Modeling neuroenergetics design

Initiative: Kurswechsel – Forschungsneuland zwischen den Lebenswissenschaften und Natur- oder Technikwissenschaften

Ausschreibung: Planning Grants

Bewilligung: 17.06.2019

Laufzeit: 1 Jahre

Projekt-Website: https://valentinriedl.de/

The human brain is unrivaled in information processing and even does so at the energetic costs of a light bulb. Although we know several design elements of efficient neuroenergetics, the brain's unique processing power as a large-scale system is still a mystery. The hypothesis is that molecular and cellular metabolic principles can be integrated with theories from mathematics and physics to model systems level neuroenergetics. Recently, the group has scaled cellular data to metabolism of brain network communication in humans using novel, metabolic imaging approaches. Further, dynamic systems and information theories rely on assumptions that largely comply with the energetic profile of individual neurons. This planning phase will initiate neuroenergetic modeling to bridge the knowledge gap between the molecular and systems level of the brain. This endeavor will open up a different perspective on brain function and might stimulate novel designs for neuromorphic computing.

Projektbeteiligte

Priv.-Doz. Dr. Valentin Riedl
Technische Universität München
Klinikum Rechts der Isar
Neuroradiologie
München