Dr. Jens Behrmann

Practical Experience

2019 - 2020 **Deep Learning Team Lead and Postdoctoral Researcher: Industrial Mathematics, University of Bremen, Germany**
Lead of the deep learning team within the group Industrial Mathematics by Prof. Dr. Peter Maass. Position includes independent research and management of scientific projects, mentoring of PhD/master projects and acquisition of research projects.

2015 - 2019 **Research Scientist: Industrial Mathematics, University of Bremen**
Research scientist in the group Industrial Mathematics led by Prof. Dr. Peter Maass with a broad scope in machine learning. Position includes work in research and industrial projects, teaching bachelor/master classes and drafting project proposals.

May 2018 - Sept 2018 **Visiting PhD student: University of Toronto and Vector Institute for AI**
Research projects during the stay included adversarial robustness and the design of novel invertible neural networks for generative modeling.

Nov 2014 - June 2015 **Master Thesis and Internship:**
Bosch, Computer Vision Research Lab, Hildesheim, Germany
Analysis of Deep Learning in the context of 3D person detection. The thesis focused on a study of optimization methods and their applications to convolutional neural networks for RGB-D and stereo data.

2012 - 2014 **Student Assistant: Robotics Innovation Center, Bremen, Germany**
Implementation of online machine learning methods for regression and robot movement based on Gaussian Processes in Python.

Education

2015 - 2019 **PhD in Industrial Mathematics, University of Bremen**, Summa cum laude
Thesis: *Principles of Neural Network Architecture Design: Invertibility and Domain-Konwledge*, supervised by Prof. Dr. Peter Maass.
PhD project on principled ways to design deep neural networks with targeted properties. Work at the intersection of deep learning and mathematics with applications to generative modeling, robustness of convolutional neural networks, tumor classification in mass spectrometry data and computer vision.

2013 - 2015 **University of Bremen**, Master of Science **Industrial Mathematics**, Grade 1.19
Thesis: *Optimization in Deep Learning and Appl. to Multi-Modal Person Detection.*
This degree focuses on developing, analyzing and applying mathematical methods for problems arising in industrial applications including subjects like image processing, optimization and inverse problems.

2009 - 2013 **University of Bremen**, Bachelor of Science **Industrial Mathematics**, Grade 1.71
Thesis: *Blind Source Separation for MALDI-Imaging.*
Thesis on unsupervised machine learning based on sparsity algorithms for Non-negative Matrix Factorization with applications to hyperspectral images from mass spectrometry.

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2012 **Cardiff University, United Kingdom**
Exchange semester including subjects like Mathematical Principles of Image Processing and Data Mining.

Publications (Selection)

2020 Tramer, Behrmann,J. et al.: *Fundamental Tradeoffs between Invariance and Sensitivity to Adversarial Perturbations*, International Conference on Machine Learning (ICML)

2019 Behrmann,J. et al.: *Invertible residual networks*, International Conference on Machine Learning (ICML) - selected as Long Oral

2019 Chen, T.Q.R., Behrmann,J. et al.: *Residual flows for invertible generative modeling*, Neural Information Processing Systems (NeurIPS) - selected as Spotlight

2019 Jacobsen,J.-H., Behrmann,J. et al.: *Excessive invariance causes adversarial vulnerability*, International Conference on Learning Representations (ICLR)

2018 Behrmann,J. ,Etmann,C. et al.: *Deep learning for tumor classification in imaging mass spectrometry*, Bioinformatics 34(7), Oxford Academic

Programming and Software Experience

Python Numerical programming, experience with machine learning libraries such as PyTorch, Scikit-learn, Tensorflow

MATLAB Numerical programming, signal and image processing

Java Basics of object-oriented programming

C++ Basics of object-oriented programming

Software Experience with agile project management software and GIT

Languages

English Fluent

German Mother tongue

Teaching and Supervision

2016-2020 Supervision of several bachelor/ master projects on machine learning

2020 Teaching assistant: Mathematical Basics of Data Analysis and Image Processing

2019 Lecturer: Mathematical Foundations of Machine Learning

2016-2019 Lecturer: Seminar on Neural Networks

2016-2019 Teaching assistant: Programming for Mathematicians

Scientific and Networking Activities (Selection)

2019-2020 Reviewer at top-tier machine learning venues such as Neural Information Processing Systems (NeurIPS) or the Journal of Machine Learning Research.

Dec 2019 Poster at Neural Information Processing Systems (NeurIPS), Vancouver

Nov 2019 Organization of Autumn School on *Deep Learning and Inverse Problems*, Bremen

Sept 2019 Organization of *Deep Learning Forum*, Bremen

June 2019 Talk and poster at International Conference on Machine Learning (ICML), Long Beach

May 2019 Poster at International Conference on Learning Representations (ICLR), New Orleans

Aug 2018	Poster at Summer School on Deep Learning and Reinforcement Learning, Toronto
Feb 2018	Talk at workhop on *Inverse Problems and Machine Learning*, Caltech
June 2017	Talk at Applied Inverse Problems Conference (AIP), Hangzhou

Bremen, Germany December 17, 2020