Patricia Rubisch

General Information

Affiliation *Institute for Neuroscience and Biopsychology for Clinical Application, Medical School Berlin*

Supervisor Dr. Melanie Stefan

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Education

2019–2024 **PhD**, *ANC: Machine Learning, Computational Neuroscience, Computational Biology*, University of Edinburgh, UK, Thesis title: The interplay between voltage-dependent plasticity, inhibition and network structure in spiking neuronal network models.

2018–2019 **MScR**, *ANC: Machine Learning, Computational Neuroscience, Computational Biology* , University of Edinburgh, UK, Master of Science by Research with Distinction.

2015 – 2018 **BSc Cognitive Science**, Eberhard Karls Universität Tübingen, Germany.

Publications

- Geirhos, R., **Rubisch, P.**, Rauber, J., Temme, C. R. M., Michaelis, C., Brendel, W., & Wichmann, F. A. *Inducing a human-like shape bias leads to emergent human-level distortion robustness in CNNs*. In Journal of Vision, 19. 2019
- Otte, S., **Rubisch, P.**, & Butz, M. V. *Gradient-based learning of compositional dynamics with modular RNNs*. In International Conference on Artificial Neural Networks, 2019

Preprints

- **Rubisch, P.**, Stefan, M. I., Hennig, M. H. *The role of temporal sensitivity of synaptic plasticity in representation learning*. bioRxiv. 2024
- Haghiri, S., **Rubisch, P.**, Geirhos, R., Wichmann, F., von Luxburg, U. *Comparison-based framework for psychophysics: Lab versus crowdsourcing*. arXiv. 2019
- Geirhos, R., **Rubisch, P.**, Michaelis, C., Bethge, M., Wichmann, F. A., & Brendel, W. *ImageNet-trained CNNs are biased towards texture; increasing shape bias improves accuracy and robustness*. arXiv. 2018. Published as a conference paper at ICLR 2019

Talks

- **Rubisch, P.**, Herbert, E., *Computational workshop on modelling inhibition in spiking neural networks*, Gordon Research Seminar: Inhibition in the CNS 2025, Newry, Maine, United States
- **Rubisch, P.**, Stefan, M., Hennig, M. *The role of temporal sensitivity of synaptic plasticity in representation learning*, The Vitual Society of Mathematical Biology MathNeuro Mini-Conference 2025, online
- **Rubisch, P.**, Hennig, M., *Inhibitory control of plasticity promotes stability and competitive learning in recurrent networks*, Gordon Research Seminar: Inhibition in the CNS 2023, Les Diablerets, Switzerland

Poster Presentations

- **Rubisch, P.**, Stefan, M., Hennig, M., *The role of temporal sensitivity of synaptic plasticity in representation learning*, presented at Gordon Research Conference: Inhibition in the CNS 2025, Newry, Maine, United States
- **Rubisch, P.**, Stefan, M., Hennig, M., *The influence of the membrane potential on inhibitory regulation of plasticity predictions and learned representations*, presented at Bernstein Conference 2024, Frankfurt, Germany
- **Rubisch, P.**, Hennig, M., *Competitive learning through fast inhibitory regulation of neural plasticity*, presented at CoSyNe 2024, Lisbon, Portugal
- **Rubisch, P.**, Hennig, M., *Inhibitory control of plasticity promotes stability and competitive learning in recurrent networks*, presented at CoSyNe 2023, Montreal, Canada
- **Rubisch, P.**, Hennig, M., *Sensitivity to subthreshold fluctuations in membrane potential is central for prediction of synaptic plasticity*, presented at Bernstein Conference 2022, Berlin, Germany
- **Rubisch, P.**, Hennig, M., *Lateral inhibition regulates Long Term Plasticity and functional specialisation*, presented at SPONT 2022, Alicante, Spain
- **Rubisch, P.**, Hennig, M., *Systematic exploration of neuron type differences in standard plasticity protocols employing a novel pathway-based plasticity rule*, presented at Bernstein Conference 2021, online
- **Rubisch, P.**, Hennig, M., *Systematic exploration of neuron type differences in standard plasticity protocols employing a novel pathway-based plasticity rule*, short talk at Neuromatch Conference 4 2021, online

Grants, Awards and Fellowships

07/2024 **LSA Fellow**, German Scholar Organisation, Germany

03/2023 **CoSyNe Presenter Travel Grant**, CoSyNe 2023 in Montreal, Canada

Teaching

2025 **Course conceptualisation & lecturer**, Medical School Berlin.
Grundlagen der Künstlichen Intelligenz für Gesundheitsberufe WS2025/26

07/2024 **Teaching Assistant**, Neuromatch Academy, online.
Teaching Assistant for 2 week *NeuroAI* course

Student supervision

2024 **Serenna Gerhard**, *Thesis titel: Comparative Analysis of Homeostatic Plasticity Mechanisms in Recurrent Spiking Neural Networks*, Co-supervised with Matthias Hennig, Informatics University of Edinburgh.

Work Experience

12/2023–Present **Postdoctoral Researcher**, Medical School Berlin, Stefan Lab.
Modelling synaptic plasticity in health and disease from molecules to networks

07/2024 **Teaching Assistant**, Neuromatch Academy, online.
Teaching Assistant for 2 week *NeuroAI* course

2019–2023 **Teaching Assistant**, University of Edinburgh, Scotland.
Teaching Assistant for *Computational Cognitive Neuroscience*, Marker for *Neural Computation* and Tutor, Demonstrator and Marker for INF1:CG (cognitive science undergraduate course)

2015–2018 **Student Research Assistant**, Eberhard Karls Universität Tübingen, AG Neural Information Processing, Prof. Felix Wichmann.
Planning, implementation and conduction of psycho-physical experiments

Additional Education

2022 **Cajal Advanced Neuroscience Training Programme**: Computational Neuroscience

2022 **FENS Summer School**: Artificial and natural computations for sensory perception: what is the link?

2020 **Neuromatch Academy**: Computational Neuroscience

Service and Leadership

2025 – today Postdoc Representative of the Bernstein Network

2025 – today Member of KI Strategieteam

2024 – today INBICA Journal Club organiser

2024 – today Science for US organiser

2020 – 2023 Committee member of the Edinburgh University Volleyball Club in the position of Club Secretary (2020–2021), Vice President (2021–2022), Inclusion Officer (2022–2023), awarded with Edinburgh University Sports Union Colours Award (2023)

2016 –2018 Student representative *Study Commission Cognitive Science*

2016 – 2018 Student representative *Board of Examiners Cognitive Science*

Reviewing

Journals Computational Brain & Behvior

Programming Languages

Languages Python, Matlab, Java, R, Scheme