

Gerhard Neumann

Curriculum Vitæ



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Current Position

Position	Professor, Chair of Learning for Autonomous Systems
Institution	University of Lincoln
Office Address	Brayford Pool, Lincoln
Birthdate	May 4th, 1981
Place of Birth	Graz, Austria

Research Interests

Autonomous Systems	Reinforcement Learning, Policy Search, Inverse Reinforcement Learning, Hierarchical Reinforcement Learning, Learning from Human Feedback, Imitation Learning, POMDPs, Curiosity and Empowerment
Machine Learning	Kernel Embeddings, Deep Learning, Bayesian Non-Parametrics, Variational Inference, Structured Prediction, Stochastic Search, Policy Evaluation
Robotics	Nuclear Robotics, Agriculture Robotics, Movement Primitives, Motor Skill Learning, Tele-Operation, Grasping Strategies, Optimal Control, Hierarchical Control, Human-Robot Interaction
Multi-Agent Systems	Multi-Agent Learning, Swarm Robotics, Decentralized-POMDPs, Opponent Modeling, Game Theory

Education

2005–2012	Dr.techn. (equivalent to Ph.D.), <i>Graz University of Technology, summa cum laude (mit Auszeichnung).</i> <i>Ph.D Thesis:</i> On Movement Skill Learning and Movement Representations for Robotics <i>Supervisor:</i> Prof. <i>Wolfgang Maass</i>
1999–2005	Dipl.-Ing. (equivalent to M.Sc.), <i>Graz University of Technology, summa cum laude (mit Auszeichnung).</i> <i>Master Thesis:</i> The Reinforcement Learning Toolbox - Reinforcement Learning for Optimal Control Tasks <i>Supervisor:</i> Prof. <i>Wolfgang Maass</i>

Professional Experience

- 2016/11–now **Full Professor, Chair of Learning for Autonomous Systems**,
University of Lincoln.
- 2014/09–2016/10 **Assistant Professor, Head of the Institute for Computational Learning for Autonomous Systems (CLAS)**,
Darmstadt University of Technology.
- 2013/11–2014/08 **Research group leader: ‘Machine Learning for Robot Control’**,
Darmstadt University of Technology.
- 2012/04–2013/11 **Postdoctoral fellow**, *Darmstadt University of Technology.*
- 2011/11–2012/04 **Research Associate**, *Darmstadt University of Technology.*
- 2008 **Visiting Researcher**, *Max Plank Institute for Biological Cybernetics.*
Department B. Schölkopf
- 2007/03–2011/10 **Teaching Assistant**, *Graz University of Technology.*
- 2005/08–2011/10 **Graduate Student**, *Graz University of Technology.*
Supervised by Prof. Wolfgang Maass, Institute for Theoretical Computer Science.
- 2004/08–2005/08 **Undergraduate Research Student**, *Graz University of Technology.*
Supervised by Prof. Wolfgang Maass, Institute for Theoretical Computer Science.

Awards

- 2017 **Best Paper Finalist (tentative) for the evolutionary numeric optimization track.**, *The Genetic and Evolutionary Computation Conference*, for the paper: Abdolemaleki A. and Bob Price and **Neumann, G.** (2017). *Deriving and Improving CMA-ES with Information Geometric Trust Regions.*
- 2016 **Best Student Paper (supervisor of)**, *European Conference on Machine Learning*, for the paper: Daniel, C.; van Hoof, H.; Peters, J.; **Neumann, G.** (2016). *Probabilistic Inference for Determining Options in Reinforcement Learning, Machine Learning (ML).*
- 2015 **Best Lecture Award**, *Fachschaft Informatik, Darmstadt University of Technology*, Best Lecture Award in the computer science department for the lecture *Robot Learning* in WS 2014/15.
- 2015 **Best Paper Finalist**, *International Conference on Robotics and Automation (ICRA) 2015*, for the paper: Kroemer, O.; Daniel, C.; **Neumann, G.**; van Hoof, H.; Peters, J. (2015). *Towards Learning Hierarchical Skills for Multi-Phase Manipulation Tasks.*
- 2015 **Best Paper Finalist, Best Service Robotics Paper Finalist**, *International Conference on Robotics and Automation (ICRA) 2015*, for the paper: Ewerton, M.; **Neumann, G.**; Lioutikov, R.; Ben Amor; Peters, J.; Maeda, G. (2015). *Learning Multiple Collaborative Tasks with a Mixture of Interaction Primitives.*
- 2014 **Scientific Challenge 1st Place**, *Robocup Soccer 3D Simulation League 2014.*
- 2014 **Best Paper Finalist**, *International Conference on Robotics and Automation (ICRA) 2014*, for the paper: Kroemer, O.; van Hoof, H.; **Neumann, G.**; Peters, J. (2014). *Learning to Predict Phases of Manipulation Tasks as Hidden States.*

- 2012 **Best Cognitive Systems Paper Award and Best Paper Finalist**, *International Conference on Intelligent Robots and Systems (IROS) 2012*, for the paper: C. Daniel, **G. Neumann**, and J. Peters. *Learning Concurrent Motor Skills in Versatile Solution Spaces*.
- 2007 **Best Paper Award**, *IEEE RAS/RSJ Conference on Humanoids Robots (HUMANOIDS)*, for the paper: H. Hauser, **G. Neumann**, A. Ijspeert, and W. Maass. *Biologically Inspired Kinematic Synergies Provide a New Paradigm for Balance Control of Humanoid Robots*.

Job Applications

- 2016 **Offer of a Chair-Professorship ‘Learning for Autonomous Systems’**, *University of Lincoln, United Kingdom*, accepted.
- 2014 **Offer of a Junior-Professorship (W1) ad personum ‘Computational Learning for Autonomous Systems’**, *Darmstadt University of Technology, Germany*, accepted.
- 2014 **Offer of a Junior-Professorship (W1) ‘Kooperative Autonome Systeme’**, *University Kassel, Germany*, declined.

Key Publications

- [1] C. Daniel, **G. Neumann**, O. Kroemer, and J. Peters. *Hierarchical Relative Entropy Policy Search*. *Journal of Machine Learning Research (JMLR)*, 2016.
- [2] R. Abdolemaleki, Lioutikov, A., J. Peters, N. Nau, L. Reis, and **G. Neumann**. *Model-based Relative Entropy Stochastic Search*. In *Advances in Neural Information Processing Systems (NIPS)*, **acceptance rate 22%**, 2015.
- [3] A. Paraschos, C. Daniel, J. Peters, and **G. Neumann**. *Probabilistic Movement Primitives*. In *Advances in Neural Information Processing Systems (NIPS)*, Cambridge, MA: MIT Press., **acceptance rate 24%**, 2013.
- [4] A. Kupcsik, M. P. Deisenroth, J. Peters, and **G. Neumann**. *Model-Based Contextual Policy Search for Data-Efficient Generalization of Robot Skills*. *Artificial Intelligence Journal*, 2014.
- [5] **G. Neumann** and J. Peters. *Fitted Q-Iteration by Advantage Weighted Regression*. In *Advances in Neural Information Processing Systems (NIPS)*, **accepted as spotlight, 12% acceptance rate**, 2009.

Funding and Project Participation

EU Projects (Framework Programme 7)

- EU-FP7-ICT Project CompLACS, Leader of Work-Package 3, Nov. 2013 - March 2015, Collaborations with: J. Shawe-Taylor (University College London), P. Auer (Montanuniversität Leoben), B. Kappen (University of Nijmegen)
- EU-FP7-ICT Project CoDyCo, contributed to the proposal

- EU-FP7-ICT Project CompLACS, Leader of Work-Package 7, Nov. 2011 - March 2015

EU Projects (HORIZON 2020)

- HORIZON 2020, Research & Innovation Action: *Robotic Manipulation for Nuclear Sorting and Segregation* (ROMANS), started in May 2015, **main author from Darmstadt University of Technology**, TUDa budget: 1.4M euro, Consortium: Rustam Stolkin (University of Birmingham), Jeffrey Kuo (National Nuclear Lab UK), Alexis Leonardis (University of Birmingham), Paolo Giordano (CNRS France), Mathieu Grossard (Commissariat à l'énergie atomique et aux énergies alternatives, CEA), **Gerhard Neumann**, Jan Peters (Darmstadt University of Technology)
- HORIZON 2020, Innovation Action: *Industrialized Robotic Manipulation for Nuclear Sorting and Segregation* (I-ROMANS), in preparation for EU call in April 2017, **Principle Investigator for Lincoln**, Consortium: Rustam Stolkin (University of Birmingham), National Nuclear Lab UK, Paolo Giordano (CNRS France), Mathieu Grossard (Commissariat à l'énergie atomique et aux énergies alternatives, CEA), **Gerhard Neumann** (University of Lincoln), Jan Peters (Darmstadt University of Technology)

DFG Projects

- *Learning Modular Control Architectures for Robot Motor Skills (Learn-Robots)* for the SPP 'Autonomous Learning', started in April 2015, **main author**, TUDa budget: 242K euro

Innovate UK Projects

- *Mushroom Robo-Pic*, starting in August 2017, **Principal Investigator**, Lincoln budget: 120K GBP

Industry Projects

- *LearnCars - Learning for Autonomous Driving*, in cooperation with Toyota, starting in August 2017, **Principal Investigator**, Lincoln budget: 80K GBP

Teaching Experience

- Spring 2017 **Data Science**,
Lecturer, bachelor-level, 120 students, University of Lincoln
- Spring 2016 **Intelligent Multi-Agent Systems** (20-00-0784-vl),
Lecturer, master-level, Darmstadt University of Technology
- Fall 2015 **Probabilistic Graphical Models (Machine Learning 2)** (20-00-0449-iv),
Lecturer, master-level, Darmstadt University of Technology
- Spring 2015 **Intelligent Multi-Agent Systems** (20-00-0784-vl),
Lecturer, master-level, Darmstadt University of Technology
- Spring 2015 **Advanced Seminar in Machine Learning** (20-00-0804-se),
Organized together with Stefan Roth and Jan Peters, Darmstadt University of Technology
- Fall 2014 **Robot Learning** (20-00-0629-vl),
Lecturer, master-level, Darmstadt University of Technology

- 2014 Lectures on **Einfuehrung in Computational Engineering** (20-00-0011-iv),
Guest Lecturer, bachelor level, approx. 480 students, Darmstadt University of
Technology
- 2014 Lectures on Boosting (20-00-0011-iv),
Guest Lecturer for the Lecture "Machine Learning 1" (20-00-0358-iv), master-
level, Darmstadt University of Technology
- Fall 2013 **Robot Learning** (20-00-0629-vl),
Lecturer, master-level, Darmstadt University of Technology
- 2012 **Seminar on Robot Learning**,
Supervised three students in the Seminar "Robot Learning" (20-00-0636-se),
Darmstadt University of Technology
- Lectures on **Expectation Maximization and Gaussian Processes**,
Guest Lecturer for the Lecture "Machine Learning 1" (20-00-0358-iv), master-
level, Darmstadt University of Technology
- 2011 Lectures on **Policy Search**,
Guest Lecturer for the Lecture "Robot Learning" (20-00-0629-vl), master-level,
Darmstadt University of Technology
- 2010 Lectures on **Reinforcement Learning and Policy Search**,
Guest Lecturer for the Lecture "Machine Learning B" (708.062), Graz Univer-
sity of Technology
- 2009 Lectures on **Neural Networks and Decision Trees**,
Guest Lecturer for the Lecture "Computational Intelligence" (442.070),
bachelor-level, approx. 120 students, Graz University of Technology
- 2007-2011 **Practical Courses on Introduction to Machine Learning**,
Teaching Assistant for Practical Course "Computational Intelligence"
(708.070) and "Einfuehrung in die Wissenverarbeitung" (442.072), bachelor-
level, approx. 200 students, Graz University of Technology

Supervision of Students and Researchers

Post-Doctoral Fellows

- Jan. 2016 – now Joni Pajarinnen, *POMDP Methods for Semi-Autonomous Sort and Segregate of Nuclear Waste*
Darmstadt University of Technology, EU Horizon 2020 Project ROMANS
- April 2015 – now Riad Akrou, *Learning Modular Control Policies for Robot Table Tennis*
Darmstadt University of Technology, DFG LearnRobots project
- April 2015 – Feb 2017 Takayuki Osa, *Semi-Autonomous Sort and Segregate of Nuclear Waste*
Darmstadt University of Technology, EU Horizon 2020 Project ROMANS

PhD Students

- Mar 2017 – now Maximilian Hüttenrauch, *Deep Reinforcement Learning for Robot Swarms*
University of Lincoln, Supervisor

- May 2015 – now Oleg Arenz, *Inverse Reinforcement Learning for Sort and Segregation of Nuclear Waste*
Darmstadt University of Technology, Supervisor, resulting publications [24]
- Jan 2015 – now Gregor Gebhardt, *Kernel Methods for Inference and State Estimation*
Darmstadt University of Technology, Supervisor
- May 2012 – Apr 2016 Christian Daniel, *Hierarchical Policy Search Methods*
Darmstadt University of Technology, Co-Supervisor, resulting publications [60, 59, 57, 6, 3]
- Feb 2012 – now Alexandros Paraschos, *Probabilistic Movement Representations*
Darmstadt University of Technology, Co-Supervisor, resulting publications [54, 55, 39]

Visiting PhD Students

- April – July 2014 Adria Colome, *Dimensionality Reduction for Probabilistic Movement Primitives*
Visiting PhD Student from IRI Barcelona,
Co-Supervisor during his visit, resulting publications [47]
- Jan – June 2014 Abbas Abdolmaleki, *Policy Search for Robot Walking*
Visiting PhD Student from Universitario de Santiago Porto,
Supervisor during his visit, resulting publications [40, 36]
- May – Dec. 2012 Andras Kupscik, *Contextual Policy Search*
Visiting PhD Student from NUS Singapore, Co-Supervisor during his visit,
resulting publications [56, 7]

Master Students

- 2017 Robert Pinsler, Topic: *Preference-based Reinforcement Learning for Robot Grasping*, Darmstadt University of Technology, Supervisor, Juli 2016 - now
Linh Hong, Topic: *Guided Deep Reinforcement Learning for POMDPs*, Darmstadt University of Technology, Supervisor, Juli 2016 - now
Dominik Dienlin, Topic: *Hierarchical Deep Reinforcement Learning for Autonomous Driving*, Darmstadt University of Technology, Supervisor, April 2017 - now
- 2016 Maximilian Hüttenrauch, Topic: *Guided Deep Reinforcement Learning for Robot Swarms*, Darmstadt University of Technology, Supervisor, Sep. 2015 - Oct. 2016
Jannik Abbenseth, Topic: *Cooperative Path-planning for Service-Robots*, Darmstadt University of Technology, Co-Supervision with Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Sep. 2015 - Aug. 2016
Hany Abdulsamad, Topic: *Trajectory Optimization for Policy Search*, Darmstadt University of Technology, Supervisor, June 2015 - Feb. 2016
Felix Friske, Topic: *Learning to Sample*, Darmstadt University of Technology, Supervisor, May 2015 - Nov. 2016

- Alexander Gabriel, Topic: *Artificial Curiosity and Empowerment for Learning Movement Skills*, Darmstadt University of Technology, Supervisor, April 2015 - March 2017
- 2015 Andreas Wieland, Topic: *Probabilistic Methods for Forecasting Electronic Load Profiles*, Darmstadt University of Technology, Co-Supervision with ISE Fraunhofer, Jan. 2015 - Nov. 2015
- 2014 Marco Ewerton, Topic: *Modeling Human-Robot Interaction with Probabilistic Movement Representations*, Darmstadt University of Technology, Co-Supervisor, Jan. 2014 – Dec. 2014
- Oleg Arenz, Topic: *Feature Extraction for Inverse Reinforcement Learning*, Darmstadt University of Technology, Supervisor, Jan. 2014 – Dec. 2014
- Johannes Ringwald, Topic: *Learning a Combination of Movement Primitives*, Darmstadt University of Technology, Supervisor, Dec. 2013 – Aug. 2014
- Gregor Gebhardt, Topic: *Spectral HMMs for Robot Control*, Darmstadt University of Technology, Supervisor, Oct. 2013 – July 2014
- Jan Mundo, Topic: *Extracting Low-Dimensional Control Variables for Movement Primitives*, Darmstadt University of Technology, Co-Supervisor, Feb. 2014 – Oct. 2014
- 2013 Rudolf Lioutikov, Topic: *Learning Reactive Feedback Policies*, Darmstadt University of Technology, Co-Supervisor, Dec. 2012 – Nov 2013
- 2012 Christian Daniel, Topic: *Hierarchical Relative Entropy Policy Search*, Darmstadt University of Technology, Co-Supervisor, Nov. 2011 – Apr. 2012
- 2011 Tim Genewein, Topic: *Structure Learning for Motor Control*, Graz University of Technology, Co-Supervisor, Mar. 2011 – Jan. 2012
- 2007 Florian Hackenberger, Topic: *Balancing Humanoid Robot Gait Using Programmable Pattern Generators*, Graz University of Technology, Co-Supervisor, Jan. 2007 – Nov. 2007

Bachelor Students

- 2015 Moritz Nakatenus, *An Evaluation of Multi-Agent RL Algorithms*, Darmstadt University of Technology, Oct. 2015 - May. 2016
- Simon Ramstedt, *Deep Reinforcement Learning with Continuous Actions*, Darmstadt University of Technology, Oct. 2015 - Apr. 2016
- Felix End, *Hierarchical Policy Search for Robot Table Tennis*, Darmstadt University of Technology, Feb. 2015 – Sep.2015
- Christoph Mayer, *Learning to Sequence Movement Primitives for Rhythmic Tasks*, Darmstadt University of Technology, Jan. 2015 – Sep.2015
- Kim Berninger, *Hierarchical Policy Search Algorithms*, Darmstadt University of Technology, Nov. 2014 – June.2015
- 2014 Julius von Willich, *Reinforcement Learning for Heros of Newerth*, Darmstadt University of Technology, May 2013 – Dec. 2014

- Annemarie Mattmann, *Wie fangen Menschen Bälle?*, Co-Supervision, Darmstadt University of Technology, October 2013 – Sep. 2014
- Thomas Hesse, *Spectral Learning for HMMs*, Darmstadt University of Technology, October 2013 – March 2014
- Kevin Luck, *Dimensionality Reduction for Policy Search*, Darmstadt University of Technology, October 2013 – March 2014
- 2013 Yannick Schröcker, *Artificial Curiosity for Motor Skill Learning*, Darmstadt University of Technology, June 2013 – May 2014
- Sandra Amend, *Regression Trees for Feature Generation*, Darmstadt University of Technology, June 2013 – June 2014
- 2012 Christopher Garry, *Learning Table Tennis with Relative Entropy Policy Search*, IREP student, Darmstadt University of Technology, Oct. – Dec. 2012
- David Sharma, *Combining Reinforcement Learning with Feature Extraction*, Darmstadt University of Technology, May 2012 – Oct. 2012
- Gregory Atherton, *Learning Rhythmic Movements with Relative Entropy Policy Search*, IREP student, Darmstadt University of Technology, Apr. 2012 – Jun. 2012
- 2009 Thomas Höll, *Learning Gaits for the Nao Robot*, Graz University of Technology, Apr. 2009 – Dec. 2009

Organization of Workshops and Tutorials

Tutorials

- 2017 Autonomous Agents and Multi-Agent Systems (AAMAS) 2017 (Era A+ class conference), “Policy Search for Robotics”, **G. Neumann** and J. Peters, May 2017
- 2015 International Conference on Machine Learning 2015 (ICML) (Era A+ class conference), “Policy Search: Methods and Applications”, **G. Neumann** and J. Peters, July 2015

Workshop Organization

- 2015 NIPS 2015, “Workshop: Learning, Inference and Control of Multi-Agent Systems”, Organizers: V. Gomez, **G. Neumann**, Y. Yedidia, P. Stone; December 2015
- 2014 NIPS 2014, “Workshop: Autonomously Learning Robots”, Organizers: **G. Neumann**, J. Pinneau, P. Auer, M. Toussaint; December 2014
- HUMANOIDS 2014, “Workshop: Policy Representations for Humanoids”, Organizers: N. Dantam, **G. Neumann**, and H. Amor; November 2014
- 2013 RSS 2013, “Workshop: Hierarchical and Structured Learning for Robotics”, Organizers: **G. Neumann**, G. Konidaris, F. Stulp, J. Peters; June 2013
- ICRA 2013, “Workshop: Novel Methods for Learning and Optimization of Control Policies and Trajectories for Robotics”, Organizers: K. Mombaur, **G. Neumann**, M. Felis, J. Peters; May 2013

- 2011 Amarsi Hands-on Workshop, “Probabilistic Inference for Motor Control”, two days lecture, Organizers: **G. Neumann**, E. Rückert; Jan. 2011

Editorial and Reviewing Activities

Associate Editor or Senior Program Committee

- 2017 International Joint Conferences on Artificial Intelligence (IJCAI), International Conference Intelligent Robots and Systems (IROS)
- 2016 International Joint Conferences on Artificial Intelligence (IJCAI), International Conference Intelligent Robots and Systems (IROS)
- 2015 International Conference on Humanoid Robots (HUMANOIDS)
- 2014 International Conference Intelligent Robots and Systems (IROS)
- 2012 European Workshop on Reinforcement Learning (EWRL): 2012

Program Committee

- 2017 International Conference on Machine Learning (ICML)
- 2016 International Conference on Machine Learning (ICML), AAAI Conference on Artificial Intelligence
- 2015 AAAI Conference on Artificial Intelligence
International Conference on Machine Learning (ICML)
- 2013 International Joint Conference on Artificial Intelligence (IJCAI)
IEEE Symposium on Adaptive Dynamic Programming and Reinforcement Learning (ADPRL)

Reviewer for Conferences

- 2017 Robotics Science and Systems (RSS), Advances in Neural Information Processing Systems (NIPS, tentative), Reinforcement Learning and Decision Making (RLDM)
- 2016 International Conference Intelligent Robots and Systems (IROS), Robotics Science and Systems (RSS), Advances in Neural Information Processing Systems (NIPS), International Conference for Robotics and Automation (ICRA), International Symposium on Experimental Robotics (ISER)
- 2015 European Workshop on Reinforcement Learning (EWRL), International Conference on Reinforcement Learning and Decision Making (RLDM), International Conference Intelligent Robots and Systems (IROS), Robotics Science and Systems (RSS), Advances in Neural Information Processing Systems (NIPS), Conference on Artificial Intelligence and Statistics (AISTATS), International Conference for Robotics and Automation (ICRA)
- 2014 International Conference on Humanoid Robots (HUMANOIDS), Advances in Neural Information Processing Systems (NIPS), IEEE Symposium Series on Computational Intelligence, International Conference for Robotics and Automation (ICRA)

- 2013 Advances in Neural Information Processing Systems (NIPS), Conference on Artificial Intelligence and Statistics (AISTATS), International Conference for Robotics and Automation (ICRA), NIPS Workshop on Advances in Machine Learning for Sensorimotor Control (AMLSC), Asian Conference on Machine Learning (ACML)
- 2012 Advances in Neural Information Processing Systems (NIPS), International Conference for Robotics and Automation (ICRA), Robotics Science and Systems (RSS)
- 2011 Advances in Neural Information Processing Systems (NIPS), International Conference for Robotics and Automation (ICRA)
- 2009 Advances in Neural Information Processing Systems (NIPS)
- 2008 Advances in Neural Information Processing Systems (NIPS)

Reviewer for Journals

- 2017 Transactions on Robotics (T-RO), Autonomous Robots (AURO), Machine Learning, Journal of Machine Learning Research
- 2016 Transactions on Robotics (T-RO), Autonomous Robots (AURO), Robotics and Autonomous Systems (RAS), Machine Learning
- 2015 International Journal of Robotics Research (IJRR), Journal of Experimental Theoretical Artificial Intelligence, Journal of Machine Learning Research (JMLR), Journal of Neurocomputing, Autonomous Robots (AURO), IEEE Transactions on Neural Networks and Learning Systems (TNLS)
- 2014 Journal of Machine Learning Research (JMLR), Artificial Intelligence, Autonomous Robots (AURO)
- 2013 Artificial Intelligence, Autonomous Robots (AURO)
- 2012 IEEE Transactions on Neural Networks and Learning Systems (TNLS), Artificial Life
- 2008 Autonomous Robots (AURO)

Talks and Outreach

Invited Talks

- PhD School on Cyber-Physical Systems, Lucca, June 2017, Invited 90 Minutes Lecture, tentative
- European Workshop on Reinforcement Learning (EWRL), Barcelona, December 2016, Invited Talk
- Workshop: 'Robotics in the 21st century: Challenges and Promises', September 2016, Invited Talk
- DALI Workshop on 'Reinforcement Learning', April 2016, Invited Talk
- NIPS Workshop on 'Novel Trends and Applications in Reinforcement Learning', December 2014, Invited Talk
- ECAI Workshop CogRob, International Workshop on Cognitive Robotics, August 2014, Invited Talk

- NIPS Workshop on 'Planning with Information Constraints for Control, Reinforcement Learning, Computational Neuroscience, Robotics and Games', Lake Tahoe, December 2013

Contributed Talks and Talks at Labs

- University of Birmingham, Birmingham, April 2017, Host: Jeremy Wyatt
- University of Oxford, Oxford, January 2017, Host: Mike Osborn
- Uni Hannover, Hannover, October 2016, Host: Sami Haddadin
- Uni Lübeck, Lübeck, June 2016
- CMU, Pittsburgh, April 2016, Host: Arthur Durbrowski
- TU Berlin, Berlin, March 2016, Host: Oliver Brock
- Uni Stuttgart, Stuttgart, March 2016, Host: Marc Toussaint
- Landesmuseum Darmstadt, Darmstadt, January 2016
- UPF, Barcelona, May 2015, Host: Vicenc Gomez
- IRI, Barcelona, May 2015, Host: Carma Torres
- Workshop on Large-scale Online Learning and Decision Making (LSOLDM), London, September 2014, Contributed Talk
- KIT, Karlsruhe, November 2014, Host: Tamim Asfour
- Deep-Mind, London, April 2014, Host: David Silver
- Imperial College, London, April 2014, Host: Marc Deisenroth
- University College London (UCL), London, April 2014, Host: Guy Lever
- European Workshop on Reinforcement Learning (EWRL), Dagstuhl, August 2013, Contributed Talk
- RSS Workshop on 'Hierarchical and Structured Learning for Robotics', Berlin, June 2013
- ICRA Workshop on ' Novel Methods for Learning and Optimization of Control Policies and Trajectories for Robotics', Karlsruhe, May 2013
- ComplACS Review Meeting, Leoben, April 2012
- University College London, Gatsby Unit, April 2012

Publications

Journal Papers

- [1] G. Maeda, M. Ewerton, **G. Neumann**, R. Lioutikov, and J. Peters. *Phase Estimation for Fast Action Recognition and Trajectory Generation in Human-Robot Collaboration*. *International Journal of Robotics Research (IJRR)*, accepted.
- [2] T. Osa, E. A. M. Ghalamzan, R. Stolkin, R. Lioutikov, J. Peters, and **G. Neumann**. *Guiding Trajectory Optimization by Demonstrated Distributions*. *IEEE Robotics and Automation Letters (RA-L)*, (2):819–826, 2017.
- [3] C. Daniel, H. van Hoof, J. Peters, and **G. Neumann**. *Probabilistic Inference for Determining Options in Reinforcement Learning*. *Machine Learning (ML)*, **best student paper ECML (journal track)**, (2-3):337–357, 2016.
- [4] G. Maeda, G. Neumann, M. Ewerton, L. Lioutikov, O. Kroemer, and J. Peters. *Probabilistic Movement Primitives for Coordination of Multiple Human-Robot Collaborative Tasks*. *Autonomous Robots (AURO)*, 2016.
- [5] A. Abdolmaleki, N. Lau, L. Reis, J. Peters, and **G. Neumann**. *Contextual Policy Search for Linear and Nonlinear Generalization of a Humanoid Walking Controller*. *Journal of Intelligent & Robotic Systems*, 2016.
- [6] C. Daniel, **G. Neumann**, O. Kroemer, and J. Peters. *Hierarchical Relative Entropy Policy Search*. *Journal of Machine Learning (JMLR)*, 2016.
- [7] A. Kupcsik, M. P. Deisenroth, J. Peters, and **G. Neumann**. *Model-Based Contextual Policy Search for Data-Efficient Generalization of Robot Skills*. *Journal of Artificial Intelligence*, 2015.
- [8] R. Lioutikov, A. Paraschos, J. Peters, and **G. Neumann**. *Generalizing Movements with Information-Theoretic Stochastic Optimal Control*. *Journal Aerospace Information Systems*, 2014.
- [9] **G. Neumann**, C. Daniel, A. Paraschos, A. Kupcsik, and J. Peters. *Learning Modular Control Policies in Robotics*. *Frontiers in Computational Neuroscience*, 2014.
- [10] C. Dann, **G. Neumann**, and J. Peters. *Policy Evaluation with Temporal Differences: A Survey and Comparison*. *Journal of Machine Learning Research*, 2014.
- [11] M. P. Deisenroth*, **G. Neumann***, and J. Peters. *A Survey on Policy Search for Robotics*. **Both authors contributed equally, Foundations and Trends in Robotics*, pages 388–403, 2013.
- [12] E. Rückert, **G. Neumann**, M. Toussaint, and W. Maass. *Learned Graphical Models for Probabilistic Planning provide a new Class of Movement Primitives*. *Frontiers in Computational Neuroscience*, 6(97), 2013.
- [13] E. Rückert and **G. Neumann**. *Stochastic Optimal Control Methods for Investigating the Power of Morphological Computation*. *Artificial Life*, 2012.
- [14] H. Hauser, **G. Neumann**, A. Ijspeert, and W. Maass. *Biologically Inspired Kinematic Synergies enable Linear Balance Control of a Humanoid Robot*. *Biological Cybernetics*, 104, 2011.

— Conference and Workshop Papers —

- [15] Akrou R., Sorokin D., Peters J., and **G. Neumann**. *Local Bayesian Optimization of Motor Skills*. In *International Conference on Machine Learning (ICML)*, 2017.
- [16] Abdolmaleki A., Bob Price, and **G. Neumann**. *Deriving and Improving CMA-ES with Information Geometric Trust Regions*. In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, 2017.
- [17] V. Tangkaratt, H. van Hoof, S. Parisi, **G. Neumann**, J. Peters, and M. Sugiyama. *Policy Search with High-Dimensional Context Variables*. In *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*, 2017.
- [18] G. H. W. Gebhardt, A. Kupcsik, and **G. Neumann**. *The Kernel Kalman Rule - Efficient Nonparametric Inference with Recursive Least Squares*. In *Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence*, 2017.
- [19] F. B. Farraj, T. Osa, N. Pedemonte, J. Peters, **G. Neumann**, and P.R. Giordano. *A Learning-based Shared Control Architecture for Interactive Task Execution*. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, 2017.
- [20] F. End, R. Akrou, J. Peters, and **G. Neumann**. *Layered Direct Policy Search for Learning Hierarchical Skills*. In *Proceedings of the International Conference on Robotics and Automation (ICRA)*, 2017.
- [21] A. Gabriel, R. Akrou, J. Peters, and **G. Neumann**. *Empowered Skills*. In *Proceedings of the International Conference on Robotics and Automation (ICRA)*, 2017.
- [22] H. Abdulsamad, O. Arenz, J. Peters, and **G. Neumann**. *State-Regularized Policy Search for Linearized Dynamical Systems*. In *Proceedings of the International Conference on Automated Planning and Scheduling (ICAPS)*, 2017.
- [23] B. Belousov, **G. Neumann**, C. Rothkopf, and J. Peters. *Catching heuristics are optimal control policies*. In *Advances in Neural Information Processing Systems (NIPS)*, 2016.
- [24] O. Arenz, H. Abdulsamad, and **G. Neumann**. *Optimal Control and Inverse Optimal Control by Distribution Matching*. In *Proceedings of the International Conference on Intelligent Robots and Systems (IROS)*, 2016.
- [25] A Abdolmaleki, N. Lau, L. Reis, and **G. Neumann**. *Non-Parametric Contextual Stochastic Search*. In *Proceedings of the International Conference on Intelligent Robots and Systems (IROS)*, 2016.
- [26] T. Osa, J. Peters, and **G. Neumann**. Experiments with hierarchical reinforcement learning of multiple grasping policies. In *Proceedings of the International Symposium on Experimental Robotics (ISER)*, 2016.
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