LARS DORNFELD

M. Sc. Biochemistry

lars-dornfeld
0009-0009-0885-8443

EXPERIENCE

Master's Thesis | *Prof. Sereina Riniker, ETH Zürich*

Beginning in Apr. 2024 - Dec. 2024, 9 months

Computational Chemistry & Molecular Dynamics. Using enhanced sampling molecular dynamics methods to elucidate the structure-permeability and structure-activity relationship of cyclic peptides. Funding by PROMOS.

MD simulations | Gromacs & Plumed | Enhanced sampling MD | Statistical physics | RDKit | Data Analysis

Intern | *Dr. Noelia Ferruz, AI for Protein Design Barcelona*

Jun. 2023 - Oct. 2023, 4 months

Machine learning for protein design. Developed and evaluated large language models for small molecule-binding protein design. Presented my work in poster-format at the 2. European Rosettacon. Funding by ERASMUS+.

Chemical & protein language models | Deep learning | HuggingFace | PyTorch (fundamentals) | Git & GitHub

Intern | *Prof. Bruno E. Correia, EPFL Lausanne*

Oct. 2022 - Feb. 2023, 4 months

Computational & experimental methods in protein design. Project 1: Implemented and validated a modular framework combining AlphaFold and proteinMPNN for fixed-backbone sequence design. Worked on the first functionalization of soluble analogues of membrane proteins. Project 2: Experimental validation for the generation of a homo-oligomerization atlas using AlphaFold. Funding by Studienstiftung.

Protein Design | Python | PyRosetta | SEC-MALS | CD Spectroscopy | X-ray Crystallography

Intern & Research assistant | *Prof. Kai Johnsson, Max-Planck Institute*

Nov. 2021 - Jul. 2022 & Mar. 2023 - Jun. 2023, 13 months (9 months part-time)

Protein Engineering & Chemical Biology. Characterized and engineered different Rhodamine-binding proteins for use in super-resolution microscopy. Developed a user-friendly computational protein-engineering pipeline.

Protein expression | Protein purification | ITC- and FP-Assay | Yeast Surface Display | Molecular Cloning

EDUCATION

M.Sc. in Biochemistry | *University Heidelberg*

2021 – 2024

Focused on: Computational Biology, Protein Design & Machine Learning. Final grade average: 1.0 ≡ 4.0 GPA.

B.Sc. in Molecular Biotechnology | *University Heidelberg*

2018 – 2021

Covered fields: Drug Research, Biophysical Chemistry, Bioinformatics. Final grade average: 1.3 ≡ 3.7 GPA.

PUBLICATIONS & PRE-PRINTS

- C. A. Goverde, M. Pacesa, N. Goldbach, **L. J. Dornfeld**, *et al.*, "Computational design of soluble and functional membrane protein analogues", Nature, 2024.
- H. Schweke, T. Levin, [and 12 others, including **L. J. Dornfeld**] "An atlas of protein homo-oligomerization across domains of life", Cell, 2024.

CONFERENCES

- **2. European Rosettacon** | Leipzig | 25. - 27. September 2023.
  Participant at poster session: **L. J. Dornfeld**, Noelia Ferruz: "Mol2Pro: Generation of small-molecule-binding proteins using a pre-trained language model.

SUPERVISION AND SOCIAL ENGAGEMENT

Laboratory supervisor

2021-2023

Three years on-site supervision and organizer of drug testing practical course at the Heidelberg University.

Biochemistry student council & Buddy program

2021-2022

Active member of the biochemistry sutdent council. Main task: Coordinated and actively participated in the Buddy Program, assisting international students within the Biochemistry and Chemistry majors at Heidelberg.

SCHOLARSHIPS

Studienstiftung des deutschen Volkes

Since April 2022

Monthly scholarship from the German Academic Scholarship Foundation, including financial and organisational support for study abroad, language courses and other activities.

SOFTWARE SKILLS

Scientific Software	PyMol, RDKit, VMD, GROMACS, Plumed, ChimeraX
Programming Skills	Advanced Python, Bash/Linux, Git, Collaborative Development
HPC	Parallel CPU computing, GPU computing, Slurm
Design	Inkscape, Blender & Molecular Nodes

LANGUAGES

German

English

Spanish