

Curriculum Vitae

Franz-Josef-Straße 18, 8700 Leoben, Austria
<https://cps.unileoben.ac.at>
rueckert@unileoben.ac.at
ORCID:0000-0003-1221-8253
+43 3842 402 1900

Elmar Arne Rueckert



April, 2023

Personal Data

Current Position **Full Professor (§98 or W3 equiv. in Germany)**, *Montanuniversität Leoben, Austria*, Chair of Cyber-Physical-Systems (CPS)

Family Status Married, three children.

Research interests

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

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

Robotics **(R)** Stochastic Optimal Control, Movement Primitives, Reinforcement Learning, Morphological Computation, Quadruped Locomotion, Humanoid Postural Control, Grasping, Tactile Learning, Dynamic Control.

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

Awards and Scholarships

2019 **Winner of the 'German AI-Young Researcher Price 2019'**, *KI-Denker der Zukunft (15k EURO)*, Most important AI price in Germany, Austria and Swiss for young AI researcher.

2019 **Advanced Robotics Best Paper Award**, *Probabilistic Movement Primitives under Unknown System Dynamics*, *Journal of Advanced Robotics*

2018 **Best Paper Award**, *Learning to Categorize Bug Reports with LSTM Networks*, at the Int. Conference on Advances in System Testing and Validation

2017 **Hanns-Voith-Stiftungspreis 2017 'Digital Solutions' (supervisor of)**, *the best masters thesis by Daniel Tanneberg on, Spiking Neural Networks Solve Robot Planning Problems*

2008 **European Exchange Program Scholarship**, University of Patra, Greece

Education

2010/02–2014/02 **Dr. techn. (equivalent to Ph.D.)**, *Technische Universitaet 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 Universitaet 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

2021/03–now	Full Professor , <i>Montanuniversität Leoben</i> , Chair of Cyber-Physical-Systems
2018/02–2021/02	Assistant Professor , <i>University of Luebeck</i> , At the Institute for Robotics and Cognitive Systems
2016/11–2021/01	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 Universitaet Darmstadt</i> Computational models for robot motion planning and human postural control.
2012/02–2014/02	Lecturer , <i>Technische Universitaet 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 Universitaet Graz</i> Supervised by Wolfgang Maass, Institute for Theoretical Computer Science.
2009/04–2010/02	Undergraduate Research Student , <i>Technische Universitaet Graz</i> Supervised by Horst Bischof, Institute for Computer Graphics and Vision.

Teaching Experience

Lecturer (12-15 lecture units plus exercises and assignments)

2021, 2022	Cyber-Physical-Systems (190.001 a. 190.002) , <i>WS, 4SWS</i> , MU Leoben , undergraduate course, https://cps.unileoben.ac.at/530-022-introduction-to-cyber-physical-systems-4sh-se-ws-2021-22/
2021, 2022	Machine Learning (190.012 a. 190.013) , <i>SS, 4SWS</i> , MU Leoben , graduate course, https://cps.unileoben.ac.at/150-012-maschinelles-lernen-2sst-vo-ss-2021-22/
2020	Reinforcement Learning (RO5102 T) , <i>SS2020, 4SWS</i> , University of Luebeck , graduate course, https://rob.ai-lab.science/teaching/reinforcement-learning-ro5102-t/
2020, 2019	Probabilistic Machine Learning (RO5101 T) , <i>WS2020/21, WS2019/20, 4SWS</i> , University of Luebeck , graduate course, https://rob.ai-lab.science/teaching/probabilistic-machine-learning-ro5101-t/
2020, 2019, 2018	Humanoid Robotics (RO5300) , <i>SS2020, SS2019, SS2018, 6ECTS</i> , University of Luebeck , undergraduate course, https://rob.ai-lab.science/teaching/humanoid-robotics-ro5300-ss2019 , evaluation reports: 2019, 2018
2018	Probabilistic Learning for Robotics (RO5601) , <i>WS2018/19, 5ECTS</i> , University of Luebeck , undergraduate course, https://rob.ai-lab.science/teaching/past-lectures/probabilistic-learning-for-robotics-ro5601-ws18-19
2012, 2013	Datastructures and Algorithms (708.031) , <i>In German. WS2012/13, WS2013/14</i> , Technische Universitaet Graz , undergraduate course with more than 370 students. Evaluation report: (2014)

Guest Lecturer (Single lecture units per Topic)

2017, 2016, 2015	Machine Learning - Statistical Approaches 1,(20-00-0358-iv) , <i>Four Lecture units on: 1. Statistics Refresher (2015), 2. Gaussian Processes (2015), 3. Optimization Refresher (2016), 4. Logistic Regression and Support Vector Machines (2017)</i> , Technische Universitaet Darmstadt , graduate course
2015	Robot Learning (20-00-0629-vI) , <i>on Optimal Control (2015)</i> , Technische Universitaet Darmstadt , graduate course
2012	Machine Learning B (708.061) , <i>Two lecture units on 1. Introduction to Robotics (2012), Reinforcement Learning (2012).</i> , Technische Universitaet Graz , graduate course on advanced machine learning topics
2011	Machine Learning A (708.063) , <i>on Probability Theory in Robotics (2011)</i> , Technische Universitaet Graz , graduate course on advanced neural network topics

Student Supervision

Ph.D. Student Supervision

		C	M	R	H
2023/05–now	Melanie Neubauer: Visual Deep Reinforcement Learning, Montanuniversität Leoben. [1]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022/08–now	Nikolaus Feith: Active Reinforcement Learning, Montanuniversität Leoben. [2]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022/03–now	Fotios Lygerakis: Deep Contrastive Robot Learning from Vision, Montanuniversität Leoben. [3]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2021/08–now	Vedant Dave: Deep Robot Motor Skill Learning from Vision and Tactile Data, Montanuniversität Leoben. [4]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2021/08–now	Linus Nwankwo: Deep Learning for Mobile Navigation, Montanuniversität Leoben. [5]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2019/02–now	Honghu Xue: Probabilistic and Neural Control Mechanisms in Robot Learning, University of Luebeck. [6]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2018/03–2021/08	Nils Rottmann: Smart Sensor, Navigation and Learning Strategies for Low-Cost Lawn Care Systems, University of Luebeck. [7]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2016/11–2020/12	Svenja Stark: Intrinsic Motivation Strategies for Learning Motor Skills, Technische Universitaet Darmstadt. [8]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Graduated Ph.D. Students

2015/10–2020/12	Daniel Tanneberg: Understand-Compute-Adapt: Neural Networks for Intelligent Agents, Co-Supervision with Prof. Jan Peters, Technische Universitaet Darmstadt, University of Luebeck [9]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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Visiting Ph.D. Student Supervision

2014/10–2015/10	Valerio Modugno: 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 Universitaet Darmstadt. [10]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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M.Sc. Theses Supervision

2023/03–now	Map-based and map-less mobile navigation in crowded dynamic environments, Montanuniversität Leoben. [11]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2023/03–now	Bayesian Optimization for learning optimal parameters of Electronic Control Units (ECU's) for Motorcycles, Montanuniversität Leoben. [12]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022/02–now	Improving fundamental metallurgical modeling using data-driven approaches, Montanuniversität Leoben. [13]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022/06–2023/02	Deep Learning of Dynamic Processes of Liquid Metall in a Mold, Montanuniversität Leoben. [14]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022/03–2022/12	A Framework for Learning Visio-Tactile Correlations of Grasping Skills, Montanuniversität Leoben. [15]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

2021/05–2022/06	A Motor Control Framework for Cyber-Physical-Systems, Montanuniversität Leoben. [16]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2021/04–2022/04	Solving Visual Navigation Tasks for Pedestrian Trajectory Generation Using Distributional Reinforcement Learning and Automatic Curriculum Learning in CARLA. [17]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2020/11–2021/10	Autonomous Dynamic Motion Control for Robotic Applications in Medicine, University of Luebeck. [18]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019/12	Learning Robot Control Policies with Hierarchical Bayesian Optimization, University of Luebeck. [19]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019/12	Mobile automatisierten Erzeugung von 3D-Objekten per Cloud/Edge Technologien, University of Luebeck. [20]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2018/01	Distributed Reinforcement Learning with Neural Networks for Robotics, Technische Universitaet Darmstadt. [21]	<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 Universitaet Darmstadt. [22]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2017/01	Adaptive Training Strategies for Brain-Computer-Interfaces, Technische Universitaet Darmstadt. Co-supervision with Moritz Grosse-Wentrup. [23]	<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 Universitaet Darmstadt. [24]	<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 Universitaet Darmstadt. [25]	<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 Universitaet Darmstadt. Student is now with a Ph.D. program at Jan Peters' lab. [26]	<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 Universitaet Darmstadt. [27]	<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 Universitaet Darmstadt. [28]	<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 Universitaet Graz. [29]	<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 Universitaet Graz. [30]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2011/08	Structure Learning for Robotic Motor Control, Technische Universitaet Graz. The student is now with a Ph.D. program of Priv.-Doz. Dr. Dr. Daniel Braun's lab. [31]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M.Sc. Project Supervision					
2020/09–2021/11	Docking of an AGV using deep reinforcement learning and NVIDIA Isaac, University of Luebeck. [32]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2018/10–2019/01	Development of a Clinical Fraction Collector, University of Luebeck. [33]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2017/07	LSTM Networks for Movement Planning in Humanoids, Technische Universitaet Darmstadt. [34]	<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 Universitaet Darmstadt. [35]	<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 Universitaet Graz. [36]	<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 Universitaet Graz. [37]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.Sc. Theses Supervision					
2023/04–now	Simultaneous localization and mapping (SLAM) with a quadrupedal robot in challenging real-world environments, Montanuniversität Leobens. [38]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2023/03–now	EAGLE – N ² ET Estimating Aerospace manufacturing time from Geometry Leveraging Encoder Neural Network, Montanuniversität Leobens. [39]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2023/03–now	Development of a generic ROS2 Device Interface based on Micro-ROS on a ESP32, Montanuniversität Leobens. [40]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2022/05	Mobile Robot Teleoperation in ROS for Basic SLAM Application, Montanuniversität Leobens. [41]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2021/10	Learning Motion Models for Local Path Planning Strategies, University of Luebeck. [42]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2020/10	An exploration scheme based on the state-action novelty in continuous state-action space, University of Luebeck. [43]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019/12	Sensor Fusion for Autonomous Driving in Embedded Systems, University of Luebeck. [44]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019/11	Complete Coverage Path Planning with low-cost Robots, University of Luebeck. [45]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019/07	Pflanzenklassifikation basierend auf Chlorophylldetekoren, University of Luebeck. [46]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2018/11	Simulation of optimal kinematic tool structures for robot guided ultrasound, University of Luebeck. [47]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2018/10	Development of a universal ultrasound station tool fixation for clinical purposes, University of Luebeck. [48]	<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 Universitaet Darmstadt. [49]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2017/10	Genetic Reactive Programming with Haskell, Technische Universitaet Darmstadt. [50]	<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 Universitaet Darmstadt. [51]	<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 Universitaet Darmstadt. [52]	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2016/12	Reinforcement Learning for Tactile-based Finger Gaiting, Technische Universitaet Darmstadt, (PDF). [53]	<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 Universitaet Graz. [54]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Publications

All Article files available at <https://cps.unileoben.ac.at/publications>

Journal Publications

C M R H

Items starting with a solid symbol (●) highlight key publications.

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|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 2022 | ● Xue, H.; Hein, B.; Bakr, M.; Schildbach, G.; Abel, B.; Rueckert, E. (2022). Using Deep Reinforcement Learning with Automatic Curriculum Learning for Mapless Navigation in Intralogistics, <i>Journal of Applied Sciences (MDPI)</i> , https://doi.org/10.3390/app12063153 , Impact Factor of 2.7 (2021) [1] | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2021 | ● Xue, H.; Herzog, R.; Berger, T.; Bäumer, T.; Weissbach, A.; Rueckert, E. (2021). Using Probabilistic Movement Primitives in analyzing human motion differences under Transcranial Current Stimulation, <i>Frontiers in Robotics and AI</i> , https://doi.org/10.3389/frobt.2021.721890 , Impact Factor of 3.5 (2021) [2] | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | ● Tanneberg, D.; Ploeger, K.; Rueckert, E. ; Peters, J. (2021). SKID RAW: Skill Discovery from Raw Trajectories, <i>IEEE Robotics and Automation Letters (RA-L)</i> , Impact Factor of 5.4 (2021) [3] | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Cansev, M. E.; Xue, H.; Rottmann, N.; Bliet, A.; Miller, L.; Rueckert, E. ; Beckerle, P. (2021). Interactive Human-Robot Skill Transfer: A Review of Learning Methods and User Experience, <i>Advanced Intelligent Systems</i> , Impact Factor of 7.3 (2021) [4] | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| | Jamsek, M.; Kunavar, T.; Bobek, U.; Rueckert, E. ; Babic, J. (2021). Predictive exoskeleton control for arm-motion augmentation based on probabilistic movement primitives combined with a flow controller, <i>IEEE Robotics and Automation Letters (RA-L)</i> , Impact Factor of 5.4 (2021) [5] | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2020 | ● Rottmann, N.; Bruder, R.; Schweikard A.; Rueckert, E. (2020). A novel Chlorophyll Fluorescence based approach for mowing area classification, <i>IEEE Sensors</i> , https://doi.org/10.1109/SENSOR47125.2020.9278858 , Impact Factor of 4.6 (2021) [6] | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | ● Tanneberg, D.; Rueckert, E. ; Peters, J. (2020). A neural computer architecture for learning algorithms, <i>Nature Machine Intelligence</i> , https://dx.doi.org/10.1038/s42256-020-00255-1 , https://rdcu.be/caRlg , Impact Factor of 25.9 (2021) [7] | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| | Cartoni, E.; Mannella, F.; Santucci, V. G.; Triesch, J.; Rueckert, E. ; Baldassarre, G. (2020). Competition Proposal: Robot open-Ended Autonomous Learning (REAL), <i>Proceedings of Machine Learning Research, 123: 142–152 (NeurIPS 2019 Competition and Demonstration Track)</i> . [8] | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 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> , https://doi.org/10.1016/j.neunet.2018.10.005 , IF of 9.7 (2021) [9] | <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> , http://jmlr.org/papers/v19/18-113.html , IF of 5.4 (2021) [10] | <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://doi.org/10.1080/01691864.2018.1437674 , (Impact Factor of 2021: 1.7, 2015: 0.96, 2014: 1.38, h5-index 2012–2016: 23, h5-median: 30) Best Paper Award . [11] | <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://doi.org/10.1038/srep28455 , Impact Factor of 5.0 (2021) [12] | <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, *Nature: Scientific Reports*, <https://doi.org/10.1038/srep21142>, **Impact Factor of 5.0 (2021)** [13] ☒ ☒ ☒ ☒
- 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, <https://doi.org/10.3389/fncom.2012.00097>, **IF of 3.0 (2021)** [14] ☒ ☒ ☐ ☐
- **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>, **IF of 3.0 (2021)** [15] ☒ ☒ ☐ ☒
- 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>, (IF of 1.7 in 2021) [16] ☒ ☒ ☐ ☐
- Conference Publications**
- 2021 • Denz, R.; Demirci, R.; Cansev, E.; Bliet, A.; Beckerle, P.; **Rueckert, E.**; Rottmann, N. (2021). A high-accuracy, low-budget Sensor Glove for Trajectory Model Learning, *International Conference on Advanced Robotics (ICAR)*. [17] ☐ ☒ ☒ ☐
- Rottmann, N.; Denz, R.; Bruder, R.; **Rueckert, E.** (2021). Probabilistic Approach for Complete Coverage Path Planning with low-cost Systems, *European Conference on Mobile Robots (ECMR)*. [18] ☐ ☒ ☒ ☐
- 2020 • Rottmann, N.; Bruder, R.; Schweikard, A.; **Rueckert, E.** (2020). Exploiting Chlorophyll Fluorescence for Building Robust low-Cost Mowing Area, *IEEE Sensors, Rotterdam, Netherlands*. [19] ☐ ☒ ☒ ☐
- Callar, T.; **Rueckert, E.**; Böttger, S.; Efficient Body Registration Using Single-View Range Imaging and Generic Shape Templates, *54th Annual Conference of the German Society for Biomedical Engineering (BMT)*. [20] ☐ ☐ ☒ ☒
- Rottmann, N.; Kunavar, T.; Babic, J.; Peters, J.; **Rueckert, E.**. Learning Hierarchical Acquisition Functions for Bayesian Optimization, *International Conference on Intelligent Robots and Systems (IROS)*. [21] ☐ ☒ ☒ ☐
- Honghu, X.; Boettger, S.; Rottmann, N.; Pandya, H.; Bruder, R.; Neumann, G.; Schweikard, A.; **Rueckert, E.** (2020). Sample-Efficient Covariance Matrix Adaptation Evolutional Strategy via Simulated Rollouts in Neural Networks, *International Conference on Advances in Signal Processing and Artificial Intelligence (ASPAl' 2020)*. [22] ☒ ☒ ☐ ☒
- 2019 Stark, S.; Peters, J.; **Rueckert, E.** (2019). Experience Reuse with Probabilistic Movement Primitives, *Proceedings of the IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)*, <https://ai-lab.science/wp/IROS2019Stark.pdf>. [23] ☒ ☒ ☐ ☒
- Rottmann, N.; Bruder, R.; Schweikard, A.; **Rueckert, E.** (2019). Loop Closure Detection in Closed Environments, *European Conference on Mobile Robots (ECMR), Prague, Czech Republic*, <https://ai-lab.science/wp/ECMR2019Rottmann.pdf>. [24] ☐ ☒ ☒ ☐
- 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*, <https://rob.ai-lab.science/wp/Biosignals2018Rottmann.pdf>. [25] ☐ ☒ ☒ ☐
- 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)*, <https://rob.ai-lab.science/wp/VALID2018Gondaliya.pdf>, **Best Paper Award**. [26] ☒ ☒ ☐ ☒

- 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>. [27]
 - 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>. [28]
 - 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>. [29]
 - 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%)**. [30]
- 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>. [31]
 - 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>. [32]
 - 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>. [33]
 - 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>. [34]
 - 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>. [35]
- 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>. [36]
 - 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>. [37]
 - 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>. [38]

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>. [39]

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>. [40]

Posters and Abstract Proceedings

2019 Boettger S.; Callar T.C.; Schweikard A.; **Rueckert, E.** (2019). Medical robotics simulation framework for application-specific optimal kinematics, *In Proc. of the Current Directions in Biomedical Engineering (BMT)*. [41]

Boettger S.; Callar T.C.; Schweikard A.; **Rueckert, E.** (2019). Medical robotics simulation framework for application-specific optimal kinematics, *The 53rd Annual Conference of the German Society for Biomedical Engineering (DGBMT within VDE)*, Sept. 25-26, Frankfurt, DE. [42]

Rueckert, E.; Philipp J.; Alexander D.; Schweikard A. (2019). Dynamic control strategies for cable-driven master-slave robots, *Proceedings on Minimally Invasive Surgery (MIC)*, Jan. 23-24, Luebeck, DE. [43]

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>. [44]

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>. [45]

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>. [46]

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>. [47]

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. [48]

Theses

2014 **Rueckert, E.** (2014). Biologically inspired motor skill learning in robotics through probabilistic inference, *Ph.D. Thesis*, Technische Universitaet Graz, <https://ai-lab.science/wp/Thesis2014Rueckert.pdf>. [49]

2010 **Rueckert, E.** (2010). Simultaneous localisation and mapping for mobile robots with recent sensor technologies, *Master Thesis*, Technische Universitaet Graz, <https://ai-lab.science/wp/Thesis2010Rueckert.pdf>. [50]

Talks

		C	M	R	H
2021/11	Künstliche Intelligenz in der Robotik. Invited Talk. At the <i>TU Austria</i> [1]	☒	☐	☒	☒
2021/03	Adaptive Neural Robot Learning. Invited Talk. At the <i>Universität Passau, Germany</i> [2]	☒	☐	☒	☒
2021/03	Lernende intelligente Roboter Invited Talk. At the <i>VDI-Netzwerk Young Engineers, Germany</i> [3]	☒	☐	☒	☒
2020/12	Wie können Roboter lernen? Invited Talk. At the <i>Carl-Jacob-Burckhardt-Gymnasium, Luebeck, Germany</i> [4]	☒	☐	☒	☒
2020/11	Robot Learning and Industrial Applications. Invited Talk. At the <i>Technische Universität Clausthal, Germany</i> [5]	☒	☐	☒	☒
2020/11	Robot Learning and Embedded Systems. Invited Talk. At the <i>Montan Universität Leoben, Austria</i> [6]	☒	☐	☒	☒
2020/09	Neural and Probabilistic Decision Making for High Level Autonomous Systems. Invited Talk. At the <i>4. Auto.AI Europe Conference, Berlin, Germany</i> [7]	☒	☐	☒	☒
2020/09	Predicting multiple Driving Hypotheses in Autonomous Systems. Keynote. At the <i>AutoSens Europe Conference, Brussels, Belgium</i> [8]	☒	☐	☒	☒
2020/09	Probabilistic Robot Control and Learning. Invited Talk. Keynote at the <i>German Conference on Artificial Intelligence (KI2020), Bamberg, Germany.</i> [9]	☒	☐	☒	☒
2020/08	Probabilistic Robot Learning. Invited Talk. At the <i>Universität Freiburg</i> [10]	☒	☐	☒	☒
2020/06	Neural and Probabilistic Artificial intelligence. Invited Talk. At the <i>Universität Hamburg</i> [11]	☒	☐	☒	☒
2020/02	Probabilistic Artificial intelligence. Invited Talk. At the <i>Universität Göttingen</i> [12]	☒	☐	☒	☒
2020/01	Neural and Probabilistic Robot Control. Invited Talk. At the <i>Friedrich-Alexander-Universität Erlangen</i> [13]	☒	☐	☒	☒
2019/11	Deep neural and probabilistic learning from few samples. Keynote. At the <i>Expertenforum 'Trends in der Mess- und Automatisierungstechnik' 2019</i> [14]	☒	☐	☒	☒
2019/11	Adaptive Learning Methods for Autonomous Systems. Invited Talk. At the <i>Technische Universität München</i> [15]	☒	☐	☒	☒
2019/11	Neuronale und stochastische Lernmethoden in der Robotik. Keynote. At the <i>Fachtagung Messunsicherheit 2019</i> [16]	☒	☐	☒	☒
2019/11	Artificial Intelligence for autonomous Robots. Invited Talk. At the <i>AI Lecture Series, Johannes Kepler University Linz, Austria.</i> [17]	☒	☒	☒	☒
2019/10	Powerful Predictive Human Motion Models Invited Talk. At the <i>Exo 2019 Conference in Berlin</i> [18]	☒	☐	☒	☒
2019/10	Künstliche Intelligenz - Chance oder Gefahr? Keynote. At the <i>VDE - Verband der Elektrotechnik Elektronik Informationstechnik e.V. Lübeck</i> [19]	☒	☐	☒	☒
2019/07	Neural and probabilistic Robot Learning. Invited Talk. At the <i>German University in Cairo (GUC), Berlin Campus, Germany.</i> [20]	☒	☒	☒	☒
2019/07	Neuro Robotic Motor Skill Learning. Invited Talk. At the <i>Technische Universität Chemnitz, Germany.</i> [21]	☒	☒	☒	☒
2019/06	A Neural Inference Framework for Planning, Model-Predictive Control and Online Adaptation. Invited Talk. At the <i>Intrinsic Motivation Learning Summer School, University Frankfurt.</i> [22]	☒	☒	☒	☒
2019/06	Neural and probabilistic model learning in robots and humans. Invited Talk. At the <i>Robotics Science and Systems (RSS 2019) Workshop Neurorobotics, Freiburg, Germany.</i> [23]	☒	☒	☒	☒
2019/06	Neural and probabilistic learning methods for autonomous systems. Invited Talk. At the <i>Kolloquium sichere autonome Systeme, University of Luebeck, Germany.</i> [24]	☒	☒	☒	☒

2019/04	Autonome Elektrofahrzeuge als urbane Lieferanten. Invited Talk. At the <i>Robert-Bosch Stiftung, Stuttgart.</i> [25]	☒ ☒ ☒ ☐
2019/04	Neural Network implementations of the Probabilistic Inference Tasks Planning, MPC and online Adaptation. Invited Talk. At the <i>Machine Learning & Robotics Lab, University Stuttgart.</i> [26]	☒ ☒ ☒ ☒
2019/03	Künstliche Intelligenz in der Robotik. Invited Talk. At the <i>Naturwissenschaftlicher Verein zu Lübeck gegründet 1872, Lübeck.</i> [27]	☒ ☒ ☒ ☒
2019/02	Erfahrungen aus den EU-Projekten AMARSi, CoDyCo und Goal-Robots. Invited Talk. <i>Erfahrungsaustausch zu Horizont 2020, Bonn, Germany.</i> [28]	☐ ☐ ☐ ☐
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> [29]	☒ ☒ ☒ ☒
2019/01	Ausblick - KI in der Robotik. Invited Talk. At the <i>VDI-Thesen und Handlungsfelder Automation 2030, Kloster Jakobsberg.</i> [30]	☒ ☒ ☒ ☒
2018/11	Neural Robot Learning. Invited Talk. At the <i>MetaNook 2018, Lübeck.</i> [31]	☒ ☒ ☒ ☒
2018/11	Neural and Probabilistic Learning Methods. Invited Talk. At the <i>Institut für Informatik, Universität Göttingen.</i> [32]	☒ ☒ ☒ ☒
2018/11	Probabilistic Neural Planning for Robotics. Invited Talk. At the <i>Universität Göttingen.</i> [33]	☒ ☒ ☒ ☒
2018/07	Neural and Probabilistic Learning for Robotics and Humans. Invited Talk. At the <i>Technische Universität München.</i> [34]	☒ ☒ ☒ ☒
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> [35]	☒ ☒ ☒ ☒
2018/07	Deep Learning for Motor Control. Invited Talk. At the <i>Lübeck 2018 Summer Academy on Medical Technology.</i> [36]	☐ ☒ ☒ ☒
2018/06	Learning Neural and probabilistic models with robots and humans. Invited Talk. <i>Institute for Neuro- and Bioinformatics, University of Luebeck.</i> [37]	☒ ☒ ☒ ☒
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> [38]	☒ ☒ ☒ ☒
2018/06	Models of human movement kinematics for predictions. Invited Talk. At the <i>Institute for Neurogenetics, University of Luebeck.</i> [39]	☒ ☒ ☐ ☒
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> [40]	☒ ☒ ☒ ☒
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</i> workshop at the International Conference on Development and Learning (ICDL), Lisbon, Portugal. [41]	☒ ☒ ☒ ☒
2017/02	Neural models for robot motor skill learning. Invited Talk. At the Universität Lübeck, Germany. [42]	☒ ☒ ☒ ☒
2017/01	Learning to Plan through Reinforcement Learning in Spiking Neural Networks. Invited Talk. At the Frankfurt Institute for Advanced Studies, Germany. [43]	☒ ☒ ☐ ☐
2016/11	Neural models for brain-machine interfaces and anthropomorphic robotics. Invited Talk. At the Albert-Ludwigs-Universität Freiburg, Germany. [44]	☒ ☒ ☒ ☒
2016/11	Probabilistic computational models of human motor control for robot learning. Invited Talk. At the INI Institute of Neuroinformatics Colloquium, Zurich, Switzerland. [45]	☒ ☒ ☐ ☒
2016/05	Models of Human Motor Control for Robotics. Invited Talk. At Joanneum Research. Guest of Michael Hofbauer, Klagenfurt, Austria. [46]	☒ ☒ ☒ ☒
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. [47]	☒ ☒ ☒ ☒

2014/02	Biologically inspired motor skill learning in robotics through probabilistic inference. Tutorial at the Machine Learning Summer School, Maribor, Slovenia. [48]	<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. [49]	<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. [50]	<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. [51]	<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. [52]	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

Workshops and Tutorials

2023	Co-Organizer of the RA-L Special Issue on: LEARNING FOR SAFE AND ROBUST CONTROL , <i>Organizers: V. MODUGNO, F. STULP, A. RAI, E. RUECKERT, A. SCHOELLIG M. COGNETTI</i> , TBD, 2023
2022/07	Co-Organizer of the Machine Learning Summer School , <i>At the Montanuniversität Leoben, Austria. Title: DSHL Summer School, (link), Peter Auer, Roland Ortner, Paul O'Leary, Lorenz Romana, and E. Rueckert</i> , July. 4–8, 2022, Leoben, Austria
2020/10	Co-Organizer of an IROS Workshop , <i>At the Intelligent Robots and Systems Conference (IROS). Title: New horizons of Robot Learning - from industrial challenges to future capabilities, (link), K. Listmann and E. Rueckert</i> , Oct. 25–29, 2020, Las Vegas, USA
2019/12	Co-Organizer of a NeurIPS Competition , <i>At the International Conference on Neural Information Processing Systems (NeurIPS). Title: Robot open-Ended Autonomous Learning (REAL), (link), E. Cartoni, S. Mohanty, F. Mannella, V. Santucci, M. Verme, S. Stark, E. Rueckert, J. Triesch, G. Baldassarre.</i> , Dec. 09–13, 2019, Vancouver, Canada
2019/11	Organizer of a Special Session on Machine Learning , <i>At the VDI/GMA experts days: Trends in der industriellen Messtechnik - Von der Messung zur Information, Prof. M. Heizmann (KIT)</i> , Nov. 28–29, 2019, Karlsruhe, German
2018/10	Tutorial on Machine Learning , <i>At the International Conference on Software Engineering Advances (SoftNet). Title: Neural and Probabilistic Learning Methods for Robotics and other Domains.</i> , Oct. 14–18, 2018, Nice, France
2016/12	Organizer of a NIPS Workshop , <i>At the Conference of Advances in Neural Information Processing Systems (NIPS). Title: Neurorobotics: a chance for new ideas, algorithms and approaches, (link), Co-Organizer: Martin Riedmiller (Google Deep Mind).</i> , Dec. 05–10, 2016, Barcelona, Spain
2014/02	Tutorial on Robot Learning , <i>At the Machine learning summer school with the technology and education for search and rescue robots project (TEDUSAR). Title: An introduction to robot learning and probabilistic movement planning.</i> , Feb., 2014, Maribor, Slovenia
2011/12	Organizer of a Two days Workshop , <i>At the University of Zürich within the European project AMARSi-project.eu. Title: Hands-on Probabilistic Inference for Motor Control, Co-Organizer: Gerhard Neumann (University Tuebingen).</i> , 2011, 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, ERASMUS</i> . Research internship on data mining graduate courses

Reviewing Experience

Journals

		C	M	R	H
2021	Applied Sciences (MDPI).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2021, 20	at - Automatisierungstechnik.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2021, 20	Sensors (MDPI).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2020	Robotics and Autonomous Systems.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022, 21, 20, 19, 18	IEEE Robotics and Automation Letters (RA-L).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2018	Neural Computation, MIT Press.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2017	IEEE Transactions on Neural Networks and Learning Systems.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2017	Information Sciences, Elsevier.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2016, 2017	PLOS Computational Biology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2014, 15, 16	Autonomous Robots (AURO).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2020, 2012,13,14,15,16,17	Frontiers in Computational Neuroscience (Front Comput Neurosci).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2016, 2019	IEEE Transactions on Robotics (TRO).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2015	International Journal of Robotics Research (IJRR).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2015	Scientific Reports, Nature Publishing Group (Sci Rep).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2012	Artificial Life Journal (Artif. Life).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2012	Journal of Neurophysiology (J. Neurophysiol.).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Conferences

2022	The International Symposium on Robotics Research (ISRR)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2022	German Conference on Artificial Intelligence (KI)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2021	International Conference on Advanced Robotics (ICAR)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2020	Living Machines (LM)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2022, 20	International Conference on Artificial Intelligence and Statistics (AISTATS)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2020	International Conference on Learning Representations (ICLR)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019	European Conference on Mobile Robots (ECMR)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2020,19	European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019	International Conference on Computer Science and Application Engineering (CSAE).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2019	International Conference on Machine Learning (ICML).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2019,18	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).	☒ ☐ ☒ ☒
2022, 21, 20, 18	International Conference on Robot Learning (CoRL).	☒ ☒ ☒ ☐
2022, 21, 20, 19, 17, 15	IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).	☒ ☒ ☒ ☐
2022, 21, 20, 18, 17, 15, 14	International Conference on Robotics and Automation (ICRA).	☒ ☒ ☒ ☐
2018, 15	Robotics: Science and Systems (RSS).	☒ ☒ ☒ ☐
2019, 17, 14	IEEE/RSJ International Conference on Humanoid Robots (HUMANOIDS).	☒ ☐ ☒ ☒
2013	International Joint Conference on Artificial Intelligence (IJCAI).	☒ ☒ ☒ ☐
2021	The International Conference on Robotics: Science and Systems (RSS)	☐ ☒ ☒ ☐
	Funding Agencies	
2019	AXA Research Fund.	☒ ☒ ☒ ☒
2021, 19	Deutsche Forschungsgemeinschaft (DFG).	☒ ☒ ☒ ☒
2019	German-Israeli Foundation for Scientific Research and Development (GIF).	☒ ☒ ☒ ☒
2018	Deutscher Akademischer Austauschdienst (DAAD).	☒ ☒ ☒ ☒

Member of Scientific Committees

Area Chair and Associate Editor

2022, 20,18	International Conference on Robot Learning (CoRL)
2019	Artificial Intelligence and Statistics (AISTATS 2020)
2020, 19	European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)
2021, 18	<i>IEEE International Conference on Robotics and Automation (ICRA).</i>
2022, 17	<i>International Conference on Intelligent Robots and Systems (IROS).</i>

Program Committee Member

2021, 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

2022	Part of the hiring committee for two §98 Professorships at the Montanuniversität Leoben.
2021	Part of the hiring committee for the W2 or W3-Professorship on <i>Reinforcement Learning</i> at the University of Würzburg.
2019	Part of the hiring committee for the W2-Professorship on <i>Interaktionsdesign und User Experience</i> at University of Luebeck.
2017	Part of the hiring committee of an <i>Independent Research Group (IRG)</i> at Technische Universität Darmstadt. Part of the review board for a DFG (engl. german research foundation) project at Technische Universität Darmstadt.

Other Memberships

- 2022, 21 **Jury member** of the Robothon 2022 and 2021, Germany, <https://www.robothon-grand-challenge.com>.
- 2021 **Jury member** of the KI-Newcomer*innen 2021, Germany, <https://kicamp.org/ki-newcomerinnen>.
- 2020 **Local Chair** of the Med-AI Conference (2020) in Lübeck, Germany, <http://medai-conference.org>.
- 2020 **Co-Organizer** of the German KI-Conference (2021) in Berlin, <https://www.ifis.uni-luebeck.de/moeller/KI2021/index.html>.
- 2020 **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

Georg Schildbach (Universität zu Lübeck), Kim Listmann (Head of ABB Future Labs Switzerland), Michael Heizmann (Karlsruher Institut für Technologie), Gianluca Baldassarre (National Research Council of Italy), 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).

Industrial

Robert Pierer (qoncept GmbH), Pschera Roman (MSC Software GmbH), Christoph Sorger and Luca Moderer (Marienhuetten GmbH), Markus Brummayer, Fuchshumer Stefan and Sergiu Illie (voestalpine Stahl GmbH), Manfred Hall and Marinus Bouwman (KNAPP GmbH), 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

- 2022/05 **Organizer**, *Open Lab Night (germ. Lange Nacht der Forschung)*
Live Demonstrations of our Research in Deep Learning, Robot Motor Skill Teaching, and Mobile Robot Navigation. https://cps.unileoben.ac.at/wp/CPS_Trailer_Youtube.mp4
- 2020/10 **Organizer**, *2nd LEGO Robotic Workshop: Autonome Elektrofahrzeuge als urbane Lieferanten*
One week LEGO Robotic workshop where students learn to implement advanced robotic topics like Kalman Filters and Sensor Fusion using LEGO Mindstorms robots and Python. <http://future.ai-lab.science>
- 2019/10 **Organizer**, *1st LEGO Robotic Workshop: Autonome Elektrofahrzeuge als urbane Lieferanten*
Like above but based on own open source developments in Matlab. <http://future.ai-lab.science>
- 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 Guilherme M., Lioutikov R. and Calandra R.
- 2014/10 **Author**, *Print media, Hoch3*, Link to the report
Background article on learning in autonomous robots. Title: *Hintergrund: Können Roboter lernen wie Menschen?*