

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

Montag, 26.06.2023, 10:00 Uhr

**Ort: Seminarraum
(Zuse Institut Berlin, Takustr. 7, 14195 Berlin)**

Disputation über die Doktorarbeit von

Herrn Erhun Giray Tuncay

Thema der Dissertation:

Optimizing Global Network Alignment in Protein-Protein Interaction Networks

Thema der Disputation:

Clustering and centrality approaches in protein-protein interactions networks

Die Arbeit wurde unter der Betreuung von **PD Dr. T. Conrad** durchgeführt.

Abstract: Advances in the field of proteomics enable to construct large scale Protein-Protein Interaction (PPI) Networks that facilitate understanding cellular organizations, processes, and functions with a network perspective. Analyzing PPI Networks with Network Clustering methods can provide insights about protein functions, disease pathology, drug discovery and personalized medicine. It is further essential to utilize these methods coherently with the underlying biological problem. In this talk, I will introduce Network Clustering methods that aim to explore the biological characteristics of these PPI networks. As a start, I will explain the basic concepts, building blocks and alternative representations of a PPI Network [1][2]. Later, I will give an overview of Network Clustering methods that detect protein complexes and functional modules in PPI Networks [1][2][3]. In this scope, I will further talk about state-of-the-art Network Clustering methods that fall into the heuristic, hierarchical, spectral, flow-simulation, partitioning, clique identification, supervised, ensemble, nature inspired and deep learning based categories. Finally, I will talk about possible application fields of these methods such as analyzing disease processes, biomarker identification and therapeutic target detection along with future research directions.

[1] Ichcha Manipur, Maurizio Giordano, Marina Piccirillo, Seetharaman Parashuraman, and Lucia Maddalena, "Community Detection in Protein-Protein Interaction Networks and Applications", IEEE/ACM TRANSACTIONS ON COMPUTATIONAL BIOLOGY AND BIOINFORMATICS, VOL. 20, NO. 1, JANUARY/FEBRUARY 2023, <https://doi.org/10.1109/TCBB.2021.3138142>

[2] Xiangmao MENG, Wenkai LI, Xiaoqing PENG, Yaohang LI, MinLI, "Protein interaction networks: centrality, modularity, dynamics, and applications", Frontiers in Computer Science, 2021, 15(6): 156902, <https://doi.org/10.1007/s11704-020-8179-0>

[3] Sourav S. Bhowmick and Boon Siew Seah, "Clustering and Summarizing Protein-Protein Interaction Networks: A Survey", IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING, VOL. 28, NO. 3, MARCH 2016, <https://doi.org/10.1109/TKDE.2015.2492559>

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. T. Conrad