers.se), +46 730 794303.