

Stephan Mandt

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Work Experience

- 2016—
present **Disney Research, Research Scientist**
Leading a machine learning research group of two postdocs plus interns
Publishing scientific publications, patents, and promoting technology transfer to various business units including Disney Studios and ABC Television
- 2014–2016 **Columbia University, Postdoctoral Research Scientist**
Conducting research on machine learning at the Data Science Institute
Focus on scalable probabilistic modeling and stochastic optimization
Advisor: David Blei
- 2012–2014 **Princeton University, Postdoctoral Fellow**
Princeton Center for Complex Materials
Conducting research on probabilistic modeling and non-equilibrium statistical physics
Awarded Princeton's 2-year PCCM Fellowship for independent research
- 2012 **Deutsche Bank, Intern**
Developed tools and analytics for an interest rates trading desk

Education

- 2008–2012 **University of Cologne, Ph.D. (Magna Cum Laude)**
Theoretical Physics, GPA 4.0/4.0
German National Academic Foundation Fellowship (Studienstiftung des dt. Volkes)
Thesis: "Transport and Non-Equilibrium Dynamics in Optical Lattices"
Advisor: Achim Rosch
- 2002–2008 **University of Cologne, M.S. and B.S. (With Distinction)**
Studies of Physics and Mathematics, GPA 4.0/4.0 (German Diplom degree)
Thesis on random matrix theory, advised by Martin Zirnbauer

Honors and Awards (Selected)

- 2016 Best Poster Award, New York Academy of Sciences ML Symposium
- 2016 NVIDIA Hardware Grant
- 2015 NSF Support Grant for Junior Researchers
- 2014–2016 New York City Ascent Fellowship
- 2013 Institute for Complex Adaptive Matter Travel Award
- 2012–2014 PCCM Fellowship, Princeton Center for Complex Materials, Princeton University
- 2010–2012 Selected for the German government's elite fellowship program, supporting the top 0.5% of students nationwide based on academic achievements (Studienstiftung des Deutschen Volkes, see Wikipedia).

Publications

Under Review

- 2017 **Stochastic Gradient Descent as Approximate Bayesian Inference**,
S. Mandt, H. Hoffman, and D. Blei,
Submitted to JMLR.
<http://arxiv.org/abs/1704.04289>.

International Conference Proceedings

- 2017 **Stochastic Learning on Imbalanced Data: Determinantal Point Processes for Mini-Batch Diversification**,
C. Zhang, H. Kjellström, and S. Mandt,
Uncertainty in Artificial Intelligence (UAI 2017), plenary talk.
Acceptance rate 29%.
- 2017 **Dynamic Word Embeddings via Skip-Gram Filtering**,
R. Bamler and S. Mandt,
International Conference on Machine Learning (ICML 2017).
Acceptance rate 25%.
- 2017 **Factorized Variational Autoencoders for Modeling Audience Reactions to Movies**,
Z. Deng, R. Navarathna, P. Carr, S. Mandt, Y. Yue, I. Matthews, and G. Mori,
Computer Vision and Pattern Recognition (CVPR 2017).
Acceptance rate 25%.
- 2016 **Exponential Family Embeddings**,
M. Rudolph, F. Ruiz, S. Mandt, and D. Blei,
Neural Information Processing Systems (NIPS 2016)
Acceptance rate 22%.
- 2016 **A Variational Analysis of Stochastic Gradient Algorithms**,
S. Mandt, M. Hoffman, and D. Blei,
Proceedings of the International Conference on Machine Learning (ICML 2016).
Acceptance rate 25%.
- 2016 **Variational Tempering**,
S. Mandt, J. McInerney, F. Abrol, R. Ranganath, and D. Blei,
Proceedings of the 19th International Conference on Artificial Intelligence and Statistics,
Journal of Machine Learning Research Conference Proceedings (AISTATS 2016).
Acceptance rate 30%.
- 2016 **Huber-Norm Regularization for Linear Prediction Models** ,
O. Zadorozhnyi, G. Benecke, S. Mandt, T. Scheffer, M. Kloft,
European Conference on Machine Learning (ECML 2016).
- 2014 **Smoothed Gradients for Stochastic Variational Inference**,
S. Mandt and D. Blei,
Advances in Neural Information Processing Systems, 2438-2446 (NIPS 2014).
Acceptance rate 25%.

Journal Papers

- 2017 **Sparse Probit Linear Mixed Model**,
S. Mandt, F. Wenzel, S. Nakajima, J. Cunningham, C. Lippert, and M. Kloft ,
Machine Learning, to appear.

- 2015 **Stochastic differential equations for quantum dynamics of spin-boson networks**,
S. Mandt, D. Sadri, A. Houck, and H. Tureci,
New Journal of Physics 17 (5), 053018.
- 2014 **Damping of Bloch oscillations: variational solutions of the Boltzmann equation beyond linear response**,
S. Mandt,
Physical Review A 90, 053624 (2014).
- 2013 **Relaxation towards negative temperatures in bosonic systems: Generalized Gibbs ensembles and beyond integrability**,
S. Mandt, A. Feiguin, S. Manmana,
Phys. Rev. A **88**, 043643 (2013).
- 2012 **Fermionic transport in a homogeneous Hubbard model: Out-of-equilibrium dynamics with ultracold atoms**,
U. Schneider, L. Hackermüller, J. P. Ronzheimer, S. Will, S. Braun, T. Best, I. Bloch, E. Demler, S. Mandt, D. Rasch and A. Rosch,
Nature Physics **8**, 213-218 (2012).
- 2011 **Interacting fermionic atoms in optical lattices diffuse symmetrically upwards and downwards in a gravitational potential**,
S. Mandt, A. Rapp, A. Rosch,
Phys. Rev. Lett. **106**, 250602 (2011) .
- 2010 **Equilibration rates and negative absolute temperatures for ultracold atoms in optical lattices**,
A. Rapp, S. Mandt, A. Rosch,
Phys. Rev. Lett. **105**, 220405 (2010). Popular media coverage of this article: “How to create temperatures below absolute zero”, David Shiga, New Scientist, 2789, p.15 (2010).
- 2010 **Zooming in on local level statistics by supersymmetric extension of free probability**,
S. Mandt, M. R. Zirnbauer,
J. Phys. A: Math. Theor. **42** (2010) 025201 (33pp).
- [Workshop Papers](#)
- 2015 **Continuous-Time Limit of Stochastic Gradient Descent Revisited**,
S. Mandt, M. Hoffman, and D. Blei,
Proceedings of the 2015 NIPS workshop on optimization (OPT2015).
- 2015 **Finding Sparse Features in Strongly Confounded Medical Binary Data**,
S. Mandt, F. Wenzel, S. Nakajima, J. Cunningham, C. Lippert, and M. Kloft,
NIPS Workshop Machine Learning for Healthcare (MLHC2015). Contributed Talk.
- 2014 **Probit Regression with Correlated Label Noise: An EM-EP approach**,
S. Mandt, F. Wenzel, J. Cunningham, and M. Kloft,
NIPS Workshop on Variational Inference (NIPS 2014).
- [Technical Reports](#)
- 2014 **Comment on "Consistent thermostats forbids negative absolute temperatures"**,
U. Schneider, S. Mandt, A. Rapp, S. Braun, H. Weimer, I. Bloch, A. Rosch,
arXiv:1407.4127.

2010 **Breakdown of diffusion: From collisional hydrodynamics to a continuous quantum walk in a homogeneous Hubbard model**,
U. Schneider, L. Hackermüller, J. P. Ronzheimer, S. Will, S. Braun, T. Best, I. Bloch, E. Demler, S. Mandt, D. Rasch and A. Rosch,
arXiv preprint arxiv:1005.3545.

2007 **Symmetric Spaces Toolkit**, *H. Sebert and S. Mandt*,
<http://www.stephanmandt.com/papers/SebertMandt2007.pdf>.

Other Publications

2012 **Transport and Non-Equilibrium Dynamics in Optical Lattices**,
S. Mandt, Ph.D. Thesis, University of Cologne 2012.

2013 **Ultrakalt und doch heißer als unendlich heiß**,
S. Mandt, Monthly proceedings of the German Physical Society (in German), Physik Journal, 3/2013.

Service

2016 **Workshop organizer**, NIPS Workshop on Approximate Inference,
as part of Neural Information Processing Systems, 60 paper submissions.

2015 **Workshop organizer**, NIPS Workshop on Approximate Inference,
as part of Neural Information Processing Systems, 32 paper submissions.

journal Journal of Machine Learning Research,

referee Digital Signal Processing,
Physical Review A (atomic physics),
Physical Review E (statistical physics),
Data Mining and Knowledge Discovery.

conference Neural Information Processing Systems,
reviewer Artificial Intelligence and Statistics,
International Conference of Machine Learning.

Mentoring and Group Leadership

Postdocs

01/2017– Cheng Zhang,
<https://cheng-zhang.org/>

03/2017– Robert Bamler,
<http://www.thp.uni-koeln.de/~rbamler/>

Interns and Students

2016 Zhiwei Deng, intern, Simon Fraser University

2014-2016 Florian Wenzel, PhD student and intern, Humboldt University Berlin.

2015 Gaurav Ragtah, master student independent study, Columbia University.

2015 Chenzhe Quian, master student independent study, Columbia University.

Invited Talks

2016 CS Colloquium, University of Southern California, California, USA

2016 CS Colloquium, ETH Zurich, Switzerland

2016 ML and Friends Seminar, UMass Amherst, Massachusetts, USA

- 2016 AI Seminar, Carnegie Mellon University, Pennsylvania, USA
- 2016 California Institute of Technology, Pasadena, USA
- 2016 Data Science Colloquium, Rutgers University, Newark, USA
- 2016 Google Research, Mountain View, USA
- 2016 Microsoft, Sunnyvale, USA
- 2016 Computer Science Colloquium, University of Rhode Island, USA
- 2016 Computer Science Colloquium, University of Colorado at Boulder, USA
- 2016 National Renewable Energy Laboratory (NREL), Golden, CO, USA
- 2015 Adobe Research, San Francisco, USA.
- 2015 Human Longevity Inc., Mountain View, USA.
- 2015 Schloss Dagstuhl Seminar, Leibniz Center for Informatics, Germany.
Machine Learning with Interdependent and Non-identically Distributed Data
- 2015 Machine Learning Seminar, Humboldt University Berlin, Germany.
- 2015 Machine Learning Seminar, Technical University Berlin, Germany.
- 2015 Machine Learning Seminar, University of British Columbia, Canada.
- 2015 D-Wave Systems, Burnaby, Canada.
- 2014 IBM Watson Research Center, Yorktown Heights, USA
- 2014 Emergent Phenomena in the Dynamics of Quantum Matter, New York, USA.
- 2013 Theoretical Physics Seminar, University of Otago, Dunedin, New Zealand.
- 2012 Theoretical Physics Seminar, Princeton University, Princeton, USA.
- 2011 Finite Temperature Non-Equilibrium Superfluid Systems, Heidelberg, Germany.
- 2010 Theoretical Physics Seminar, University of Colorado, Boulder, USA.
- 2010 Theoretical Physics Seminar, Ecole Polytechnique, Palaiseau, France.

Teaching Experience

- 10/2015 Guest lecture, Title: "Stochastic Gradient Descent", Humboldt University Berlin.
- 2/2015 Guest lecture, Title: "Variational Inference", Humboldt University Berlin.
- Fall 2013 Instructor, Condensed Matter Field Theory, Princeton University
Extracurricular undergraduate course.
- Spring 2012 Teaching assistant, Computer Physics, University of Cologne.
- Fall 2011 Teaching assistant, Mathematical Methods, University of Cologne.
- Spring 2011 Teaching assistant, Quantum Field Theory II, University of Cologne.
- Fall 2010 Teaching assistant, Quantum Field Theory I, University of Cologne.
- Spring 2010 Teaching assistant, Statistical Physics, University of Cologne.
- Fall 2009 Teaching assistant, Quantum Physics, University of Cologne.
- Spring 2009 Teaching assistant, Electrodynamics, University of Cologne.
- Fall 2008 Teaching assistant, Classical Mechanics, University of Cologne.