FRAUNHOFER CHALMERS
RESEARCH CENTRE FOR INDUSTRIAL MATHEMATICS

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 funded by the Swedish Foundation for Strategic Research for an ambitious and talented

PhD Student – Mathematical Modeling for Personalized Nutrition

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

The aim of the project is to develop and apply novel numerical methods and algorithms to learn mixed effects dynamical systems from population time-series metabolomics data obtained from controlled dietary intervention studies. This will let us identify groups of individuals with specific metabolic phenotypes and predictive biomarkers of such groups to help guide towards optimal personalized diets. Another key aspect is to develop and extend mathematical methods to model dynamic changes in metabolic risk factors as a function of the metabolome and other determinants. This will enhance our understanding of individual variation in dynamic metabolic responses to dietary intakes and how this affects cardiometabolic risk. Our vision is that developed tools within five years can be used to facilitate personalized dietary advice for improved prevention of non-communicable diseases as well as result in tailored foods for groups of individuals with similar needs. Methodologies that may be employed during the course of the project are nonlinear mixed effects modeling, particle Markov Chain Monte Carlo methodology, Gaussian process learning, and probabilistic programming.

The student will be employed by the Fraunhofer-Chalmers Centre and enrolled as a PhD-student at the Division of Food and Nutrition Science, Department of Biology and Biological Engineering at Chalmers University of Technology. The project is carried out as part of an existing collaboration between FCC and FNS. Totally, the graduate programme will comprise 4 years of study and research.

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 and food & nutrition science. 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

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, +46 730 794303.