Niklas S. Nolte

Personal Data

Name:	Niklas Stefan Nolte
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Work Experience

06/2023-XX/XXXX	Postdoctoral Research Scientist at FAIR, Meta • Transformers & memory • Representation learning in structured data • attacking post-quantum encryption systems • AI for fundamental physics
03/2021-06/2023	Postdoctoral Associate at Massachusetts Institute of Technology (MIT) • AI Research & Fundamental Physics - IAIFI Project Inductive Biases, Lipschitz Networks, Robustness, Interpretability • Research and software development for the High Level Trigger (HLT) at the LHCb Experiment at CERN, applying our developed models in high stake environments.
11/2017-02/2021	Doctoral thesis at European Organization for Nuclear Research (CERN) *A Selection Framework for LHCb's Upgrade Trigger* Full time research and software development for the HLT and detector upgrade of LHCb in 2022
10/2016-09/2017	Master's thesis *Search for Lepton Flavor Violation in* $\phi \to e^+\mu^-$ *decays*
04/2015-07/2015	Bachelor's thesis *Search for LFV in* $B^+ \to K^+e^+\mu^-$ *decays*

Scientific Education

11/2017-02/2021	Physics PhD with specialization on high performance software development and machine learning for physics, supported by the Wolfgang-Gentner scholarship / CERN & TU Dortmund University.
10/2018	CERN School of Computing in Israel
10/2015-10/2017	Master of Science in Physics / TU Dortmund University
10/2012-09/2015	Bachelor of Science in Physics / TU Dortmund University
09/2004-06/2012	Abitur / Geschwister-Scholl-Gymnasium Lüdenscheid

Training and Supervision

03/2022-05/2022	Teaching LEAPS Leadership class at MIT
05/2017-06/2023	Supervised multiple Grad and Undergrad students and one high school student
Occasionally	Taught C++ at Hackathons within the LHCb collaboration
02/2017	Teaching Assistant for "Statistical Methods of Data Processing"
2010-2017	Private tutor for Physics and Mathematics
since 2008	Volunteer worker for youth groups at church, summer camps etc.

Publications

2024	From Neurons to Neutrons: A Case Study in Interpretability (not yet public) submitted to ICML
2024	The cool and the cruel: separating hard parts of LWE secrets submitted to AfricaCrypt 2024
2024	*Salsa Fresca: Angular Embeddings and Pre-Training for ML Attacks on Learning With Errors* submitted to ICML
2024	*DiSK: A Diffusion Model for Structured Knowledge* submitted to ICML
2023	*Development of the Topological Trigger for LHCb Run 3* ACAT
2023	*NuCLR: Nuclear Co-Learned Representations* SynS&ML, IMCL
2023	*Expressive Monotonic Networks* ICLR & *Robust and Provably Monotonic Networks* Machine Learning: Sci. Tech.
2022	*Finding NEEMo: Geometric Fitting using Neural Estimation of the Energy Movers Distance* ML4PS, NeurIPS
2022	*Towards Understanding Grokking: An Effective Theory of Representation Learning* NeurIPS
2022	*A Comparison of CPU and GPU Implementations for the LHCb Experiment Run 3 Trigger* Comput Softw Big Sci
2021	*Evolution of the energy efficiency of LHCb's real-time processing* CHEP
2020	*Configuration and scheduling of the LHCb trigger application* CHEP
2019	*A new scheduling algorithm for the LHCb upgrade trigger application* ACAT
2018	*New Approaches to track reconstruction in LHCb's Vertex Detector* CHEP
2017-2023	The LHCb collaboration publishes jointly, based on collaborative work on the detector and the resulting data at the LHC, see the homepage

Awards and Extraordinary

2021	LHCb Early Career Scientist Award
2018	Wolfgang-Gentner Scholarship
in School	Skipped grades 2 and 10

Expertise

Languages	German (native)
	English (C2)
	Spanish (A1)
Computing	Expert level Python
	PyTorch, NumPy etc.
	(A little rusty) advanced to expert level C++ (STL (C++17), BOOST)
	Previous experience with Haskell, Julia, Clojure, Go
	Daily use of git[lab|hub], zsh/bash
	LaTeX
	UNIX systems