



Franz Pernkopf

Curriculum Vitae

Contact Information

Graz University of Technology
Institute of Signal Processing and
Speech Communication
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Education

- 7/2010 **Habilitation**, *Venia Docendi for Intelligent Systems*, Graz University of Technology, Austria, Thesis: Graphical Models: Discriminative Learning, Inference, and Applications.
- 10/1999–3/2002 **Ph.D. (Dr. mont.)**, University of Leoben, Institute for Automation, Austria, Thesis: Automatic Visual Inspection of Metallic Surfaces, with distinction.
- 10/1994–6/1999 **MSc (Dipl.-Ing.)**, *Electrical Engineering/Biomedical Engineering*, Graz University of Technology, Austria and University of Edinburgh, Scotland (UK), Thesis: Control Software for a 64 by 64 pixel Spatial Light Modulator.
- 9/1989–6/1994 **Technical College**, *Electrical Engineering*, HTBLA Steyr, Austria, with distinction.

Professional Experience

- 9/2019 – present Professor for Intelligent Systems at the Institute of Signal Processing and Speech Communication, Graz University of Technology, Austria.
- 1/2011 – 8/2019 Associate Professor at the Institute of Signal Processing and Speech Communication, Head of the Intelligent Systems Group, Graz University of Technology, Austria.
- 06/2010 – 12/2010 Senior Research Scientist at the Institute of Signal Processing and Speech Communication, Graz University of Technology, Austria.
- 09/2005 – 01/2006 Research Associate (Erwin Schrödinger fellow) at the University of Washington, Department of Electrical Engineering, Seattle, USA.
- 09/2004 – 05/2010 University Assistant (Assistant Professor level) at the Institute of Signal Processing and Speech Communication, Graz University of Technology, Austria.
- 12/2003 – 8/2004 Research Associate (Erwin Schrödinger fellow) at the University of Washington, Department of Electrical Engineering, Seattle, USA.
- 09/2003 – 11/2003 Research Associate (Erwin Schrödinger fellow) at the Oakland University, Department of Computer Science and Engineering, Rochester, USA.

- 11/2002 – 08/2003 University Assistant (Assistant Professor level) at the Institute of Signal Processing and Speech Communication, Graz University of Technology, Austria.
- 06/2001 – 10/2002 University Assistant at the Institute for Automation, University of Leoben, Austria.
- 10/1999 – 05/2001 Research Assistant at the Institute for Automation, University of Leoben, Austria.

Professional Interests

Machine Learning and Statistical Pattern Recognition; Statistical Data Processing and Modeling; Feature Selection, Graphical Models (Bayesian Networks, Discriminative Parameter and Structure Learning, Belief Propagation); Deep Learning, Bayesian Deep Neural Networks, Particle Filters for Tracking; Data Clustering (Unsupervised Learning and Finite Mixture Models); Intelligent Systems; Medical and Speech Processing Applications.

Teaching

- 2025 Probabilistic Machine Learning (lecture course).
- 2025 Speaking and Listening Machines (seminar course) .
- 2011 – 2025 Computational Intelligence (lecture course).
- 2020 Machine Learning 1 (lecture course).
- 2011 – 2015 Einführung in die Wissensverarbeitung (lecture course).
- 2003 – 2019 Speech Communication II (lecture course).
- 2020 –2025 Automatic Speech Recognition (lecture course).
- 2008 – 2024 Verfassen wissenschaftlicher Arbeiten (seminar).
- 2005 – 2019 Advanced Signal Processing Seminar. The following topics have been treated over the years:
 - Resource-efficient Neural Networks (WS 2017/2018) - (WS 2019/2020)
 - Signal Processing for Assisted Living (WS 2016/2017)
 - Acoustic Event Detection, Classification, and Keyword spotting (WS 2015/2016)
 - Deep Models and Learning (WS 2014/2015)
 - Speech Information Processing (WS 2013/2014)
 - Fundamental Technologies in Modern Speech Recognition (SS 2013)
 - Signal Processing in Geophysical Problems (WS 2012/2013)
 - Probabilistic Models of Cognition (SS 2012)
 - Convex Optimization for Signal Processing (WS 2011/2012)
 - Graphical Models for Signal Processing (SS 2011)
 - Iterative Decoding Methods and Applications (WS 2010/2011)
 - Kernel Methods (WS 2009/2010)
 - Distributed Signal Processing in Sensor Networks and Applications (WS 2008/2009)
 - Biometrics (WS 2007/2008)
 - Statistical Machine Translation (WS 2006/2007)
 - Graphical Models (SS 2005)
- 2019 – 2024 Signal Processing and Machine Learning 1 Seminar. The following topics have been treated over the years:
 - Uncertainty Modeling in Deep Neural Networks (WS 2024/2025)
 - Causality meets Machine Learning (WS 2023/2024)
 - Physics Informed Neural Networks (WS 2022/2023)
 - Explainable AI (WS 2021/2022)
 - Resource-efficient Neural Networks (WS 2020/2021)
- 2003 – 2022 Speech Communication Laboratory.
- 2003 – 2009 Computational Intelligence (problem class).

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- 2005 – 2009 Einführung in die Wissensverarbeitung (problem class).
- 2004 – 2023 Digital Signal Processing Laboratory.
- 2001, 2002 Autonomous Robot Seminar.
- 2001, 2002 Automatic Surface Inspection (lecture course).

Research Projects

- 06/2025 – 05/2028 **Perceptive Radar Induction via Symbolic Modeling**, *Funding institution: FFG, Total: 762.000 €, SPSC: 432.000 €, Involvement: Project leader (joint project with Levata GmbH and Infineon Technologies Austria AG).*
- 03/2023 – 02/2026 **Physics-informed Neural Networks for Multibody Dynamics Simulation and its Application to Railway Vehicles**, *Funding: Siemens Mobility Austria GmbH: 296000 €, Involvement: Project leader.*
- 10/2022 – 9/2029 **CD Laboratory for Dependable Intelligent Systems in Harsh Environments**, *Funding: 1700000 €, Involvement: Project leader (joint project with RHI Magnesita and Siemens).*
- 01/2022 – 12/2023 **Effective Construction of Hybrid Semi-Parametric Models for Model-Based Condition Monitoring and Accelerated Material Design**, *Funding: 200000 €, joint project with MCL Leoben.*
- 10/2020 – 09/2022 **General Framework for Inference on Graphical Models**, *Funding: 475000 €, Involvement: Project leader.*
- 10/2021 – 9/2024 **Robust and ExPLainable AI for Radar Sensors**, *Funding institution: FFG, Total: 351.000 €, SPSC: 236.000 €, Involvement: Project leader (joint project with Infineon Technologies Austria AG).*
- 03/2019 – 02/2022 **Dependable Internet of Things in Adverse Environments, Subproject: Dependable Multi-Agent Systems**, *Funding institution: LEAD Project (excellence programm at TU Graz), 150000 €.*
- 01/2018 – 06/2019 **Artificial Intelligence in Motion Laboratoy (aiMotionLab)**, *Funding institution: Land Steiermark, Total: 390000 €, SPSC: 334000 €, Involvement: joint project with FH Joanneum (project leader) and University of Leoben.*
- 1/2018 – 12/2020 **Smart Accelerated Hardware for Radar Sensors enabling Autonomous Driving**, *Funding institution: FFG, Total: 518.396 €, SPSC: 259.131 €, Involvement: Project leader (joint project with Infineon Technologies Austria AG, Magna Steyr Engineering AG & CoKG).*
- 10/2018 – 05/2020 **Automatic and Reliable Classification of Highly Inline Measured Wafer Edge Defects using Embedded Screeners (ARCHIMEDES)**, *Funding institution: FFG, Total: 689.256 €, SPSC: 147.000 €, Involvement: (joint project with Bright Red Systems GmbH (project leader).*
- 10/2016 – 12/2020 **Resource-Efficient Deep Models for Embedded Systems**, *Funding institution: Austrian Science Fund (FWF), Total: 380000 €, SPSC: 215000 €, I2706-N31, Involvement: Project leader (joint project with University of Heidelberg, H. Fröning).*
- 01/2017 – 06/2019 **PipeSense**, *Funding institution: Industry, Total: 300000 €, SPSC: 125000 €, Involvement: Project Leader - Institute of Engineering Geodesy and Measurement Systems, Graz University of Technology, Partners: (joint project with Graz University of Technology, Institute of Engineering Geodesy and Measurement Systems, Österreichische Vereinigung für Gas- und Wasserfach, Energienetze Steiermark GmbH, Linz Gas Netz GmbH, Netz Burgenland Erdgas GmbH, Netz Niederösterreich GmbH, Netz Oberösterreich GmbH, Salzburg Netz GmbH.*
- 07/2016 – 09/2016 **Anschubfinanzierung**, *Funding institution: TU Graz, 7000 €.*

- 01/2015 – 12/2019 **Multichannel Acoustic Event Classification and Recognition for Low-resource Platforms**, *Funding institution: Industry, 150000€*, Involvement: Project Leader, Partner: Ognios GmbH, Salzburg, Austria.
- 01/2016 – 06/2019 **Dependable Internet of Things in Adverse Environments, Subproject: Dependable Composition**, *Funding institution: LEAD Project (excellence programm at TU Graz), 150000€*.
- 07/2015 – 06/2018 **Learning of Bayesian Network Classifiers and Sum-Product Networks**, *Funding institution: Austrian Science Fund (FWF), 260000€, P27803-N15*, Involvement: Project leader.
- 03/2015 – 07/2015 **Anschubfinanzierung**, *Funding institution: TU Graz, 7300€*.
- 03/2015 – 02/2017 **Brain, Ears & Eyes - Pattern Recognition Initiative**, *Funding institution: BioTechMed Graz, 120000€*, Involvement: Project leader at TU Graz (joint project with Medical University Graz, P. Marschik).
- 05/2014 – 07/2016 **Computerunterstützte akustische Diagnostik thorakaler Erkrankungen**, *Funding institution: Land Steiermark, Total: 159000€, SPSC: 100000€*, Involvement: Project leader (joint project with Medical University Graz, F.-M. Smolle-Juettner).
- 02/2013 – 08/2016 **Probabilistic Graphical Models For Time-Series Signal Mixtures**, *Funding institution: Austrian Science Fund (FWF), 443000€, P25244-N15*, Involvement: Project leader.
- 06/2011 – 12/2014 **National Research Network: Signal and Information Processing in Science and Engineering - Part II, Subproject: Nonlinear Dynamics and Machine Learning**, *Funding institution: Austrian Science Fund (FWF), 328000€, S10610-N13*, Involvement: Project leader.
- 06/2011 – 01/2014 **Discriminative Learning of Graphical Models with Application to Speech and Image Processing**, *Funding institution: Austrian Science Fund (FWF), 302000€, P22488-N23*, Involvement: Project leader.
- 06/2008 – 05/2011 **National Research Network: Signal and Information Processing in Science and Engineering - Part I, Subproject: Nonlinear Dynamics and Machine Learning**, *Funding institution: Austrian Science Fund (FWF), 270000€, S10604-N13*, Involvement: Deputy project leader, scientific consultant.
- 10/2007 – 09/2010 **Discriminative Learning of Bayesian Network Classifiers**, *Funding institution: Austrian Science Fund (FWF), 104000€, P19737-N15*, Involvement: Project leader.
- 09/2005 – 01/2006, 12/2003 – 08/2004, 09/2003 – 11/2003 **Shape Description and Classification using Probabilistic Graphical Models**, *Funding institution: Austrian Science Fund (FWF), 50000USD, J2243-N04, Schrödinger Fellowship*, Involvement: Project leader, Partners: University of Washington, Department of Electrical Engineering, Seattle, USA; Oakland University, Department of Computer Science and Engineering, Rochester, USA.
- 03/2001 – 10/2002 **Detection of Surface Defects on Raw Milled Steel Blocks using Range Imaging**, *Funding institution: Industry*, Involvement: Responsible project collaborator, Partner: Voest Donawitz Stahl, Leoben, Austria.
- 11/1999 – 12/2000 **Automatic Inspection System for Detection and Classification of Flaws on Turned Parts**, *Funding institution: Industry*, Involvement: Responsible project collaborator, Partner: Mec.Com, Austria.

Reviewing Activities

- Journals IEEE Transactions on Pattern Analysis and Machine Intelligence, JMLR, IEEE Transactions on Audio, Speech, and Language Processing, JASA, IEEE Transactions on Signal Processing, Machine Learning, Pattern Recognition Letters, IEEE Transactions on Data Mining and Knowledge Engineering, Data Mining and Knowledge Discovery, Artificial Intelligence in Medicine, Machine Vision and Applications, International Journal of Approximate Reasoning, IEEE Signal Processing Letters, IEEE Transactions on Medical Imaging, Artificial Intelligence Review, International Journal of Pattern Recognition and Artificial Intelligence.
- Conferences ICASSP-2025, UAI-2025, AISTATS-2025, IJCNN-2025, NeurIPS-2024, ICASSP-2024, CVPR-2024, AISTATS-2023, Interspeech-2023, ICML-2023, ICASSP-2023, ICML-2021, AISTATS-2022, UAI-2021, ICASSP-2021, Interspeech-2021, NeurIPS-2020, ICML-2020, IJCAI-2020, NIPS-2019, IJCAI-2019, ICASSP-2018, ICASSP-2017, Interspeech-2017, NIPS-2016, MLSP-2016, Interspeech-2016, ICASSP-2016, Interspeech-2015, ICASSP-2015, ICML-2014, ICASSP-2014, ICASSP-2013, ICML-2013, Interspeech-2013, EUSIPCO-2014, EUSIPCO-2010; EUSIPCO-2012; EUSIPCO-2013; ITG-Fachtagung-2012, International Symposium on Chinese Spoken Language Processing (ISCSLP 2012)
- Funding Institutions DigitalFutures - KTH Sweden, ERC, Czech Science Foundation, Serbia Innovation Project (2011 - 2022)

Professional Activities and Memberships

- 3/2025 Talk, "Resource-efficiency and Robustness in Deep Learning", Stockholm, Sweden.
- 10/2023 Talk, "Uncertainty in Deep Neural Networks", CERN, Switzerland.
- 10/2023 Talk, "Intelligent Systems in Harsh Environments: Research @ TU Graz", CERN, Switzerland.
- 2023 Area Chair of ECML/PKDD 2023
- 2017, 2018 2019, Organization of Workshop on Embedded Machine Learning (WEML),
2021, 2022 2024 <https://www.deepchip.org>
- 2021 Session Chair at the Interspeech 2021
- 2020, 2021, 2022, Organization of ECML Workshop: IoT, Edge, and Mobile for Embedded Machine Learning
2023, 2024, 2025 (ITEM)
- 2020 Review Editor in Frontiers in Digital Health - Health Informatics
- 2020 Senior Program Committee Member of IJCAI 2020
- 2020 CHiME 2020 workshop Scientific Committee
- 8/2019 Infineon SummerSchool, Villach, Talk "*Speech Enhancement for ASR using Resource-Efficient Deep Neural Networks*".
- 2019 Session Chair at the Interspeech 2019, Graz, Austria
- 2019 Research Data Management Policy Working Group TU Graz
- 2019 Senior Program Committee Member of IJCAI 2019
- 9/2019 Special Sessions & Challenges Chair, Interspeech 2019.
- 9/2018 Invited Talk, Xilinx, Dublin, Ireland.
- 5/2018 Invited Talk, University of Passau, Germany.
- 2017 – Advisory Board of Swiss Innovation Valley AG.
- 10/2017 Invited Talk, Graz University of Technology, Austria.
- 10/2017 Invited Talk, University of Heidelberg, Germany.
- 2017 Session Chair at the Interspeech 2017, Stockholm, Sweden.

- 6/2017 Invited Talk, University of Innsbruck, Austria.
- 2017 Habilitation Committee of Pejman Mowlaei Beikzadehmahaleh, Graz University of Technology.
- 6/2016 Talk, "Efficient Probabilistic Models for Cochlea Implants", Med-EI, Innsbruck.
- 2016 Substitute member of the works council for academic personnel, Graz University of Technology.
- 2016 Program Committee for the IEEE Workshop on Machine Learning for Signal Processing (MLSP).
- 2016 Scientific Committee of 4th CHiME Workshop.
- 1/2015 Invited Talk, "Efficient Probabilistic Models: Learning and Reduced-Precision Analysis", Technical University Munich, Germany.
- 2015 Scientific Committee of Interspeech.
- 2014 Signal Processing Theory and Methods (SPTM) Technical Committee of the IEEE Signal Processing Society.
- 2014 Senior Member of the IEEE.
- 2013 Coordination Team of the Doctoral School *Information and Communications Engineering* at Graz University of Technology.
- 2013 Session Chair at the European Conference on Machine Learning (ECML 2013), Prague, Czech Republic.
- Invited Tutorial, "Probabilistic Graphical Models", Academic Press Library in Signal Processing, Vol. 1, Ch. 18, pp. 989-1064, 2014.
- 2008, 2012 Program Committee for the International Conference on Signal and Image Processing (SIP).
- 06/2011 Invited Talk, "Discriminative Learning of Bayesian Networks and Applications", Machine Learning Technical Meeting, Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Vienna.
- Editorial Board of ISRN Artificial Intelligence.
- 04/2011 Invited Talk, "Discriminative Learning of Bayesian Network Classifiers", University of Bonn, Bonn.
- 10/2010 Invited Talk, "Discriminative Learning of Bayesian Network Classifiers", Austrian Research Institute for Artificial Intelligence, Vienna.
- 10/2009 Invited Talk, "Machine Learning for Speech Processing", ITG Fachgruppe, Graz.
- 2008 Session Chair at the International Conference on Computer Vision and Computer Graphics Theory and Applications (VISIGRAPP 2008), Madeira, Portugal.
- 2/2007 Invited Tutorial, "Discriminative learning of Bayesian networks for classification", Tutorial on Pattern Recognition, FTW Forschungszentrum Telekommunikation Wien GmbH, Vienna.

Awards and Scholarships

- 2022 WKO Forschungsstipendium, Hannes Bradl
- 2019 Best Paper Award at ICTSS 2019: B.K.Aichernig, R. Bloem, M. Ebrahimi, M. Horn, F. Pernkopf, W. Roth, A. Rupp, M. Tappler, M. Tranninger, "*Learning a Behavior Model of Hybrid Systems through Combining Model-Based Testing and Machine Learning*"
- 2016 Finalist of best student paper, *DNN-based Speech Mask Estimation for Eigenvector Beamforming*, ICASSP, 2016.

- 2016 Finalist of best student paper, *A Robust Multichannel Lung Sound Recording Device*, BIODEVICES, 2016.
- 2012 Kardinal-Innitzer-Förderungspreis (Kardinal-Innitzer Young Investigator Award), Vienna, Austria.
- 2010 Young Investigator Award of the Province Styria (Förderungspreis des Landes Steiermark), Graz, Austria.
- 2010 Finalist of best student paper, *A Factorial Sparse Coder Model for Single Channel Source Separation*, Interspeech, 2010.
- 2003 Fahrzeugverband-Jubiläumstiftung Forschungspreis (Fachverband der Fahrzeugindustrie), Wien, Österreich.
- 2002 Erwin Schrödinger Fellowship, Vienna, Austria.
- 2002 Erwin-Wenzel-Preis, Linz, Austria.
- 2002 Fred-Margulies Preis, Vienna, Austria.

Academic Cooperation Partners (Selected)

- Sebastian Tschitschek, University of Vienna, Austria.
- Robert Peharz, Graz University of Technology.
- Philipp Aichinger, Medical University Vienna, Austria
- Holger Fröning, University of Heidelberg, Germany.
- Pedro Domingos, Jeff Bilmes, University of Washington, USA.
- Peter Marschik, Freyja-Maria Smolle-Jüttner, Horst Olschewski, Medical University Graz, Austria.

Soft Skills

- 2024 Individuelles Performance-Management, Graz University of Technology, Austria.
- 2017 Nichts Neues ohne Innovation, Graz University of Technology, Austria.
- 2017 Psychologische Ansätze zur Personalführung, Graz University of Technology, Austria.
- 2015 - 2016 Advanced Leadership Program, Graz University of Technology, Austria.
 - Hochschuldidaktik für Führungskräfte
 - Erfolgreich führen und kommunizieren mit Konzepten der Transaktionsanalyse
 - Führungskompetenz kompakt
 - Sich und andere verändern
 - Strategieentwicklung für Führungskräfte
 - Arbeitsrecht für Führungskräfte
 - Wie wir uns unsere Probleme selber machen
- 2015 Management von Forschungsprojekten, Graz University of Technology, Austria.
- 2014 Forschungsprojekt- und Programmmanagement für Projektauftraggeber/innen, Graz University of Technology, Austria.
- 2010 – 2011 Management Development Program at Graz University of Technology, Austria.
 - 2011 Leading Technical Teams, Graz University of Technology, Austria.
- 2010, 2011 Didaktik 1,2,3: Durchführen von Lehrveranstaltungen im akademischen Bildungsbereich, Graz University of Technology, Austria.
- 2010 Erfolgreich in die Öffentlichkeit: Dos and Don'ts für den Umgang mit Medien, Graz University of Technology, Austria.
- 2009 Führen, Delegieren, Motivieren, Graz University of Technology, Austria.

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Supervised PhD Students

- 2010 Stefan Petrik, Phonetic Similarity Matching of Non-Literal Transcripts in Automatic Speech Recognition.
- 2010 Michael Stark, Source-Filter Model Based Single Channel Speech Separation.
- 2012 Michael Wohlmayr, Probabilistic Model-Based Multiple Pitch Tracking of Speech.
- 2013 Christina Leitner, Speech Enhancement using Kernel PCA.
- 2014 Sebastian Tschitschek, Maximum Margin Bayesian Networks: Asymptotic Consistency, Hybrid Learning, and Reduced-Precision Analysis.
- 2014 Dietmar Schabus, Audio-visual Speech Synthesis Based on Hidden Markov Models, external PhD Candidate at FTW Forschungszentrum Telekommunikation Wien GmbH, Vienna.
- 2015 Robert Peharz, Foundations of Sum-Product Networks for Probabilistic Modeling.
- 2019 Matthias Zöhrer, Speech Enhancement Using Deep Neural Beamformers.
- 2019 Christian Knoll, Understanding the Behavior of Belief Propagation.
- 2019 Elmar Messner, A Holistic Approach to Multi-Channel Lung Sound Classification.
- 2020 Martin Trapp, Sum-Product Networks for Complex Modelling Scenarios, external PhD Candidate at Austrian Research Institute for Artificial Intelligence (OFAI), Vienna.
- 2021 Lukas Pfeifenberger, Towards the Evolution of Neural Acoustic Beamformers, external PhD Candidate funded from Ognios (industry partner), Salzburg.
- 2021 Günther Schindler, Compressing and Mapping Deep neural Networks on Edge Computing Systems, external PhD examiner, Ruprecht-Karls University Heidelberg, Germany.
- 2021 Wolfgang Roth, Probabilistic Methods for Resource Efficiency in Machine Learning.
- 2022 Truc Nguyen, Robust Lunk Sound and Acoustic Scene Classification.
- 2022 Johanna Rock, Resource-efficient Neural Networks for Automotive Radar Interference Mitigation.
- 2022 Alexander Fuchs, Improving Efficiency and Generalization in Deep Learning Models for Industrial Applications
- 2024 Christoph Obermair, Interpretable Fault Prediction for CERN Energy Frontier Colliders
- 2025 Harald Leisenberger, Analysis of Message Passing Algorithms and Free Energy Approximations in Probabilistic Graphical Models
- running Christian Toth, Causality
- running Christian Oswald, ML for Interference Mitigation
- running Sophie Steger, Uncertainty Modelling in Neural Networks
- running Jixiang Lei, Domain Adaptation
- running Martin Hofmann-Wellenhof, Physics-informed Neural Networks for Condition Modelling of Rail Vehicles
- running Stefan Fagner, Neural Radiance Fields for 3D Reconstructions of Kilns
- running Joao de Freitas, Temperature Prediction in Rotary Kiln
- running Lukas Klantschnig, UWB Sensing for Vital Signals
- running Benedikt Mayrhofer, Real-time Voice Conversion

Supervised Master Students

- 2007 Christoph Böhm, Unsupervised Speaker Segmentation in One-Channel Speech Data.
- 2007 Christian Wallinger, A Flexible Sender-Based Packet Loss Recovery Method.

- 2008 Christoph Schmauder, Schwingungsanalyse für Störstoffdetektion und Schnittspalteinstellung einer Müllzerkleinerungsmaschine, joint project with Komptech.
- 2008 Michael Wiesenegger, Wavelet-Based Speaker Change Detection in Single Channel Speech Data.
- 2010 Robert Peharz, Single Channel Source Separation using Dictionary Design Methods for Sparse Coder.
- 2012 Gregor Pirker, A Speech Database for Pitch Determination.
- 2012 Christoph Klug, RTBlocks: A Cross-Platform Algorithm Design Framework for Real-Time Audio Processing on Android.
- 2013 Nikolaus Mutsam, Maximum Margin Hidden Markov Models.
- 2013 Klaus Dobbler, Vibroakustisches Monitoring in Smart Homes.
- 2013 Florian Pokorny, Detection of Negative Emotions in Speech Signals Using Bags-of-Audio-Words.
- 2013 Lukas Pfeifenberger, Evaluation, Simulation and Implementation of a Multi-Channel Speech Enhancement System.
- 2013 Andreas Zehetner, Keyword Spotting for Emergency.
- 2014 C.E. Cancione Chacón, On Belief Propagation and Higher Order Power Methods.
- 2014 Erwin Nindl, Traffic Flow Reconstruction on Motorways by Data Fusion.
- 2014 Georg Kapeller, Speech Enhancement with Sum-Product Networks.
- 2015 Michael Rath, Message Scheduling in Loopy Belief Propagation.
- 2015 Wolfgang Roth, Hybrid Generative-Discriminative Training of GMMs.
- 2015 Christopher Walles, Segmental Conditional Random Fields for Phone Recognition.
- 2016 Johannes S. Innerbichler, Cloud Storage Performance Analysis.
- 2016 Markus Feuerstein, Refractory Wear Modelling Using Statistical Methods.
- 2016 Michael Peitler, Acoustic Event Detection of General Sounds.
- 2017 Fridtjof Sterna, Real-time Automatic Recognition of Spoken Digits on an Embedded System using Deep Recurrent Neural Networks.
- 2018 Christoph Aigner, Requirements Specification of a Systems-Engineering Tool: Example on Effort Estimation using Neural Networks.
- 2018 Florian Kulmer, Self-Confident Belief Propagation.
- 2018 Johanna Rock, Change-point Detection in Smartphone Usage.
- 2018 Andreas Wöhrer, 16 Channel USB 2.0 Sound Card for Digital MEMS Microphones.
- 2018 Andreas Wurm, Predicting the Latency of MQTT Brokers Using Deep Learning.
- 2019 Hannes Unterholzner, Channel Selection for Distant Automatic Speech Recognition.
- 2020 Christoph Obermair, Extension of Signal Monitoring Applications with Machine Learning.
- 2020 Johannes Wolfgruber, Multi-Channel Lung Sound Recording Software.
- 2020 Christian Toth, Synthesizing Infomap: A Kullback-Leibler Divergence-Based Approach To Community Detection.
- 2020 Markus Huber, Efficient Single-Channel Music Source Separation with Deep Neural Networks.
- 2020 Maria Sendlhofer-Schag, Batter Modeling By Means Of Statistical Models.
- 2020 Raphael Schlüsselbauer, Speech Recognition - A Transfer Learning Approach.
- 2021 Philipp Gabler, Automatic Graph Tracking in Dynamic Probabilistic Programs via Source Transformations.
- 2021 Christoph Maurer, Integration and Deployment of Machine Learning Models.

- 2021 Sebastian Grill, Machine Learning Assisted Heat Detection in Dairy Cows.
- 2021 David Peter, Resource Efficient Neural Networks for Keyword Spotting.
- 2021 Michael Hirschmugl, FPGA Implementation of a Compolutional Neural Network for Radar Interference Mitigation.
- 2022 Christian Oswald, On Optimal Feature Orderings in Bayesian Network Classifiers.
- 2022 Lukas Längle, Oxygen Saturation Measurements for Anea Divers.
- 2022 Hannes Bradl, Multi-Instrument Recognition, Mix-Parameter Estimation and Timbre Characterization Using Deep Neural Networks.
- 2022 Leonhard Leopold, Wear Prediction of Refractory Lining using Neural Networks.
- 2022 Lukas Maier, Low-Complexity Convolutional Neural Networks for Acoustic Scene Classification.
- 2023 Martin Hofmann-Wellenhof, Physics-Informed Neural Networks for Oscillating Problems.
- running Christoph, Schögler: DNNs for Future Tradeing of Crypto Coins.
- 2023 Fabio Ziegler, Refractory Modelling with Deep Neural Networks.
- 2023 Nico Mittendrein, Data Augmentation for Time-Domain Music Separation.
- 2023 Michael Reiter, Acoustic COVID-19 Detection Using Multiple Instance Learning.
- 2023 Stefan Fragner, Stockpile Volume Estimation using Photogrammetry.
- 2024 Thomas Ntoumanoglou, Graph Structure Optimization for Improving Approximate Inference.
- 2024 Sandro Eitzinger, Resource Efficient Single Channel Source Separation.
- 2024 Felix Rost, Data Augmentation for Robust Detection/Alignment of Objects.
- 2024 Manuel Wurzer, Machine Learning for Predicting Time Temperature Transformation in Bainitic Steel.
- 2024 Benedikt Kantz, Explainable Artificial Intelligence and Uncertainty Attribution in Industrial Process Modelling.
- 2025 Daniel Zirat, Pruning Techniques for Enhancing Model Efficiency in Single-Channel Speech Separation
- 2025 Niki Kopp, Analysis of Probabilistic Learning Algorithms for Discretized Recurrent Neural Networks.
- 2025 Benedikt Görgei, Interference Avoidance in PTP Synchronized FMCW Radar Satellite Systems.
- running Jan Kowalczyk, LIDAR
- running Philipp Steinwender, Invertible Neural Networks.

Key Publications

Most of my research relates to the area of machine learning, statistical modeling, and artificial intelligence. In particular, the focus is on developing innovative methods and techniques for extraction of information and modeling of data including the empirical verification of the methods. In the sequel, some key publications (ordered by year) are listed.

1. W. Roth, G. Schindler, B. Klein, R. Peharz, S. Tschatschek, H. Fröning, F. Pernkopf, Z. Ghahramani, "Resource-Efficient Neural Networks for Embedded Systems", JMLR, Vol. 25, pp. 1–51, 2024, DOI: <https://www.jmlr.org/papers/volume25/18-566/18-566.pdf>.
2. C. Toth, L. Lorch, C. Knoll, A. Krause, F. Pernkopf, R. Peharz, J. von Kügelgen "Active Bayesian Causal Inference", NeurIPS, 2022.
3. C. Knoll, A. Weller and F. Pernkopf, "Self-Guided Belief Propagation – A Homotopy Continuation Method",

- IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol.45, pp. 5139-5157, 2023, DOI: 10.1109/TPAMI.2022.3196140.
4. M. Trapp, R. Peharz, H. Ge, F. Pernkopf, and Z. Ghahramani, "Bayesian Learning of Sum-Product Networks", NeurIPS, 2019.
 5. C. Knoll and F. Pernkopf, "Belief Propagation: Accurate Marginals or Accurate Partition function - Where is the Difference?", UAI, 2019.
 6. C. Knoll, D. Mehta, T. Chen, F. Pernkopf, "Fixed Points of Belief Propagation - An Analysis via Polynomial Homotopy Continuation", IEEE Transactions on Pattern Analysis and Machine Intelligence, pp. Vol. 40, No. 9, pp. 2124–2136, 2018, DOI: 10.1109/TPAMI.2017.2749575.
 7. R. Peharz, R. Gens, F. Pernkopf, P. Domingos, "On the Latent Variable Interpretation in Sum-Product Networks", IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 39, No. 10, pp. 2030–2044, 2017, DOI: 10.1109/TPAMI.2016.2618381.
 8. S. Tschitschek and F. Pernkopf, "On Bayesian Network Classifiers with Reduced Precision Parameters", IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 37, No. 4, pp. 774–785, 2015, DOI: 10.1109/TPAMI.2014.2353620.
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I contributed to more than 190 refereed conference papers (some at UAI, ICML, AISTATS, NIPS, ECML, AAAI, and ICASSP), 60 refereed journal papers (some at IEEE TPAMI, IEEE TSALP, PLOS One, IEEE TBME, JMLR, Pattern Recognition), 2 book chapters and some patents. These papers received >5300 citations on Google Scholar and my h-index is 38.

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