HANNES STÄRK

M.Sc. Informatics Student with Machine Learning major at TUM, Munich, DE

hannes-stark.com | HannesStark | hannes-stark | hannes.staerk@gmail.com

EDUCATION

M.Sc. Informatics | Machine Learning major

Technical University Munich

since Oct 2019 | Munich, DE | Full-time

- 2nd Year: Advanced topics in machine learning and probabilistic inference
- 1st Year: Introduction to machine learning and learning theory

Attending theoretical foundations of AI and protein prediction reading groups

B.Sc. Informatics | Mathematics track

Bundeswehr University Munich

Sept 2017 – Sept 2019 | Munich, DE | Full-time

- 2nd Year: Networking, statistics, and advanced maths
- 1st Year: Mathematics, algorithms, and programming foundations

Build concept and start development of the app CoachPTBS

RESEARCH EXPERIENCE AND PAPERS

Master's Thesis

Prof. Pietro Liò, Computer Laboratory, Cambridge University

Feb 2021 – Present | Cambridge, UK | Full-time remote

- **Semi-supervised learning for small molecular graphs with 3D information**
- Neural estimation of mutual information to maximize it between a spectral representation of the 3D structure and a spatial graph representation

Interdisciplinary project Bioinformatics

Prof. Burkhard Rost, Bioinformatics chair, Technical University Munich

Sept 2020 – Feb 2021 | Munich, DE | Full-time course

- **Developed new attention mechanism and architecture for predicting proteins' subcellular location beating the previous SOTA by 5 percentage points**
- Evaluate different types of learned representations for proteins and what information is captured by Transformers' protein embeddings

First author of "Light Attention Predicts Protein Location from the Language of Life" currently under review at ICML

Guided Research Computer Vision

Prof. Matthias Nießner's CV & AI chair, Technical University Munich

March 2020 – Sept 2020 | Munich, DE | Full-time course

- **Generating new views of a scene captured only with a handful of images using Neural Radiance Fields; collaboration with two other students**
- Adapted Neural Radiance Fields for a dynamic scene of a human to interpolate between and render different views and human poses

Coauthor of "Neural Radiance Fields for Novel View and Human Pose Synthesis" (unpublished) with video explanation and code

Seminar: Selected topics in machine learning

Prof. Stephan Günnemann's ML group, Technical University Munich

April 2020 – Sept 2020 | Munich, DE | Full-time course

- Seminar where each student wrote a survey on selected machine learning topics and had to review the papers of three other students

A detailed "Survey on Transformers" (unpublished)

SUMMARY

*I am passionate about **MACHINE LEARNING**, learning on **GRAPHS** and **BAYESIAN NEURAL NETWORKS**. I have hands-on experience from academia + industry and am now fully devoted to research. My main expertise has revolved around **TRANSFORMERS**, and new attention mechanisms applied to **PROTEIN PREDICTION** tasks. I am a researcher with a mathematical background, eager to solve impactful problems and work in academia.*

SKILLS

Python ●●●●○

Main language in projects and personal use

Java + Scala ●●●○○

Two years of backend development and main language during studies

Other Languages: HTML, CSS, JavaScript (proficient) R, C++, SQL, ARM assembly, Swift, MATLAB (used occasionally)

PyTorch ●●●●○

Protein localization prediction, Neural Radiance Fields, Graph representations in reinforcement learning, WaveNet for denoising audio, Enzyme prediction + projects done as coursework, exercises created for courses

TensorFlow, Keras ●○○○○

Variational Autoencoder for remote sensing images

Other: Spectral Methods for Graphs, Audio processing, Robotics, Computer Vision and Graphics, Git, Unix systems, Shell, Docker, Cloudfoundry, Jenkins, Unittesting, Jupyter, LaTeX, **clean code**, AWS, Google Cloud Platform

Languages:

German ●●●●●

Native Speaker

English ●●●●●

Professional Proficiency | 96% in TOEFL test

French ●○○○○

Secondary language at school and from friends

Skill rankings represent personal frame of reference

LEISURE

Sports: Gymnastics, Calisthenics, Acrobatics

Maths: Explaining and illustrating short topics from maths or science, Watching online lectures, and writing summaries with reviews

Other: Chess, reading popular science, attending ML conferences, paper discussion groups

WORK EXPERIENCE

Mathematics Lecturer

BIB Augsburg gGmbH

since Feb 2020 | Augsburg, DE | Part-time

Teaching linear algebra, analysis, and statistics

- Organizing online teaching and weekly individual lessons
- Student mediation and counseling. Collecting feedback, Weekly reports

Teaching Assistant for Deep Learning

Technical University Munich

Nov 2020 – April 2021 | Munich, DE | Part-time

Holding office hours and giving lessons to subgroups of all students

- Creating exercise and learning material like jupyter notebooks or graphics
- Explaining lecture content and answering questions via online teaching tool

Student Assistant

Institute of Mathematics and OR, Bundeswehr University Munich

Sept 2018 – July 2019 | Munich, DE | Part-time

Worked on causal inference for train traffic data with structure learning in Bayesian networks and validated approaches with simulation data

- Implemented and evaluated methods for regression on time-series data

PyTorch, Python, Anylogic simulations, Recurrent neural networks, SARIMA, ARIMAX, LSTMs, Bayesian network structure learning, causal inference

Dual Study Program

Allianz Deutschland AG

Sept 2017 – Sept 2019 | Munich, DE | Part-time

Web-development and digital infrastructure maintenance in an agile development team, technical training in computer science

- Designed and Developed an app for organizing large software releases
- Provided web-applications for customer interaction and deployment pipelines

Java (Spring Boot), HTML, CSS, TypeScript (Angular), Git, Jenkins, software engineering best practices, clean and fast programming

PROJECTS AND ACTIVITIES

Deep learning for robotics

Technical University Munich

Nov 2020 – Present | Munich, DE

- **Project in a course: using graph representations of robots in reinforcement learning**
- Implementing and evaluating Graph Neural Networks that are able to capture the full spatial geometry of a represented robot

Gymnastics and Acrobatics Trainer

VfL Buchloe

Sept 2015 – Present | Buchloe, DE

- Started acrobatics show group Akrobatik Astral
- Training gymnastics and acrobatics groups
- Choreograp and participate in shows

Bachelor's Thesis

Bundeswehr University Munich

May 2019 – Sept 2019 | Munich, DE

- Implemented a convolutional variational autoencoder and investigated methods for interpolating in the latent space and understanding it with t-SNE and linear probing
- "Understanding Variational Autoencoders' Latent Representations of Remote Sensing Images"

Tool for calculating Network centralities

Bundeswehr University Munich

Feb 2019 – Aug 2019 | Munich, DE

- Implemented a web application that calculates different centrality measures for arbitrary graphs
- Wrote a report about the tool and the algorithms for the spectrum based centrality measures

Talent base Memmingen: Physics

BSG Memmingen

Sept 2016 – Jul 2017 | Memmingen, DE

- Extracurricular program where we built a nitrogen laser using high voltage to ionize a thin strip of air