

Maren Wehrheim

RESEARCH INTERESTS

I am a Postdoctoral researcher with a strong interest in **applying deep learning to model cognitive and perceptual processes in the brain**. My work focuses on investigating neural functions associated with **perceptual and cognitive features**, how **geometric properties** of brains and artificial neural networks change along the visual processing hierarchy, and how the **prefrontal cortex** shapes perception. By combining experimental data analysis, geometric measures, and computational modeling, I aim to uncover core organizing principles of brain computation.

EDUCATION

Postdoctoral Fellow (with Kohitij Kar) York University	Since July 2025
Visiting Researcher (with Blake Richards) Mila – Quebec AI Institute	Since Fall 2024
Ph.D. in Computational Neuroscience Goethe University Frankfurt & Frankfurt Institute for Advanced Studies (FIAS)	Winter 2020 – Spring 2025
M.Sc. Computer Science & Business Goethe University Frankfurt, <i>Grade: Distinction</i>	Spring 2018 – Fall 2020
B.Sc. International Business Administration Frankfurt School of Finance & Management, <i>Grade: 1.6</i>	Fall 2014 – Spring 2018
Edinburgh University, Scotland & Bocconi University, Italy Exchange student	2016

JOURNAL PUBLICATIONS & CONFERENCE PROCEEDINGS

Osuna-Vargas, P., **Wehrheim, M.**, Zinz, L., Rahm, J., Balakrishnan, A., Kaminer, A., Heilemann, M. & Kaschube, M. (2025). Denoising diffusion models for high-resolution microscopy image restoration. In 2025 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) (pp. 4320-4330). IEEE.

Wehrheim, M., Faskowitz, J., Schubert, A.-L., & Fiebach, C. J. (2024). Reliability of variability and complexity measures for task and task-free BOLD fMRI. *Human Brain Mapping*, 45(10), e26778.

Wehrheim, M., Osuna-Vargas, P., & Kaschube, M. (2024). Linking in Style: Understanding learned features in deep learning models. *ECCV 2024*, Springer Nature Switzerland, Cham, pp.162–180.

Rahm, J. V., Balakrishnan, A., **Wehrheim, M.**, Kaminer, A., Glogger, M., Kessler, L. F., Kaschube, M., Barth, H.-D., & Heilemann, M. (2024). Fast and Long-Term Super-Resolution Imaging of Endoplasmic Reticulum Nano-structural Dynamics in Living Cells Using a Neural Network. *Small Science*, 2400385.

Wehrheim, M., Faskowitz, J., Sporns, O., Fiebach, C. J., Kaschube, M., & Hilger, K. (2023). Few temporally distributed brain connectivity states predict human cognitive abilities. *NeuroImage*, 277, 120246.

PREPRINTS & WORKING PAPERS

Galella S., **Wehrheim, M.**, Kaschube, M. (2025). Representational Geometry Collapse in ANNs Limits Semantic Generalization: A Dimensionality Mismatch Between Brains and ANNs. **(accepted at NeurIPS 2025)**

Wehrheim, M., Alamooti, S. T., Ramezanpour, H., & Kar, K. (2025). Facial expression discrimination emerges from neural subspaces shared with detection and identity. *bioRxiv*, 2025-08. **(under review at Nature Communications)**

HONORS & AWARDS

2025	Vision Science Society (VSS) travel award
2023	VISTA Travel Award; SFI Complexity-GAINs Summer School Award
2021	Graduate Student Award of the Cognitive Neuroscience Society

FUNDING

Since Jul 2025	Connected Minds Postdoctoral Fellowship
Jul 2021 – Dec 2024	Deutsche Forschungsgesellschaft (DFG) Interfacing image analysis and molecular life science (iMol GRK)
Nov 2020 – Jun 2023	Alfons & Gertrud Kassel-Stiftung Interdisciplinary Center for Data Science and AI

TEACHING EXPERIENCE & RESEARCH ASSISTANCE

Since Fall 2025	Mentor for the Shenoy Undergraduate Research Fellowship in Neuroscience (SURFiN)
2020 - 2024	Teaching assistant for Matthias Kaschube Pattern Recognition and Machine Intelligence, Introduction to Python
Spring and Fall 2022	Teaching assistant Machine Learning for Psychologists (Master Level)
Fall 2021	Teaching assistant Python for Psychologists (Master Level), Introduction to Programming (Bachelor Level)

CONFERENCES & SUMMER SCHOOLS

2025	Vision Science Society (VSS), Cosyne
2023	VSS, Psychologie & Gehirn (PuG), Organization for Computational Neuroscience (OCNS), Cognitive Computational Neuroscience (CCN) Complexity-GAINs SFI Summer School. Project: Meta-learning is all you need. The project resulted in a five-day symposium at SFI.
2022	Brain Minds and Machines Summer School. Project: Predicting emotion with deep neural networks
2021	Psychologie und Gehirn (PuG) 46 th Annual Meeting, Cognitive Neuroscience Society (CNS) 28 th Annual Meeting Neuromatch Academy. Deep Learning Track
2020	Neuromatch 3.0, Bernstein Conference

PROGRAMMING SKILLS

Python, basic MATLAB, Web development (HTML, CSS, JavaScript), Ruby, Git & Github

REFERENCES

Kohitij Kar
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Centre for Integrative and Applied Neuroscience
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