Artur Toshev

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ACADEMIC HISTORY

04/2021 – present	Doctoral Candidate under the supervision of Professor Nikolaus Adams **Technical University of Munich (TUM)** (Munich, DE) **Topic**: Data-Driven Acceleration of Particle-Based Fluid Simulations ➢ Investigation of ways for improving MCMC with ideas from mesoscopic SDE-driven fluid dynamics, i.e. Lévy processes, - paper in preparation ➢ Temporal and Spatial Coarsening of Navier-Stokes Systems through Geometric Deep Learning ➢ Phase transition problems described by more complex PDEs than Navier-Stokes
09/2019 – 12/2019	Exchange Program TUMexchange (Focus area: Statistical Mechanics) **Korea Advanced Institute of Science and Technology (KAIST)** (Daejeon, KR)
10/2018 – 03/2021	M.Sc. *Materials Science and Engineering* **Technical University of Munich (TUM)** (Munich, DE) **Specialization**: Uncertainty Quantification and Mathematical Modeling **Thesis**: *Levy-Driven Langevin Monte-Carlo* **Final Grade**: 1,2 (with High Distinction)
10/2016 – 03/2019	B.Sc. *Engineering Science* **Technical University of Munich (TUM)** (Munich, DE)
02/2016 – 06/2016	Exchange Program Erasmus+ (Focus ares: Thermodynamics) **Polytechnic University of Valencia (UPV)** (Valencia, ES)
10/2013 – 09/2017	B.Eng. *Building Services Engineering* **Munich University of Applied Sciences** (Munich, DE)

PUBLICATIONS AND OPEN-SOURCE CONTRIBUTIONS

02/2023	E(3) Equivariant Graph Neural Networks for Particle-Based Fluid Mechanics (web) **Physics4ML Workshop at ICLR 2023**
07/2022	*On the Relationships between Graph Neural Networks for the Simulation of Physical Systems and Classical Numerical Methods* (web) **AI4Science Workshop at ICML 2022**
Open-source:	➢ Fixing a bug in the OpenFPM C++ library (here) ➢ Tutorial on GNNs for beginners, writing GCN and GAT from scratch (here) ➢ Tutorial on setting up CUDA for ML using PyTorch, TF, and JAX (here)

POSTERS AT WORKSHOPS / SUMMER SCHOOLS

09/2022	Poster: *Equivariance in Smoothed Particle Hydrodynamics* Physics meets Artificial Intelligence, **ASC, LMU** (Munich, DE)
07/2022	Presentation: *Equivariance in Smoothed Particle Hydrodynamics* Swiss Equivariant Learning Workshop, **EPFL** (Lausanne, CH)
07/2022	Project (ongoing): *Distilling large GNNs for molecules* LOGML Summer School, **London Geometry and Machine Learning** (virtual)

TEACHING @ TUM

04/2023-08/2023	*Seminar AI for Science* - Seminar
10/2022-02/2023	Introduction to Scientific Machine Learning for Engineers - Lecture and Exercise
04/2022-08/2022	*Turbulent Flows* - Exercise
10/2021-02/2022	*Turbulent Flow Simulation on HPC Systems* - Practical course
04/2020-07/2020	*Engineering Mechanics 2 (MSE)* - Tutorial

WORKING EXPERIENCE

07/2017-12/2017	Research Assistant - Integration of a latent heat storage into a heat pump system **Bavarian Center for Applied Energy Research (ZAE)** (Garching, DE)
05/2014-10/2017	Working Student - Technical design and monitoring of building services systems **Eura Ingenieure Weißmann** (Munich, DE)
08/2016-10/2016	Working Student - Measuring and control system of a compression chiller **Munich University of Applied Sciences** (Munich, DE)
10/2013-04/2014	Working Student - Geodetic measurements and 3D laser scanning **Vokal and Partner** (Munich, DE)

READING GROUPS AND SEMINARS

02/2022-present	**Seminar at Prof. Nils Thuerey's group** at TUM
02/2022-present	**Italian Association for Machine Learning** - ML Theory Study Group (virtual)
11/2021-02/2022	**Machine Learning Collective** - Physics Informed ML Reading Group (virtual)
02/2021-02/2022	**Toshev Colloquium**: In the middle of the pandemic, I initiated a webinar series among fellow students mainly focusing on the natural sciences and ML (see my website). Over the course of one year we held 30 meetings!

SKILLS, SCHOLARSHIPS & HOBBIES

Languages	Bulgarian: Mother tongue English: Proficiency (C2) German: Proficiency (C2) Spanish: Intermediate (B1)
Software	➢ Programming (advanced): *Python (PyTorch, JAX)*, *Matlab* ➢ Programming (intermediate): C, C++, *Julia, HTML, Bash* ➢ *LaTeX, Markdown; Microsoft Office, LibreOffice* ➢ *Linux, Windows*
Scholarships	➢ Deutschlandstipendium 10/2019 – 03/2021 ➢ Hans-Rudolf-Stiftung 10/2018 – 09/2020
Hobbies	➢ Rock climbing, hiking

Munich, 13.04.2023