UNIVERSITÄT LEIPZIG

SFB1423

VANDERBILT UNIVERSITY

MKF / SFB1423 Module

Integration of Experimental Data with Artificial Intelligence to study Membrane Proteins

Prof. Hassane Mchaourab & Prof. Erkan Karakas
Vanderbilt University, Center for Structural Biology

Dr. Matthias Elgeti & Prof. Dr. Jens Meiler
Leipzig University, Faculty of Medicine

Aims: Teach theoretical and practical aspects of integrating EPR spectroscopy with computational modelling to study membrane protein structure, dynamics, and function.

Basics: Biochemistry, amino acid structure, peptide bond, secondary structure, tertiary structure, biological membrane, protein sensors, protein transporters, protein channels Theoretical and practical aspects of protein sequence alignments, secondary structure prediction, comparative modeling, protein-protein and protein-ligand docking.

Course Description: Structure-based drug design, virtual screening. The relationship of protein sequence, structure, variation, and disease. This course includes a laboratory section.

05.-08.06.23
9-12 AM, Faculty of Medicine, Biophysics, Härtelstr. 16-18, Room 018

Registration:
Please send an Email to albrecht@uni-leipzig.de

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Schedule

Monday
(23/06/05)

Jens Meiler

9 am - 11 am

Lecture: Theoretical Basis of Protein Structure Prediction with Artificial Intelligence

11 am - 12 am

Student presentation and discussion of two scientific publications assigned prior to class
Jumper J, et al. Nature. 2021;596(7873):583-9
Sala D, et al. Structure. 2022;30(8):1157-68

Tuesday
(23/06/06)

Erkan Karakas

9 am - 11 am

Lecture: Experimental aspects of studying membrane protein structures

11 am - 12 am

Student presentation and discussion of two scientific publications assigned prior to class
Porta JC, et al. Sci Adv. 2022
Han B, et a. The Journal of biological chemistry. 2023;299(4):104574

Wednesday
(23/0607)

Matthias Elgeti

9 am - 11 am

Lecture: EPR Technologies for studying membrane protein Structure

11 am - 12 am

Student presentation and discussion of two scientific publications assigned prior to class
Wingler LM, et al. Cell. 2019;176(3):468-78
Lerch MT, et al. PNAS. 2020;117(50):31824-31

Thursday
(23/06/08)

Hassane Mchaourab

9 am - 11 am

Lecture: Integrating EPR Data with Artificial Intelligence to study Membrane Proteins

11 am - 12 am

Student presentation and discussion of two scientific publications assigned prior to class
Del Alamo D, et al. eLife. 2022;11
Del Alamo D, et al. PNAS. 2022;119(34)

Keywords:

One week block course, 12 hours presence / 24 hours self-study, Individual Presentations, 1 CP, Scientific papers will be assigned prior to class. Students are expected to review literature, study one paper in detail, and prepare a 10min presentation on that paper's topic.