

A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Mittwoch, 12. Dezember 2018, 10:30

Ort: Seminarraum 006

(Fachbereich Mathematik und Informatik, Takustr. 9, 14195 Berlin)

Disputation über die Doktorarbeit von

Herrn Simon Hubert Tausch

Thema der Dissertation:

Development of bioinformatics tools for the rapid and sensitive detection of known and unknown pathogens from next generation sequencing data

Thema der Disputation:

HiC deconvolution of metagenomic data

Die Arbeit wurde unter der Betreuung von **PD Dr. B. Renard** durchgeführt.

Abstract:

Metagenomic sequencing enables the detection of genetic material directly from its environment without prior cultivation. Through this technology, it is now possible to detect known as well as novel species in complex samples such as these from human gut microbiome. This may hold relevant information on human physiology, also as locus of infectious diseases. Still, the meaningful assembly of sequences from complex metagenomic communities is complicated by repeat regions, spurious associations between species, and many more. Furthermore, the association of mobile genetic elements such as plasmids to their hosts is impossible based on metagenomics short read data alone. The disputation talk will address these difficulties and propose an additional data type to aid the deconvolution of metagenomics datasets. The HiC technology is utilized providing biological information on the intracellular proximity of sequences. With this knowledge, it is possible to cluster contigs which stem from the same cell. Based on publications of Press et al. (2017) and Burton et al. (2014), it is shown that adding HiC data to classical metagenome sequencing yields more near-complete, high quality microbial genomes from microbiomes than conventional contig binning. Furthermore, unlike classical binning methods, it enables the clustering of plasmids and their hosts with high confidence. Beyond the implementation and use-case shown, methodological weaknesses of this approach will be discussed.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
PD Dr. B. Renard