

David Linhardt

Postdoctoral Researcher

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Summary

Postdoctoral researcher specializing in ultra-high field fMRI methods, exploring visual cortex organization through population receptive field (pRF) mapping. My work bridges fundamental research and clinical application, and rests on a commitment to open science: the methods I develop are released as openly licensed, containerized software that others can install, run and build on, so that pRF analyses are reproducible beyond the lab that produced them.

Professional Experience

Medical University of Vienna

Postdoctoral Researcher

Feb 2025–present

- PI on FWF ESPRIT fellowship; methods development for applying pRF mapping in clinical populations.
- Coordinating an fMRI journal club series for a mixed-experience audience.

Medical University of Vienna

PhD Candidate

Apr 2020–Jan 2025

- Developed and refined methods for pRF mapping.
- Applied pRF mapping to investigate partial visual field loss in patients with retinal conditions.

Basque Center on Cognition, Brain, and Language, Spain

Research Stay

Sep 2022–Nov 2022

- Funded by EMBO Scientific Exchange Grant No. 9415.
- Collaborative work on pRF analysis and the effect of choice of paradigm; resulted in one publication and ongoing collaboration.

Medical University of Vienna

Research Assistant

Jan 2018–Mar 2020

Education

Medical University of Vienna

PhD in Medical Physics

Apr 2020–Jan 2025

Dissertation: Characterizing population receptive field mapping at high and ultra-high fields

TU Wien

MSc in Technical Physics

Feb 2017–Mar 2020

Project: Stimulus selection in functional magnetic resonance imaging based retinotopic mapping

TU Wien

BSc in Technical Physics

Oct 2013–Feb 2017

Funding

2026–2029: Principal Investigator. FWF ESPRIT Early Career Postdoctoral Fellowship: *Retinal Staging via Bayesian Reverse Modeling of pRF Data*. DOI: 10.55776/ESP1445525. Amount: 346,505 €.

2025–2028: Cooperation partner; PI: Garikoitz Lerma-Usabiaga. *Multimodal characterization of reading networks: integrating spatiotemporal dynamics and brain structure*.

2022: EMBO Scientific Exchange Grant No. 9415 (fully funded research stay in Spain).

Publications

First-author Publications

Linhardt, D., Woletz, M., Paz-Alonso, P. M., Windischberger, C., and Lerma-Usabiaga, G. (2025). "Biases in Volumetric Versus Surface Analyses in Population Receptive Field Mapping". *Human Brain Mapping*. DOI: 10.1002/hbm.70140.

Linhardt, D., Pawloff, M., Woletz, M., Hummer, A., Tik, M., Vasileiadi, M., Ritter, M., Lerma-Usabiaga, G., Schmidt-Erfurth, U., and Windischberger, C. (2022). "Intrasession and Intersession Reproducibility of Artificial Scotoma pRF Mapping Results at Ultra-High Fields". *eNeuro*. DOI: 10.1523/ENEURO.0087-22.2022.

Linhardt, D., Pawloff, M., Hummer, A., Woletz, M., Tik, M., Ritter, M., Schmidt-Erfurth, U., and Windischberger, C. (2021). "Combining stimulus types for improved coverage in population receptive field mapping". *NeuroImage*. DOI: 10.1016/j.neuroimage.2021.118240.

Other Publications

Coates, A., Sedlmayr, P., Wastian, A., Mayrhofer, H., **Linhardt, D.**, Windischberger, C., Bartels, A., Ischebeck, A., and Zaretskaya, N. (2026). "The Human Visual Claustrum Responses to Physical Stimulus Properties and Subjective Content During Movie Viewing". *Human Brain Mapping*. DOI: 10.1002/hbm.70583.

Pawloff, M., Linhardt, D., Woletz, M., Hollaus, M., Mylonas, G., Holder, G. E., Sacu, S., Windischberger, C., and Ritter, M. (2026). "Robust and reproducible population receptive field mapping in patients with retinal pathologies". *Eye*. DOI: 10.1038/s41433-026-04523-z.

Mittal, S., Woletz, M., **Linhardt, D.**, and Windischberger, C. (2025). "GEM-pRF: GPU-Empowered Mapping of Population Receptive Fields for Large-Scale fMRI Analysis". *Medical Image Analysis*. DOI: 10.1016/j.media.2025.103891.

Coates, A., **Linhardt, D.**, Windischberger, C., Ischebeck, A., and Zaretskaya, N. (2024). "High-resolution 7T fMRI reveals the visual zone of the human claustrum". *Imaging Neuroscience*. DOI: 10.1162/imag_a_00327.

- Grosshagauer, S., Woletz, M., Vasileiadi, M., **Linhardt, D.**, Nohava, L., Schuler, A.-L., Windischberger, C., Williams, N., and Tik, M. (2024). "Chronometric TMS-fMRI of personalized left dorsolateral prefrontal target reveals state-dependency of subgenual anterior cingulate cortex effects". *Molecular Psychiatry*. DOI: 10.1038/s41380-024-02535-3.
- Ritter, M., Hummer, A., Pawloff, M., Ledolter, A. A., **Linhardt, D.**, Woletz, M., Deak, G. G., Sacu, S., Ristl, R., Ramazanova, D., Holder, G. E., Windischberger, C., and Schmidt-Erfurth, U. M. (2024). "Retinotopic cortical mapping in objective functional monitoring of macular therapy". *British Journal of Ophthalmology*. DOI: 10.1136/bjo-2021-320723.
- Pawloff, M., **Linhardt, D.**, Woletz, M., Hummer, A., Sacu, S., Vasileiadi, M., Lerma-Usabiaga, G., Holder, G., Schmidt-Erfurth, U. M., Windischberger, C., and Ritter, M. (2023). "Comparison of Stimulus Types for Retinotopic Cortical Mapping of Macular Disease". *Translational Vision Science & Technology*. DOI: 10.1167/tvst.12.3.6.
- Tik, M., Vasileiadi, M., Woletz, M., **Linhardt, D.**, Schuler, A.-L., Williams, N., and Windischberger, C. (2023). "Concurrent TMS/fMRI reveals individual DLPFC dose-response pattern". *NeuroImage*. DOI: 10.1016/j.neuroimage.2023.120394.
- Vasileiadi, M., Schuler, A.-L., Woletz, M., **Linhardt, D.**, Windischberger, C., and Tik, M. (2023). "Functional connectivity explains how neuronavigated TMS of posterior temporal subregions differentially affect language processing". *Brain Stimulation*. DOI: 10.1016/j.brs.2023.06.014.
- Vasileiadi, M., Woletz, M., **Linhardt, D.**, Grosshagauer, S., Tik, M., and Windischberger, C. (2023). "Improved brain stimulation targeting by optimising image acquisition parameters". *NeuroImage*. DOI: 10.1016/j.neuroimage.2023.120175.

Open-Source Software

Openly available tools covering the full population receptive field (pRF) workflow, developed to make pRF analyses reproducible and usable outside the lab that produced them. Distributed via public repositories, container images and package registries.

stim4prf: Generation of visual stimuli and their corresponding aperture sequences for pRF experiments. github.com/dlinhardt/stim4prf

prfprepare: Closes the gap between fMRI preprocessing (e.g. fMRIPrep) and pRF analysis, operating on BIDS-formatted derivatives. Distributed as a Docker image ([davidlinhardt/prfprepare](https://github.com/davidlinhardt/prfprepare)). github.com/fmriat/prfprepare

roipack: Handling of ROI masks and cortical atlases shared across the pRF tool chain. github.com/dlinhardt/roipack

GEM-pRF: Co-developer. GPU-accelerated pRF estimation for large-scale fMRI analysis; available on PyPI (`pip install gempyf`) with documentation at gempyf.github.io. Method published in *Medical Image Analysis* (10.1016/j.media.2025.103891).

prfresult: Containerized visualization and reporting of pRF analysis results. Distributed as a Docker image ([davidlinhardt/prfresult](https://github.com/davidlinhardt/prfresult)). github.com/fmriat/prfresult

PRFclass: Python interface for working with pRF results: loading, masking, derived measures, and plotting in the visual field, on the cortical surface and on flatmaps. github.com/dlinhardt/PRFclass

PRFmodel: Contributor. Community validation framework for pRF analysis methods (vista-lab/PRFmodel).

Invited Talks

May 2025: Sensory Brain Mapping Workshop, London, United Kingdom. *"A Reproducible Pipeline for Population Receptive Field Mapping"*

Nov 2023: BrainHack Donostia, San Sebastián, Spain. *"Streamlined pRF Mapping and Optimized Stimulation for fMRI vision research"*

Academic Service & Open Science

2026–present: Member, Center Science Board, Center for Medical Physics and Biomedical Engineering, Medical University of Vienna. Representing predoctoral and early postdoctoral researchers in institutional decision-making.

Peer review: Reviewer for international peer-reviewed journals in neuroimaging and vision science.

Outreach: Active participation in science communication events.

Teaching: Teaching in graduate-level courses, Medical University of Vienna.

Supervision: Supervision and co-supervision of BSc and MSc students.

Peer-reviewed Conference Abstracts

- Linhardt, D.**, Mittal, S., Woletz, M., Schwarzkopf, D. S., and Windischberger, C. (2026). "Stimulus Configuration and Temporal Sampling Jointly Modulate pRF Reproducibility". *Vision Sciences Society Meeting (VSS)*, Florida, USA.
- Linhardt, D.**, Zuschlag, D., and Windischberger, C. (2026). "NORDIC Denoising acts as a Low-Pass Filter on fMRI Time Courses". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Bordeaux, France.
- Lerma-Usabiaga, G., Baker, C. I., Benson, N. C., Dekker, T., Dumoulin, S. O., Gardner, J., Grill-Spector, K., Kay, K., Knapen, T., Kupers, E. R., Ribeiro, F. L., Schwarzkopf, D. S., Wandell, B., Winawer, J., Windischberger, C., and **Linhardt, D.** (2025). "Population Receptive Field Modeling: Methods, Challenges, and Insights". *Vision Sciences Society Meeting (VSS)*, Florida, USA.
- Linhardt, D.**, Mittal, S., Woletz, M., and Windischberger, C. (2025). "Simulating Stimulus-Specific Variability in Population Receptive Field Mapping". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Brisbane, Australia.
- Linhardt, D.**, Zuschlag, D., Coates, A., Zaretskaya, N., and Windischberger, C. (2025). "Laterality of the Visual Claustrum and beyond". *Vision Sciences Society Meeting (VSS)*, Florida, USA.
- Ribeiro, F. L., Satzger, R., **Linhardt, D.**, Bambridge-Lozan, T., Benson, N. C., Schwarzkopf, D. S., Puckett, A. M., Hebart, M., and Bollmann, S. (2025). "Building a Comprehensive Toolkit for Human Visual Cortex Parcellation". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Brisbane, Australia.
- Linhardt, D.**, Bogner, J., Woletz, M., Schwarzkopf, D. S., and Windischberger, C. (2024). "Stimulus smoothness influences pRF parameters". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Seoul, South Korea.
- Linhardt, D.**, Yongning, L., Paz-Alonso, P., Wandell, B., Windischberger, C., and Lerma-Usabiaga, G. (2024). "Comparing pRF Mapping Estimates for Words and Checker Patterns". *Vision Sciences Society Meeting (VSS)*, Florida, USA.
- Linhardt, D.**, Paz-Alonso, P., Windischberger, C., and Lerma-Usabiaga, G. (2023). "pRF analysis in volume and surface space". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Montreal, Canada.
- Linhardt, D.**, Windischberger, C., Paz-Alonso, P., and Lerma-Usabiaga, G. (2023). "Simple, automated and reproducible pRF analysis". *Vision Sciences Society Meeting (VSS)*, Florida, USA.
- Linhardt, D.**, Pawloff, M., Hummer, A., Woletz, M., Tik, M., Vasileiadi, M., Ritter, M., Lerma-Usabiaga, G., Schmidt-Erfurth, U., and Windischberger, C. (2022). "Intra- and inter-session reproducibility of artificial scotoma pRF mapping results at ultra-high fields". *Vision Sciences Society Meeting (VSS)*, Florida, USA.
- Linhardt, D.**, Woletz, M., Vasileiadi, M., Lerma-Usabiaga, G., and Windischberger, C. (2022). "Seamless pRF mapping analysis from data to maps". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Glasgow, UK.
- Linhardt, D.**, Pawloff, M., Woletz, M., Tik, M., Vasileiadi, M., Ritter, M., Schmidt-Erfurth, U., and Windischberger, C. (2021). "Towards objective scotomata assessment using fMRI-based retinotopic

mapping: a connectomic approach". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Online.

Linhardt, D., Pawloff, M., Hummer, A., Ritter, M., Woletz, M., Schmidt-Erfurth, U., and Windischberger, C. (2020). "Artificial scotoma size estimation on high-resolution 7T retinotopy data". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Online.

Linhardt, D., Hummer, A., Woletz, M., and Windischberger, C. (2019). "Distortion correction for retinotopic mapping at ultra-high magnetic fields". *Annual Meeting of the Organization for Human Brain Mapping (OHBM)*, Rome, Italy.