FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Dienstag, 23. August 2022, 11:00 Uhr

Ort: Seminarraum 006
(Fachbereich Mathematik und Informatik, Takusstr.9, 14195 Berlin)

Disputation über die Doktorarbeit von

Frau Marie Hoffmann

Thema der Dissertation:
What is in my Sample? - Challenges and Approaches for Unveiling the Hidden Diversity in Plankton Samples

Thema der Disputation:
Designing highly multiplex PCR primer sets with Simulated Annealing Design using Dimer Likelihood Estimation (SADDLE)

Die Arbeit wurde unter der Betreuung von **Prof. Dr. K. Reinert** durchgeführt.

Abstract: One major challenge in the design of highly multiplexed PCR primer sets is the large number of potential primer dimer species that grows quadratically with the number of primers to be designed. Simultaneously, there are exponentially many choices for multiplex primer sequence selection, resulting in systematic evaluation approaches being computationally intractable. Here, we present and experimentally validate Simulated Annealing Design using Dimer Likelihood Estimation (SADDLE), a stochastic algorithm for design of multiplex PCR primer sets that minimize primer dimer formation. In a 96-plex PCR primer set (192 primers), the fraction of primer dimers decreases from 90.7% in a naively designed primer set to 4.9% in our optimized primer set. Even when scaling to 384-plex (768 primers), the optimized primer set maintains low dimer fraction. In addition to NGS, SADDLE-designed primer sets can also be used in qPCR settings to allow highly multiplexed detection of gene fusions in cDNA, with a single-tube assay comprising 60 primers detecting 56 distinct gene fusions recurrently observed in lung cancer.

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. K. Reinert