Marius Pesavento

Professor Dr.-Ing.

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Education

1992 – 1999 **Diploma studies;** Department of Electrical Engineering, Ruhr-Universität Bochum, Germany, Degree: Dipl.-Ing

2000 – 2001 **Master studies:** Communication Research Lab (CRL), Department of Electrical Engineering and Information Sciences, McMaster University, Hamilton, Ontario, Canada, Degree: Ms.-Eng. – *With distinction*

2001 – 2005 **Doctorate research:** Signal Theory Group, Department of Electrical Engineering and Information Sciences, Ruhr-Universität Bochum, Germany, Degree: Dr.-Ing. – *With distinction*

Doctorate Advisor: Prof. Johann Böhme

Experience

2001 – 2005 Research Assistant, Signal Processing Group, Ruhr-Universität Bochum

2005 – 2007 Research Engineer for digital signal processing, FAG Industrial Services GmbH (enterprise of the Schaeffler-Group), Aachen, Germany [`http://www.fis-services.de`]

2007 – 2009 Head of Signal Processing Section, mimoOn GmbH, Duisburg, Germany (today CommAgility) [`http://www.mimoOn.de`]

2010 – 2013 Assistant Professor (W1) for Robust Signal Processing, Communication Systems Group, Darmstadt University of Technology, Darmstadt, Germany

2013 – now Full Professor (W3), Head of Communication Systems Group, TU Darmstadt, Germany

Research Interests

- Sensor array and statistical signal processing
- Multiuser MIMO communication networks
- Optimization methods
- Graph and distributed signal processing
- Model-aided machine learning

Awards and honors

2023 Co-author of the paper that received the Best Student Paper Award (2nd place) at the 2023 IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (IEEE CAMSAP 2023), Los Sueños, Costa Rica, 2023.

2015 Co-author of the paper (https://ieeexplore.ieee.org/document/7051831) that received the Best Paper Award at the 19-th ITG International Workshop on Smart Antennas (WSA 2015), Ilmenau, Germany, 2015.

2014 Co-author of the paper (doi:10.1109/SAM.2014.6882328) that received the Best Student Paper Award (3rd place) at the Eight IEEE Sensor Array and Multichannel Signal Processing Workshop, A Coruña, Spain, 2014.

2010 Co-author of the paper (doi:10.4108/icst.crowncom.2011.245766) that received the Best Paper Award at the 5th International ICST Conference on Cognitive, Radio Oriented Wireless Networks (CrownCom 2011), Cannes, France, 2011.

2006 Young Author Best Paper Award 2005 (doi:10.1109/TSP.2002.801929), Signal Processing Society, Institute of Electrical and Electronics Engineers (IEEE), 2002.

2006 Heinrich-Kost-Price 2006, Gesellschaft der Freunde der Ruhr-Universität Bochum.

2003 ITG Preis 2003, Verband der Elektrotechnik Elektronik Informationstechnik (VDE).

2001 Outstanding Thesis Research Award, McMaster University.

Academic activities

IEEE SPS Regional Director-at-Large for Region 8, 2025-2026, non-voting Member of Board of Governors IEEE Signal Processing Society.

Technical Committees IEEE Technical Committee (TC) "Sensor Array and Multichannel Signal Processing" Vice-Chair 2025, member 2012 – 2017), IEEE TC member "Signal Processing Theory and Methods" (since 2021), Member of the EURASIP Technical Area Committee (TAC) "Signal Processing for Multisensor Systems" (since 2016), Vice-chair (2019 – 2021), Chair (2022 – 2024), Past-Chair 2025, EURASIP TAC member "Signal Processing for Communications and Networking" (2016 – 2018), EURASIP TAC member "Theoretical and Methodological Trends in Signal Processing" (2021 – 2023).

Conferences Technical Co-Chair EUSIPCO 2019, Technical Co-Chair IEEE SAM 2014, Technical Area Chair Asilomar Conference 2012, Technical Area Chair Asilomar Conference 2020, Finance Chair IEEE SPAWC 2013, Finance Chair IEEE CAMSAP 2015, Co-Organizer STATOS workshops 2013 (Darmstadt), 2015 (Budapest), 2018 (Rome), 2022 (Belgrade).

Editorial Boards Deputy Editor-in-Chief IEEE Open Journal of Signal Processing (since January 2025, Senior Area Editor 2019 – 2024, Editor-in-Chief 2026 – 2028), Editorial board member IEEE Transactions on Signal Processing (2012 – 2016), Editorial Board member EURASIP Signal Processing (AE since 2011, Subject editor since 2024)

Guest Editor of the IEEE Journal of Selected Topics in Signal Processing, Special Issue: Array Signal Processing for Angular Models in Massive MIMO Communications (F. Gao, Z. Tian, E. G. Larsson, M. Pesavento and S. Jin), 2019 `https://doi:10.1109/JSTSP.2019.2938880`].

Section Editor Academic Press Library in Signal Processing, Volume 7: Array, Radar and Communications Engineering (R. Chellappa and S. Theodoridis), Section 3: Sensor Array Processing (M. Pesavento), 2018, ISBN: 9780128118887.

Lead Guest Editor EURASIP Signal Processing Special Issue: Advances in Sensor Array Processing in Memory of Alex B. Gershman (M. Pesavento, Y.I. Abramovich, F. Gini, N. Sidiropoulos, A.M. Zoubir), 2013, [`https://doi.org/10.1016/j.sigpro.2013.07.003`].

Guest Editor of the EURASIP Journal on Advances in Signal Processing, Special Issue: Advances in Two-Dimensional Angle-of-Arrival Processing for Localization and Communications (L. Mailaender, S. Affes, M. Juntti, M. Pesavento), 2011 [`https://doi.org/10.1186/1687-6180-2011-94`].

Talks and Tutorials (recent and upcoming)

Tutorial Speaker	Nato Lecture series on SET-337 *Advances in Array Calibration for improved ESM Sensor Performance*, Title: "Tensor-based Array Calibration Methods," June 3-4, 2025 at ISL in Saint-Louis (France) and on June 5-6, 2025 at FKIE in Wachtberg (Germany)
Tutorial Speaker	Nato Lecture series on SET-337 *Advances in Array Calibration for improved ESM Sensor Performance*, Title: "Direction-of-Arrival Estimation and Offset Synchronization in Partly Calibrated Arrays," June 3-4, 2025 at ISL in Saint-Louis (France) and on June 5-6, 2025 at FKIE in Wachtberg (Germany)
Keynote Speaker	at the International Workshop on Resilient 6G Networks (WResNet 6G), Satellite workshop of IEEE WCNC 2025, Title: "Model assisted deep learning for resilient 6G networks", 24-27 March, 2025, Milan, Italy
Speaker	Berlin 6G Conference, Special Session on Machine Learning for 6G, Title: "Model assisted deep learning for resilient 6G networks", Berlin, July 3, 2025
Keynote Speaker	Symposium on "New trends in signal processing with applications" at the Montenegrin Academy of Sciences and Arts, June 2024.
Tutorial Speaker	IEEE SAM 2020: "Four Decades of Array Signal Processing Research: An Optimization Relaxation Technique Perspective", M. Pesavento, M. Trinh-Hoang, M. Viberg, (slides).
Tutorial Speaker	EUSIPCO 2020: "Four Decades of Array Signal Processing Research: An Optimization Relaxation Technique Perspective", M. Pesavento, M. Trinh-Hoang, M. Viberg, (slides).
Tutorial Speaker	EUSIPCO 2017: "Exploiting structure and pseudo-convexity in iterative parallel optimization algorithms for real-time and large scale applications", M. Pesavento, Y. Yang, (slides).
Tutorial Speaker	IEEE ICASSP 2015: "Mixed-integer programming in signal processing and communications", M. Pesavento, Y. Cheng, M.E. Pfetch, (slides).

Doctorates ongoing

Abushawashi, Yahya R. Y.	Topic: "Model assisted deep learning for direction-of-arrival estimation" (since 2025)
Debre, Kaleb	Topic: "Signal processing methods for MIMO radar systems" (since 2022)
Schynol, Lukas	Topic: "Deep unfolding methods for signal procesing and communications" (since 2021)
Müller, Raphael	Topic: "Low-rank calibration and imaging techniques of over-the-air ultrasound arrays" (since 2020)
Patak, Priynanka	Topic: "Distributed AI in mobile network architectures for systems beyond 5G" (since 2019)

Doctorates graduated

Fan, Yufan	Topic: "Decentralized singular value decomposition of symmetric and non-symmetric matrices for large-scale sensor networks" (defended 2025-03-28, Co-referee: Prof. Dr. Bin Yang)
Liu. Tianyi	Title: "A Parallel Successive Convex Approximation Framework with Smoothing Majorization for Phase Retrieval" (defended 2024-09-26, Co-referee: Prof. Dr. Stefan Ulbrich)

Taleb, Dima	Title: "General rank transmit beamforming methods for multicasting networks."(defended 2023-07-24, Co-referee: Prof. Dr.-Ing. Martin Haardt)
Schenck, David	Title: "Development and Performance Analysis of Direction-of-Arrival Estimators" (defended 2022-06-07, Co-referee: Dr. Xavier Mestre)
Trinh-Hoang, Minh	Title: "Partial Relaxation: A Computationally Efficient Direction-of-Arrival Estimation Framework" (defended 2020-04-30, Co-referee: Prof. Dr. Mats Viberg)
Nikolay, Fabio	Title: "Graph Learning Methods for Genetic Interaction Networks" (defended 2019-11-25, Co-referee: Prof. Dr. Monica Bugallo)
Hegde, Ganapati	Title: "Energy-Efficient and Robust Hybrid Analog-Digital Precoding for Massive MIMO Systems" (defended 2019-10-22, Co-referee: Prof. Dr.-Ing. Christos Masouros)
Bahlke, Florian	Title: "Optimization Methods for Heterogeneous Wireless Communication Networks: Planning, Configuration and Operation" (defended 2019-01-30, Co-referee: Prof. Dr.-Ing. Eduard A. Jorswieck)
Steffens, Christian	Title: "Compact Formulations for Sparse Reconstruction in Fully and Partly Calibrated Sensor Arrays" (defended 2017-09-25, Co-referee: Prof. Dr. Marc Pfetsch)
Suleiman, Wassim	Title: "Decentralized Direction of Arrival Estimation" (defended 2017-09-02, Co-referee: Prof. Dr.-Ing. Abdelhak Zoubir)
Ramos Cantor, Oscar	Title: "Cooperative Resource Allocation in Wireless Communication Networks" (defended 2017-07-18, Co-referee: Prof. Dr. Constantinos B. Papadias)
Zhang, Xin	Title: "MIMO Radar DOD/DOA Estimation and Performance Analysis in the Presence of SIRP Clutter" (defended 2016-08-17, Co-referee: Prof. Dr. Mohammed Nabil El Korso)
Wen, Xin	Title: "Higher-rank Transmit Beamforming Using Space Time Block Coding" (defended 2016-02-12, Co-referee: Prof. Dr. Anthony Man-Cho So)
Ciochina, Dana	Title: "Multiuser Downlink Beamforming Techniques for Cognitive Radio Networks" (defended 2015-12-02, Co-referee: Prof. Dr. Dirk T. M. Slock)
Bornhorst, Nils	Title: "Energy-Efficient Distributed Multicast Beamforming Using Iterative Second-Order Cone Programming" (defended 2014-12-12, Co-referee: Univ.-Prof. Dr.-Ing. Martin Haardt)
Schad, Adrian	Title: "Advanced Relaying Methods for One-Way and Two-Way Communication" (defended 2014-10-29, Co-referee: Prof. Dr. Sergiy A. Vorobyov)
Cheng, Yong	Title: "Joint Downlink Beamforming and Discrete Resource Allocation Using Mixed-Integer Programming" (defended 2013-12-13, Co-referee: Prof. Dr. Stefan Ulbrich)
Wajid, Imran	Title: "Robust Algorithms for Downlink Beamforming in the Conventional and Cognitive Radio Networks with Erroneous Channel State Information" (defended 2012-10-15, Co-referee: Prof. Dr. Erik G. Larsson)
Abdelkader, Ahmed	Title: "Multicast and Relay Beamforming in Wireless Multi-User Networks" (defended 2012-07-02, Co-referee: Prof. Dr.-Ing. Abdelhak Zoubir)
Samadi, Nima	Title: "Advanced Blind Signal Processing for MIMO Communications" (defended 2012-05-31, Co-referee: Prof. Dr. Shahram Shahbazpanahi)
Alabed, Samer	Title: "Computationally Efficient Spatial and Cooperative Diversity Techniques for Wireless Communication Networks" (defended 2012-05-08, Co-referee: Prof. Dr. Ing. Babak Khalaj)

Li, Liang	Title: "Transmit and Multiuser Diversity Techniques in Wireless Communications" (defended 2012-05-02, Co-referee: Prof. Dr. Constantinos B. Papadias)
Parvazi, Pouyan	Title: "Sensor Array Processing In Difficult And Non-Idealistic Conditions" (defended 2012-01-18, Co-referee: Prof. Dr.-Ing. Christoph F. Mecklenbräuker)

Lectures

2009 – 2015	Information Theory I (Point-to-Point), Bachelor, 5 Credit Points (Lecture 3h + Tutorial 1h), winter-term
2009 – now	Information Theory II (Networks), Master, 4 Credit Points (Lecture 2h + Tutorial 1h), summer term
2010 – 2022	MIMO Communications and Space-Time-Coding, Master, 4 Credit Points (Lecture 2h + Tutorial 1h), winter-term
2013 – now	Deterministic Signals and Systems, Bachelor, 7 Credit Points (Lecture 3h + Tutorial 2h), winter-term
2014 – 2024	Convex Optimization in Signal Processing and Communications, Master, 5 Credit Points (Lecture 2h + Tutorial 1h + Course Project), summer term
2017 – now	Sensor Array Processing and Adaptive Beamforming, Master, 4 Credit Points (Lecture 2h + Tutorial 1h), summer term
2019 – now	Matrix Analysis and Computations, Master, 5 Credit Points (Lecture 3h + Tutorial 1h), summer term
2020 – now	Graph Signal Processing, Learning and Optimization, Master 5 CP (Lecture 3h + Tutorial 1h), winter term