Katja Seeliger *Curriculum Vitae*

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The Netherlands

EDUCATION

Donders Institute for Brain, Cognition and Behaviour *October 2015 to present*

Ph.D. candidate in the Artificial Cognitive Systems Lab, supervised by Marcel van Gerven. I am working on understanding the brain from an algorithmic perspective based on encoding models. We study how representations from convolutional neural networks relate to human sensory processing. I am also working on inverting this mapping (sensory reconstruction).

Technische & Humboldt-Universität Berlin / BCCN Berlin
September 2012 to September 2015

Master of Science in Computational Neuroscience. Next to the thesis project, the degree included three short-term laboratory projects and a seminar project. (final grade: 1.4)

- *Thesis*: Neural encoding for video stimuli with K-means-based hierarchical representation learning. Supervised by Machine Learning Group at TU Berlin. (grade: 1.0)
- *Lab rotation 3*: Hierarchical video feature learning for an encoding model for spatio-temporal stimuli (fMRI) in the group of Shinji Nishimoto (4/2014 - 6/2014, CiNet, Osaka, Japan).
- *Lab rotation 2*: Extending a network editor for analysing robustness in boolean networks in the group of Nihat Ay (2/2014 - 3/2014, MPI-MIS, Leipzig).
- *Lab rotation 1*: Conducting an fMRI pilot experiment aimed at reconstructing spatiotemporal visual perception in Haynes lab (11/2013 - 1/2014, BCCN).
- *Seminar project*: Auditory Brain-Computer-Interfaces: Detecting spatial auditory attention in cocktail-party situations. (summer term 2013, BBCI group).

Bauhaus-Universität Weimar *April 2008 to April 2012*

Bachelor of Science in Computer Science and Media / Media Systems (final grade: 1.3)

- *Thesis*: Usability of P300-spelling and asynchronous input for text input systems on the Emotiv consumer EEG. Supervised by Günther Schatter. The thesis evaluates affordable text entry methods for locked-in patients. (grade: 1.3, written: 1.0)
- *Laboratory project*: Predicting ⋆ featured articles in the Wikipedia – feature engineering for information quality in Java / Weka.
- *Research project*: Multi-touch display on a sea-container – set-up of an outdoor multi-touch panel, assisting media artists in creating multi-touch applications for Bauhaus Summæry.
- *Additional laboratory project*: Visualizing a cellular automaton for sand dune dynamics on a multi-tile display. (9/2010 - 4/2011, Large-Scale Computational Science Division, Osaka University, Japan).

Bauhaus-Universität Weimar *October 2007 to September 2008*

Studies towards a Bachelor of Arts in Media Culture.

Albert-Schweitzer-Gymnasium, Bad Düben *September 1998 to June 2006*

Abitur (Saxony) with focus courses in Mathematics / Physics (final grade: 1.4)

PROFESSIONAL

DLR Institute of Planetary Research, Berlin-Adlershof
March 2013 to March 2014, September 2014 to August 2015

Student employment at the section for Asteroids and Comets: Assistance within machine learning-based visual smoke detection in the FireWatch project, preparation of particle simulations on the HLRN for comet visualizations for the Rosetta mission, control wrapper for the pco.edge sCMOS camera (Python), developing a metadatabase and a GUI interface for the Rosetta OSIRIS / VIRTIS / NavCam data (Python), organization of the Rosetta / Philae AskMeAnything session.

Professional

Datameer Inc., San Mateo, CA (US) *May 2012 to August 2012*

Research & Development intern in the San Francisco Bay Area office: Prototyping and implementing (Python, Java, Hadoop) a MapReduce machine learning model for the Datameer business intelligence software, performance optimization. The implementation could largely be transferred into the fall 2013 release. The internship was financially supported by the GIZ.

Chair of Web Technology and Information Systems, Bauhaus-Universität Weimar
June to September 2010, April 2011 to August 2012

Student employment: Information retrieval on the Wikipedia corpus: Tasks in research for automatic detection of information quality ($\star$ featured articles, cleanup templates); analyses and processing of the revision history data using Hadoop MapReduce. This work was included within the InnoProfile project *Intelligent Learning*.

Chair of Building Physics, Bauhaus-Universität Weimar *August 2009 to April 2010*

Student employment: Researching background in learning theory, prototyping of a building physics eLearning serious game within the project *Intelligent Learning*.

first site locations, Hamburg (GER) *July to September 2007*

Location scout intern: Documenting and offering locations for advertisement productions.

Rockstar Games Lincoln, Lincoln (UK) *July 2006 to June 2007*

Localisation Tester: Proofreading translations and participating in the quality assurance and design evaluation process of Rockstar Games.

Information technology

Programming Languages

- Professional or student project experience with Python, Java, MATLAB, C++.
- Encountered Ada, C#, R, SQL, XML / HTML in assignments or small projects.

Software Frameworks and Applications

- Professional or student project experience with scientific Python (e.g. chainer, numpy, matplotlib), Hadoop MapReduce, Psychophysics Toolbox, FieldTrip.
- Familiar with VCS (CVS, git, SVN), Weka, JIRA, SQLite, LaTeX.

Publications

K. Seeliger, R. P. Sommers (co-first author), U. Güçlü, S. E. Bosch, M. A. J. van Gerven (2018): *A large single-participant fMRI dataset for probing brain responses to naturalistic stimuli in space and time. (in review)*

K. Seeliger, U. Güçlü., L. Ambrogioni, Y. Güçlütürk, M. A. J. van Gerven (2018). *Generative adversarial networks for reconstructing natural images from brain activity*. NeuroImage, 181, 775-785. *(preprint)*

K. Seeliger, M. Fritsche, U. Güçlü, S. Schoenmakers, J.-M. Schoffelen, S. E. Bosch, M. A. J. van Gerven (2017): *Convolutional neural network-based encoding and decoding of visual object recognition in space and time*. NeuroImage, 2017, doi:10.1016/j.neuroimage.2017.07.018. *(preprint)*

S. E. Bosch, K. Seeliger, M. A. J. van Gerven (2016): *Modeling Cognitive Processes with Neural Reinforcement Learning*. bioRxiv preprint, doi:10.1101/084111.

All co-authored research work is listed on my GoogleScholar profile.

Talks and seminars

Schloss Dagstuhl Seminar on Human-Like Neural-Symbolic Computing (2017). Talk: *Neural network representations and visual processing in brains*.

2017 OIST Computational Neuroscience Course (OCNC), Okinawa, Japan. Fully-funded summer school on computational neuroscience (attended).

Conference / Workshop posters

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*. NIPS workshop MLINI, December 2016, 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*. NIPS workshop MLINI, December 2016, Barcelona.

S. E. Bosch, K. Seeliger, M. A. J. van Gerven: *Modeling human probabilistic categorization with neural reinforcement learning.* NIPS workshop Brains+Bits, December 2016, 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, March 22-23 2016, Amersfoort, The Netherlands.

M. Tangermann, K. Seeliger, A. Nolte, J. Schumacher, P. Zhutovsky, B. Blankertz: *Detecting spatial auditory attention in cocktail-party situations.* Abstracts of the 30th International Congress of Clinical Neurophysiology (ICCN) of the IFCN, March 20-23 2014, Berlin.

Other

Teaching and other university duties

- 2016-2018: Artificial Neural Networks (AI B.Sc.) (preparing / assisting / grading assignments and final exam)
- 2017-2018: Python for Artificial Intelligence (AI B.Sc.) (assistance / grading in practicals)
- 2017-2018: Software management and user support for the DCC cluster
- 2017: Academic and Professional Skills (AI B.Sc.) (grading essays)
- 2016: Computational Modeling and Cognitive Development (Amsterdam Brain and Cognition Summer School) (prepared and taught one-week practical)

Languages

- German: Native speaker
- English: Fluent (self-assessed CEFR C1, FCE 2005)
- Japanese: Basic (self-assessed CEFR A2)

Links

GoogleScholar profile | Academic homepage | MindCodec blog