Résumé

Philipp Hennig

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Career

from 05 / 2018 Eberhard Karls University of Tübingen
  Full Professor (W3) on the Chair for the Methods of Machine Learning

2011 – 2018 Max Planck Institute for Intelligent Systems, Tübingen

  Independently Funded:
  09 / 2016 – 03 / 2018: *Max Planck Group Leader* (W2)
  04 / 2015 – 08 / 2016: *Emmy Noether Group Leader*

  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

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–now	Member of the Executive Board of the *International Max Planck Research School for Intelligent Systems*
2014–now	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 Oelfke
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 & Titterington, 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.