Forschungszentrum Borstel
Leibniz Lungenzentrum

The Research Center Borstel is an international, funded by federal and state science company with 550 employees. Our central task is research and patient care in the field of respiratory diseases. We operate both, infrastructure of basic research as well as a medical clinic. We have one goal: to improve existing methods for the detection, prevention and treatment of lung diseases and to develop new, innovative therapeutic approaches. We are looking for the research group Bioanalytical Chemistry (PD Dr. Schwudke) at this time for a

master student (m/f/v)

Lipids are in the center of many biological processes. In recent years, technological advances made it possible to identify and quantify lipids from cells, tissues and organisms in a comprehensive manner. Such lipidomes are the basis for a number of biomedical investigation to study the influence of perturbed lipid metabolism in diseases and development.

This project is a cooperation between the University of Hamburg and the Research Center Borstel.

Context:

Recently, we developed the LUX Score, which provides the first well defined metric to calculate the homology between lipidomes. The current approach is based on a chemical space model built solely from lipid structures. Lipid molecules are represented using the Simplified Molecular-Input Line-Entry System (SMILES), a line notation using ASCII strings. When the Levenshtein distances between all SMILES of all lipidomes are determined, one can represent all together in one chemical space model, which allows in the end to determine homology between individual lipidomes (Marella et al. PLOS Comp. Biol. 2015). The LUX score itself can be interpreted in similar fashion as one would use genetic distances.

Problem Definition:

The goal of this master thesis is to develop algorithms that will allow to incorporate lipid quantities into the lipidome homology computation. For this purpose an optimization function needs to be defined that helps to maximize the accuracy of the homology metric and should improve associations of phenotypic data to lipidomes (Eggers et al. Scientific Reports 2017).

Qualification:

- Master student in bioinformatics or informatics
- Good knowledge in data mining and optimization models
- Experience in using statistical and bioinformatics tools is advantageous
- Experience in python is advantageous

Duration: Six months

Payment: The Research Center Borstal offers 400 Euro per month

The Research Center Borstel encourages female candidates to apply and will be treated favourably in case of equal qualification. Disabled applicants with equal qualifications will be considered on a preferential basis.
For further information, contact: PD Dr. Dominik Schwudke, Email: **dschwudke@fz-Borstel.de** or Dr. Fadi Al Machot Email: **falmachot@fz-Borstel.de**.

Applicants are requested to send their cover letter, CV without picture and list of publication until 1.12.2018 only via email to: **bewerbung@fz-borstel.de.**