

HANNES STÄRK

MIT Research Intern - M.Sc. Informatics from TUM, Munich, DE

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EDUCATION

M.Sc. Informatics | Machine Learning major

Technical University of Munich


 Oct 2019 - Sept 2021  Munich, DE  Full-time

- "passed with high distinction" (1.2) - No corrections for thesis
- Learning theory, ML, DL, Quantum Computing, Protein Prediction, ...
-  Attending theoretical foundations of AI and protein prediction reading groups

B.Sc. Informatics | Mathematics track

Bundeswehr University Munich

 Oct 2017 - Sept 2019  Munich, DE  Full-time

- Only student who completed the 3 year curriculum in 2 years
-  Built concept and started development of the app [CoachPTBS](#)

EXTRACURRICULAR TRAINING

Machine Learning Summer School: [MLSS](#)  Aug 2021

- Strong student award and nominated for best paper (selective admission)

Eastern European ML Summer School: [EEML](#)  Jul 2021

- 1 of 4 chosen students to present research (selective admission)

London Geometry and ML Summer School: [LOGML](#)  Jul 2021

- GNNs for molecules project with Dr. Wengong Jin (selective admission)

PRAIRIE/MIAI AI Summer School: [PAISS](#)  Jul 2021

- Organized two meetups about Graph ML (selective admission)

MAIN RESEARCH PROJECTS

MIT Internship: Geometric DL for Binding Prediction

[Tommi Jaakkola](#), MIT + [Regina Barzilay](#), MIT + [Octavian Ganea](#), MIT


 since Oct 2021  Boston, USA  Full-time

- SE(3)-invariant prediction of the bound ligand's 3D coordinates

Master's Thesis on Graph Representation Learning

[Pietro Liò](#), Cambridge University + [Stephan Günnemann](#), TUM


 Mar 2021 - Sept 2021  Cambridge, UK  Full-time remote

- Self-supervised learning for small molecular graphs: [Thesis](#)
- Use SSL to pre-train GNNs with 3D information of molecules leading to a 22% average improvement in prediction error: [video explanation](#) 

Protein Language Models for Protein Prediction

[Burkhard Rost](#), Technical University of Munich

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

- Developed [attention mechanism and architecture](#) for predicting proteins' subcellular location beating SOTA by 8 percentage points: [video](#) 

PUBLICATIONS

- Stärk, Hannes et al. (2021) "3D Infomax improves GNNs for Molecular Property Prediction". Under review. Also accepted at NeurIPS 2021 ML4PH, AI4S, SSL workshops and ELLIS ML4Molecules workshop.
- Kefato, Z.; Stärk, Hannes et al. (2021) "Jointly Learnable Data Augmentations for Self-Supervised GNNs". In: Under review. Accepted at NeurIPS 2021 SSL
- Stärk, Hannes et al. (2021) "Light Attention Predicts Protein Location from the Language of Life". In: OUP Bioinformatics Advances. Posters + contributed talk at ICLR'21 AI4PH and ICLR'21 MLPCP. Poster + long talk at MLCBS 2021. Poster + talk at WCB ICML 2021.

SUMMARY

I am passionate about **MACHINE LEARNING** and especially **GRAPH REPRESENTATION LEARNING**. I have hands-on experience from academia + industry and am now fully devoted to research. My main expertise revolves around symmetry aware **GNNs** for **MOLECULES** and **SELF-SUPERVISED LEARNING** on graphs. Previously, I worked on transformers for **PROTEIN PREDICTION**. I am a researcher with a mathematical background, eager to learn about important problems and find impactful solutions.

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



Self-Supervised learning, Transformers for proteins, Differentiable rendering, Reinforcement learning, WaveNet for denoising audio, Enzyme prediction + projects done as coursework and exercises created for courses

TensorFlow, Keras



Variational Autoencoder for aerial images

Other: Spectral Methods for Graphs, Computer Vision, Git, Unix systems, Shell, Docker, Cloud-foundry, 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


LEISURE

Sports: Gymnastics, Calisthenics, Acrobatics

Watching online lectures, Writing about maths, Chess  , Paper discussion groups

AWARDS

 Highest prize money award at WCB ICML'21

 Strong student award at MLSS

WORK EXPERIENCE

Mathematics Instructor

BIB Augsburg gGmbH

📅 since Feb 2020 📍 Augsburg, DE 🛒 Part-time

👤 4h workweek: teaching linear algebra, analysis, and statistics

- Online lectures and weekly individual lessons

Student Assistant

Institute of Mathematics and OR, Bundeswehr University Munich

📅 Sept 2018 – July 2019 📍 Munich, DE 🛒 Part-time

👤 10h workweek: causal inference + structure learning in Bayesian networks

- 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

👤 38h workweek: 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

TEACHING

Operations Research

Technical University of Munich, Decision Sciences

📅 April 2021 – Sept 2021 📍 Remote 🛒 Part-time

- Taught two recitations per week for 40 students, helped in online forum

Deep Learning

Technical University of Munich, CV & AI Niessnerlab

📅 Nov 2020 – April 2021 📍 Remote 🛒 Part-time

- Held weekly office hours, created exercises and learning material like jupyter notebooks, answered questions in an online forum

VOLUNTARY WORK

Co-organizer of ML on Graphs workshop @ WSDM 2022

2022 Machine Learning on Graphs Workshop

📅 Dec 2021 – Feb 2022 📍 Remote

- Publicity Chair, advertising, and running workshop [Twitter account](#)

Reviewer for ML4H 2021 Symposium

2021 Machine Learning for Health Symposium

📅 Sept 2021 - Oct 2021 📍 Remote

- Review four papers on graph representation learning and time series analysis

ICLR 2021 and ICML 2021 Volunteer

ICML and ICLR

📅 Jul 2021 📍 Remote 🛒 One-time event

- Helped presenters during poster and live sessions and in workshops

Gymnastics and Acrobatics Trainer

VfL Buchloe

📅 Sept 2015 – Present 📍 Buchloe, DE

- Started acrobatics show group [Akrobatik Astral](#)
- Training gymnastics and acrobatics groups for competitions and shows
- Choreograph acrobatics [shows](#) 📺 and participate in them

TALKS

Mila - Quebec AI Institute 📅 Dec 2022

Upcoming talk. Invited by Dr. Prudencio Tossou

Twitter Research 📅 Dec 2022

Upcoming talk. Invited by Fabrizio Frasca

Hong Kong ML meetup 📅 Dec 2021

Invited talk about GNNs for molecules

Technical University of Munich 📅 Nov 2021

Two **guest lectures** about protein prediction for biology and CS students. Host: Prof. Burkhard Rost

University of Cambridge 📅 Oct 2021

AI Research seminar. Host: Prof. Mateja Jamnik

Valence Discovery 📅 Oct 2021

Research Talk. Host: Daniel Cohen

ICLR'21, ICML'21, and NeurIPS'21 Workshops

4 contributed talks for strong papers

ISMB/ECCB 2021 📅 July 2021

Chosen for "Long Talk" on representation learning

RLB Workshop 📅 July 2021

Protein localization. Host: Christian Dallago

PROJECTS

GraphML Reading Group

LoGaG Reading Group

📅 since Aug 2021 📍 virtual

- I am organizing the [Learning on Graphs and Geometry reading group](#) where paper authors present their work in an open discussion on Zoom
- >50 weekly attendees and sponsored by [Valence](#)

Guided Research Computer Vision

Matthias Nießner's CV & AI chair at TUM

📅 Mar 2020 – Sept 2020 📍 Munich, DE

- "Neural Radiance Fields for Novel View and Human Pose Synthesis" (unpublished) with [video](#) 📺 explanation and [code](#) 🔗

Predict Protein webserver

Rostlab at Technical University of Munich

📅 April 2021 📍 Munich, DE

- Provide the state-of-the-art subcellular localization predictions for the [predict protein webserver](#)

GNNs for Reinforcement Learning

Technical University of Munich

📅 Nov 2020 – Mar 2021 📍 Munich, DE

- Project in a course: graph representations of robots in reinforcement learning: [Report](#) 📄, [Code](#) 🔗

Seminar: Topics in machine learning

DAML at Technical University of Munich

📅 April 2020 – Sept 2020 📍 Munich, DE

- I wrote a survey on Transformers and reviewed the papers of three other students: [My survey](#) 📄

Bachelor's Thesis

Bundeswehr University Munich

📅 May 2019 – Sept 2019 📍 Munich, DE

- Implemented a variational autoencoder and developed methods for interpolating in the latent space and interpreting + visualizing it: [Bachelor's thesis](#)