Marcel Binz

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Research Interests

Cognitive Science; Resource Rationality; Meta-Learning; Machine Learning; Reinforcement Learning; Deep Learning; Bayesian Inference; Information Theory; Decision-Making; Exploration; Reasoning

Current Position

Max Planck Institute for Biological Cybernetics, PI: Dr. Eric Schulz   **2021 - present**
Postdoctoral researcher

Education

Philipps-Universität Marburg, PI: Prof. Dominik Endres   **2018 - 2021**
Dr. rer. nat. (Psychology)

KTH Royal Institute of Technology, Stockholm   **2015 - 2018**
M.Sc. (Machine Learning)

Eberhard Karls Universität Tübingen   **2012 - 2015**
B.Sc. (Cognitive Science)

Experience

Harvard University, PI: Prof. Samuel Gershman   **09/2019 - 12/2019**
Research visit

Facebook Inc.   **06/2016 - 12/2016**
Research internship

Eberhard Karls Universität Tübingen, PI: Prof. Martin Butz   **04/2015 - 08/2015**
Research assistant

Awards

German Cognitive Science Society Best Publication Award   **2020 - 2022**
Award for the best publication in cognitive science by a young investigator.

German Academic Exchange Service (DAAD) Scholarship   **2019**
Funding for a three month research visit at Harvard University.

EuroCogSci 2019 Best Poster Award   **2019**
Award for the best poster presentation.

DMV-Abiturpreis   **2010**
Award for excellent performance in high school mathematics.

Publications

[5] **Binz, M.** and Schulz, E., in press. Using cognitive psychology to understand GPT-3. *Proceedings of the National Academy of Sciences*.

[4] **Binz, M.** and Schulz, E., 2022. Reconstructing the Einstellung Effect. *Computational Brain & Behavior*.

[3] **Binz, M.** and Schulz, E., 2022. Modeling Human Exploration Through Resource-Rational Reinforcement Learning. *36th Conference on Neural Information Processing Systems (NeurIPS 2022)*. Selected as Oral.

[2] **Binz, M.**, Gershman, S.J., Schulz, E. and Endres, D., 2022. Heuristics From Bounded Meta-Learned Inference. *Psychological Review*.

[1] Brändle, F., **Binz, M.** and Schulz, E., 2022. Exploration Beyond Bandits. *The Drive for Knowledge: The Science of Human Information Seeking. Cambridge University Press*.

Please check my google scholar profile for an exhaustive list of abstracts, extended abstracts, and non-archival conference publications.

Teaching

Computational Cognitive Science, Eberhard Karls University of Tübingen Lecturer	**2022**
Bayesian Statistics and Machine Learning, Philipps-Universität Marburg Lecturer	**2020**
Theoretical Neuroscience, Philipps-Universität Marburg Lecturer	**2019, 2020**
Deep Learning in Data Science, KTH Royal Institute of Technology Teaching assistant	**2017**

Supervision

Johannes Schubert, Eberhard Karls Universität Tübingen, Master Thesis Investigating the Optimism Bias Using Meta-Reinforcement Learning	**ongoing**
Luca Schulze Buschoff, Eberhard Karls Universität Tübingen, Master Thesis Development as Decompression	**2022**
Akshay Kumar Jagadish, Eberhard Karls Universität Tübingen, Master Thesis Compositional Generalization in Meta-Reinforcement Learning	**2021**
Gwen Hirsch, Philipps-Universität Marburg, Master Thesis Comparing Meta-Learners with Human Performance in a Continual Learning Framework	**2020**
Hauke Niehaus, Philipps-Universität Marburg, Master Thesis Simulating Decision-Making Deficits in a Deep Meta-Reinforcement-Learning Agent	**2019**

Reviewing

Annual Meeting of the Cognitive Science Society	**2021 - present**
Computational Brain & Behavior	**2022 - present**
Proceedings of the National Academy of Sciences (PNAS)	**2022 - present**
Psychological Review	**2022 - present**