Moritz Boos

Curriculum Vitae

Experience

Work

3/2020– **Research Associate**, Applied Neurocognitive Psychology Lab, Carl-von-Ossietzky University, Oldenburg, I worked on using Machine Learning methods to understand the neuronal processing of speech..

6/2019–1/2020 **Staff Associate**, Neural Acoustic Processing Lab, Columbia University, New York, I worked on adapting Deep Learning methods for application in auditory neuroscience..

11/2016–5/2019 **Research Associate**, Applied Neurocognitive Psychology Lab, Carl-von-Ossietzky University, Oldenburg, I worked on using Machine Learning methods to understand the neuronal processing of speech..

2/2015–11/2015 **Contractual Work**, Georg-August University, Göttingen, Statistical analysis of questionnaire data.

3/2014–5/2015 **Research Assistant**, Applied Neurocognitive Psychology Lab, Carl-von-Ossietzky University, Oldenburg, Implementing and developing statistical methods for regression-based speech encoding in ECoG data.

11/2013-12/2015 **Contractual Work**, Medical School Hanover, Hanover, Statistical analysis of EEG data.

5/2012–9/2012 **Teaching Assistant**, Department for Engineering Psychology, Technische Universität Carolo-Wilhelmina, Braunschweig, Teaching Assistant for experimental methods.

9/2011–9/2012 **Research Assistant and Teaching Assistant**, Department for Psychological Methods, Technische Universität Carolo-Wilhelmina, Braunschweig, Research Assistant for conducting a usability study and Teaching Assistant for a statistical methods in psychology class.

4/2011–8/2011 **Research Assistant**, Institute for High Voltage Technology, Technische Universität Carolo-Wilhelmina, Research assistant for the development and statistical analysis of questionnaire data.

Internships and Further Education

7/2016–10/2016 **Internship**, INRIA Saclay, Saclay, Research internship in the Parietal lab at INRIA. Estimating speech encoding models with different basis functions in fMRI, from low-level audiory features to natural language processing models..

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5/2015–8/2015 **Internship**, Otto-von-Guericke University, Magdeburg, Research internship in the Psychoinformatics lab (Michael Hanke). I was building voxel-wise encoding models for auditory stimuli in fMRI.

8/2013–9/2013 **Internship**, Medical School Hanover, Hanover, Research internship in Cognitive Neuroscience. Modelling choice under uncertainty using a hierarchical bayesian model.

6/2013–7/2013 **Internship**, German Aerospace Center, Braunschweig, Research internship in Human-Computer Interaction.

10/2011–7/2012 **Founded and organized the Statistical Methods for Psychology Meeting**, Technische Universität Carolo-Wilhelmina, Braunschweig, Discussion of statistical methods for psychology.

6/2010–1/2011 **Internship**, Department of Psychological Methods and Biopsychology, Technische Universität Carolo-Wilhelmina, Braunschweig, Research internship conducting an empirical study of signal discrimination at traffic lights.

Education

2016– **PhD student in the Applied Neurocognitive Psychology Lab**, *Carl-von-Ossietzky University*, Oldenburg.

2013–2017 **Masters of Science in Neurocognitive Psychology (in English)**, *Carl-von-Ossietzky University*, Oldenburg.

2009–2013 **Bachelor of Science in Psychology**, *Technische Universität Carolo-Wilhelmina*, Braunschweig.

Masters Thesis

Title *Estimating the Latent Space of Encoding Models Using Binary Sparse Coding*

Supervisors Professor Jochem Rieger & Professor Jörg Lücke

Description In this thesis I compare the effect of different auditory basis representations – based on either the logarithmic Mel-frequency spectrogram or a binary sparse coding representation – on the performance of speech encoding models for functional magnetic resonance imaging (fMRI) data.

Practical Project

Title *The Effect of Nonlinearities in Speech Encoding*

Supervisors Professor Jochem Rieger & Cristiano Micheli

Description In this half-year research project I worked on the effect of nonlinearities in regression models for speech encoding using ECoG data.

Bachelor Thesis

Title *Driver Modelling using Bayesian Networks*

Supervisors Professor Frank Eggert & Professor Mark Vollrath

Description In this bachelor thesis I modelled driving behaviour in a driving simulator using Bayesian networks.

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Computer skills

Programming languages	Python, R, MATLAB
Machine Learning frameworks	Tensorflow, Keras, Pytorch, Stan

Machine Learning competitions

2015 **How much did it rain? II**, *Predict hourly rainfall using data from polarimetric radars*, Place 72/587, Top 13%.

2018 **Toxic Comment classification challenge**, *Identify and classify toxic online comments*, Place 119/4551, Top 3%.

Open source development

Nilearn A machine learning library for neuroimaging

Attended workshops

2/2016 **Brainhack**, *Paris*, Collaborative development of open source software for neuroscience, I worked on an example of voxel-wise encoding models..

3/2017 **Brainhack**, *Paris*, Collaborative development of open source software for neuroscience, I implemented a plotting function..

5/2018 **Brainhack**, *Magdeburg*, Collaborative development of open source software for neuroscience, I worked on statistical methods for auditory neuroscience..

11/2019 **Brainhack**, *New York City*, Collaborative development of open source software for neuroscience, I worked on improving the display of quality control visualizations in neuroimaging..

Publications

Papers

[1] Moritz Boos et al. "Probabilistic inference: Task dependency and individual differences of probability weighting revealed by hierarchical Bayesian modelling". In: *Frontiers in Psychology* 7 (2016), p. 755.

[2] Florian Lange et al. "Road crossing behavior under traffic light conflict: Modulating effects of green light duration and signal congruency". In: *Accident Analysis & Prevention* 95 (2016), pp. 292–298.

[3] Silke Schicktanz et al. "Attitudes towards brain death and conceptions of the body in relation to willingness or reluctance to donate: results of a student survey before and after the German transplantation scandals and legal changes". In: *Journal of Public Health* 25.3 (2017), pp. 249–256.

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[4] Caroline Seer et al. “Prior probabilities modulate cortical surprise responses: A study of event-related potentials”. In: *Brain and cognition* 106 (2016), pp. 78–89.

Proceedings

[5] Peer Manske, Frederik Meysel, and Moritz Boos. “VOD-CA-Assisting Human Flight Performance and Situation Awareness in Lateral Deconflicting”. In: *Proceedings of the Human Factors and Ergonomics Society Europe Chapter Annual Meeting. Turin*. 2013.

Posters

[6] Moritz Boos, Jörg Lücke, and Jochem W. Rieger. “Data-driven discovery of general mechanisms of cortical auditory processing”. 2017. Poster presented at the Signal And Noise Along the Auditory Pathway conference.

[7] Moritz Boos, Jörg Lücke, and Jochem W. Rieger. “Data-driven models reveal the generalizing mechanisms of speech processing in naturally varying soundscapes”. 2018. Poster presented at the Cognitive Computational Neuroscience conference.

[8] Moritz Boos, Jörg Lücke, and Jochem W. Rieger. “Estimating the latent space of human auditory functional speczialization with binary sparse coding”. 2017. Poster presented at the Computational and Systems Neuroscience conference.

[9] Moritz Boos, Jochem W. Rieger, and Jörg Lücke. “Data-driven discovery of general mechanisms of cortical auditory processing”. 2017. Poster presented at the Speech in Noise conference.