

Curriculum Vitae

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Elmar Arne Rueckert



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Personal Data

Current Position **Assistant Professor (W1 with tenure track)**, *University Lübeck, Germany*, at the Institute for Robotics and Cognitive Systems.

Family Status Married, two children.

Research interests

Probabilistic Computational Neuroscience **(C)** Human Motor Control, Movement Decoding and Understanding, Brain-Computer-Interfaces, Electroencephalography, Spiking Neural Networks, Optimal Feedback Control, Muscle Synergies, Probabilistic Time-Series Models.

Stochastic Machine and Deep Learning **(M)** Deep Networks, Graphical Models, Probabilistic Inference, Variational Inference, Gaussian Processes, Transfer Learning, Message Passing, Clustering, Bayesian Optimization, Lazy Learning, Genetic Programming, LSTMs.

Probabilistic Robot Learning **(R)** Stochastic Optimal Control, Movement Primitives, Reinforcement Learning, Imitation Learning, Morphological Computation, Quadruped Locomotion, Humanoid Postural Control, Grasping, Tactile Learning, Prosthesis Control.

Medical Robotics and Human Motor Control **(H)** Tumour Tracking, Self-Motion Compensation, Prosthesis Control, Motor Adaptation, Skill Learning, Postural Control, Telepresence, Embodiment, Congruence in Teleoperation, Interactive Learning from human feedback.

Education

2010/02–2014/02 **Dr. techn. (equivalent to Ph.D.)**, *Technische Universität Graz, Austria*, in Computer Science under supervision of Wolfgang Maass.

Title Biologically inspired motor skill learning in robotics through probabilistic inference (PDF).

Defense Feb. 4th, 2014. **Summa Cum Laude** (with honors).

2007/02–2010/01 **Dipl.-Ing. (M.Sc.)**, *Technische Universität Graz, Austria*, in Artificial Intelligence and Computer Vision under supervision of Horst Bischof.

Title Simultaneous localisation and mapping for mobile robots with recent sensor technologies, (PDF).

Defense Jan. 28, 2010. **Summa Cum Laude** (with honors).

Professional Experience

Academic

2018/02–now	Assistant Professor , <i>University of Lübeck</i> , At the Institute for Robotics and Cognitive Systems.
2016/11–now	Research Group Leader , <i>Supervisor of two Ph.Ds, PI of GOAL-Robots</i> . Computational models for learning from intrinsic motivation and open-ended movement skill libraries.
2014/04–2016/02	Senior Research Scientist , <i>Project leader in the EU-Project CoDyCo</i> . Movement primitive models for compliant torque control of humanoids and tactile learning.
2015/11–2016/01	Senior Research Scientist , <i>Project leader in the EU-Project TACMAN</i> . Manipulation and tactile learning with neural models.
2014/02–2015/10	Postdoctoral fellow , <i>Technische Universität Darmstadt</i> . Computational models for robot motion planning and human postural control.
2012/02–2014/02	Lecturer , <i>Technische Universität Graz</i> . Undergraduate course (3rd semester) on Data Structures and Algorithms with more than 380 registered students.
2010/02–2014/02	Graduate Student , <i>Technische Universität Graz</i> . Supervised by Wolfgang Maass, Institute for Theoretical Computer Science.
2009/04–2010/02	Undergraduate Research Student , <i>Technische Universität Graz</i> . Supervised by Horst Bischof, Institute for Computer Graphics and Vision.

Teaching Experience

2019	Lecturer , <i>Machine Learning for Robotics (RO5101 T)</i> , 8ECTS, University of Lübeck, graduate course.
2018	Lecturer , <i>Probabilistic Learning for Robotics (RO5601)</i> , 5ECTS, University of Lübeck, undergraduate course, https://rob.ai-lab.science/teaching/humanoid-robotics-ro5300-ss2019 .
2019, 2018	Lecturer , <i>Humanoid Robotics (RO5300)</i> , 6ECTS, University of Lübeck, undergraduate course, https://rob.ai-lab.science/teaching/past-lectures/humanoid-robotics-ro5300-ss2018 .
2017, 2016, 2015	Guest Lecturer , <i>Robot Learning (20-00-0629-vI)</i> , Technische Universität Darmstadt, graduate course. Guest Lecturer , <i>Machine Learning - Statistical Approaches 1, (20-00-0358-iv)</i> , Technische Universität Darmstadt, Graduate course.
2012, 2013, 2014	Lecturer , <i>Datastructures and Algorithms (708.031)</i> , Technische Universität Graz, undergraduate course with more than 370 students. Received an outstanding evaluation for a PhD student in the second year (PDF) .
2012	Guest Lecturer , <i>Machine Learning B (708.061)</i> , Technische Universität Graz, graduate course on advanced machine learning topics.
2011	Guest Lecturer , <i>Machine Learning A (708.063)</i> , Technische Universität Graz, graduate course on advanced neural network topics.

Student Supervision

Ph.D. Student Supervision

		C	M	R	H
2019/02–now	Probabilistic and Neural Control Mechanisms in Robot Learning, University of Luebeck. [1]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2018/03–now	Learning Optimal Control and Planning Strategies in Mobile and Humanoid Robots, University of Luebeck. [2]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

2016/11–now	Intrinsic Motivation Strategies for Learning Motor Skills, Technische Universität Darmstadt. [3]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2015/10–now	Machine Learning for Human-Like Tactile Manipulation, within the EU-project TACMAN, Technische Universität Darmstadt. [4]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Visiting Ph.D. Student Supervision		
2014/10–2015/10	Learning soft task priorities for control of redundant robots, within the EU-project CoDyCo, Supervised by Serena Ivaldi at INRIA Nancy. Co-supervised by Elmar Rueckert and Jan Peters at Technische Universität Darmstadt. [5]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M.Sc. Theses Supervision		
2019/01–now	Mobile automatisierten Erzeugung von 3D-Objekten per Cloud/Edge Technologien, University of Luebeck. [6]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2018/10–now	Design and Control of a Pneumatic Ankle Exoskeleton, University of Luebeck. [7]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
2018/01	Distributed Reinforcement Learning with Neural Networks for Robotics, Technische Universität Darmstadt. [8]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2017/06	Learning to Categorize Issues in Distributed Bug Tracker Systems, Technische Universität Darmstadt. [9]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2017/01	Adaptive Training Strategies for Brain-Computer-Interfaces, Technische Universität Darmstadt. Co-supervision with Moritz Grosse-Wentrup. [10]	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
2016/02	Learning Probabilistic Feedforward and Feedback Policies for Generating Stable Walking Behaviors, (PDF), Technische Universität Darmstadt. [11]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2016/01	Learning Probabilistic Classifiers from Electromyography Data for Predicting Knee Abnormalities, (PDF), Technische Universität Darmstadt. [12]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2015/09	Spiking Neural Networks Solve Robot Planning Problems, (PDF), Technische Universität Darmstadt. Student is now with a Ph.D. program at Jan Peters' lab. [13]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2014/11	Probabilistic Inference for Movement Planning in Humanoids, (PDF), Technische Universität Darmstadt. [14]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
2014/10	Extracting Low-Dimensional Control Variables for Movement Primitives, (PDF), Technische Universität Darmstadt. [15]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
2013/05	Monte Carlo Sampling Methods for Motor Control of Constraint High-dimensional Systems, (PDF), Technische Universität Graz. [16]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2013/05	Probabilistic Models for Learning the Dynamics Model of Robots, (PDF), Technische Universität Graz. [17]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2011/08	Structure Learning for Robotic Motor Control, Technische Universität Graz. The student is now with a Ph.D. program of Priv.-Doz. Dr. Dr. Daniel Braun's lab. [18]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
M.Sc. Project Supervision		
2018/10–2019/01	Development of a Clinical Fraction Collector, University of Luebeck. [19]	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
2017/07	LSTM Networks for Movement Planning in Humanoids, Technische Universität Darmstadt. [20]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2016/10	Stochastic Optimal Control of Humanoid Robots in multi-contact environments, (PDF), Technische Universität Darmstadt. [21]	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2013/06	Reinforcement Learning with Dynamic Movement Primitives, (PDF), Technische Universität Graz. [22]	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2012/10	Gibbs Sampling Methods for Motor Control Problems with Hard Constraints, (PDF), Technische Universität Graz. [23]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

B.Sc. Theses Supervision

2018/12–now	Pflanzenklassifikation basierend auf Chlorophylldetekoren, University of Luebeck. [24]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2018/04–2018/11	Simulation of optimal kinematic tool structures for robot guided ultrasound, University of Luebeck. [25]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2018/04–2018/10	Development of a universal ultrasound station tool fixation for clinical purposes, University of Luebeck. [26]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2017/12	The Effects of Intrinsic Motivation Signals on Reinforcement Learning Strategies, Technische Universität Darmstadt. [27]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2017/10	Genetic Reactive Programming with Haskell, Technische Universität Darmstadt. [28]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2017/09	Simulation of the underactuated Sake Robotics Gripper in V-REP and ROS, Technische Universität Darmstadt. [29]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2017/03	Nonparametric Deep Neural Networks for Movement Planning, (PDF), Technische Universität Darmstadt. [30]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2016/12	Reinforcement Learning for Tactile-based Finger Gaiting, Technische Universität Darmstadt, (PDF). [31]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2011/04	Ein Vergleich von Lernalgorithmen für Parametersuche im hochdimensionalen Raum, (PDF), Technische Universität Graz. [32]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Publications

Journal Publications

C M R H

Items starting with a solid symbol (●) highlight key publications without the PhD advisor (Wolfgang Maass) as co-author, others (○) include the PhD advisor as co-author.

2019	●Tanneberg, D.; Peters, J.; Rueckert, E. (2018). Intrinsic Motivation and Mental Replay enable Efficient Online Adaptation in Stochastic Recurrent Networks, <i>Neural Networks - Elsevier</i> , doi: https://doi.org/10.1016/j.neunet.2018.10.005 , https://ai-lab.science/wp/NeuralNetworks2018Tanneberg.pdf , Impact Factor of 7.197 (2017) . [1]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2018	Sosic, A.; Zoubir, A.; Rueckert, E. ; Peters, J.; Koepl, H. (2018). Inverse Reinforcement Learning via Nonparametric Spatio-Temporal Subgoal Modeling, <i>Journal of Machine Learning Research (JMLR)</i> , https://rob.ai-lab.science/wp/JMLR2018Sosic.pdf . [2]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2017	Paraschos, A.; Rueckert, E. ; Peters, J.; Neumann, G. (2017). Probabilistic Movement Primitives under Unknown System Dynamics, <i>Advanced Robotics</i> , https://ai-lab.science/wp/AR2018Paraschos.pdf , (impact factor 2015: 0.96, 2014: 1.38, h5-index 2012–2016: 23, h5-median: 30) [3]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2016	● Rueckert, E. ; Camernik, J.; Peters, J.; Babic, J. (2016). Probabilistic Movement Models Show that Postural Control Precedes and Predicts Volitional Motor Control, <i>Nature: Scientific Reports</i> , doi:10.1038/srep28455, https://ai-lab.science/wp/SciReps_HumanContacts.pdf , (impact f. 2016, 4.259, 2015: 5.228, h5-index 2012–2016: 131, h5-median: 190). [4]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	● Rueckert, E. ; Kappel, D.; Tanneberg, D.; Pecevski, D.; Peters, J. (2016). Recurrent Spiking Networks Solve Planning Tasks, <i>Nature: Scientific Reports</i> , doi:10.1038/srep21142, https://ai-lab.science/wp/SciReps_NeuralPlanning.pdf , (impact f. see above). [5]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2013	○ Rueckert, E. ; Neumann, G.; Toussaint, M.; Maass, W. (2013). Learned graphical models for probabilistic planning provide a new class of movement primitives, <i>Frontiers in Computational Neuroscience</i> , 6, 97, doi:10.3389/fncom.2012.00097, https://ai-lab.science/wp/Frontiers2013aRueckert.pdf , (impact factor 2015, 2.85, 2014: 1.87, h5-index 2012–2016: 37, h5-median: 52). [6]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- **Rueckert, E.**; d'Avella, A. (2013). Learned parametrized dynamic movement primitives with shared synergies for controlling robotic and musculoskeletal systems, *Frontiers in Computational Neuroscience*, 7, 138, doi:10.3389/fncom.2013.00138, <https://ai-lab.science/wp/Frontiers2013bRueckert.pdf>, (impact factor see above) [7] ☒ ☒ ☐ ☒
- 2012 **Rueckert, E.**; Neumann, G. (2012). Stochastic Optimal Control Methods for Investigating the Power of Morphological Computation, *Artificial Life*, 19, 1, doi:10.1162/ARTL_a_00085, <https://ai-lab.science/wp/ArtificialLife2013Rueckert.pdf>, (impact factor 2016, 1.316, 2015: 1.042, 2014:1.386, h5-index 2012–2016: 16, h5-median: 27). [8] ☒ ☒ ☐ ☐
- Conference Publications**

Items starting with a solid symbol (●) highlight key publications without the PhD advisor (Wolfgang Maass) as co-author, others (○) include the PhD advisor as co-author.
- 2019 Rottmann, N.; Bruder, R.; Schweikard, A.; **Rueckert, E.** (2019). Cataglyphis ant navigation strategies solve the global localization problem in robots with binary sensors, *Proceedings of Int. Conference on Bio-inspired Systems and Signal Processing (BIOSIGNALS)*, Prague, Czech Republic. [9] ☐ ☒ ☒ ☐
- 2018 Gondaliya, K.; Bernecker, C.; Peters, J.; **Rueckert, E.** (2018). Learning to categorize bug reports with LSTM networks, *International Conference on Advances in System Testing and Validation Lifecycle (VALID)*. [10] ☒ ☒ ☐ ☒
- 2017 • **Rueckert, E.**; Nakatenus M.; Tosatto S.; Peters J. (2017). Learning Inverse Dynamics Models in O(n) time with LSTM networks, *Proceedings of the International Conf. on Humanoid Robots (HUMANOIDS)*, <https://ai-lab.science/wp/Humanoids2017Rueckert.pdf>, (h5-index 2012–2016: 26, h5-median: 38). [11] ☒ ☒ ☐ ☐

Stark, S.; Peters, J.; **Rueckert, E.** (2017). A Comparison of Distance Measures for Learning Nonparametric Motor Skill Libraries, *Proceedings of the International Conf. on Humanoid Robots (HUMANOIDS)*, <https://ai-lab.science/wp/Humanoids2017Stark.pdf>, (h5-index see above). [12] ☒ ☒ ☐ ☒

Tanneberg, D.; Peters, J.; **Rueckert, E.** (2017). Efficient Online Adaptation with Stochastic Recurrent Neural Networks, *Proceedings of the International Conf. on Humanoid Robots (HUMANOIDS)*, <https://ai-lab.science/wp/Humanoids2017Tanneberg.pdf>, (h5-index see above). [13] ☒ ☒ ☐ ☐

• Tanneberg, D.; Peters, J.; **Rueckert, E.** (2017). Online Learning with Stochastic Recurrent Neural Networks using Intrinsic Motivation Signals, *Proceedings of the International Conference on Robot Learning (CoRL)*, <https://ai-lab.science/wp/CoRL2017Tanneberg.pdf>, (**1st time event, paper acceptance rate: 29%, selected as long talk paper with a acceptance rate of 10%**). [14] ☒ ☒ ☐ ☐
- 2016 • Tanneberg, D.; Peters, J.; **Rueckert, E.** (2016). Deep Spiking Networks for Robot Learning and Planning, *Proceedings of the International Conf. on Humanoid Robots (HUMANOIDS)*, Nov. 15-17, Cancun Mexico, <https://ai-lab.science/wp/Humanoids2016Tanneberg.pdf>, (h5-index 2012–2016: 26, h5-median: 38). [15] ☒ ☒ ☐ ☐

Azad, M.; Ortenzi, V.; Lin, H., C.; **Rueckert, E.**; Mistry, M. (2016). Model Estimation and Control of Complaint Contact Normal Force, *Proceedings of the Int. Conference on Humanoid Robots (HUMANOIDS)*, Nov. 15-17, Cancun Mexico, <https://ai-lab.science/wp/Humanoids2016Azad.pdf>, (h5-index see above). [16] ☒ ☒ ☐ ☐

Weber, P.; **Rueckert, E.**; Calandra, R.; Peters, J.; Beckerle, P. (2016). A Low-cost Sensor Glove with Vibrotactile Feedback and Multiple Finger Joint and Hand Motion Sensing for Human-Robot Interaction, *Proceedings of the IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, Aug. 26-31, New York, USA, <https://ai-lab.science/wp/Romans2016Weber.pdf>, (h5-index 2012–2016: 21, h5-median: 28). [17] ☒ ☐ ☒ ☐

- Modugno, V.; Neumann, G.; **Rueckert, E.**; Oriolo, G.; Peters, J.; Ivaldi, S. (2016). Learning soft task priorities for control of redundant robots, *Proceedings of the International Conference on Robotics and Automation (ICRA)*, May, 16-21, Stockholm, Sweden, <https://ai-lab.science/wp/ICRA2016Modugno.pdf>, (**h5-index 2012–2016: 71, h5-median: 95**). [18]
- Kohlschuetter, J.; Peters, J.; **Rueckert, E.** (2016). Learning Probabilistic Features from EMG Data for Predicting Knee Abnormalities, *Proceedings of the XIV Mediterranean Conference on Medical and Biological Engineering and Computing (MEDICON)*, March 31st - April 2nd, Paphos, Cyprus, <https://ai-lab.science/wp/Medicon2016Kohlschuetter.pdf>, (h5-index 2012–2016: 9, h5-median: 11). [19]
- 2015 • **Rueckert, E.**; Mundo, J.; Paraschos, A.; Peters, J.; Neumann, G. (2015). Extracting Low-Dimensional Control Variables for Movement Primitives, *Proceedings of the International Conference on Robotics and Automation (ICRA)*, May 26-30, Seattle, Washington, USA, <https://ai-lab.science/wp/ICRA2015Rueckert.pdf>, (**h5-index 2012–2016: 71, h5-median: 95**). [20]
- Calandra, R.; Ivaldi, S.; Deisenroth, M.; **Rueckert, E.**; Peters, J. (2015). Learning Inverse Dynamics Models with Contacts, *Proceedings of the International Conference on Robotics and Automation (ICRA)*, May 26-30, Seattle, Washington, USA, <https://ai-lab.science/wp/ICRA2015Calandra.pdf>, (**h5-index see above**). [21]
- Paraschos, A.; **Rueckert, E.**; Peters, J.; Neumann, G. (2015). Model-Free Probabilistic Movement Primitives for Physical Interaction, *Proceedings of the IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)*, Sept. 28 - Oct. 02, Hamburg, Germany, <https://ai-lab.science/wp/IROS2015Paraschos.pdf>, (**h5-index 2012–2016: 50, h5-median: 68**). [22]
- 2014 **Rueckert, E.**; Mindt, M.; Peters, J.; Neumann, G. (2014). Robust Policy Updates for Stochastic Optimal Control, *Proceedings of the International Conf. on Humanoid Robots (HUMANOIDS)*, Nov. 18 - 20, Madrid, Spain, <https://ai-lab.science/wp/Humanoids2014Rueckert.pdf>, (h5-index 2012–2016: 26, h5-median: 38). [23]
- 2011 **Rueckert, E.**; Neumann, G. (2011). A study of Morphological Computation by using Probabilistic Inference for Motor Planning, *Proceedings of the Int. Conference on Morphological Computation (ICMC)*, pp.51–53, Sep. 13-15, Venice, Italy, <https://ai-lab.science/wp/ICMC2011Rueckert.pdf>. [24]
- Posters and Abstract Proceedings**
- 2019 **Rueckert, E.**; Philipp Jauer; Alexander Derksen; Achim Schweikard (2019). Dynamic control strategies for cable-driven master-slave robots, *Proceedings on Minimally Invasive Surgery (MIC)*, Jan. 23-24, Luebeck, DE. [25]
- 2017 Thiem, S.; Stark, S.; Tanneberg, D.; Peters, J.; **Rueckert, E.** (2017). Simulation of the underactuated Sake Robotics Gripper in V-REP, *Workshop Abstract of the International Conference on Humanoid Robots (HUMANOIDS)*, Nov. 15-17, Birmingham, UK, <https://ai-lab.science/wp/Humanoids2017Thiem.pdf>. [26]
- 2016 Sharma, D.; Tanneberg, D.; Grosse-Wentrup, M.; Peters, J.; **Rueckert, E.** (2016). Adaptive Training Strategies for BCIs, *Cyathlon Symposium*, SWISS Arena, Oct 6, 2016, <https://ai-lab.science/wp/Cyathlon2016Sharma.pdf>. [27]
- 2015 **Rueckert, E.**; Lioutikov, R.; Calandra, R.; Schmidt, M.; Beckerle, P.; Peters, J. (2015). Low-cost Sensor Glove with Force Feedback for Learning from Demonstrations using Probabilistic Trajectory Representations, *Workshop Abstract of the International Conference on Robotics and Automation (ICRA)*, May 26-30, Seattle, Washington, USA, arxiv.org/abs/1510.03253, <https://ai-lab.science/wp/ICRA2015bRueckert.pdf>. [28]

2013	<p>Rueckert, E.; Kappel, D.; Neumann, D.; Toussaint, M.; Maass, W. (2013). Principles for an Alternative Design of Movement Primitives that Uses Probabilistic Inference in Learned Graphical Models, <i>Workshop at the International Conference on Robotics and Automation (ICRA)</i>, May 6-10, Karlsruhe, Germany, https://ai-lab.science/wp/ICRA2013Rueckert.pdf. [29]</p> <p>Rueckert, E.; d'Avella, A. (2013). Learned Muscle Synergies as Prior in Dynamical Systems for Controlling Bio-mechanical and Robotic Systems, <i>Proceedings of Neural Control of Movement Conference (NCM)</i>, selected as long talk in highly competitive selection process, pp.27-28, Aug. 16-20, Puerto Rico, USA. [30]</p>	<p>☒ ☒ ☐ ☐</p> <p>☒ ☒ ☐ ☒</p>
Theses		
2014	<p>Rueckert, E. (2014). Biologically inspired motor skill learning in robotics through probabilistic inference, <i>Ph.D. Thesis</i>, Technische Universität Graz, https://ai-lab.science/wp/Thesis2014Rueckert.pdf. [31]</p>	<p>☒ ☒ ☒ ☒</p>
2010	<p>Rueckert, E. (2010). Simultaneous localisation and mapping for mobile robots with recent sensor technologies, <i>Master Thesis</i>, Technische Universität Graz, https://ai-lab.science/wp/Thesis2010Rueckert.pdf. [32]</p>	<p>☐ ☒ ☐ ☐</p>

Talks

		C M R H
2019/03	Künstliche Intelligenz in der Robotik. Invited Talk. At the <i>Naturwissenschaftlicher Verein zu Lübeck gegründet 1872, Lübeck</i> . [1]	☒ ☒ ☒ ☒
2019/02	Erfahrungen aus den EU-Projekten AMARSi, CoDyCo und Goal-Robots. Invited Talk. <i>Erfahrungsaustausch zu Horizont 2020, Bonn, Germany</i> . [2]	☐ ☐ ☐ ☐
2019/01	Event-based neural motion planning and learning in robots. Invited Talk. At the <i>International Workshop on Intelligence Augmentation and Amplification, Kaiserslautern, Germany</i> . [3]	☒ ☒ ☒ ☒
2019/01	Ausblick - KI in der Robotik. Invited Talk. At the <i>VDI-Thesen und Handlungsfelder Automation 2030, Kloster Jakobsberg</i> . [4]	☒ ☒ ☒ ☒
2018/11	Neural Robot Learning. Invited Talk. At the <i>MetaNook 2018, Lübeck</i> . [5]	☒ ☒ ☒ ☒
2018/11	Neural and Probabilistic Learning Methods. Invited Talk. At the <i>Institut für Informatik, Universität Göttingen</i> . [6]	☒ ☒ ☒ ☒
2018/11	Probabilistic Neural Planning for Robotics. Invited Talk. At the <i>Universität Göttingen</i> . [7]	☒ ☒ ☒ ☒
2018/07	Neural and Probabilistic Learning for Robotics and Humans. Invited Talk. At the <i>Technische Universität München</i> . [8]	☒ ☒ ☒ ☒
2018/07	Neurorobotics: Learning neural and probabilistic models for robots and humans. Invited Talk. At the <i>Technische Universität Berlin, Electrical Engineering and Computer Science</i> . [9]	☒ ☒ ☒ ☒
2018/07	Deep Learning for Motor Control. Invited Talk. At the <i>Lübeck 2018 Summer Academy on Medical Technology</i> . [10]	☐ ☒ ☒ ☒
2018/06	Learning Neural and probabilistic models with robots and humans. Invited Talk. <i>Institute for Neuro- and Bioinformatics, University of Luebeck</i> . [11]	☒ ☒ ☒ ☒
2018/06	Neural and probabilistic models for learning in robots and humans. Invited Talk. At the <i>Institute of Medical Informatics, University of Luebeck</i> . [12]	☒ ☒ ☒ ☒
2018/06	Models of human movement kinematics for predictions. Invited Talk. At the <i>Institute for Neurogenetics, University of Luebeck</i> . [13]	☒ ☒ ☐ ☒
2018/04	Probabilistic models for motor skill learning in robots and humans. Invited Talk. At the <i>Institute for Electrical Engineering in Medicine, University of Luebeck</i> . [14]	☒ ☒ ☒ ☒
2017/09	Experience Replay in Model-based Reinforcement Learning for Open-Ended Learning. Invited Talk. At the <i>Ethical Issues of Open Ended-Learning in Autonomous Robots workshop</i> at the International Conference on Development and Learning (ICDL), Lisbon, Portugal. [15]	☒ ☒ ☒ ☒

2017/02	Neural models for robot motor skill learning. Invited Talk . At the Universität Lübeck, Germany. [16]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2017/01	Learning to Plan through Reinforcement Learning in Spiking Neural Networks. Invited Talk . At the Frankfurt Institute for Advanced Studies, Germany. [17]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2016/11	Neural models for brain-machine interfaces and anthropomorphic robotics. Invited Talk . At the Albert-Ludwigs-Universität Freiburg, Germany. [18]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2016/11	Probabilistic computational models of human motor control for robot learning. Invited Talk . At the INI Institute of Neuroinformatics Colloquium, Zurich, Switzerland. [19]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
2016/05	Models of Human Motor Control for Robotics. Invited Talk . At Joanneum Research. Guest of Michael Hofbauer, Klagenfurt, Austria. [20]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2016/04	Probabilistic Models of Human Motor Control for Robotics and Prosthetics. Invited Talk at the Institute of Neural Engineering, Laboratory of Brain-Computer Interfaces, invited by Gernot Mueller-Putz, Graz, Austria. [21]	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2014/02	Biologically inspired motor skill learning in robotics through probabilistic inference. Tutorial at the Machine Learning Summer School, Maribor, Slovenia. [22]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2013/04	Learned Muscle Synergies as Prior in Dynamical Systems for Controlling Bio-mechanical and Robotic Systems. Plenary Talk of Neural Control of Movement Conference (NCM), Puerto Rico, USA. [23]	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2012/11	Interaction between biology and robotics and what we can learn from it. Invited Talk at Andrea d'Avella's lab, Rome, Italy. [24]	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2011/11	Motor Skill Learning with Robots using Probabilistic Inference. Invited Talk at Jan Peters's lab, Darmstadt, Germany. [25]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
2011/06	Motor Skill Learning with Robots. Invited Talk at Marc Toussaint's lab, Berlin, Germany. [26]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

Workshops and Tutorials

2018	Tutorial, Invited speaker , <i>Title: Neural and Probabilistic Learning Methods for Robotics and other Domains</i> .
Venue	The Thirteenth International Conference on Software Engineering Advances, SoftNet 2018, Nice, France.
2016	1.5 days Workshop, Organizer , <i>Neurorobotics: a chance for new ideas, algorithms and approaches, (link)</i> .
Organizer	Elmar Rueckert and Martin Riedmiller (Google Deep Mind).
Venue	Conference of Advances in Neural Information Processing Systems (NIPS), Dec. 05–10, 2016, Barcelona, Spain.
2014	Tutorial, Invited speaker , <i>Title: An introduction to robot learning and probabilistic movement planning.</i>
Venue	Machine learning summer school with the technology and education for search and rescue robots project (TEDUSAR), Maribor, Slovenia.
2011	Two-days Workshop, co-organizer , <i>Hands-on Probabilistic Inference for Motor Control.</i>
Organizer	Gerhard Neumann (University of Lincoln, UK) and Elmar Rueckert .
Venue	Outreach workshop within the European project AMARSi-project.eu, Zurich, Switzerland.

Research Stays

2017, 2016	Jozef Stefan Institute, Slovenia , <i>Department of Automation, Biocybernetics and Robotics</i> , Jan Babic. Research collaboration on understanding motor adaptation in human postural control in dangerous situations.
2015, 2014	Jozef Stefan Institute, Slovenia , <i>Department of Automation, Biocybernetics and Robotics</i> , Jan Babic. Research internship on investigating the functional role of supportive contacts in human postural control.
2012	Ghent University, Belgium , <i>Reservoir Lab</i> , Benjamin Schrauwen. Research internship on exploring Stochastic Optimal Control for real robot control.
2012	Santa Lucia Foundation, Rome, Italy , <i>Laboratory of Neuromotor Physiology</i> , Andrea d'Avella. Research internship on Learning Muscle Synergies in Dynamical Systems.
2008	University of Patra, Greece , <i>Undergraduate exchange program, ERAS-MUS</i> . Research internship on data mining graduate courses.

Reviewing Experience

Journals

		C	M	R	H
2018	Neural Computation, MIT Press.	☒	☒	☒	☒
	RAL track of International Conference on Robotics and Automation (ICRA).	☒	☒	☒	☐
2017	IEEE Transactions on Neural Networks and Learning Systems.	☒	☒	☐	☒
2017	Information Sciences, Elsevier.	☒	☒	☐	☒
2016, 2017	PLOS Computational Biology.	☒	☒	☐	☒
2014, 15, 16	Autonomous Robots (AURO).	☒	☒	☒	☐
2012, 13, 14, 15, 16, 17	Frontiers in Computational Neuroscience (Front Comput Neurosci).	☒	☒	☐	☒
2016	IEEE Transactions on Robotics (TRO).	☒	☐	☒	☐
2015	International Journal of Robotics Research (IJRR).	☒	☐	☒	☐
2015	Scientific Reports, Nature Publishing Group (Sci Rep).	☒	☒	☒	☒
2012	Artificial Life Journal (Artif. Life).	☒	☐	☒	☐
2012	Journal of Neurophysiology (J. Neurophysiol.).	☒	☐	☐	☒

Conferences

2019	International Conference on Machine Learning (ICML).	☒	☒	☒	☒
2019,2018	International Joint Conference on Biomedical Engineering Systems and Technologies (SAB).	☒	☒	☒	☒
2018	International Conference on Neural Information Processing Systems (NIPS).	☒	☐	☒	☒
2018	International Conference on Simulation of Adaptive Behavior (SAB).	☒	☐	☒	☒
2018	International Conference on Robot Learning (CoRL).	☒	☒	☒	☐
2015, 2017	IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).	☒	☒	☒	☐
2011, 14, 15, 17, 18	International Conference on Robotics and Automation (ICRA).	☒	☒	☒	☐
2015, 2018	Robotics: Science and Systems (RSS).	☒	☒	☒	☐
2014,2017	IEEE/RSJ International Conference on Humanoid Robots (HUMANOIDS).	☒	☐	☒	☒
2013	International Joint Conference on Artificial Intelligence (IJCAI).	☒	☒	☒	☐

Member of Scientific Committees

Area Chair and Associate Editor

- 2018 Area Chair for International Conference on Robot Learning (CoRL)
Associate Editor for the *2018 IEEE International Conference on Robotics and Automation (ICRA 2018)*.
- 2017 Associate Editor for the *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017)*.

Program Committee Member

- 2018 Robotics: Science and Systems (RSS 2018).
International Conference on Bio-inspired Systems and Signal Processing (BIOSIGNALS 2018).
- 2016 Joint Conference on Artificial Intelligence (IJCAI 2016).
- 2015 Robotics: Science and Systems (RSS 2015).

Hiring Committee Member

- 2019 Part of the hiring committee for the W2-Professorship on *Interaktionsdesign und User Experience* at University of Luebeck.
- 2017 Part of the hiring committee of an *Independent Research Group (IRG)* at Technische Universität Darmstadt.
Part of the review board for a DFG (engl. german research foundation) project at at Technische Universität Darmstadt.

Other Memberships

- 2019 Designated chair of the Expert Committee of the Association of German Engineers (VDI) for *fundamentals of intelligent learning systems* (german: Fachausschussvorsitzender zu Grundlagen lernender intelligenter Systeme), <https://www.vdi.de/technik/fachthemen/mess-und-automatisierungstechnik>.
- 2018-2019 INSTICC is the Institute for Systems and Technologies of Information, Control and Communication, a scientific, non-profit, association whose main goals are to serve the international scientific community by promoting, developing and disseminating knowledge in the areas of information systems and technologies, control and communications.
- 2018 Reviewer for the German Academic Exchange Service (Deutscher Akademischer Austauschdienst).
- 2017 Representative of the students' representative council at the Technische Universität Darmstadt.

Major Collaborations

Accademic

Achim Schweikard (Universität zu Lübeck), Floris Ernst (Universität zu Lübeck), Heinz Koepl (Technische Universität Darmstadt, Germany), Jan Peters (Technische Universität Darmstadt, Germany), Philipp Beckerle (Technische Universität Darmstadt, Germany), Gerhard Neumann (University of Lincoln, UK), Marc Toussaint (Universität Stuttgart, Germany), Wolfgang Maass (Technische Universität Graz, Austria), Jan Babic (Josef Stefan Institute, Ljubijana, Slovenia), Michael Mistry (University of Birmingham, UK), Moritz Grosse-Wentrup (Max-Planck Institute Tuebingen, Germany), Serena Ivaldi (INRIA Nancy, France), Giuseppe Oriolo (University of Rome, Italy), Marc Deisenroth (Imperial College London, UK), Tucker Hermans (University of Utah, USA), Andrea d'Avella (Foundation Santa Lucia, Italy), Thomas Schack (Universität Bielefeld, Germany), Benjamin Schrauwen (Ghent University).

Outreach Activities

- 2019/02 **Organizer**, *Schülerprojekt: Our Common Future*.
Interactive robot demonstrations of joint and task space control of industrial robot arms, the mobile segway Loomo and the automation principles in ultrasound monitoring. Supported by Nils Rottmann and Sven Boettger.
- 2018/11 **Author**, *Print media, 54° Nord*, [Link to the report](#).
Ich zeig dir wie's geht! *Laien trainieren intelligente Roboter*
- 2015 – 2017 **Advisor**, *Cyathlon-Team Athena-Minerva*.
Supervisor and advisor of *Cyathlon* related theses and projects. (Cyathlon-Team Athena-Minerva).
- 2015 – 2017 **Organizer**, *Kinderuni Darmstadt, 1–2 events per year*.
Interactive robot demonstrations of the Nao, the ICub and the Darias robots. Supported by Veronika Weber, Rudolf Lioutikov, Gregor Gebhardt and Guilherme J. Maeda.
- 2015/04 **Organizer**, *Major German TV program, SAT1*.
Life demonstrations of teaching the ICub how to stack cups.
- 2015/03 **Organizer**, *KID Science Radioclub*, [Link to the report](#).
Lab tour and life demonstrations of the Oncilla, the ICub and the Darias robots. Supported by Veronika Weber, Guilherme J. Maeda, Rudolf Lioutikov and Roberto Calandra.
- 2014/10 **Author**, *Print media, Hoch3*, [Link to the report](#).
Background article on learning in autonomous robots. Title: *Hintergrund: Können Roboter lernen wie Menschen?*