

Marvin Schmitt

MACHINE LEARNING SCIENTIST · PHD RESEARCHER

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SUMMARY

Machine learning scientist currently pursuing a PhD in computer science. Specializing in state-of-the-art machine learning algorithms, statistical modeling, and data visualization. 7+ years of hands-on experience in Python and R, with a comprehensive understanding of deep learning tools (TensorFlow and PyTorch). General problem solver with a passion for finding tailored and rigorous solutions to complex problems. Strong analytical skills combined with a talent for effectively communicating advanced concepts.

EXPERIENCE

since 2021

PhD Researcher

CLUSTER OF EXCELLENCE SIMTECH, UNIVERSITY OF STUTTGART, GERMANY

- Cyber Valley project: Meta-Uncertainty in Bayesian Model Comparison
- Researched state-of-the-art methods in deep learning, uncertainty quantification, and robustness
- Published scientific papers in top-tier machine learning venues: AISTATS, UAI
- Developed research software for deep learning, trustworthy machine learning, and data visualization
- Managed student assistants and supervised student projects on probabilistic machine learning

2017 – 2019

Business Consultant

FREELANCE

- Instructed business workshops on communication, leadership, coaching, conflict, change, and personality
- Programmed a manuscript generation software to create custom training material with Python, Flask, and LaTeX

2017 – 2019

Network Officer

MARSILIUS-KOLLEG CENTER FOR ADVANCED STUDY, HEIDELBERG UNIVERSITY, GERMANY

- Implemented a robust live streaming concept based on UDP multicast (internal) and RTMP (external)
- Constructed a network-wide media center based on Samba
- Maintained the website and digital knowledge base in Imperia CMS with HTML, CSS, PHP, and JavaScript

2018

Research Intern

QUANTITATIVE RESEARCH METHODS IN PSYCHOLOGY, HEIDELBERG UNIVERSITY, GERMANY

- Developed an algorithm to derive expectation measures from eye-tracking data
- Implemented machine learning methods to improve eye-tracking based usability research

2017

Consultant Intern

MC HISCHE CONSULTING

- Advised the preparation and realization of business workshops
- Facilitated a book publication with focus on content, style guidelines, and typesetting

2016 – 2021

Tutor and Teaching Assistant

INSTITUTE OF PSYCHOLOGY, HEIDELBERG UNIVERSITY, GERMANY

- Taught seminars and tutorials about statistical inference, probabilistic modeling, and data science
- Conceptualized and graded student assignments, graded exams

EDUCATION

since 2021

PhD, Computer Science

CLUSTER OF EXCELLENCE SIMTECH, STUTTGART, GERMANY

- Advisors: Prof. Dr. Paul-Christian Bürkner, Prof. Dr. Andreas Bulling
- Expected graduation: 12/2024

2022

MSc, Data and Computer Science

HEIDELBERG UNIVERSITY, GERMANY

- Grade 1.0 / 4.0 (A+; best: 1.0)
- Master thesis: Visualization of Distribution and Uncertainty of Posterior Model Probabilities

2021

MSc, Psychology

HEIDELBERG UNIVERSITY, GERMANY

- Grade 1.0 / 4.0 (A+; best: 1.0)
- Master thesis: Model Misspecification in Bayesian Parameter Estimation Tasks with Invertible Neural Networks

2018

BSc, Psychology

HEIDELBERG UNIVERSITY, GERMANY

- Grade 1.2 / 4.0 (A; best: 1.0)
- Bachelor thesis: Influence of Suggestive Questions on Usability Tests

TEACHING

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|----------------|---|
| Summer 2022 | Lecture & Exercise , Statistical Inference at Fresenius UAS, Heidelberg |
| Summer 2022 | Exercise , Bayesian Statistics and Probabilistic Machine Learning at University of Stuttgart |
| Winter 2021/22 | Lecture & Exercise , Statistical Inference at Fresenius UAS, Heidelberg |
| Winter 2021/22 | Seminar , Introduction to Statistics with R for PhD researchers at Heidelberg University |
| Summer 2021 | Exercise , Descriptive Statistics & Probability Theory at Fresenius UAS, Heidelberg |
| Summer 2021 | Lecture & Exercise , Statistical Inference at Fresenius UAS, Heidelberg |
| Winter 2020/21 | Seminar (TA) , Statistics with R at Heidelberg University |
| Winter 2020/21 | Lecture & Exercise , Statistical Inference at Fresenius UAS, Heidelberg |
| Summer 2020 | Seminar (TA) , Programming with R at Heidelberg University |
| 2020 | Seminar , Communication Techniques at Fresenius UAS, Wiesbaden |
| 2017 | Workshop , Group Coaching at Fresenius UAS, Frankfurt |
| 2016–2019 | Tutorial , Descriptive Statistics, Probability Theory & Statistical Inference at Heidelberg University |

EXTRACURRICULAR ACTIVITIES & AWARDS

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| 2019 – 2021 | Scholarship holder , German Academic Scholarship Foundation (Studienstiftung d. dt. Volkes) |
| 2018 | Didactic certificate for tutors , Heidelberg University |
| 2016 – 2021 | Elected representative , Examination board M.Sc. & Diploma Psychology (break 10/2016 – 09/2017) |
| 2016 – 2021 | Elected representative , Institute Council (Fachrat) Psychology |
| 2016 – 2020 | Member , Student Council (Fachschaft) Psychology |
| 2014 | Award for remarkable social commitment , Auguste-Viktoria-Gymnasium Trier |

SELECTED INVOLVEMENT

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| Consultant | Academic consultant in industry for Axem Neurotechnology (since 2022) |
| Reviewer | Reviewer for international scientific conferences (since 2022): ICML, AISTATS, AABI |

EVENTS

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| 2023 | Poster (contributed) , AISTATS 2023, Valencia, Spain |
| 2023 | Talk (invited) , Bayes Comp conference, Levi, Finland |
| 2023 | Poster (contributed) , Bayes Comp conference, Levi, Finland |
| 2022 | Talk (invited) , Cyber Valley: Writing workshop, consulting on students' AI short stories |
| 2022 | Poster (invited) , ELLIS Unit Stuttgart Kickoff: <i>Model misspecification in simulation-based inference</i> |
| 2022 | Talk (invited) , Cyber Valley: Office hours, <i>Where does AI begin?</i> |
| 2022 | Talk (invited) , Blue Yonder Group Inc.: <i>Validating synthetic training data in probabilistic machine learning</i> |
| 2022 | Participant , 1 st SimTech summer school: Knowledge-driven machine learning and its applications |

SKILLS

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| Languages | German (native), English (fluent), French (basic), Latin (basic), Norwegian (basic) |
| Programming | Python, R, occasionally: C++, Java, JavaScript, HTML, CSS |
| Data Science | Python (Tensorflow/keras, PyTorch, sklearn, scipy, numpy, pandas, pytest), R (brms, lme4, afex, tidyverse), Stan |
| Visualization | Python (matplotlib, seaborn), R (ggplot2, plotly, rgl, shiny, gganimate), OpenGL |
| Documentation | LaTeX (KOMA, tikZ), git, Imperia, Markdown, RMarkdown, Jupyter, sphinx, roxygen, Quarto |

SELECTED PUBLICATIONS

- [1] S. T. Radev, **M. Schmitt**, V. Pratz, U. Picchini, U. Köthe, and P.-C. Bürkner. JANA: Jointly Amortized Neural Approximation of Complex Bayesian Models. In R. J. Evans and I. Shpitser, editors, *Proceedings of the 39th Conference on Uncertainty in Artificial Intelligence*, volume 216 of *Proceedings of Machine Learning Research*, pages 1695–1706. PMLR, 2023
- [2] **M. Schmitt**, S. T. Radev, and P.-C. Bürkner. Meta-Uncertainty in Bayesian Model Comparison. In *Proceedings of The 26th International Conference on Artificial Intelligence and Statistics (AISTATS)*, volume 206 of PMLR, pages 11–29, 2023
- [3] **M. Schmitt**, P.-C. Bürkner, U. Köthe, and S. T. Radev. Detecting Model Misspecification in Amortized Bayesian Inference with Neural Networks. *45th German Conference on Pattern Recognition (GCPR)*, accepted

OTHER PUBLICATIONS

- [4] S. T. Radev*, **M. Schmitt***, L. Schumacher, L. Elsemüller, V. Pratz, Y. Schälte, U. Köthe, and P.-C. Bürkner. BayesFlow: Amortized Bayesian Workflows With Neural Networks, 2023. arXiv:2306.16015
- [5] F. Ewendt*, **M. Schmitt***, A. Kluttig, J. Kühn, F. Hirche, F. B. Kraus, B. Ludwig-Kraus, R. Mikolajczyk, W. Wätjen, P.-C. Bürkner, M. Föller[§], and G. I. Stangl[§]. Association between vitamin D status and eryptosis – results from the German National Cohort Study. *Annals of Hematology*, 2023