

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, 11. Februar 2025, 9:00 Uhr

Ort: Seminarraum 006

(Fachbereich Mathematik und Informatik, Königin-Luise-Str.24-26, 14195 Berlin)

Disputation über die Doktorarbeit von

Aybuge Altay

Thema der Dissertation:

Cell - type annotation in single-cell chromatin accessibility data

Thema der Disputation:

Nonlinear Dimension Reduction Techniques: MDS, t-SNE, and UMAP

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

Abstract: High-dimensional data present substantial challenges, especially in terms of the computational resources they require and the difficulty in understanding and visualizing their complex structures. As a result, reducing the dimension of the data while preserving its essential features is of great interest from various perspectives. While traditional linear methods like principal component analysis (PCA) are commonly applied to reduce dimension, they often fall short in capturing the nonlinear data patterns. This is where nonlinear dimension reduction techniques, also known as manifold learning, come into play, offering a way to map high-dimensional data into a more comprehensible, lower-dimensional form. This transformation facilitates a clearer data visualization and enhances interpretability. In this talk I will explore three popular nonlinear dimension reduction methods: multidimensional scaling (MDS), t-distributed stochastic neighbor embedding (t-SNE), and uniform manifold approximation and projection (UMAP), and provide an intuitive understanding of their mechanisms. The second part of the presentation will focus on my thesis work, which addresses cell-type annotation in scATAC-seq data.

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