

# Dr. Raoul Malm

German citizenship

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## Work Experience

- 10/2018 - 04/2019 **Researcher at Swiss AI Lab IDSIA, Lugano**  
Working group of Prof. Dr. Jürgen Schmidhuber  
Topic: Artificial curiosity in 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
- 04/2008 - 04/2009 **Research assistant in Experimental Physics, Johannes Gutenberg-University Mainz**  
Working group of Prof. Dr. Arnold Rauschenbeutel  
Project: "Construction of an Optical Fiber-based Biosensor"
- 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  $\epsilon_K$  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 (3), Tensorflow (2), C++ (1), LaTeX (3) <sup>1</sup>

## Software Projects

- 2019 Implementation of 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)

<sup>1</sup>In brackets is shown the experience with the language on a 5-point scale from 1 (basic knowledge) to 5 (complete knowledge).

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## Coursera Certificates

- 2018 "Machine Learning" & "Deep Learning Specialisation" & "Algorithms", Stanford University
- 2018 "Neuronal Networks For Machine Learning", University of Toronto

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## 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. *C* **74**, 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

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## Selection of Talks

- 2015 "Loop Processes and Higgs Phenomenology in a Warped Extra Dimension", Physics seminar, Ludwig Maximilian University of Munich
- 2014 "Loop Processes and Higgs Phenomenology in a Warped Extra Dimension", Graduate Summer School, Frauenchiemsee
- 2013 "5D Perspective on Higgs Production via Gluon Fusion at the Boundary of a Warped Extra Dimension", Graduate School Retreat, Eberbach Abbey, Eltville
- 2012 "Mitigation of the  $\epsilon_K$  Fine-tuning Problem in the Randall-Sundrum Model", Graduate School Retreat, Bad Kreuznach

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## 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

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