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

Dienstag, 14. Mai 2019, 14:15 Uhr

Ort: Seminarraum I

(Max-Planck-Institut für molekulare Genetik, Ihnestraße 63, 14195 Berlin)

Disputation über die Doktorarbeit von

Frau Franziska Witte

Thema der Dissertation:

Dissecting the genetic basis of transcriptional and translational regulation in heart and liver

Thema der Disputation:

Finding periodic signals in biological data

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

Abstract:
Periodicity can be found in signals stemming from various sciences, such as economics, statistics, mathematics, but also biology. Especially, the identification and recognition of specific periodic patterns is a large research field. To filter the signal from noise, a Fourier transformation is used by mapping the raw signal into the frequency domain. In the first talk the focus lies on the discrete Fourier transform (DFT), where non-parametric spectral density estimation is used for extracting periodic parts from a complex signal. Among the mathematical techniques to derive spectral density estimates two examples will be described in further detail: the periodogram analysis and the multitaper approach, which is based on multiple periodograms in different windows (tapers).
One application of using non-parametric spectral density estimates is the identification of the three nucleotide periodicity in ribosome profiling data that corresponds to the actively translating ribosome by using a multitaper analysis. This is a useful step to pre-process ribosome profiling data in order to identify translated proteins and filter out noise for further analysis.
In the second talk, I will present the results of my thesis on quantitative trait loci analysis from RNA-seq and ribosome profiling data in a rat heart and liver dataset.

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