

Résumé

Philipp Hennig

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Career

since 05 / 2018 Eberhard Karls University of Tübingen, Baden-Württemberg
Full Professor (W3) — Chair for the Methods of Machine Learning

2011 – 2018 Max Planck Institute for Intelligent Systems, Tübingen

Independently Funded:

09 / 2016 – 04 / 2018: Max Planck Group Leader (W2)

04 / 2015 – 08 / 2016: Emmy Noether Group Leader

Funded by the Department of Empirical Inference (Bernhard Schölkopf):

03 / 2013 – 04 / 2015: Senior Research Scientist

07 / 2011 – 03 / 2013: Research Scientist

03 / 2011 – 06 / 2011: Postdoc Scholar

Doctor of Philosophy — University of Cambridge, UK _____ 10 / 2007 – 01 / 2011

Affiliations Robinson College & Cavendish Laboratory

Thesis Approximate Inference in Graphical Models

Advisor Sir David J C MacKay †

Mentors Thore Graepel, David Stern, Ralf Herbrich, Carl E. Rasmussen, Zoubin Ghahramani

Funding Microsoft Research Ltd.

dates submitted 10/2010, defended 11 January 2011, graduated 30 April 2011.

British PhDs are not graded

Diplomphysiker — Ruprecht Karl University Heidelberg & Imperial College, London _____ 10 / 2001 – 03 / 2007

Thesis Point-Spread Functions for backscattered imaging in the Scanning Electron Microscope

Advisor Winfried Denk (Max Planck Institute for Medical Research)

GPA 1.1 on the German university scale from 1.0 ('very good') to 4.0 ('sufficient')

Erasmus Exchange at Imperial 2004/05 (MSc Programme Quantum Fields and Fundamental Forces)

Key Awards

- ▶ ERC Starting Grant 2017 (funding period 2018–2022)
- ▶ Max Planck Research Group Lead 2016 (funding period 2016–2021)
- ▶ DFG Emmy Noether Fellow 2015 (funding period 2015–2020, replaced in 2016 by above MPG grant)

Academic Service

2017–2018 Member of the Executive Board of the International Max Planck Research School for Intelligent Systems

2014–2018 Member of the Steering Committee of the Center for Learning Systems of the Max Planck Society and the Swiss Federal Institute of Technology (ETH)

2014–now Area Chair for NIPS (2014,2016,2017), ICML (2017,2018) and AISTATS (2015,2016,2017)

2013 & 2015 Co-Organizer of the Machine Learning Summer School (MLSS) in Tübingen

2013–now Member of the Editorial Board of the Journal of Machine Learning Research (JMLR)

2013–now Co-Organizer of three NIPS workshops (2012,2015,2016), a Dagstuhl Seminar (2016) an ICERM Seminar (2017), a Minisymposium at the SIAM UQ conference (2018)

Peer-Reviewed Publications (chronological. open-access publications marked with [OA])

pre-prints

- [OA] Paul Rubenstein, Ilya Tolstikhin, Philipp Hennig, Bernhard Schölkopf
Probabilistic Active Learning of Functions in Structural Equation Models
in review — arXiv 1706.10234
- [OA] Filip de Roos & Philipp Hennig
Krylov Subspace Recycling for Fast Iterative Least Squares in Machine Learning
in review — arXiv 1706.00241
- [OA] Maren Mahsereci, Lukas Balles, Christoph Lassner, and Philipp Hennig
Early Stopping without a Validation Set
in review — arXiv 1703.09580
- [OA] Philipp Hennig & Roman Garnett
Exact Sampling from Determinantal Point Processes
in review — arXiv 1609.06840

published or in press

- [OA] Lukas Balles & Philipp Hennig
Dissecting adam: The Sign, Magnitude and Variance of Stochastic Gradients
in Dy and Krause, eds., International Conference on Machine Learning (ICML), vol. **35** (2018). In press.
- ▶ Niklas Wahl, Philipp Hennig, Hans-Peter Wieser and Mark Bangert
Analytical incorporation of fractionation effects in probabilistic treatment planning for intensity-modulated proton therapy
Medical Physics, vol. **45** (2018), no. 4, pp. 1317–1328
- [OA] Michael Schober, Simo Särkkä, Philipp Hennig
A probabilistic model for the numerical solution of initial value problems
Statistics & Computing, 2018. in press (online first access available)
- [OA] Maren Mahsereci and Philipp Hennig
Probabilistic Line Searches for Stochastic Optimization
Journal of Machine Learning Research (JMLR), vol. **18** (2017), no. 119, pp. 1–59 (cf. NIPS paper below)
- ▶ Hans-Peter Wieser, Philipp Hennig, Niklas Wahl, Mark Bangert
Analytical probabilistic modeling of RBE-weighted dose for ion therapy
Physics in Medicine and Biology, vol. **62** (2017), no. 23, pp. 8959–8982
- ▶ Alonso Marco Valle, Philipp Hennig, Stefan Schaal, and Sebastian Trimpe
On the Design of LQR Kernels for Efficient Controller Learning
in A. Astolfi, ed., IEEE Conference on Decision and Control (CDC), vol. **56** (2017)
- [OA] Lukas Balles, Javier Romero, and Philipp Hennig
Coupling Adaptive Batch Sizes with Learning Rates
in G. Elidan & K. Kersting, eds., Uncertainty in Artificial Intelligence (UAI), vol. **33** (2017)
- ▶ Niklas Wahl, Philipp Hennig, Hans-Peter Wieser, and Mark Bangert
Efficiency of analytical and sampling-based uncertainty propagation in intensity-modulated proton therapy
Physics in Medicine and Biology, vol. **62** (2017), no. 14, pp. 5790–5807
- [OA] Aaron Klein, Stefan Falkner, Simon Bartels, Philipp Hennig and Frank Hutter
Fast Bayesian Optimization of Machine Learning Hyperparameters on Large Datasets
in Singh & Zhu, eds: Artificial Intelligence and Statistics (AISTATS) vol. **20** (2017)
- ▶ Alonso Marco, Felix Berkenkamp, Philipp Hennig, Angela P. Schoellig, Andreas Krause, Stefan Schaal, and Sebastian Trimpe
Virtual vs. Real: Trading Off Simulations and Physical Experiments in Reinforcement Learning with Bayesian Optimization; in Nakamura & Okamura, eds.: International Conference on Robotics and Automation (ICRA), 2017

- [OA] Arthur Gretton and Philipp Hennig and Carl Edward Rasmussen and Bernhard Schölkopf (editors)
New Directions for Learning with Kernels and Gaussian Processes (Dagstuhl Seminar 16481)
 Dagstuhl Reports, vol. **6** (2017) no. 11, pp. 2192–5283
- [OA] Edgar Klenske & Philipp Hennig
Dual Control for Approximate Bayesian Reinforcement Learning
 Journal of Machine Learning Research (JMLR), vol. **17**, no. 127, pp. 1–30 (2016)
- [OA] Hans Kersting & Philipp Hennig
Active Uncertainty Calibration in Bayesian ODE Solvers
 in Ihler & Janzing, eds.: Uncertainty in Artificial Intelligence (UAI), vol. **32** (2016), pp. 309–318
- [OA] Edgar Klenske, Philipp Hennig, Bernhard Schölkopf, Melanie N. Zeilinger
Approximate Dual Control Maintaining the Value of Information with an Application to Building Control
 European Control Conference (ECC) (2016), to appear
- ▶ Alonso Marco, Philipp Hennig, Jeannette Bohg, Stefan Schaal, Sebastian Trimpe
Automatic LQR Tuning Based on Gaussian Process Global Optimization
 in Okamura, ed.: IEEE International Conference on Robotics and Automation (ICRA) (2016), pp. 270–277
- [OA] Simon Bartels & Philipp Hennig
Probabilistic Approximate Least-Squares
 in Gretton & Robert, eds.: Artificial Intelligence and Statistics (AISTATS) vol. **19** (2016)
 Journal of Machine Learning Research W&CP vol. **51**, pp. 676–684
- [OA] Javier González, Zhenwen Dai, Philipp Hennig, Neil Lawrence
Batch Bayesian Optimization via Local Penalization
 in Gretton & Robert, eds.: Artificial Intelligence and Statistics (AISTATS) vol. **19** (2016)
 Journal of Machine Learning Research W&CP vol. **51**, pp. 648–657
- [OA] Maren Mahsereci, Philipp Hennig
Probabilistic Line Searches for Stochastic Optimization
 in Cortes, Lawrence, Lee, Sugiyama & Garnett, eds.: Advances in Neural Information Processing Systems (NIPS) vol. **28** (2015), pp. 181–189. (full oral presentation)
- [OA] Philipp Hennig, Michael A. Osborne, Mark Girolami
Probabilistic Numerics and Uncertainty in Computations
 Proceedings of the Royal Society A, vol. **471** nr. 2179 (2015)
- [OA] Edgar Klenske, Melanie N. Zeilinger, Bernhard Schölkopf, Philipp Hennig
Gaussian Process based Predictive Control for Periodic Error Correction
 IEEE Transactions on Control Systems Technology, vol. **24** no. 1, (Jan 2016 / published May 2015)
- [OA] Søren Hauberg, Michael Schober, Matthew Liptrot, Philipp Hennig, Aasa Feragen
A Random Riemannian Metric for Probabilistic Shortest-Path Tractography
 in Navab, Hornegger, Wells & Frangi, eds.: Medical Image Computing and Computer Assisted Intervention (MICCAI) vol. **18** (2015),
 Springer LNCS vol. **9349**, pp. 597–604
- [OA] Eleni Sgouritsa, Dominik Janzing, Philipp Hennig, Bernhard Schölkopf
Inference of Cause and Effect with Unsupervised Inverse Regression
 in Lebanon & Vishwanathan, eds.: Artificial Intelligence and Statistics vol. **18** (2015)
 Journal of Machine Learning Research W&CP vol. **38**, pp. 847–855
- ▶ Philipp Hennig
Probabilistic Interpretation of Linear Solvers
 SIAM Journal on Optimization (SIOPT) vol. **25** no. 1 (2015), pp. 234–260
- [OA] Michael Schober, David Duvenaud, Philipp Hennig
Probabilistic ODE Solvers with Runge-Kutta Means
 in Ghahramani, Welling, Cortes, Lawrence & Weinberger, eds.: Advances in Neural Information Processing Systems (NIPS) vol. **27** (2014),
 pp. 739–747 (full oral presentation)
- [OA] Tom Gunter, Michael A. Osborne, Roman Garnett, Philipp Hennig, Stephen Roberts
Sampling for Inference in Probabilistic Models with Fast Bayesian Quadrature
 in Ghahramani, Welling, Cortes, Lawrence & Weinberger, eds.: Advances in Neural Information Processing Systems (NIPS) vol. **27** (2014),
 pp. 2789–2797

- [OA] Franziska Meier, Philipp Hennig, Stefan Schaal
Incremental Local Gaussian Regression
 in Ghahramani, Welling, Cortes, Lawrence & Weinberger, eds.: Advances in Neural Information Processing Systems (NIPS) vol. **27** (2014), pp. 972–980
- [OA] Martin Kiefel, Christian H. Schuler, Philipp Hennig
Probabilistic Progress Bars
 in Jiang, Hornegger & Koch, eds.: German Conference on Pattern Recognition (GCPR) vol. **36** (2014)
- [OA] Roman Garnett, Michael A. Osborne, Philipp Hennig
Active Learning of Linear Embeddings for Gaussian Processes
 in Zhan & Tiang, eds.: Uncertainty in Artificial Intelligence (UAI) vol. **30** (2014), pp. 230–239
- [OA] Franziska Meier, Philipp Hennig, Stefan Schaal
Efficient Bayesian Local Model Learning for Control
 in Burgard, ed.: IEEE International Conference on Intelligent Robotics Systems (IROS) 2014, pp. 2244–2249
- [OA] Michael Schober, Niklas Kasenburg, Aasa Feragen, Philipp Hennig & Søren Hauberg
Probabilistic Shortest Path Tractography in DTI using Gaussian Process ODE solvers
 in Golland, Hata, Barillot, Hornegger, Howe, eds.: Medical Image Computing and Computer Assisted Intervention (MICCAI) vol. **17** (2014), Springer LNCS vol. **8675**, pp. 265–272
- [OA] Philipp Hennig, Søren Hauberg
Probabilistic Solutions to Differential Equations and their Application to Riemannian Statistics
 in Kaski & Corander, eds.: Artificial Intelligence and Statistics (AISTATS) vol. **17** (2014)
 Journal of Machine Learning Research W&CP vol. **33**, pp. 347–355
- [OA] David Lopez-Paz, Philipp Hennig, Bernhard Schölkopf
The Randomized Dependence Coefficient
 in Burges, Bottou, Welling, Ghahramani & Weinberger, eds.: Advances in Neural Information Processing Systems (NIPS) vol. **26** (2013), pp. 1–9
- [OA] Edgar Klenske, Melanie N. Zeilinger, Bernhard Schölkopf, Philipp Hennig
Nonparametric dynamics estimation for time periodic systems
 Annual Allerton Conference on Communication, Control, and Computing vol. **51** (2013)
- [OA] Mark Bangert, Philipp Hennig, Uwe Oelfke
Analytical probabilistic modeling for radiation therapy planning
 Physics in Biology and Medicine vol. **58** no. 16 (Aug 2013), pp. 5401–5419
- ▶ Mark Bangert, Philipp Hennig, Uwe Oelfke
Analytical probabilistic proton dose calculation and range uncertainties
 in Haworth & Kron, eds.: International Conference on the Use of Computers in Radiation Therapy (ICCR) vol. **17** (2013), Journal of Physics Conf. Series vol. **489** (2014), pp. 012002
- [OA] Philipp Hennig & Martin Kiefel
Quasi-Newton Methods — A New Direction (extended version of ICML paper below)
 Journal of Machine Learning Research (JMLR), vol. **14** (Mar 2013), pp. 807–829
- [OA] Philipp Hennig
Fast Probabilistic Optimization from Noisy Gradients
 in Dasgupta & McAllester, eds.: International Conference on Machine Learning (ICML) vol. **30** (2013)
 Journal of Machine Learning Research W&CP vol. **28** no. 1 (2013), pp. 62–70
- [OA] Philipp Hennig & Martin Kiefel
Quasi-Newton Methods — A New Direction
 in Langford & Pineau, eds.: International Conference on Machine Learning (ICML) vol. **29** (2012), pp. 25–32
- [OA] Philipp Hennig & Christian H. Schuler
Entropy Search for Information Efficient Global Optimization
 Journal of Machine Learning Research (JMLR), vol. **13** (Jun 2012), pp. 1809–1837
- [OA] Botond A. Bócsi, Philipp Hennig, Lehel Csató, J. Peters
Learning Tracking Control with Forward Models
 in Papanikolopoulos & Oh, eds.: IEEE International Conference on Robotics and Automation (ICRA) 2012

- [OA] Philipp Hennig, David Stern, Ralf Herbrich, Thore Graepel
Kernel Topic Models
in Lawrence & Girolami, eds.: Artificial Intelligence and Statistics (AISTATS) vol. **15** (2012)
Journal of Machine Learning Research W&CP vol. **22** (2012), pp. 511–519
- [OA] Philipp Hennig
Optimal Reinforcement Learning for Gaussian Systems
in Shawe-Taylor, Zemel, Bartlett, Pereira & Weinberger, eds.: Advances in Neural Information Processing Systems (NIPS) vol. **24** (2011),
pp. 325–333
- [OA] Philipp Hennig
Approximate Inference in Graphical Models
PhD thesis, University of Cambridge, 14 Nov 2010 (examination) / 30 April 2011 (graduation)
- ▶ Mark Bangert, Philipp Hennig, Uwe Delfke
Using an infinite von Mises-Fisher Mixture Model to Cluster Treatment Beam Directions in External Radiation Therapy
in Khoshgoftaar & Zhu, eds.: International Conference on Machine Learning and Applications (ICMLA) vol. **9** (2010), pp. 746–751
- [OA] Philipp Hennig, David Stern, Thore Graepel
Coherent Inference on Optimal Play in Game Trees.
in Teh & Titterton, eds.: Artificial Intelligence and Statistics (AISTATS) vol. **13** (2010)
Journal of Machine Learning Research W&CP vol. **9**, pp. 326–333
- ▶ Philipp Hennig & Winfried Denk
Point-spread functions for backscattered imaging in the scanning electron microscope
Journal of Applied Physics vol. **102** (2007), pp. 123101

Patents

- ▶ P. Hennig, D. Stern, T. Graepel, R. Herbrich
Topic Models (Application)
patent application filed by Microsoft Research Ltd. on 10/26/2010, serial number 12/912428
US patent number 8,645,298 granted February 4, 2014.