

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

DISPUTATION

Montag, 15. Mai 2017, 13.30 Uhr

**Ort: Seminarraum 1, Turm 3 EG
Max-Planck-Institut für Molekulare Genetik
Innstraße 63 - 73, 14195 Berlin**

Disputation über die Doktorarbeit von

Herrn Johannes Helmuth

**Thema der Dissertation:
Robust Normalization of Next Generation Sequencing Data**

**Thema der Disputation:
Robust Statistics in Computational Epigenomics**

Die Arbeit wurde unter der Betreuung von **Prof. Dr. M. Vingron** durchgeführt.

Abstract: In Computational Epigenomics, researchers aim to uncover the basic control principles of cellular plasticity by interrogating the dynamics of epigenetic modifications (e.g. histone modifications). To this extent, the relation of these reversible modifications and the gene activity is studied by mathematical methods, such as statistics. Classical statistical approaches like Regression Analysis are used to model epigenomic features that are measured for example by chromatin immunoprecipitation followed by high-throughput DNA sequencing (ChIP-seq). However, ordinary regression analysis is confounded by the presence of erratic measurements (i.e. outliers) which are common in ChIP-seq data sets. Here, robust statistical methods represent an adequate way to derive hypothetical (null-)models from collected data containing numerous outliers. The classical Random Sampling Consensus (RANSAC) algorithm from 1981 exemplifies an intuitive iterative approach for a robust regression. In addition, other Least Squares Regression extensions have been proposed to enable signal extraction in the presence of outliers. Using real world examples I motivate the application of robust regression approaches for the analysis of ChIP-seq data in Computational Epigenomics.

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
Prof. Dr. M. Vingron