

## FREIE UNIVERSITÄT BERLIN Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

# DISPUTATION

**Dienstag, 24. September 2013**

**16.00 Uhr**

**Ort: SR1, Erdgeschoss, Turm 3  
Max-Planck-Institut für Molekulare Genetik  
14195 Berlin, Ihnestr. 63-73 (Dahlem)**

**Disputation über die Doktorarbeit von**

**Herrn Michael Love, M.Sc.**

**Thema der Dissertation:  
Statistical analysis of  
high-throughput sequencing count data**

**Thema der Disputation:  
Variance stabilizing transformations for  
microarray intensity measurements**

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

Abstract: The gene expression microarray is a powerful tool for research in molecular biology and medicine, quantifying RNA levels across thousands of genes simultaneously. However, normalization methods are necessary in order to derive biologically meaningful and statistically useful quantities from measured probe intensities. In particular, raw probe values are not directly comparable across different arrays, and the variance of these values is not constant across the range of intensities.

In the first part of my presentation, I will introduce variance stabilizing transformations for microarray data which account for both inter-array calibration and the stabilization of the variance of probe intensities. For high intensity probes, ratios derived from transformed data coincide with standard log ratios, while for low intensity probes, the ratios of transformed data are moderated toward 0.

The second part of my presentation will summarize the results of my thesis, concerning the statistical modeling of read counts from high-throughput sequencing assays. Here, discrete distributions are used in place of the continuous distributions for microarray intensities, though a similar approach can be used to account for the dependence of the variance of read counts on the mean.

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