

HANNES STÄRK

MIT PhD Student in Electrical Engineering and Computer Science

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EDUCATION


PhD in EECS | Machine Learning

Massachusetts Institute of Technology  June 2022 - June 2027

- Advised by Prof. [Tommi Jaakkola](#) and Prof. [Regina Barzilay](#)
- Working on ML for biochemistry and generative models.


M.Sc. Informatics | Machine Learning major

Technical University of Munich  Oct 2019 - Sept 2021

- "passed with high distinction" (1.2) - No corrections for [thesis](#)
 - Thesis at University of Cambridge with Pietro Liò and Stephan Günnemann.
 - 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)

SELECTED PAPERS (find all here:)

- Stärk et al. (2023) "[Harmonic Self-Conditioned Flow Matching for Multi-Ligand Docking and Binding Site Design](#)". In: *Under Review*. Oral at [NeurIPS'23 AI4Science workshop](#).
- Gabriele Corso*, Hannes Stärk* et al. (2023) "[DiffDock: Diffusion Steps, Twists, and Turns for Molecular Docking](#)". In: *ICLR 2023*. Best paper at [NeurIPS'22 Score-Based Methods Workshop](#)
- Stärk et al. (2022) "[EquiBind: Geometric Deep Learning for Drug Binding Structure Prediction](#)". In: *ICML 2022*. Also spotlight at [ICLR'22 MLDD](#).
- Stärk et al. (2022) "[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*. Spotlight at [ICLR'21 MLPCP](#). Poster + talks at [MLCSB 2021](#) and [WCB ICML 2021](#).

WORK EXPERIENCE

ML Research Intern

Valence Discovery

 March 2022 - May 2022  remote  Part-time

 Graph ML for drug-target binding affinity prediction

Mathematics Instructor

BIB Augsburg gGmbH

 Feb 2020 - Nov 2021  Augsburg, DE  Part-time

 4h per week: teaching linear algebra, analysis, and statistics

- Online lectures and weekly individual lessons

SUMMARY

*I am a second-year PhD student at MIT CSAIL advised by Tommi Jaakkola and Regina Barzilay. I work on ML for **bio-chemistry problems and diffusion/flow based generative models**. I aim to use ML for modeling complex systems with the purpose of improving our understanding of the world and helping tackle impactful real-world problems.*

NEWS

MIT News featured [DiffDock](#)  Mar 2023

MIT News featured [EquiBind](#)  Jul 2022

ACADEMIC OUTREACH

My Reading Group: LoGG

 since Aug 2021  virtual

- I organize the weekly [Learning on Graphs and Geometry reading group](#) where I discuss papers with authors on Zoom with ~ 75 weekly attendees.
- Slack community of over 2,700 researchers
- Sponsored by [Recursion Valence Labs](#)

Co-founder and Organizer of the [Learning on Graphs Conference](#)

 since Dec 2022  virtual

- Innovate reviewing process with financial incentives for reviewers and quality control
- Decentralized meetups, free registration, and fully openly accessible

Main organizer of [MoML Conference](#)

 since Oct 2022  MIT, Cambridge, MA

- 300 attendee, Molecular ML conference, in honor of my deceased mentor [Octavian Ganea](#).

REVIEWING

- 5 NeurIPS 2023 Workshops (11 papers)
- NeurIPS 2023. Awarded "[top-reviewer](#)" (6 papers)
- ICML 2023 Frontiers in Learning, Control, and Dynamical Systems Workshop (3 papers)
- ICML 2023 Synergy of Scientific and Machine Learning Modelling Workshop (1 paper)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (1 paper)
- Bioinformatics (1 paper)
- 2021 Machine Learning for Health Symposium (4 papers)

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

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

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

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

Gymnastics, Philosophy, Acrobatics, Watching online lectures, Chess ♚, Paper discussions

AWARDS

Lightning award at MLSS

Strong student award at MLSS

Highest prize money award at WCB ICML'21

TALKS (find all here: [🌐](#))

[American Chemical Society](#) Aug 2023

Invited talk at Skolnik Award Symposium

[Mila - Quebec AI Institute](#) Jan 2022

Molecular Modelling. Host: Dr. Prudencio Tossou

[Twitter Research](#) Jan 2022

Host: Prof. Michael Bronstein and Fabrizio Frasca

[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

[ISMB/ECCB 2021](#) July 2021

Chosen for "Long Talk" on representation learning