

HANNES STÄRK

EECS PhD student at MIT - M.Sc. Informatics from TU Munich

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EDUCATION

PhD in EECS | Machine Learning

Massachusetts Institute of Technology 📅 June 2022 - June 2027

- Co-advised by Prof. [Tommi Jaakkola](#) and Prof. [Regina Barzilay](#)

M.Sc. Informatics | Machine Learning major

Technical University of Munich 📅 Oct 2019 - Sept 2021

- "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

- 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)

PREVIOUS CORE RESEARCH PROJECTS

MIT Internship: Geometric DL for Binding Prediction

Tommi Jaakkola, MIT + Regina Barzilay, MIT + Octavian Ganea, MIT

📅 Oct 2021 - Feb 2022 📍 Remote

- SE(3)-invariant prediction of the bound ligand's 3D coordinates: [Paper](#) 📖

Master's Thesis on Graph Representation Learning

Pietro Liò, Cambridge University + Stephan Günnemann, TUM

📅 Mar 2021 - Sept 2021 📍 Remote

- Use SSL to pre-train GNNs with 3D information of molecules leading to a 22% average improvement in prediction error: [video explanation](#) 📺

SELECTED PAPERS (find all here: 🎓)

- Gabriele Corso*, Stärk Hannes* et al. (2022) "EquiBind: Geometric Deep Learning for Drug Binding Structure Prediction". In: *ICML 2022. Spotlight at ICLR'22 MLDD*.
- Stärk et al. (2022) "EquiBind: Geometric Deep Learning for Drug Binding Structure Prediction". In: *ICML 2022. Spotlight at ICLR'22 MLDD*.
- Stärk et al. (2021) "3D Infomax improves GNNs for Molecular Property Prediction". In: *ICML 2022. Also at NeurIPS 2021 ML4PH, AI4S, SSL workshops and ELLIS ML4Molecules workshop*.
- Stärk et al. (2021) "Light Attention Predicts Protein Location from the Language of Life". In: *OUP Bioinformatics Advances. Also at ICLR'21 AI4PH and spotlight at ICLR'21 MLPCP. Poster + talks at MLCSB 2021 and WCB ICML 2021*.

SUMMARY

*I am a first-year PhD student at MIT CSAIL co-advised by Tommi Jaakkola and Regina Barzilay. I work on **GEOMETRIC DEEP LEARNING**, physics-inspired ML and applications in **MOLECULAR BIOLOGY** and **PHYSICS**. I aim to use ML to model complex systems that cannot be captured by simple equations. This is with the purpose of improving our understanding of the world and helping tackle **IMPACTFUL** real-world problems.*

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

ML Research Intern

Valence Discovery

📅 March 2022 - May 2022 📍 remote 🧰 Part-time

📌 Paper on drug-target binding affinity prediction

Mathematics Instructor

BIB Augsburg gGmbH

📅 Feb 2020 - Nov 2021 📍 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

VOLUNTEERING AND PAPER REVIEWS

Co-founder and Organizer of the Learning on Graphs Conference

- founded the LoG Conference with Dr. Petar Veličković and Yuanqi Du

Reviewing papers

- IEEE Transactions on Pattern Analysis and Machine Intelligence (1)
- Bioinformatics (1)
- 2021 Machine Learning for Health Symposium (4)

Co-organizer of ML on Graphs Workshop @ WSDM 2022

ICLR 2021 and ICML 2021 Volunteer

- Help presenters and host talks including keynotes

Gymnastics and Acrobatics Trainer

VfL Buchloe

📅 Sept 2015 - May 2022 📍 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 (find all here: 🌐)

Mila - Quebec AI Institute

📅 Jan 2022

Molecular Modelling. Host: Dr. Prudencio Tossou

Twitter Research

📅 Jan 2022

Host: Prof. Michael Bronstein and 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

Invited 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