

# Marvin Schmitt

MACHINE LEARNING SCIENTIST · PHD RESEARCHER

✉ mail.marvinschmitt@gmail.com · 🏠 www.marvinschmitt.com · 📷 marvinschmitt · 🐦 @MarvinSchmittML

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

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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

- Designed 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 a machine learning algorithm to derive expectation measures from eye-tracking data in R

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

- Instructed tutorials and seminars on statistical inference and data science
- Graded student assignments and exams

## EDUCATION

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since 2021

### PhD, Computer Science

CLUSTER OF EXCELLENCE SIMTECH, STUTTGART, GERMANY

- Advisors: Dr. Paul-Christian Bürkner, Prof. Dr. Andreas Bulling

2020 – 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

2018 – 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

2014 – 2018

### BSc, Psychology

HEIDELBERG UNIVERSITY, GERMANY

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

2006 – 2014

### Abitur (A-levels)

AUGUSTE-VIKTORIA-GYMNASIUM, TRIER, GERMANY

- Grade 1.1 / 4.0 (A; best: 1.0)
- Stay abroad in Kerala, India: Represented the school's humanitarian UNESCO project for local partners
- Stay abroad in Illinois, US: Researched the impact of the religious education system in the US (CertiLingua project)

# TEACHING

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

# EXTRACURRICULAR ACTIVITIES & AWARDS

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

# SELECTED INVOLVEMENT

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

# EVENTS

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

# SKILLS

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

# PUBLICATIONS

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- [1] 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<sup>§</sup>, and G. I. Stangl<sup>§</sup>. Association between vitamin d status and eryptosis – results from the german national cohort study. *Annals of Hematology*, 2023.
- [2] 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 *The 39th Conference on Uncertainty in Artificial Intelligence (UAI)*, 2023.
- [3] **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*, volume 206 of PMLR, pages 11–29, 2023.
- [4] **M. Schmitt**, P.-C. Bürkner, U. Köthe, and S. T. Radev. Detecting model misspecification in amortized Bayesian inference with neural networks. 2021. arXiv:2112.08866.