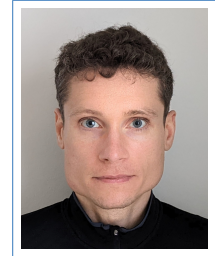# Dr. Raoul Malm

German citizenship

homepage: www.raoulmalm.de
linkedin: raoulmalm
github: raoulma

Work Experience

since 09/2019	**Software Developer at d-fine GmbH, Frankfurt am Main** Development of IT desktop and web applications in the financial sector. Technology stack: - Languages: Python (Qt, FastAPI), TypeScript/JavaScript (Vue.js) - DevOps: GitLab/Gitea/Jenkins, UpSource, SonarQube, Ansible, Docker - Deployment: on-premises and in the cloud using AWS (Serverless) Services via Terraform - Databases: PostgreSQL, Oracle, MySQL
10/2018 - 05/2019	**Researcher at Swiss AI Lab IDSIA, Lugano** Working group of Prof. Dr. Jürgen Schmidhuber Topic: Artificial curiosity in deep reinforcement learning
10/2017 - 09/2018	**Professional Reorientation:** Self-teaching Machine Learning and Computer Vision by taking online courses, studying scientific books and research papers, and writing source code.
01/2017 - 09/2017	**Sabbatical:** Travelling in Nepal, Myanmar, Thailand, Hong Kong, China and Japan; Trekking to the Everest Base Camp in Nepal, climbing Mont Blanc in France, running the Zugspitze trail-marathon near Munich and the city marathons in Cologne and Frankfurt
05/2011 - 12/2016	**Research assistant in Theoretical Physics, Johannes Gutenberg-University Mainz** Working group of Prof. Dr. Matthias Neubert Topics: physics beyond the Standard Model, collider physics and phenomenology
05/2005 - 01/2006	**Civilian service**, St. Vincenz and Elisabeth Hospital in Mainz, Germany

Education

08/2012 - 11/2016	**Dr. rer. nat. in Theoretical Physics with Distinction, Grade: 0.7 (summa cum laude)** Johannes Gutenberg-University Mainz Thesis: "Five-dimensional Perspective on Higgs Physics and the $b \rightarrow s\gamma$ Transition in a Warped Extra Dimension" (d-nb.info/1120148685/34) Supervisor: Prof. Dr. Matthias Neubert
04/2006 - 05/2012	**Dipl.-Phys. in Theoretical Physics, Grade: 1.0 (very good)** Johannes Gutenberg-University Mainz Thesis: "Mitigation of the ϵ_K Fine-tuning Problem in the Randall-Sundrum Model" Supervisor: Prof. Dr. Matthias Neubert
08/1996 - 03/2005	**Secondary School (Abitur), Grade: 1.6 (good)** "Gymnasium am Kurfürstlichen Schloss" in Mainz

Programming Skills

Python (4), JavaScript (2), Git (2), SQL (2), C++ (1), R (1)

The number in each round bracket shows my experience on a 5-point scale from 1 (basic knowledge) to 5 (complete knowledge) of the corresponding language.

Software Projects

2022-2023	Development of a web application for the process automatisation in credit quality review - Initial design of the software architecture and implementation of the prototype - Implementation of backend with Python (FastAPI) and frontend with JavaScript (Vue.js) - DevOps using GitLab, SonarQube, Ansible and Docker allowing for continuous delivery - Migration into the cloud using AWS (Serverless) Services, configured via Terraform
2020-2021	Development of a desktop application for the process automatisation in credit quality review - Implementation of the backend and frontend with Python using Qt - DevOps using Gitea, Jenkins, Upsource and SonarQube allowing for continuous delivery

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2019	Implementation of deep reinforcement learning agents (DDPG, DQN, PPO, VPG) in Python using TensorFlow to solve various environments, e.g. 2D mazes and OpenAI gym environments Pong, CartPole, Pendulum. One of the projects focused on artificial curiosity where a model of the environment is learnt to improve the agent's exploration behaviour.
2018	Nuclei segmentation of microscopic images (2018 Data Science Bowl) by coding a U-Net shaped 10-layer CNN in Python using TensorFlow, where the main computation is performed on an Nvidia GPU in the Google cloud. I finished the Kaggle contest in the top 14%.
2011 - 2016	Numerical analysis of Higgs/Flavour physics in warped extra dimensions using Mathematica.
2004	Basic speech recognition software written in C++ in order to navigate a small vehicle by speaking commands into a microphone. ("Jugend forscht" project)

MOOC Certificates

2021	AWS Certified Cloud Practitioner & Professional Scrum Master I (PSM I)
2018	Coursera: Machine Learning & Deep Learning Specialisation & Algorithms

Awards

05/2017	Prize for excellent doctoral thesis given by "Friends of Mainz University"
05/2013 - 05/2015	Junior membership of the Gutenberg Academy, Johannes Gutenberg-University Mainz
08/2012 - 08/2014	Fellowship through the Graduate School "Symmetry Breaking in Fundamental Interactions" (DFG/GRK 1581), Student representative from 08/2013 till 08/2014
30/01/2013	Prize for outstanding diploma thesis of the faculty Physics, Mathematics and Computer Science, Johannes Gutenberg-University Mainz
02/2004	First place in "Jugend forscht" (German youth science competition) at the regional level C++ project: "Speech Recognition: Realisation and Application"

Peer-reviewed Scientific Papers

2016	R. Malm, M. Neubert, C. Schmell, JHEP **04**, 042 (2016), arXiv:1509.02539 [hep-ph]
2015	R. Malm, M. Neubert, C. Schmell, JHEP **02**, 008 (2015), arXiv:1408.4456 [hep-ph]
2014	J. Hahn, C. Hörner, R. Malm, M. Neubert, K. Novotny, C. Schmell, Eur. Phys. J. $C74$, 2857 (2014), arXiv:1312.5731 [hep-ph]
2014	R. Malm, M. Neubert, K. Novotny, C. Schmell, JHEP **01**, 173 (2014), arXiv:1303.5702
2012	M. Bauer, R. Malm, and M. Neubert, Phys. Rev. Lett. **108**, 081603 (2012), arXiv:1110.0471

Stays Abroad

06/2014 - 07/2014	Summer school TASI 2014 "Journeys Through the Precision Frontier: Amplitudes for Colliders" at the University of Colorado, Boulder, USA
01/2014 - 02/2014	Winter school "GGI Lectures on the Theory of Fundamental Interactions" at the Galileo Galilei Institute for Theoretical Physics, Florence, Italy
05/2013 - 06/2013	Workshop "Exploring the TeV Scale New Physics with LHC Data" at the Kavli Institute for Theoretical Physics at the University of California, Santa Barbara, USA

Languages	German (native), English (fluent), French (basics)
Personal Interests	Trail Running | Climbing