Marvin Koß

Education

2008–2016 **High School**, *Gymnasium Oedeme*, Lüneburg.
Abiturnote 2.1

2016–2017 **Universität Siegen**, *Computer Science, towards B.S.*
transferred to Heidelberg University

2017–2024 **Ruprecht-Karls-Universität Heidelberg**, *Computational Linguistics*, ***B.A***.
GPA 1.3

2022-2024 **Ruprecht-Karls-Universität Heidelberg**, *Mathematics*, ***B.Sc***.
GPA 2.1

Academic Employment

Webmaster at ICL, (04/19-04/20) — **Tasks** Website Maintenance and Development

Research Assistant at ZITI, (11/20-10/22) — **Tasks** Development of a tool for Neural Network Quantization in the DeepChip Project; UQ using BNNs (slides)

Research Assistant at IWR, (01/23-09/23), 80h — **Tasks** Analyzing a Novel Particle-Based Optimizer from a Mean-Field Perspective (Preprint)

Research Assistant at IWR, (04/24-09/24), 80h — **Tasks** Developing a Novel Particle-Based Optimizer (Code)

Research Assistant at IWR, (11/24-04/25) — **Tasks** Proofreading the Script of a Graduate Lecture I was taking, cf. Page 4

Research Assistant at StatNLP Group, (11/24-05/25) — **Tasks** Developing Proofs and Conducting Experiments in ML for Healthcare

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Research Assistant	at Mannheim Math. Institute, (07/25–)	**Tasks**	Writing Papers on Game theoretically stabilizing AI Governance (Agenda, Proposal); (PhD prep)

Publications

arXiv Preprint On the mean field limit of consensus based methods

Academic Teaching

Teaching Assistant	Formal Mathematical Foundations for Computational Linguists, SS 2018	**Tasks**	Convey mathematical basics and proof techniques to students and grade exercises
Teaching Assistant	Formal and Computational Semantics, WS 2018	**Tasks**	Give tutorials, create python assignments, give some lectures, grade exercises

Other Employment

Working Student	at Sovanta, (01/23-04/23)	**Tasks**	An Image-to-Text Pipeline
Private Tutor	at Lerncenter HD, (09/23-07/24)	**Tasks**	Math Coaching

Volunteer Work

At the Heidelberg CoLi Fachschaft

Helper at ESSLLI 2018, Bulgaria

Languages

German	Native	
English	Fluent	*C1*
Russian	Basic	

Programming Languages

Python	8 years of Experience	numpy, pytorch, pyro, sklearn, keras, spaCy, nltk, tensorflow, HF transformers
Java	Basic Knowledge	
C++	Basic Knowledge	example project
SQL	Basic Knowledge	

Example Coursework Projects

B.Sc. Thesis	Mean-Field Particle Swarm Optimization	thesis	Prof. Dr. Jakob Zech

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B.A. Thesis	Extended Key-Value Retrieval Networks	code, thesis	Prof. Dr. A. Sokolov
Project	Corpus linguistical investigation of a word cluster		R. Perkuhn
Project	Hierarchical Dirichlet Processes for WSI		Dr. V. Nastase, Dr. M. Herweg
Project	Pragmatic Modelling Of Utterances Using First Order Logic Semantic Representations	report	Dr. M. Herweg
Project	Global Normalization for Machine Translation		Prof. Dr. A. Sokolov
Project	Unsupervised NMT		Prof. Dr. S. Riezler

Side Projects

Voice Assistant	Modular Home Assistant Connected to `ChatGPT`	code
Pragmatics Workshops	Workshops I give using my Pyro Port of www.problang.org	slides, code
Hydra	Navier-Stokes Transformer Variant	code

Academic Interests

Narratives	And how they connect reinforcement learning and linguistics	blog post
Theory Of Mind	RSA (Pragmatics), Game Theory, Imitiation Learning	slides, code
AI Alignment	How can we align AGI with our values - or let them guide ours?	Agenda
Unc. Quant.	e.g. in BNNs	slides
Quantisation	of Transformers to $\leq$ INT8	code
TDA	Morse Theory, Gromov-Wasserstein	
Hydrodynamics	esp. differential geometric	code
Interpretability	Anthropic-esque mechanistic	visualisation
SDE Theory	and computational techniques	preprint
Mean Field	Analyses of Diff. Eqs.	see preprint above
Reinforcement Learning	RLHF variants	
Optimal Transport	both Math and Algos	Sinkhorn code
Cognitive Architectures	akin to ACT-R, PSI	

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Comp. Neuroscience	e.g. Mean Field Hodgkin Huxley Variants