Benedikt Christian Clemens

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Research Experience

Oct 2024 – Feb 2025 **Frauenhofer Institute for Algorithms and Scientific Computing (SCAI), Germany**
Research intern in Professor Holger Fröhlich's Biomedical AI and Data Science group

- Investigating cell subtypes in microglia and cells of the dorsolateral prefrontal cortex in Alzheimer's Disease (AD) patients using sc-RNA and sn-RNA sequencing data
- Conducting literature search for machine learning methods for cell clustering
- Applying graph machine learning for detection of cell communities characteristic for early onset of AD

Nov 2023 – Sep 2024 **University Hospital Bonn, Germany**
Bioinformatician at the Felix Meissner Lab

- Conducted analysis of surgical and medical data to identify candidates for a longitudinal study (n=92) on Systemic Inflammatory Response Syndrome (SIRS); the group's subsequent biomarker discovery found protein signatures that can predict SIRS from blood draft during surgery (preliminary results)
- Automated and streamlined spatial proteomics data analysis in Python modules for use by wet-lab scientists; these modules are integrated into a collaborative database, enabling visualization of protein co-localizations post-treatment, different representations of spatial protein profiles, and distance measurements between protein profiles
- Implemented data imputation techniques for proteomic dataset whereby missing values are sampled from a shifted normal distribution calculated from experimentally-observed means and variances

Jun 2022 – Dec 2022 **Massachusetts General Hospital, USA**
Bioinformatician at the Wilhelm Haas Lab

- Automated the lab's sample preparation using the Opentrons OT-2 API:
  - Designed custom 3D prints to make labware compatible with the robotic platform
  - Automated protein denaturation and purification (SP3-Protocol)
  - Automated protein quantification
- Developed novel methods to purify proteins and compress the dynamic range of the plasma proteome, resulting in an over 100% increase of low-abundance proteins compared to the previously used SP3-purification protocol
- Physically processed over 1,200 patient samples on the robotic platform for a large-scale early lung cancer detection study
- The automated workflow and purification methods were presented at the ASMS 2023 in Houston, Texas

Oct 2021 – Dec 2021 **Massachusetts General Hospital, USA**
Intern at the Wilhelm Haas Lab

- Maintained, troubleshooted and repaired mass spectrometers and chromatographs
- Performed proteomic sample preparation techniques

Education

Apr 2023 – Present **Life Science Informatics Master (University of Bonn, Germany)**

- Coursework in machine learning, computer science, structural bioinformatics, and biomedical data science. Earned the highest marks in multiple exams. Overall GPA: 3.7/4.0

Oct 2019 – Apr 2023 **Bachelor of Science in Biology (University of Bonn, Germany)**

- Specialization in bioinformatics and proteomics. Overall GPA: 3.58/4.0

Extracurricular activities

Oct 2018 – Oct 2020 **Social worker at Domizil am Venusberg**

- Worked with residents requiring high levels of care due to disabilities, cancer, and/or dementia

Jan 2003 – Jun 2016 **Professional athlete (Judo):**
1. Godesberger Judo Club, Bonn, Germany

- Achieved several placements (including gold, silver, bronze) over a 5-year period (2011-2016) in international tournaments and at the West German Championships
- Refere, assistant trainer and supervisor of young athletes during holiday programs

Skills:

Computation: Python, R, Gitlab, Pytorch, Deep Learning, Graph Machine Learning, Time Series Analysis, Cheminformatics
Laboratory: Mass Spectrometry (LC-MS/MS), Sample Automation, Proteomic Sample Preparation