

Academic Positions

- Mar 2020 **Postdoctoral Research**, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig.
- present Convolutional neural networks and vision neuroscience. Synthesizing preferred stimuli for individual brain areas. Group leader: MARTIN HEBART

Education

- Oct 2015 **Ph.D. in Cognitive Computational Neuroscience**, Donders Institute for Brain, Cognition and Behaviour, Nijmegen.
- Dec 2019 Research on how representations learned by convolutional neural networks relate to human visual processing. Recording of the (up to then) largest audiovisual human functional MRI data set, with the aim of training modern neural network representations directly on brain activity. Further work on reconstruction visual perception from brain activity. Supervision: MARCEL A. J. VAN GERVEN, UMUT GÜÇLÜ. 
- Oct 2012 **M.Sc. in Computational Neuroscience**, Technische & Humboldt-Universität, Berlin.
- Sep 2015 Joint degree organized by *Bernstein Center for Computational Neuroscience*. The degree included three lab rotations and a seminar project (final grade: 1.4).
- Seminar project** Auditory Brain-Computer-Interfaces: Detecting spatial auditory attention in cocktail-party situations. Supervision: MICHAEL TANGERMANN, BBICI GROUP)
- Lab rotation 1** Conducting fMRI pilot experiment aimed at reconstructing spatiotemporal visual perception. Supervision by YI CHEN and JOHN-DYLAN HAYNES.
- Lab rotation 2** Extending a network editor for analysing robustness in random boolean networks. Supervision: JOHANNES RAUH in the group of NIHAT AY at *MPI-MIS*, Leipzig.
- Lab rotation 3** Hierarchical video feature learning for an fMRI encoding model for video stimuli. Supervision: SHINJI NISHIMOTO at *CiNet*, Osaka, Japan.
- Thesis** Neural encoding for video stimuli with unsupervised hierarchical representation learning. Supervised by GRÉGOIRE MONTAVON in the group of KLAUS-ROBERT MÜLLER, Machine Learning Group, Technical University of Berlin (grade: 1.0). 
- Apr 2008 **B.Sc. in Computer Science and Media**, Bauhaus-Universität, Weimar.
- Apr 2012 Computer science degree with a research focus through full-semester lab rotations. Courses in experimental and perception psychology (final grade: 1.3).
- Lab rotation 1** Predicting ★ featured articles in the Wikipedia – feature engineering for detecting information quality, supervised by MAIK ANDERKA in the group of BENNO STEIN. (10/2009–3/2010)
- Lab rotation 2** Setting up a multi-touch display on a sea-container for Bauhaus Summæry, supervised by BERNHARD BITTORF. (4/2010–8/2010)
- Additional lab rotation** Implementing a cellular automaton for sand dune dynamics on a multi-tile display. Supervision: KIYOSHI KIYOKAWA and MACOTO KIKUCHI at *Cybermedia Center*, Osaka University. (9/2010–4/2011)
- Thesis** Usability of P300-spelling and asynchronous input for text input systems on the *Emotiv consumer EEG*. Supervision: GÜNTHER SCHATTER (grade: 1.3, written: 1.0). 
- Oct 2007 **Media Culture**, Bauhaus-Universität, Weimar.
- Mar 2008 Transitioned to computer science in first semester.
- June 2006 **Abitur**, Albert-Schweitzer-Gymnasium, Bad Dübén.
- Mathematics / Physics (final grade: 1.4).

Other positions

- Mar 2017 – **Software management & support**, Donders Centre for Cognition (DCC), Nijmegen.
- Sep 2018 DCC Cluster IT work and support.
- Mar 2013 – **Student assistant**, DLR Institute of Planetary Research, Berlin.
- Aug 2015 IT- and machine learning-related work for *Firewatch* (automated forest fire detection) and the *Rosetta mission*, supervised by STUBBE HVIID and EKKEHARD KÜHRT at the section for *Asteroids and Comets*.

- May 2012 – **Research & development intern**, *Datameer*, San Mateo, CA.
- Aug 2012 Implementation of a large-scale machine learning model in MapReduce, supervised by ULRICH RÜCKERT and HANS-HENNING GABRIEL. Internship supported by GIZ.
- June 2010 – **Student assistant**, *Web Technology & Information Systems*, Bauhaus-Universität, Weimar.
- Aug 2012 Information retrieval and feature engineering in the Wikipedia revision history with MapReduce; supervised by MAIK ANDERKA.
- Aug 2009 – **Student assistant**, *Building Physics*, Bauhaus-Universität, Weimar.
- Apr 2010 Literature research for interactive eLearning; supervised by THOMAS BRÖKER and HEINRICH SÖBKE.
- July 2007 – **Intern location scouting**, *first site locations*, Hamburg.
- Sep 2007 Documenting locations for advertisement and movie productions. Pre-university media internship.
- July 2006 – **Localisation Tester**, *Rockstar Games*, Lincoln.
- June 2007 Proofreading translations, quality assurance, design evaluations.

Publications

- 2022 Singer, J.D., K. **Seeliger**, T. C. Kietzmann, and M. N. Hebart (2022). “From photos to sketches-how humans and deep neural networks process objects across different levels of visual abstraction”. In: *Journal of Vision* 22.2, pp. 4–4.
- 2021 Le, L., L. Ambrogioni, K. **Seeliger**, Y. Güçlütürk, M.A.J. van Gerven, and U. Güçlü (2021). “Brain2Pix: Fully convolutional naturalistic video reconstruction from brain activity”. In: *bioRxiv PREPRINT (in review)*.
- Seeliger***, K., L. Ambrogioni*, Y. Güçlütürk, L. M. van den Bulk, U. Güçlü, and MAJ van Gerven (2021). “End-to-end neural system identification with neural information flow”. In: *PLOS Computational Biology* 17.2.
- 2019 Gerven, M.A.J. van, K. **Seeliger**, U. Güçlü, and Y. Güçlütürk (2019). “Current advances in neural decoding”. In: *Explainable AI: Interpreting, Explaining and Visualizing Deep Learning*. Springer, pp. 379–394.
- Seeliger***, K., R. P. Sommers*, U. Güçlü, S. E. Bosch, and M. A. J. van Gerven (2019). “A large single-participant fMRI dataset for probing brain responses to naturalistic stimuli in space and time”. In: *bioRxiv PREPRINT (in review)*.
- 2018 Rijthoven, M. van, Z. Swiderska-Chadaj, K. **Seeliger**, J. van der Laak, and F. Ciompi (2018). “You only look on lymphocytes once”. In: *Medical Imaging with Deep Learning (MIDL) 2018*.
- Seeliger**, K., U. Güçlü, L. Ambrogioni, Y. Güçlütürk, and MAJ van Gerven (2018). “Generative adversarial networks for reconstructing natural images from brain activity”. In: *NeuroImage* 181, pp. 775–785.
- Troost, M., K. **Seeliger**, and MAJ van Gerven (2018). “Generalization of an upper bound on the number of nodes needed to achieve linear separability”. In: *Benelux Conference on Artificial Intelligence (BNAIC) 2018*.
- 2017 Güçlütürk, Y., U. Güçlü, K. **Seeliger**, S. Bosch, E. van Lier, and M.A.J. van Gerven (2017). “Reconstructing perceived faces from brain activations with deep adversarial neural decoding”. In: *Advances in Neural Information Processing Systems (NeurIPS) 2017*, pp. 4249–4260.
- 2016 Bosch, S., K. **Seeliger**, and MAJ van Gerven (2016). “Modeling Cognitive Processes with Neural Reinforcement Learning”. In: *bioRxiv PREPRINT*.

Talks

- 2022 *Leveraging large data sets and deep learning to synthesize images preferred by brain areas*. Symposium on Deep Learning and Vision Neuroscience, Iberian Conference on Perception (CIP), June 2022, Barcelona.
- Convolutional neural networks and human visual information processing*. 1st Leipzig Symposium on Intelligent Systems, Leipzig University, April 2022.
- 2021 *Convolutional neural networks and visual information processing*. Search Symposium Computational Neuroscience, Osnabrück University, virtual.

A large single-participant fMRI dataset for probing brain responses to naturalistic stimuli in space and time. Symposium on Naturalistic Stimuli in Cognitive Neuroscience, Tagung experimentell arbeitender Psychologen (TeaP), virtual.

2019 *End-to-end learning of neural information processing systems from brain data.* Deep learning in Computational Neuroscience Workshop, Bernstein Conference, Berlin.

Neural network representations and visual processing in brains. Symposium on Big data in vision science, European Conference on Visual Perception (ECVP), Leuven.

2017 *Neural network representations and visual processing in brains.* Schloss Dagstuhl Seminar on Human-Like Neural-Symbolic Computing, Wadern.

[Invited \(non-conference\)](#)

2021 University of Montreal (virtual)

Courtois NeuroMod project. Host: JULIE A. BOYLE and PIERRE BELLEC.

2019 Max Planck Institute for Human Cognitive and Brain Sciences

Vision and Computational Cognition Group. Host: MARTIN HEBART.

Conference posters

2021 K. Seeliger, J. Roth, M. N. Hebart: Synthesizing preferred stimuli for individual voxels in the human visual system. Vision Sciences Society (VSS), 2021, virtual.

J. Roth, K. Seeliger, T. Schmid, M. N. Hebart: Synthesizing Preferred Stimuli for Individual Voxels in the Human Visual System. Computational and Systems Neuroscience (COSYNE), 2021, virtual.

2019 J. Singer, K. Seeliger, M. N. Hebart: The representation of object drawings and sketches in deep convolutional neural networks. NeurIPS workshop on Shared Visual Representations in Human & Machine Intelligence (SVRHM), 2020, virtual.

K. Seeliger, L. Ambrogioni, U. Güçlü, M. A. J. van Gerven: Neural Information Flow: Learning neural information processing systems from brain activity. Conference on Cognitive Computational Neuroscience (CCN), Berlin.

2016 K. Seeliger, M. Fritsche, U. Güçlü, S. Schoenmakers, J.-M. Schoffelen, S. E. Bosch and M. A. J. van Gerven: A forward pass through the visual system: ConvNets encode MEG source activity. NeurIPS workshop MLINI, Barcelona.

K. Seeliger, G. Montavon, K.-R. Müller, M. A. J. van Gerven, S. Nishimoto: Hierarchical K-means encodes human visual cortex activity on video stimuli. NeurIPS workshop MLINI, Barcelona.

S. E. Bosch, K. Seeliger, M. A. J. van Gerven: Modeling human probabilistic categorization with neural reinforcement learning. NeurIPS workshop Brains+Bits, Barcelona.

K. Seeliger, M. Fritsche, U. Güçlü, S. Bosch, S. Schoenmakers and M. A. J. van Gerven: Convolutional neural networks code for spatiotemporal MEG source activity across the visual system. ICT.OPEN2016, Amersfoort.

2014 M. Tangermann, K. Seeliger, A. Nolte, J. Schumacher, P. Zhutovsky, B. Blankertz: Detecting spatial auditory attention in cocktail-party situations. 30th International Congress of Clinical Neurophysiology (ICCN) of the IFCN, Berlin.

Supervision

MASTER THESES Roman Leipe (2022, Leipzig University), Johannes Roth (2020, Leipzig University), Leonieke van den Bulk (2019, Radboud University), Sebastian Tiesmeyer (2019, Radboud University), Elizaveta Genke (2019, Erasmus Mundus MAIA), Marjolein Troost (2018, Radboud University), Hugo Dictus (2018, VU & University of Amsterdam)

MASTER THESES (2ND) Mart van Rijthoven (2018, Radboud University)

BACHELOR THESES (2ND) Lino Vliex (2016, Radboud University)

INTERNSHIP Florian Mahner (Osnabrück & Radboud University)

Teaching

- 2016 – 2018 Tutor Artificial Neural Networks (AI B.Sc.). Preparing / assisting / grading assignments and final exam.
- 2017 – 2018 Tutor Python for Artificial Intelligence (AI B.Sc.). Assisting / grading assignments.
- 2017 Academic and Professional Skills (AI B.Sc.). Grading essays.
- 2016 *Computational Modeling and Cognitive Development at Amsterdam Brain and Cognition Summer School.*
Prepared and taught one-week practical.

Reviewer activity

PRIMARY	Human Brain Mapping Neurons, Behavior, Data analysis & Theory CCN meeting NeurIPS SVRHM workshop	CO-REVIEWS	Nature Machine Intelligence Nature Human Behaviour NeurIPS Current Biology Journal of Neuroscience
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Active collaborations

- JULIE BOYLE, PIERRE BELLEC & MARIE ST-LAURENT, Courtois NeuroMod project, University of Montréal, Canada
- ROWAN SOMMERS & SANDER E. BOSCH, Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands
- TIM KIETZMANN & ADRIEN DOERIG, Osnabrück University, Germany
- LYNN LE, Donders Institute, Nijmegen, The Netherlands

Organizational activities

- CoCoNUT Co-organizer of Cognitive Computational Neuroscience Unification Trial talk series at MPI-CBS.