# Franziska Horn

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## experience

10/2018 – present **Freelance Data Science Consultant** Ludwigshafen
- design, implementation, and evaluation of data science solutions tailored to the client's needs
- workshops on how to use machine learning techniques in practice
- clients include BASF and TRUMPF

03/2018 – 10/2018 **Data Science Consultant (Working Student)** BASF, Ludwigshafen
- most experienced Python developer in the team, responsible for code review
- implementation of machine learning algorithms, e.g., a library for automatic feature engineering and selection, and analysis of complex datasets to optimize processes in chemical plants

09/2017 – 02/2018 **Research Assistant** TU Berlin (Technische Universität Berlin)
- in the machine learning group of Prof. Dr. Klaus-Robert Müller
- predictive maintenance / time series analysis project in collaboration with BASF (worked on-site in Ludwigshafen)
- designed, implemented, and evaluated linear and non-linear regression models in Python to predict the degradation of catalysts in chemical plants

07/2016 – 06/2017 **Machine Learning Scientist** spectrm, Berlin
- developed a chatbot AI to respond to user messages automatically (RiveScript)
- implemented a content recommendation API for newspaper articles, which can be used by all clients to promote their content (Python Flask App)
- selected new members for the machine learning team

02/2014 – 06/2016 **Data Scientist** idalab, Berlin
- advanced analytics consulting projects, ML algorithm development in Python, presentation of results, and project management
- clients included razorfish (NLP backend for automatic content classification) and outfittery (style prediction algorithms for curated shopping)

09/2013 – 09/2014 **Student Research Assistant** TU Berlin
- 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

08/2012 – 08/2013 **Student Research Assistant** TU Berlin
- 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)

07/2011 – 10/2011 **Research Intern** MIT (Massachusetts Institute of Technology), Cambridge, MA
- 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

07/2007 – 12/2009 **Student Research Assistant** Fraunhofer Institute for Chemical Technology, Pfinztal
- worked independently, responsible for collection of infrared spectroscopy data

## education

04/2015 – present **Ph.D. Candidate** TU Berlin (Technische Universität Berlin)
- 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
- supervised bachelor and master students
- funded by the Elsa-Neumann Scholarship from the universities of Berlin

04/2013 – 03/2015 **M.Sc. Computer Science** TU Berlin
- 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)

10/2012 – 03/2013 **M.Sc. Computational Neuroscience** BCCN / TU Berlin
- interdisciplinary & strongly research oriented international master program
- highly competitive application process (10 places/year)
- switched to computer science after 1 semester to deepen my technical knowledge and get a wider choice of application areas

10/2009 – 09/2012 **B.Sc. Cognitive Science** Universität Osnabrück
- interdisciplinary study program including courses in neurobiology, computer science, psychology, artificial intelligence, mathematics, computational linguistics, neuroinformatics, and philosophy; taught in English
- 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)
- graduated with distinction (1.1)

09/2000 – 06/2009 **Abitur (secondary school)** Fichte-Gymnasium Karlsruhe
- 11th grade as a year abroad in Missouri (USA)

## skills

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|---|---|
| language | German (native), English (fluent), French (basics) |
| programming | Python (7+ years), SQL, MatLab, R, Java ~ https://github.com/cod3licious |
| computing | Linux/Unix<br>version control (git)<br>office applications & LaTeX |

## publications

Context encoders as a simple but powerful extension of word2vec
Franziska Horn
In *Proceedings of the 2nd Workshop on Representation Learning for NLP*, pages 10-14, Vancouver, Canada, August 2017. Association for Computational Linguistics.

"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.

Explaining Predictions of Non-Linear Classifiers in NLP
Leila Arras, Franziska Horn, Gregoire Montavon, Klaus-Robert Müller and Wojciech Samek
In *Proceedings of the 1st Workshop on Representation Learning for NLP*, pages 1-7, Berlin, Germany, August 2016. Association for Computational Linguistics.

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.

## preprints

The DALPHI annotation framework & how its pre-annotations can improve annotator efficiency
Robert Greinacher and Franziska Horn
*arXiv preprint arXiv:1808.05558*, 2018.

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.

Interactive Exploration and Discovery of Scientific Publications with PubVis
Franziska Horn
*arXiv preprint arXiv:1706.08094*, 2017.

Learning Similarity Preserving Representations with Neural Similarity Encoders
Franziska Horn and Klaus-Robert Müller
*arXiv preprint arXiv:1702.01824*, 2017.