

Philipp Geiger

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Summary

Education, research **Doctorate in computer science, MSc (eq.) in mathematics**; published at **ICML, UAI; machine learning, causal inference, time series, multi-agent, decision making**

Applications, teamwork In **Python, SQL: implemented congestion forecasting app; modelled multi-agent systems; cooperating within cross-disciplinary teams**

Experience

12/2018 – present **Research scientist**
Bosch Center for Artificial Intelligence, Renningen, Germany

- Applying machine learning and game theory for multi-agent and causal aspects of prediction and decision making in traffic situations

04/2017 – 10/2018 **Postdoc researcher**
Max Planck Institute for Intelligent Systems, Tübingen, Germany

- Lead [research project](#) on machine learning for efficient multi-agent facility usage
- Applied time series analysis: Kalman filtering, exponential smoothing, RNNs
- Applied game theory: Bayesian games, best-response dynamics; using sensor data
- In Python, TensorFlow, SQL: implemented data-driven congestion forecasting app
- Teamed up with economist, physicists, software engineers; supervised a MSc student
- Achieved data privacy agreement with work councils after presenting project to them

07/2015 – 10/2015 **Research intern**
Microsoft Research Ltd., Cambridge, United Kingdom

- Implemented AI agents in simulations together with engineers under Katja Hofmann

Education

06/2013 – 03/2017 **Doctorate in computer science (equivalent to PhD)**
Max Planck Institute for Intelligent Systems, Tübingen, and **University of Stuttgart**, Germany

- Thesis title: "Causal models for decision making via integrative inference"
- Grade: magna cum laude/"very good"
- Supervisors: Bernhard Schölkopf, Dominik Janzing and Marc Toussaint
- Connected causal models with quasi-experiments, counterfactuals, information theory, reinforcement learning, statistical models, economic time series, decision making
- Used Gaussian process regression for cloud computer debugging; Python, R, Matlab

10/2006 – 12/2012 **Diplom in mathematics (equivalent to MSc)**
Heidelberg University and **Humboldt University of Berlin**, Germany

- Thesis title: "Mutual Information and Gödel Incompleteness"
- Grade: 1.4 (best score 1.0 of 5.0)"very good"
- Specialization: mathematical logic, theoretical computer science; minor: philosophy

Skills

Programming

- Machine learning implementation (Gaussian process regression, ridge regression, neural networks, Kalman filtering, exponential smoothing, k-means clustering) with Python (working knowledge), TensorFlow, R, Matlab, SQL (basic) in Linux
- Object-oriented programming with Python (working knowledge), C++ (basic)

- Communicating**
- Presenting and explaining data, insights and results using PowerPoint, LaTeX, HTML
 - Coordinating with diverse stakeholders and understanding them: customers, manufacturers, researchers, software engineers, work councils and privacy officers
 - Languages: German (native), English (fluent), French (beginner)

Selected publications

- Peer-reviewed**
- Geiger, P., Zhang, K., Gong, M., Janzing, D., & Schölkopf, B. (2015). Causal inference by identification of vector autoregressive processes with hidden components. In *Proceedings of the 32nd International Conference on Machine Learning (ICML)*. [↗](#)
 - Gong, M., Zhang, K., Schoelkopf, B., Tao, D., & Geiger, P. (2015). Discovering temporal causal relations from subsampled data. In *Proceedings of the 32nd International Conference on Machine Learning (ICML)*. [↗](#)
 - Geiger, P., Janzing, D., & Schölkopf, B. (2014). Estimating causal effects by bounding confounding. In *Proceedings of the 30th Conference on Uncertainty in Artificial Intelligence (UAI)*. [↗](#)
- Preprints**
- Geiger, P., Winkelmann, J., Proissl, C., Besserve, M., & Schölkopf, B. (2018). Coordination via predictive assistants from a game-theoretic view. *ArXiv Preprint ArXiv:1803.06247*. [↗](#)
 - Geiger, P., Carata, L., & Schoelkopf, B. (2016). Causal inference for cloud computing. *ArXiv Preprint ArXiv:1603.01581*. [↗](#)
- Theses**
- Geiger, P. (2017). Causal models for decision making via integrative inference. PhD thesis. [↗](#)
 - Geiger, P. (2012). Mutual information and Gödel incompleteness. Diploma thesis. [↗](#)

Supervision, teaching and reviewing

- 10/2016 – 03/2017 **Supervisor**
- Student: Claudius Proissl (University of Stuttgart); research project during MSc
- 10/2013 – 02/2014 **Teaching assistant**
- University of Tübingen, Germany
- Lecture "Intelligent Systems I": a first course in machine learning
- 10/2011 – 04/2012 **Teaching assistant**
- Heidelberg University, Germany
- Lecture "Computability and Computational Complexity Theory I"
- 10/2014 – present **Reviewer**
- Conferences: NIPS ('14, '17), ICML ('16, '17), UAI ('16, '17, '18, '19)
 - Journals: ACM TIST, IEEE PAMI, IEEE TKDE, IJDSA

Memberships and awards

- 09/2015 – 06/2017 Associate Doctoral Fellow of Max Planck ETH Center for Learning Systems
- 07/2005 Award for outstanding results in physics by German Physical Society (DPG)

References

- Prof. Bernhard Schölkopf
- Max Planck Institute for Intelligent Systems, Tübingen, Germany
- Relationship: PhD thesis co-supervisor
 - Email: Sekretariat-Schoelkopf@tuebingen.mpg.de
- Dr. Katja Hofmann
- Microsoft Research Ltd., Cambridge, United Kingdom
- Relationship: research internship supervisor
 - Email: katja.hofmann@microsoft.com

Dr.
Wolfgang
Merkle

Heidelberg University, Germany

- Relationship: diplom thesis supervisor
- Email: merkle@math.uni-heidelberg.de