Caroline Haimerl

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current research	**Champalimaud Centre for the Unknown**, Lisbon, Portugal

2022-now   **Postdoctoral researcher**
advisors: Joe J. Paton and Christian Machens

I study how hierarchical behavioral control is achieved in the brain by developing new theoretical models of efficient state and action representation that incorporate recent experimental findings of parallel hierarchical circuits in the basal ganglia and provide predictions for their roles in different cognitive and motor tasks.
Methods: Reinforcement Learning, Control Theory

education   **New York University**, NY, US

2016-2022   **PhD Neuroscience**
advisors: Eero P. Simoncelli and Cristina Savin
affiliation: Center for Neural Science

How does the brain route visual information given a particular task? Combining computational modeling and neural data analysis, I developed a novel theory of how task-information can be transferred flexibly in biological and artificial neural networks based on labeling through latent dynamic modulators.
Methods: Bayesian inference, Latent dynamical models, Artificial neural networks

University of Vienna, AUT

2012-2016   **Bachelor of Science - Psychology**

2011-2015   **Bachelor of Science - Statistics**

University of Chicago, IL, US

2015   exchange program with focus computational neuroscience

previous research   **Google Brain**, virtual, US
2021(3m)   research intern
supervisor: Michael Isard
topic: mixture of heterogeneous experts models to scale up NLP Transformers

New York University, NY, US

2016   graduate research assistant
advisor: György Buzsáki
topic: decoding from neural populations in hippocampal CA1 during 2D maze exploration

INMED, Marseille, FR

2015-2016   research technician
advisors: Rosa Cossart and Arnaud Malvache
topic: modeling hippocampal networks underlying flexible spatio-temporal processing

University of Chicago, IL, US

2015   research technician
advisor: Jason MacLean
topic   detecting microcircuits in temporal patterns of spontaneous cortical activity

publications   Boeshertz, G., **Haimerl, C.**, & Savin, C. (2023). Task adaption by biologically inspired stochastic comodulation. arXiv preprint **arXiv**:2311.15053.

Haimerl, C., Ruff, D. A., Cohen, M. R., Savin, C., & Simoncelli, E. P. (2023). Targeted V1 comodulation supports task-adaptive sensory decisions. **Nature Communications**, 14(1), 7879.

Haimerl, C., Simoncelli, E.P., Savin, C. (2022). Targeted comodulation in V1 supports flexible and accurate downstream decoding. **NeurIPS** workshop "All Things Attention" available on Open Review

Haimerl, C., Savin, C., Simoncelli, E.P. (2019). *Flexible and accurate decoding of neural populations through stochastic comodulation,* **NeurIPS**

Haimerl, C.*, Angulo-Garcia, D.*, Villette, V., Reichinnek, S., Torcini, A., Cossart, R., Malvache, A. (2019). *Internal representation of hippocampal neuronal population spans a time-distance continuum*, **PNAS**, 116 (15)

Malvache, A., Reichinnek, S., Villette, V., **Haimerl, C.**, Cossart, R. (2016). *Awake hippocampal reactivations project onto orthogonal neuronal assemblies*, **Science**, 353/6305

research talks		
	2023 Sep	*Bernstein workshop talk*, Berlin
	2023 Feb	*"Towards a theory of artificial and biological neural networks",* Les Houches
	2022 Dec	*NeurIPS Workshop "All Things Attention",* New Orleans
	2021 Apr	*Champalimaud,* Lisbon
	2021 Apr	*MPI,* Tübingen
	2021 Mar	*Lumos External Talks series*, Vienna
	2021 Jan	*Open House,* CNS, NYU, New York (internal)
	2020 Nov	*Lab Talks Series,* CNS, NYU, New York (internal)
	2020 Jan	*Open House,* CNS, NYU, New York (internal)
	2019 Nov	*Doctoral student talk series,* CNS, NYU, New York (internal)
	2019 Oct	***Janelia Theory Workshop*, Janelia Research Campus**
	2019 Jul	*Google PhD Fellowship Summit*, Mountain View
	2019 Jun	*Center for the Neural Basis of Cognition*, University of Pittsburgh
	2018 Oct	***Champalimaud Research Symposium*, Lisbon**
	2018 Mar	***COSYNE main conference*, Denver**
	2017 Mar	*INMED*, Marseille

posters		
	2024 June	*FENS meeting, Vienna*
	2024 Feb	*COSYNE* main conference, Lisbon
	2023 Sep	*Bernstein conference*, Berlin
	2022 March	*COSYNE* main conference, Lisbon, see poster presentation
	2020 Sep	*Bernstein conference*, Berlin
	2019 Dec	*NeurIPS*, Vancouver
	2019 Mar	*COSYNE* main conference*,* Lisbon
	2018 Jul	*MLSS*, Buenos Aires
	2017 Feb	*COSYNE* main conference, SLC
	2017 May	*ICMNS*, Boulder
	2016 Nov	*SFN*, San Diego
	2016 Jul	*FENS*, Copenhagen

teaching, outreach, organization, reviewing		
	2024	Teaching Assistant at *Cajal Computational Neuroscience Course*, Lisbon
	2024	Workshop organizer for *Multi-regional computations: from data to principles*, at *COSYNE* 2024
	2023	Reviewer for *COSYNE* 2024
	2023-now	Organizer of Theory Seminars at Champalimaud Research
	2023	Workshop Organizer on *Behavioral flexibility and its neural correlates*, at *Bernstein conference*
	2023	Reviewer for 9th European Student Conference on Behavior & Cognition
	2022	Reviewer for *COSYNE* 2023
	2022	selected speaker for **SoapBox** Science Lisbon at the Festival Internacional da Ciência **FICA** (science outreach)
	2022 Jul	Lecturer in Preschool of **Cajal Computational Neuroscience** course
	2020 Jul	Lecturer "*Linear Dynamical Systems and the Kalman filter*" **Neuromatch** Academy
	2020 Feb	Teaching Assistant "*Normative Approaches to Understanding Neural Coding and Behavior*" **COSYNE tutorial**

	2019 Oct	Lecturer "*Dynamical latent models: Capturing dynamics underlying neural population activity*" **Janelia Theory Workshop**, Janelia Research Campus
	2019	Teaching Assistant "*Probabilistic Time Series Analysis*" Center for Data Science, **New York University**
	2015	Teaching Assistant "*Statistical Programming with R*" Department of Statistics and Operations Research, **University of Vienna**
awards	2024	SCGB Transition to Independence Award
	2024	SPN Travel Grant for FENS meeting
	2022	NYU Dissertation award
	2019-2021	Google PhD fellowship
	2016-2018	MacCracken Fellowship for Doctoral Studies, NYU
	2018	COSYNE travel grant for presenters
	2017	CAJAL Stipend to attend summer school
	2017	Dean's student travel grant to present research
	2015-2016	Erasmus stipend for research abroad
	2015	Scholarship for Exchange Semester, awarded by the University of Vienna
	2014	Scholarship for Excellence Department of Psychology, University of Vienna
	2013	Scholarship for Excellence Department of Statistics and Operations Research, University of Vienna
mentoring	2024 -now	Committee member for master student Lucas Piper at Instituto Superior Técnico
	2023 -now	Co-supervisor of PhD student Francisco Azevedo at Champalimaud Research
	2023	Supervisor of summer intern Anna Freund
	2023	Co-supervisor of master student Gauthier Boeshertz
relevant courses & trainings	2023	Grant Writing Workshop by ProScience, organized at the Champalimaud Centre
	2018-2019	"*Computational Statistics*" taught by Liam Paninski, Columbia University "*Analysis of Time Series Data*" taught by Cristina Savin, NYU "*Optimization-Based Data Analysis*" taught by Carlos Fernandez-Granda, NYU
	2018, Jun	Machine Learning Summer School, Buenos Aires
	2017, Aug	CAJAL Course in Computational Neuroscience at the Champalimaud Centre for the Unknown, Lisbon
	2016, May	Paris Neuroscience School in Optical Imaging and Electrophysiology at the Université Paris Descartes and Ecole Normale Supérieure
other activities	2023 -now	Founder of "*Women & Allies in Science*" group at the Champalimaud Centre
	2014	Intern at Schuhfried, Psychology Development Department
	2014	Intern at *FH Vienna*, University of Applied Science
	2012	Volunteer teacher at Pal Ewam Namgyal Monastic School in Pokhara, Nepal
languages		German (native), English (professional), Spanish (advanced), French (basic)
programming		Python, Matlab, R