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.
Date of Birth	January 3rd, 1982 at Unterpremstätten, Austria.

Research interests

Computational Neuroscience **(C)**	Human Motor Control, Movement Decoding and Understanding, Brain-Computer-Interfaces, Electroencephalography, Spiking Neural Networks, Optimal Feedback Control, Muscle Synergies, Minimum Intervention Principle
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
Robot Learning **(R)**	Stochastic Optimal Control, Movement Primitives, Reinforcement Learning, Imitation Learning, Morphological Computation, Quadruped Locomotion, Humanoid Postural Control, Grasping, Tactile Learning, Prosthesis Control
Models of Human Motor Control **(H)**	Motor Adaptation, Skill Learning, Postural Control, Telepresence, Embodiment, Congruence in Teleoperation, Probabilistic Time-Series Models, Muscle Synergies, Hippocampal Models for Planning, Models of Neural Dynamics
Medical Robotics **(E)**	Real-time Tumour Tracking, Probabilistic Motion Compensation Models, Prosthesis Control, Movement Decoding and Understanding, Brain-Computer-Interfaces, Real-time Control, 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**, *University of Lübeck*, At the Institute for Robotics and Cognitive Systems.

2016/11–now **Research Group Leader**, *Supervisor of two Ph.Ds, PI of GOAL-Robots*. Computational models for learning from intrinsic motivation and open-ended movement skill libraries.

2014/04–2016/02 **Senior Research Scientist**, *Project leader in the EU-Project CoDyCo*. Movement primitive models for compliant torque control of humanoids and tactile learning.

2015/11–2016/01 **Senior Research Scientist**, *Project leader in the EU-Project TACMAN*. Manipulation and tactile learning with neural models.

2014/02–2014/04 **Postdoctoral fellow**, *Technische Universität Darmstadt*. Computational models for robot motion planning and human postural control.

2012/02–2014/02 **Lecturer**, *Technische Universität Graz*. Undergraduate course (3rd semester) on Data Structures and Algorithms with more than 380 registered students.

2010/02–2014/02 **Graduate Student**, *Technische Universität Graz*. Supervised by Wolfgang Maass, Institute for Theoretical Computer Science.

2009/04–2010/02 **Undergraduate Research Student**, *Technische Universität Graz*. Supervised by Horst Bischof, Institute for Computer Graphics and Vision.

Industrial

2009/02–2009/12 **Research Scientist on AI for acoustical engineering**, *Startup company mangoo.net*, Maribor, Slovenia. Learning noise cancellation systems with microphone arrays. (C-sharp, C++, Matlab prototyping, electronic circuit design and field tests).

2008/07–2009/02 **Software Developer (part time)**, *Strobl, Horvath & Schinagl GmbH*, Graz. Now called one's own. Online data management solutions (C-sharp, C++, SQL, Microsoft Server).

2006/07–2008/01 **Software Developer (part time)**, *ingen Software Consulting GmbH*, Graz. Large-scale datamanagement systems for universities (JAVA, JAVA-script, AJAX, hibernate, SQL).

2004/02–2006/06 **Software Developer (part time)**, *Kristl, Seibt & CO. GmbH*, Graz. Maintenance and extension of the internal datamanagement system (Visual Basic, C++, Access, SQL, SAP).

2000/06–2002/09 **Electrical Developer (part time)**, *REC GmbH*, Saarbruecken, Germany. Maintenance and development of car park sensor technologies (Visual Basic, C++, electronic circuit design and testing).

1998/08–1998/09 **Electrical Engineer**, *Styrian electrical stock company*, Graz. Mandatory practical work experience during the high school.

Teaching Experience

2018 **Lecturer**, *Humanoid Robotics (RO5300), 6ECTS*, University of Lübeck, undergraduate course, https://rob.ai-lab.science/teaching/#RO5300.

2018 **Lecturer**, *Probabilistic Learning for Robotics (RO5601), 5ECTS*, University of Lübeck, graduate course, https://rob.ai-lab.science/teaching/#RO5601.

2017, 2016, 2015 **Guest Lecturer**, *Robot Learning (20-00-0629-vl)*, Technische Universität Darmstadt , graduate course.

Guest Lecturer, *Machine Learning - Statistical Approaches 1,(20-00-0358-iv)*, Technische Universität Darmstadt , Graduate course.

2012, 2013, 2014 **Lecturer**, *Datastructures and Algorithms (708.031)*, Technische Universität Graz , undergraduate course with more than 370 students. **Received an outstanding good evaluation (PDF)**.

2012 **Guest Lecturer**, *Machine Learning B (708.061)*, Technische Universität Graz , graduate course on advanced machine learning topics.

2011 **Guest Lecturer**, *Machine Learning A (708.063)*, Technische Universität Graz , graduate course on advanced neural network topics.

Student Supervision

Ph.D. Student Supervision

		C	M	R	H	E
2018/03–now	Learning Optimal Navigation Strategies in Mobile and Humanoid Robots, University of Luebeck. [1]	☐	☒	☒	☐	☒
2016/11–now	Intrinsic Motivation Strategies for Learning Motor Skills, Technische Universität Darmstadt. [2]	☒	☒	☒	☒	☐
2015/10–now	Machine Learning for Human-Like Tactile Manipulation, within the EU-project TACMAN, Technische Universität Darmstadt. [3]	☒	☒	☒	☒	☐

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. [4]	☒	☒	☐	☐	☐

M.Sc. Theses Supervision

2018/10–now	Design and Control of a Pneumatic Ankle Exoskeleton, University of Luebeck. [5]	☒	☒	☐	☒	☒
2018/01	Distributed Reinforcement Learning with Neural Networks for Robotics, Technische Universität Darmstadt. [6]	☒	☒	☐	☐	☐
2017/06	Learning to Categorize Issues in Distributed Bug Tracker Systems, Technische Universität Darmstadt. [7]	☐	☒	☐	☐	☐
2017/01	Adaptive Training Strategies for Brain-Computer-Interfaces, Technische Universität Darmstadt. Co-supervision with Moritz Grosse-Wentrup. [8]	☒	☐	☒	☐	☒
2016/02	Learning Probabilistic Feedforward and Feedback Policies for Generating Stable Walking Behaviors, (PDF), Technische Universität Darmstadt. [9]	☒	☒	☐	☐	☐
2016/01	Learning Probabilistic Classifiers from Electromyography Data for Predicting Knee Abnormalities, (PDF), Technische Universität Darmstadt. [10]	☐	☒	☒	☒	☒
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. [11]	☒	☒	☐	☐	☐
2014/11	Probabilistic Inference for Movement Planning in Humanoids, (PDF), Technische Universität Darmstadt. [12]	☐	☒	☒	☐	☐
2014/10	Extracting Low-Dimensional Control Variables for Movement Primitives, (PDF), Technische Universität Darmstadt. [13]	☐	☒	☒	☐	☐
2013/05	Monte Carlo Sampling Methods for Motor Control of Constraint High-dimensional Systems, (PDF), Technische Universität Graz. [14]	☐	☒	☐	☐	☐
2013/05	Probabilistic Models for Learning the Dynamics Model of Robots, (PDF), Technische Universität Graz. [15]	☐	☒	☐	☐	☐
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. [16]	☐	☒	☐	☐	☐

M.Sc. Project Supervision

2018/10–2019/01	Development of a Clinical Fraction Collector, University of Luebeck. [17]	☐	☐	☒	☐	☒
2017/07	LSTM Networks for Movement Planning in Humanoids, Technische Universität Darmstadt. [18]	☒	☒	☐	☐	☐

		C	M	R	H	E
2016/10	Stochastic Optimal Control of Humanoid Robots in multi-contact environments, (PDF), Technische Universität Darmstadt. [19]	☒	☐	☒	☒	☐
2013/06	Reinforcement Learning with Dynamic Movement Primitives, (PDF), Technische Universität Graz. [20]	☒	☐	☐	☐	☐
2012/10	Gibbs Sampling Methods for Motor Control Problems with Hard Constraints, (PDF), Technische Universität Graz. [21]	☐	☒	☐	☐	☐

B.Sc. Theses Supervision

2018/04–now	Development of a universal ultrasound station tool fixation for clinical purposes, University of Luebeck. [22]	☐	☐	☒	☐	☒
2018/04–now	Simulation of optimal kinematic tool structures for robot guided ultrasound, University of Luebeck. [23]	☐	☐	☒	☒	☒
2017/12	The Effects of Intrinsic Motivation Signals on Reinforcement Learning Strategies, Technische Universität Darmstadt. [24]	☒	☒	☐	☐	☐
2017/10	Genetic Reactive Programming with Haskell, Technische Universität Darmstadt. [25]	☐	☒	☐	☐	☐
2017/09	Simulation of the underactuated Sake Robotics Gripper in V-REP and ROS, Technische Universität Darmstadt. [26]	☒	☒	☐	☐	☐
2017/03	Nonparametric Deep Neural Networks for Movement Planning, (PDF), Technische Universität Darmstadt. [27]	☒	☐	☐	☐	☐
2016/12	Reinforcement Learning for Tactile-based Finger Gaiting, Technische Universität Darmstadt, (PDF). [28]	☒	☐	☒	☒	☐
2011/04	Ein Vergleich von Lernalgorithmen für Parametersuche im hochdimensionalen Raum, (PDF), Technische Universität Graz. [29]	☐	☒	☐	☐	☐

Publications

Journal 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.

		C	M	R	H	E
2018	•Tanneberg, D.; Peters, J.; **Rueckert, E.** (2018). Intrinsic Motivation and Mental Replay enable Efficient Online Adaptation in Stochastic Recurrent Networks, *Neural Networks - Elsevier*, 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]	☒	☒	☒	☐	☐
	Sosic, A.; Zoubir, A.; **Rueckert, E.**; Peters, J.; Koeppl, H. (2018). Inverse Reinforcement Learning via Nonparametric Spatio-Temporal Subgoal Modeling, *Journal of Machine Learning Research (JMLR)*, https://rob.ai-lab.science/wp/JMLR2018Sosic.pdf. [2]	☒	☐	☒	☐	☐
2017	Paraschos, A.; **Rueckert, E.**; Peters, J.; Neumann, G. (2017). Probabilistic Movement Primitives under Unknown System Dynamics, *Advanced Robotics*, https://ai-lab.science/wp/AR2018Paraschos.pdf, (impact factor 2015: 0.96, 2014: 1.38, h5-index 2012–2016: 23, h5-median: 30) [3]	☒	☐	☒	☐	☐
2016	• **Rueckert, E.**; Camernik, J.; Peters, J.; Babic, J. (2016). Probabilistic Movement Models Show that Postural Control Precedes and Predicts Volitional Motor Control, *Nature: Scientific Reports*, 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]	☐	☒	☐	☒	☐
	• **Rueckert, E.**; Kappel, D.; Tanneberg, D.; Pecevski, D; Peters, J. (2016). Recurrent Spiking Networks Solve Planning Tasks, *Nature: Scientific Reports*, doi:10.1038/srep21142, https://ai-lab.science/wp/SciReps_NeuralPlanning.pdf, **(impact f. see above)**. [5]	☒	☒	☒	☒	☐

2013 ○ **Rueckert, E.**; Neumann, G.; Toussaint, M.; Maass, W. (2013). Learned graphical models for probabilistic planning provide a new class of movement primitives, *Frontiers in Computational Neuroscience*, 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] ☒ ☒ ☐ ☐ ☐

• **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.

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)*. [9] ☒ ☒ ☐ ☒ ☐

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). [10] ☒ ☒ ☐ ☐ ☐

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). [11] ☒ ☒ ☐ ☒ ☐

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). [12] ☒ ☒ ☐ ☐ ☐

• 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%)**. [13] ☒ ☒ ☐ ☐ ☐

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). [14] ☒ ☒ ☐ ☐ ☐

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). [15] ☒ ☒ ☐ ☐ ☐

		C	M	R	H	E
	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). [16]	☒	☐	☒	☐	☐
	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)**. [17]	☐	☒	☐	☐	☐
	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). [18]	☐	☒	☐	☒	☐
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)**. [19]	☒	☒	☐	☐	☐
	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)**. [20]	☒	☒	☐	☐	☐
	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)**. [21]	☒	☒	☐	☐	☐
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). [22]	☒	☐	☒	☐	☐
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. [23]	☐	☒	☐	☐	☐

Posters and Abstract Proceedings

		C	M	R	H	E
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. [24]	☒	☐	☒	☐	☐
2016	Sharma, D.; Tanneberg, D.; Grosse-Wentrup, M.; Peters, J.; **Rueckert, E.** (2016). Adaptive Training Strategies for BCIs, *Cybathlon Symposium*, SWISS Arena, Oct 6, 2016, https://ai-lab.science/wp/Cybathlon2016Sharma.pdf. [25]	☒	☐	☒	☒	☐

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. [26]	☒ ☐ ☒ ☐ ☐
2013	**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, *Workshop at the International Conference on Robotics and Automation (ICRA)*, May 6-10, Karlsruhe, Germany, https://ai-lab.science/wp/ICRA2013Rueckert.pdf. [27]	☒ ☒ ☐ ☐ ☐
	Rueckert, E.; d'Avella, A. (2013). Learned Muscle Synergies as Prior in Dynamical Systems for Controlling Bio-mechanical and Robotic Systems, *Proceedings of Neural Control of Movement Conference (NCM)*, **selected as long talk in highly competitive selection process**, pp.27–28, Aug. 16-20, Puerto Rico, USA. [28]	☒ ☒ ☐ ☒ ☐

Theses

2014	**Rueckert, E.**. (2014). Biologically inspired motor skill learning in robotics through probabilistic inference, *Ph.D. Thesis*, Technische Universität Graz, https://ai-lab.science/wp/Thesis2014Rueckert.pdf. [29]	☒ ☒ ☒ ☒ ☐
2010	**Rueckert, E.**. (2010). Simultaneous localisation and mapping for mobile robots with recent sensor technologies, *Master Thesis*, Technische Universität Graz, https://ai-lab.science/wp/Thesis2010Rueckert.pdf. [30]	☐ ☒ ☐ ☐ ☐

Talks

		C M R H E
2018/11	Neural Robot Learning. **Invited Talk**. At the *MetaNook 2018, Lübeck*. [1]	☒ ☒ ☒ ☒ ☒
2018/11	Neural and Probabilistic Learning Methods. **Invited Talk**. At the *Universität Göttingen*. [2]	☒ ☒ ☒ ☒ ☒
2018/11	Probabilistic Neural Planning for Robotics. **Invited Talk**. At the *Universität Göttingen*. [3]	☒ ☒ ☒ ☒ ☒
2018/07	Neural and Probabilistic Learning for Robotics and Humans. **Invited Talk**. At the *Technische Universität München*. [4]	☒ ☒ ☒ ☒ ☒
2018/07	Neurorobotics: Learning neural and probabilistic models for robots and humans. **Invited Talk**. At the *Technische Universität Berlin, Electrical Engineering and Computer Science*. [5]	☒ ☒ ☒ ☒ ☒
2018/07	Deep Learning for Motor Control. **Invited Talk**. At the *Lübeck 2018 Summer Academy on Medical Technology*. [6]	☒ ☒ ☒ ☒ ☒
2018/06	Learning Neural and probabilistic models with robots and humans. **Invited Talk**. At the *Institute for Neuro- and Bioinformatics, University of Luebeck*. [7]	☒ ☒ ☒ ☒ ☒
2018/06	Neural and probabilistic models for learning in robots and humans. **Invited Talk**. At the *Institute of Medical Informatics, University of Luebeck*. [8]	☒ ☒ ☒ ☒ ☒
2018/06	Models of human movement kinematics for predictions. **Invited Talk**. At the *Institute for Neurogenetics, University of Luebeck*. [9]	☒ ☒ ☒ ☒ ☒
2018/04	Probabilistic models for motor skill learning in robots and humans. **Invited Talk**. At the *Institute for Electrical Engineering in Medicine*, University of Luebeck. [10]	☒ ☒ ☒ ☒ ☒
2017/09	Experience Replay in Model-based Reinforcement Leaning for Open-Ended Learning. **Invited Talk**. At the *Ethical Issues of Open Ended-Learning in Autonomous Robots* workshop at the International Conference on Development and Learning (ICDL), Lisbon, Portugal. [11]	☒ ☒ ☒ ☒ ☒
2017/02	Neural models for robot motor skill learning. **Invited Talk**. At the Universität Lübeck, Germany. [12]	☒ ☒ ☒ ☒ ☐

2017/01	Learning to Plan through Reinforcement Learning in Spiking Neural Networks. **Invited Talk**. At the Frankfurt Institute for Advanced Studies, Germany. [13]	☒ ☒ ☐ ☐ ☐
2016/11	Neural models for brain-machine interfaces and anthropomorphic robotics. **Invited Talk**. At the Albert-Ludwigs-Universität Freiburg, Germany. [14]	☒ ☒ ☒ ☒ ☐
2016/11	Probabilistic computational models of human motor control for robot learning. **Invited Talk**. At the INI Institute of Neuroinformatics Colloquium, Zurich, Switzerland. [15]	☒ ☒ ☐ ☒ ☐
2016/05	Models of Human Motor Control for Robotics. **Invited Talk**. At Joanneum Research. Guest of Michael Hofbaur, Klagenfurt, Austria. [16]	☒ ☒ ☒ ☒ ☐
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. [17]	☒ ☒ ☒ ☒ ☐
2014/02	Biologically inspired motor skill learning in robotics through probabilistic inference. **Tutorial** at the Machine Learning Summer School, Maribor, Slovenia. [18]	☐ ☒ ☒ ☒ ☐
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. [19]	☒ ☐ ☒ ☒ ☐
2012/11	Interaction between biology and robotics and what we can learn from it. **Invited Talk** at Andrea d'Avella's lab, Rome, Italy. [20]	☒ ☐ ☒ ☒ ☐
2011/11	Motor Skill Learning with Robots using Probabilistic Inference. **Invited Talk** at Jan Peters's lab, Darmstadt, Germany. [21]	☐ ☒ ☒ ☐ ☐
2011/06	Motor Skill Learning with Robots. **Invited Talk** at Marc Toussaint's lab, Berlin, Germany. [22]	☐ ☒ ☒ ☐ ☐

Workshops and Tutorials

2018	**Tutorial, Invited speaker**, *Title: Neural and Probabilistic Learning Methods for Robotics and other Domains.*.
Venue	The Thirteenth International Conference on Software Engineering Advances, SoftNet 2018, Nice, France.
2016	**1.5 days Workshop, Organizer**, *Neurorobotics: a chance for new ideas, algorithms and approaches, (link)*.
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**, *Title: An introduction to robot learning and probabilistic movement planning.*.
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**, *Hands-on Probabilistic Inference for Motor Control.*.
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**, *Department of Automation, Biocybernetics and Robotics*, Jan Babic. Research collaboration on understanding motor adaptation in human postural control in dangerous situations.

2015, 2014 **Jozef Stefan Institute, Slovenia**, *Department of Automation, Biocybernetics and Robotics*, Jan Babic. Research internship on investigating the functional role of supportive contacts in human postural control.

2012 **Ghent University, Belgium**, *Reservoir Lab*, Benjamin Schrauwen. Research internship on exploring Stochastic Optimal Control for real robot control.

2012 **Santa Lucia Foundation, Rome, Italy**, *Laboratory of Neuromotor Physiology*, Andrea d'Avella. Research internship on Learning Muscle Synergies in Dynamical Systems.

2008 **University of Patra, Greece**, *Undergraduate exchange program, ERASMUS. Research internship on data mining graduate courses*.

Reviewing Experience

Journals

		C	M	R	H	E
2018	Neural Computation, MIT Press.	☒	☒	☒	☒	☒
2018	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

2019,2018	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

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

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 Koeppl (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).

Industrial

Joern Ihlenburg (Magna International), Alexander Zak (Magna International), Michael Hofbaur (Joanneum Research Austria), Michael Gienger (Honda Research), Erik Bogner (Manager Driveability and Simulation) and Jürgen Holzinger (Project Manager Drive) of the AVL List GmbH.

Outreach Activities

2015 – 2017 **Advisor**, *Cybathlon-Team Athena-Minerva*.
Supervisor and advisor of *Cybathlon* related theses and projects. (Cybathlon-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?*