

# Dr. Raoul Malm

German citizenship

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- since 10/2017 - Self-teaching Machine/Deep/Reinforcement Learning and Computer Vision by taking Coursera courses, studying scientific books<sup>1</sup> 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

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## 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

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## 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"

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## Programming Languages

Python, TensorFlow, C++, Mathematica, LaTeX

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## Software Projects

- 2018 Nuclei segmentation of microscopic images (2018 Data Science Bowl) by coding a U-Net shaped 10-layer CNN in Python using TensorFlow and OpenCV, where the main computation is performed on a Nvidia GPU in the Google cloud, see my github page. I finished the contest in the top 14%.
- 2018 Cancer classification of breast histology images by coding a CNN in Python using TensorFlow and OpenCV. My jupyter notebook won a \$500 kernel prize, see my kaggle profile.
- 2011-2016 Numerical analysis of Higgs and Flavour physics in warped extra dimensions using Mathematica and C++, see my github page.
- 2004 Basic speech recognition software written in C++ in order to navigate a small vehicle by speaking commands into a microphone, see my homepage.

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<sup>1</sup>I have been studying "Pattern Recognition and Machine Learning" by M. Bishop, "Foundations of Machine Learning" by M. Mohri et. al., "Deep Learning" by I. Goodfellow et. al., "Algorithms for Reinforcement Learning" by C. Szepesvari and "Computer Vision" by R. Szeliski.

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## Coursera Certificates

- 2018 Machine Learning & Deep Learning Specialisation, Stanford University
- 2017 Neuronal Networks For Machine Learning, University of Toronto
- 2017 Bayesian Statistics, University of California, Santa Cruz
- 2017 Financial Engineering and Risk Management, Columbia University

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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
- 2012 “Neutrinos faster than light? Theoretical aspects”, Physics seminar, Johannes Gutenberg-University Mainz

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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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## Work Experience

- 2011-2016 Research assistant, Johannes Gutenberg-University Mainz  
Working group of Prof. Dr. Matthias Neubert  
Topics: physics beyond the Standard Model, collider physics and phenomenology
- 2012 - 2014 Academic teaching (Johannes Gutenberg-University Mainz) with advanced tutorials on
  - Quantum Field Theory and Theoretical Particle Physics
  - Modern Quantum Field Theory and Introduction to the Standard Model
  - Higher Quantum Mechanics and Quantum Field Theory
- 04/2008 - 04/2009 Research assistant as a student, Johannes Gutenberg-University Mainz  
QUANTUM 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

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