

Curriculum Vitae

Jonas Peters

Personal Information

born on 28. May 1984 in Nordhorn, Germany

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Education and Professional Experience

- 08/2016 – Associate Professor of Statistics, University of Copenhagen
- 03/2015 – 08/2016 Group Leader “Causality” at the Max Planck Institute for Intelligent Systems, Tübingen
- 12/2012 – 02/2015 PostDoc (Marie Curie, IEF) at ETH Zürich, Switzerland
- 05/2014 – 07/2014 Visiting researcher at CMU, Pittsburgh, USA (host: P. Spirtes)
- 09/2013 – 12/2013 Visiting researcher at UC Berkeley, USA (host: M. Wainwright)
- 02/2012 – 12/2012 PhD at ETH Zürich, ETH Medal for an outstanding PhD thesis (supervisor: P. Bühlmann)
- 08/2011 – 10/2011 Internship at Microsoft Research, Redmond, USA (host: L. Bottou)
- 01/2009 – 02/2012 PhD at Max Planck Institute for Biological Cybernetics, Tübingen (supervisor: D. Janzing, B. Schölkopf)
- 01/2009 Diploma in mathematics (minor: physics), University of Heidelberg, “with distinction”
- 06/2007 Master of Advanced Study in Mathematics (Part III), University of Cambridge, UK, “with distinction”
- 06/2002 – 05/2003 Civilian Service (administration of a children’s home)
- 06/2002 Abitur at Burg-Gymnasium Bad Bentheim, one year skipped

Scholarships and Awards

ASA Causality in Statistics Education Award (2018; with D. Janzing and B. Schölkopf), Teacher of the year at SCIENCE, University of Copenhagen (2018; out of ~1000 lecturers), Member of the Junge Akademie (since 2016; board member since 2017), Marie Curie fellowship (2013–2015), ETH medal for an outstanding PhD thesis (2013), scholarship of the Max Planck Society (2009–2012), scholarship of the Studienstiftung des deutschen Volkes (2004–2008), UNWIN prize and election to scholar (Downing College, Cambridge) (2007), European Excellence Programme (DAAD), Kurt-Hahn-Trust, Hölderlin Programme (Allianz) (all 2006–2007), participant in German academy for high school students (2001)

External Funding

Principal Investigator:	
Marie Curie Fellowship (IEF) (2013–2015):	184,709 €
Carlsberg Foundation Distinguished Associate Prof. Fellowship (since 2018):	360,000 €
Villum Young Investigator (since 2018):	1,100,000 €
Co-Investigator:	
Villum Foundation (since 2016):	648,000 €

Scientific Memberships

Bernoulli Society, Danish Society for Theoretical Statistics, Institute of Mathematical Statistics (IMS), International Statistical Institute (ISI elected), Royal Statistical Society

Teaching (university lecturer)

Lecture courses	University of Tübingen (2015), ETH Zurich (2014–2016), University of Copenhagen (2016–)
Master students	D. Bürge, N. Pfister, M. Stahlberg, R. Tanase, (master theses), J. Gleixner, I. Ustyuzhaninov, F. Gieringer, S. Bauer (interns)
PhD students (ongoing)	N. Pfister (co-supervisor with P. Bühlmann), R. Christiansen, M. Jakobsen

Teaching (other)

Summer academies	Studienstiftung des deutschen Volkes (two weeks, 2015), Deutsche SchülerAkademie (two weeks, 2009 – 2016)
Tutorials	Pompeu Fabra, Barcelona (2018), KU Summer School on Graphical Models, Tjärö (2017), MIT, Cambridge (2017), DTU Summer School about Machine Learning, Copenhagen (2016), Machine Learning Summer School, Cadiz (2016), German Conference on Pattern Recognition (GCPR), Aachen (2015), Machine Learning Summer School, Tübingen (2015), Junge Akademie-Workshop “Causation from Correlation?”, Ohlstadt (2015)

Reviewing

Journals, Books	ACM Transactions on Intelligent Systems and Technology, Annals of Statistics, Bernoulli Journal, Biometrika, eLife, IEEE Transactions of Pattern Analysis and Machine Intelligence, IEEE Transactions on Information Theory, Information Fusion, International Journal of Approximate Reasoning, Journal of Artificial Intelligence Journal of Causal Inference, Journal of Machine Learning Research, Journal of the American Statistical Association, Journal of the Royal Statistical Society, MIT Press, Nature – Scientific Reports, Neurocomputing, NeuroImage, Physica A, PLOS ONE, Statistical Science, Statistics and Computing, Transactions on Intelligent Systems and Technology, Wiley
Conferences	several years: AISTATS COLT, ECML, ICLR, ICML, ICONIP, NIPS, TIME, UAI,
Area Chair / AE	AISTATS 2016, UAI 2018
Grants	ERC (EU), NWO (The Netherlands), SNF (Switzerland)

(Co-)organized workshops

04/2018	Workshop: “Statistics in Complex Systems”
03/2018	Workshop: “Time for Space”
07/2015	UAI - Workshop: “Advances in Causal Inference”
03/2015	DALI - Workshop: “Networks: Causality and Processes”
07/2014	UAI - Workshop: “Causal Inference: Learning and Prediction”

Selected Talks

05/2018	Distinguished Lecture Series, CMU & University of Pittsburgh, Pittsburgh, USA
01/2018	Isaac Newton Institute, Cambridge, UK
06/2017	Workshop on Environmental Informatic Challenges, Jena
06/2017	Stochastics and Statistics Seminar, MIT, Cambridge, USA
03/2017	Workshop on Stat. Rec. of Discrete, Geometric and Inv. Str. Oberwolfach, Germany
02/2017	Danish Society of Theoretical Statistics, Copenhagen, Denmark
02/2016	Statistics Seminar, University of Oxford, UK

- 09/2015 Deutsche Mathematiker-Vereinigung, Hamburg
- 07/2015 ISI World Statistics Congress, Rio de Janeiro, Brazil
- 01/2015 Weierstraß Institute, Berlin
- 07/2014 University of Los Angeles, USA
- 07/2014 California Institute of Technology, Pasadena, USA
- 01/2015 Statistics Seminar, University of Cambridge, UK
- 01/2015 Seminar at Gatsby Computational Neuroscience Unit, London, UK
- 07/2015 60th World Statistics Congress - ISI, Rio de Janeiro, Brasil
- 07/2014 IMS Annual Meeting, Sydney, Australia
- 12/2012 IST Austria, Vienna, Austria
- 07/2011 plenary talk at the Conf. on Uncertainty in Artificial Intelligence (UAI)

Additional Skills

- Languages English (fluent), Latin (advanced), Dutch, Danish (intermediate), French (beginner)
- Computer R, Python, Matlab, C#, Linux, LaTeX, Excel, Subversion, Visual Basic, Delphi, Turbo Pascal
- Other interests Playing the Cello, hiking, cycling, climate change

Books

1. J. Peters, D. Janzing, and B. Schölkopf. *Elements of Causal Inference: Foundations and Learning Algorithms*. MIT Press, Cambridge, MA, USA, 2017

Preprints

1. R. Christiansen and J. Peters. Invariant causal prediction in the presence of latent variables. *ArXiv e-prints (1808.05541)*, 2018
2. R. Shah and J. Peters. The hardness of conditional independence testing and the generalised covariance measure. *ArXiv e-prints (1804.07203)*, 2018
3. D. Rothenhäusler, P. Bühlmann, N. Meinshausen, and J. Peters. Anchor regression: heterogeneous data meets causality. *ArXiv e-prints (1801.06229)*, 2018
4. S. Bongers, J. Peters, B. Schölkopf, and J. M. Mooij. Structural causal models: Cycles, marginalizations, exogenous reparametrizations and reductions. *ArXiv e-prints (1611.06221)*, 2016

Peer-Reviewed Publications

1. C. Heinze-Deml, J. Peters, and N. Meinshausen. Invariant causal prediction for nonlinear models. *Journal of Causal Inference (accepted)*, 2018
2. N. Pfister, P. Bühlmann, and J. Peters. Invariant causal prediction for sequential data. *Journal of the American Statistical Association (accepted)*, 2018
3. M. Rojas-Carulla, B. Schölkopf, R. Turner, and J. Peters. Causal transfer in machine learning. *Journal of Machine Learning Research*, 19(36):1–34, 2018
4. N. Pfister, P. Bühlmann, B. Schölkopf, and J. Peters. Kernel-based tests for joint independence. *Journal of the Royal Statistical Society: Series B*, 80:5–31, 2017
5. N. Meinshausen, A. Hauser, J. Mooij, J. Peters, P. Versteeg, and P. Bühlmann. Methods for causal inference from gene perturbation experiments and validation. *Proceedings of the National Academy of Sciences*, 113(27):7361–7368, 2016
6. B. Schölkopf, D. Hogg, D. Wang, D. Foreman-Mackey, D. Janzing, C.-J. Simon-Gabriel, and J. Peters. Modeling confounding by half-sibling regression. *Proceedings of the National Academy of Sciences*, 113(27):7391–7398, 2016
7. J. Peters, P. Bühlmann, and N. Meinshausen. Causal inference using invariant prediction: identification and confidence intervals. *Journal of the Royal Statistical Society: Series B (with discussion)*, 78(5):947–1012, 2016

8. S. Bauer, B. Schölkopf, and J. Peters. The arrow of time in multivariate time series. In *Proceedings of the 33rd International Conference on Machine Learning (ICML)*, pages 2043–2051. Journal of Machine Learning Research: Workshop and Conference Proceedings, 2016
9. J. M. Mooij, J. Peters, D. Janzing, J. Zscheischler, and B. Schölkopf. Distinguishing cause from effect using observational data: methods and benchmarks. *Journal of Machine Learning Research*, 17(32):1–102, 2016
10. S. Sippel, J. Zscheischler, M. Heimann, F. E. L. Otto, J. Peters, and M. D. Mahecha. Quantifying changes in climate variability and extremes: Pitfalls and their overcoming. *Geophysical Research Letters*, 42(22):9990–9998, 2015
11. D. Rothenhäusler, C. Heinze, J. Peters, and N. Meinshausen. backShift: Learning causal cyclic graphs from unknown shift interventions. In *Advances in Neural Information Processing Systems 28 (NIPS)*, pages 1513–1521. Curran Associates, Inc., 2015
12. B. Schölkopf, D. W. Hogg, D. Wang, D. Foreman-Mackey, D. Janzing, C.-J. Simon-Gabriel, and J. Peters. Removing systematic errors for exoplanet search via latent causes. In *Proceedings of the 32nd International Conference on Machine Learning (ICML)*, pages 2218–2226. ACM Press, 2015
13. B. Schölkopf, K. Muandet, K. Fukumizu, S. Harmeling, and J. Peters. Computing functions of random variables via reproducing kernel hilbert space representations. *Statistics and Computing*, 25(4):755–766, 2015
14. J. Peters and P. Bühlmann. Structural intervention distance (SID) for evaluating causal graphs. *Neural Computation*, 27:771–799, 2015
15. J. Peters. On the intersection property of conditional independence and its application to causal discovery. *Journal of Causal Inference*, 3:97–108, 2014
16. P. Bühlmann, J. Peters, and J. Ernest. CAM: Causal additive models, high-dimensional order search and penalized regression. *Annals of Statistics*, 42:2526–2556, 2014
17. J. Peters, J. M. Mooij, D. Janzing, and B. Schölkopf. Causal discovery with continuous additive noise models. *Journal of Machine Learning Research*, 15:2009–2053, 2014
18. J. Peters, D. Janzing, and B. Schölkopf. Causal inference on time series using structural equation models. In *Advances in Neural Information Processing Systems 26 (NIPS)*, pages 585–592. Curran Associates, Inc., 2013
19. J. Peters and P. Bühlmann. Identifiability of Gaussian structural equation models with equal error variances. *Biometrika*, 101(1):219–228, 2014
20. L. Bottou, J. Peters, J. Quiñonero-Candela, D. X. Charles, D. M. Chickering, E. Portugaly, D. Ray, P. Simard, and E. Snelson. Counterfactual reasoning and learning systems: The example of computational advertising. *Journal of Machine Learning Research*, 14:3207–3260, 2013
21. E. Sgouritsa, D. Janzing, J. Peters, and B. Schölkopf. Identifying finite mixtures of nonparametric product distributions and causal inference of confounders. In *Proceedings of the 29th Annual Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 556–565. AUAI Press, 2013
22. B. Schölkopf, D. Janzing, J. Peters, E. Sgouritsa, K. Zhang, and J. M. Mooij. On causal and anticausal learning. In *Proceedings of the 29th International Conference on Machine Learning (ICML)*, pages 1255–1262. Omnipress, 2012
23. J. Peters, J. M. Mooij, D. Janzing, and B. Schölkopf. Identifiability of causal graphs using functional models. In *Proceedings of the 27th Annual Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 589–598. AUAI Press, 2011
24. D. Janzing, E. Sgouritsa, O. Stegle, J. Peters, and B. Schölkopf. Detecting low-complexity unobserved causes. In *Proceedings of the 27th Annual Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 383–391. AUAI Press, 2011
25. K. Zhang, J. Peters, D. Janzing, and B. Schölkopf. Kernel-based conditional independence test and application in causal discovery. In *Proceedings of the 27th Annual Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 804–813. AUAI Press, 2011
26. J. Peters, D. Janzing, and B. Schölkopf. Causal inference on discrete data using additive noise

- models. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 33:2436–2450, 2011
27. J. Peters, D. Janzing, and B. Schölkopf. Identifying cause and effect on discrete data using additive noise models. In *Proceedings of the 13th conference on Artificial Intelligence and Statistics (AISTats)*, volume 9, pages 597–604. *Journal of Machine Learning Research: Workshop and Conference Proceedings*, 2010
 28. D. Janzing, J. Peters, J. M. Mooij, and B. Schölkopf. Identifying confounders using additive noise models. In *Proceedings of the 25th Annual Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 249–257. AUAI Press, 2009
 29. J. M. Mooij, D. Janzing, J. Peters, and B. Schölkopf. Regression by dependence minimization and its application to causal inference. In *Proceedings of the 26th International Conference on Machine Learning (ICML)*, pages 745–752. ACM Press, 2009
 30. J. Peters, D. Janzing, A. Gretton, and B. Schölkopf. Detecting the direction of causal time series. In *Proceedings of the 26th International Conference on Machine Learning (ICML)*, pages 801–808. ACM Press, 2009
 31. P. O. Hoyer, D. Janzing, J. M. Mooij, J. Peters, and B. Schölkopf. Nonlinear causal discovery with additive noise models. In *Advances in Neural Information Processing Systems 21 (NIPS)*, pages 689–696. Curran Associates, Inc., 2009
 32. J. Peters, D. Janzing, A. Gretton, and B. Schölkopf. Kernel methods for detecting the direction of time series. In *Proceedings of the 32nd Annual Conference of the German Classification Society (GfKl 2008)*, pages 1–10, 2009

PhD Thesis

J. Peters. *Restricted Structural Equation Models for Causal Inference*. PhD thesis, ETH Zurich and MPI for Intelligent Systems, 2012. <http://dx.doi.org/10.3929/ethz-a-007597940>

Diploma Thesis

J. Peters. *Asymmetries of Time Series under Inverting their Direction*. Diploma Thesis, University of Heidelberg, 2008. <http://www.math.ku.dk/~peters>