

# Franziska Horn

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## experience

04/2015 – present	<b>Research Assistant</b> - in the machine learning group of Prof. Dr. Klaus-Robert Müller - developed the Similarity Encoder (SimEc) neural network architecture for learning low dimensional embeddings of data points by preserving similarity structures found in the original high dimensional input data; with applications e.g. in the area of NLP by extending the word2vec algorithm to produce embeddings for out-of-vocabulary words and words with multiple meanings - collaboration with BASF on predictive maintenance / time series analysis - supervised bachelor and master students - funded by the Elsa-Neumann Scholarship from the state of Berlin	TU Berlin (Technische Universität Berlin)
07/2016 – 06/2017	<b>Machine Learning Scientist</b> - developed a chatbot AI to respond to user messages automatically - implemented a content recommendation API for newspaper articles, which can be used by all clients to promote their content - selected new members for the machine learning team	spectrm
02/2014 – 06/2016	<b>Data Scientist</b> - advanced analytics consulting projects, algorithm development, presentation of results, and project management - clients included razorfish (NLP backend for automatic content classification) and outfittery (style prediction algorithms for curated shopping)	idalab
09/2013 – 09/2014	<b>Student Research Assistant</b> - machine learning research in the group of Prof. Dr. Klaus-Robert Müller - focus on text classification, unsupervised learning (word2vec vector space embedding, dimensionality reduction), and information extraction - short-term research stay at UCLA; collaboration with Prof. Dr. Alcino Silva	TU Berlin
08/2012 – 08/2013	<b>Student Research Assistant</b> - EEG data analysis at the Berlin Brain-Computer Interface Lab - developed and efficiently implemented new algorithms in MatLab - three peer-reviewed publications (journal and conferences)	TU Berlin
07/2011 – 10/2011	<b>Research Intern</b> - at the McGovern Institute for Brain Research / Gabrieli Lab - analyzed fMRI data using NIPY with results published in JAMA Psychiatry - sponsored by a DAAD RISE scholarship	Massachusetts Institute of Technology (MIT)
07/2007 – 12/2009	<b>Student Research Assistant</b> - hands-on science in the field of chemical analysis / infrared spectroscopy - devised creative solutions for tricky experimental setups - worked independently with the sole responsibility for the collection of data	Fraunhofer Institute for Chemical Technology

## education

04/2013 – 03/2015	<b>M.Sc. Computer Science</b> - focus: intelligent systems. machine learning: theory, lab course, project; advanced information management (big data & Hadoop); neurobiology - thesis: KNOWLEDGE EXTRACTION FROM COMPLEX BIOLOGICAL TEXTS: A MACHINE LEARNING APPROACH (supervisor: Prof. Dr. Klaus-Robert Müller, TU Berlin) - graduated top of my class (1.0)	TU Berlin (Technische Universität Berlin)
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10/2012 – 03/2013	<b>M.Sc. Computational Neuroscience</b> <ul style="list-style-type: none"> <li>- interdisciplinary &amp; strongly research oriented international master program</li> <li>- highly competitive application process (10 places/year)</li> <li>- switched to computer science after 1 semester to deepen my technical knowledge and get a wider choice of application areas</li> </ul>	BCCN / TU Berlin
10/2009 – 09/2012	<b>B.Sc. Cognitive Science</b> <ul style="list-style-type: none"> <li>- interdisciplinary study program including courses in neurobiology, computer science, psychology, artificial intelligence, mathematics, computational linguistics, neuroinformatics, and philosophy; taught in English</li> <li>- thesis in the field of brain-computer interfaces at the TU Berlin: COMPARING AND COMBINING MULTIPLE EEG FEATURES IN MOTOR IMAGERY BCI – A LARGE SCALE STUDY (supervisor: Prof. Dr. Benjamin Blankertz, TU Berlin)</li> <li>- graduated with distinction (1.1)</li> </ul>	Universität Osnabrück
09/2000 – 06/2009	<b>Abitur (secondary school)</b> <ul style="list-style-type: none"> <li>- 11<sup>th</sup> grade as a year abroad in Missouri (USA)</li> </ul>	Fichte-Gymnasium Karlsruhe

## activities

October 2015	<b>Data2Day Workshop in Karlsruhe, Germany: Introduction to Data Science</b> <ul style="list-style-type: none"> <li>- 1 day workshop where I was responsible for the practical part and instructed the 25 participants on how to use Python, numpy, pandas, and sklearn to get the most out of their data</li> </ul>	
September 2014	<b>Advanced Scientific Programming in Python – Summer School in Split, Croatia</b> <ul style="list-style-type: none"> <li>- lectures and tutorials on advanced topics like parallelization and Cython</li> <li>- programming project in teams: artificial intelligence for a pacman game</li> </ul>	
July 2012	<b>McKinsey Technology Lab “Big Data” in Prague</b> <ul style="list-style-type: none"> <li>- 4 day workshop to discuss the importance and usability of big data technology in various business areas, including a case study developing the concept for a big data application</li> </ul>	
regularly	<b>various Meetups in Berlin</b> <ul style="list-style-type: none"> <li>- e.g. PyData and Machine Learning Talks</li> </ul>	

## skills

language	native German, fluent English, basic French
programming	Python (main), SQL, MatLab, R, Java ~ <a href="https://github.com/cod3licious">https://github.com/cod3licious</a>
computing	Linux/Unix office applications & LaTeX Adobe Photoshop, InDesign, Illustrator

## publications

### Learning Similarty Preserving Representations with Neural Similarity Encoders

Franziska Horn and Klaus-Robert Müller

*arXiv preprint arXiv:1702.01824*, 2017.

### Context encoders as a simple but powerful extension of word2vec

Franziska Horn

*Proceedings of the 2nd Workshop on Representation Learning for NLP*, 2017.

### Interactive Exploration and Discovery of Scientific Publications with PubVis

Franziska Horn

*arXiv preprint arXiv:1706.08094*, 2017.

### **“What is Relevant in a Text Document?”: An Interpretable Machine Learning Approach**

Leila Arras, Franziska Horn, Gregoire Montavon, Klaus-Robert Müller and Wojciech Samek  
*PloS one*, 12(8):e0181142, 2017.

### **Discovering topics in text datasets by visualizing relevant words**

Franziska Horn, Leila Arras, Gregoire Montavon, Klaus-Robert Müller and Wojciech Samek  
*arXiv preprint arXiv:1707.06100*, 2017.

### **Exploring text datasets by visualizing relevant words**

Franziska Horn, Leila Arras, Gregoire Montavon, Klaus-Robert Müller and Wojciech Samek  
*arXiv preprint arXiv:1707.05261*, 2017.

### **Explaining Predictions of Non-Linear Classifiers in NLP**

Leila Arras, Franziska Horn, Gregoire Montavon, Klaus-Robert Müller and Wojciech Samek  
*Proceedings of the 1st Workshop on Representation Learning for NLP*, 2016.

### **Robust Artifactual Independent Component Classification for BCI Practitioners**

I. Winkler, S. Brandl, F. Horn, E. Waldburger, C. Allefeld, M. Tangermann  
*Journal of Neural Engineering*, 11(3):035013, 2014.

### **Predicting Treatment Response in Social Anxiety Disorder From Functional Magnetic Resonance Imaging**

O. Doehrmann, S. S. Ghosh, F. E. Polli, G. O. Reynolds, F. Horn, A. Keshavan, ... & J. D. Gabrieli  
*JAMA Psychiatry*, 70(1):87-97, 2013.

### **Increasing the Spectral Signal-To-Noise Ratio of Common Spatial Patterns**

Franziska Horn, Sven Dähne  
*Proceedings of the Fifth International Brain-Computer Interface Meeting*, 2013.

### **Combining Multiple EEG Features in Motor Imagery BCI**

Franziska Horn, Johannes Höhne, Sven Dähne, Benjamin Blankertz  
*BBCI Workshop - Advances in Neurotechnology, Berlin, Germany*, 2012.