Johannes Maly

✉ johannes.maly@ku.de
https://johannes-maly.github.io

Positions

11/2020–now **PostDoc (akademischer Rat auf Zeit)**, *Department of Scientific Computing, Catholic University of Eichstaett/Ingolstadt*, Eichstaett.
Member of the group of Prof. Dr. Goetz Pfander

02/2019–10/2020 **PostDoc**, *Chair for Mathematics of Data Processing, RWTH Aachen University*, Aachen.
Member of the group of Prof. Dr. Holger Rauhut

Education

01/2016–01/2019 **PhD in mathematics**, *Technical University of Munich*, Munich.
Under supervision of Prof. Dr. Massimo Fornasier

10/2013–09/2015 **Master of Science**, *Technical University of Munich*, Munich, *1.2 - passed with high distinction*.
Mathematics

10/2011–09/2013 **Bachelor of Science**, *Technical University of Munich*, Munich, *1.9 - passed with merit*.
Mathematics with minor in computer science

05/2011–09/2011 **TwoInOne program**, *Technical University of Munich*, Munich.
Special program to shorten Bachelor's degree

09/2003–04/2011 **University-entrance diploma**, *Erasmus Grasser Gymnasium*, Munich, *1.2 - passed with high distinction*.

Theses

Ph.D. thesis *Recovery Algorithms for Quantized Compressed Sensing*;
Advisor Prof. Dr. Massimo Fornasier

M.Sc. thesis *Weighted Energy-Dissipation Approximation for an Optimal Control Problem*;
Advisor Prof. Dr. Martin Brokate

Experience

Teaching — Further Education

04/2018–02/2019 **"Zertifikat Hochschullehre der Bayrischen Universitäten"**, *Technical University of Munich*, Munich.
Seminar on advanced methods for teaching

Teaching — Courses

11/2020–now **Teaching at the Catholic University of Eichstaett/Ingolstadt**, Eichstaett.
Lecturer for the following courses (Lecture+Exercise):
- "Introduction to Scientific Computing" (Summer term 2021)
- "Introduction to Numerical Analysis" (Winter term 2020/21)

02/2019–10/2020 **Teaching at RWTH Aachen University**, Aachen.
Teaching assistant for the following courses:
- "Optimization" (Summer term 2020)
- "Repetitorium - Higher Mathematics II" (Winter term 2019/20)
- "Higher Mathematics II" (Summer term 2019)

05/2011-01/2019 **Teaching at TUM**, Munich.
Teaching assistant for the following courses:
- "Foundations of Data Analysis" (Summer term 2018)
- "Analysis für Informatiker" (Summer term 2014)
- "Analysis für Informatiker" (Summer term 2012)

Thesis Supervision

04/2021–now **Patrik Hammer (Bachelor's Thesis)**, *Catholic University of Eichstaett/Ingolstadt*, Eichstaett.
Topic: "On the uniform approximation property of neural networks"

02/2020–05/2020 **Havva Akcay (Bachelor's Thesis)**, *RWTH Aachen University*, Aachen.
Topic: "On the relation between stability and regularisation for Support Vector Machines"

04/2019–09/2019 **Konstantin Riedl (Master's Thesis)**, *Technical University of Munich*, Munich.
Topic: "Non-Convex Approaches to Compressed Sensing and Robust Recovery of Simultaneously Structured Signals from Inaccurate and Incomplete Information"

02/2018–08/2018 **Judith Wewerka (Master's Thesis)**, *Technical University of Munich*, Munich.
Topic: "Near-Optimal Data-Driven ℓ_1-Regularization"

Visiting Researcher

03/2019 **Research stay**, *Simula Research Laboratory*, Oslo.

03/2016–04/2016 **Research stay**, *Hausdorff Research Institute for Mathemtaics*, Bonn.

08/2014–01/2015 **Semester abroad**, *Nanyang Technological University*, Singapore.

Vocational

2012-2015 **Work experience and working student**, *Siemens*, Munich.
Work on pedestrian flow simulation based on cellular automatons and enhancements of simulator

List of Publications

Submitted Preprints to Refereed Journals

[10] **S. Dirksen, J. Maly, H. Rauhut**, "Covariance Estimation under One-Bit Quantization", 2021, *arXiv preprint: https://arxiv.org/abs/2104.01280*.

[9] **J. Maly**, "Robust Sensing of Low-Rank Matrices with Non-Orthogonal Sparse Decomposition", 2021, *arXiv preprint: https://arxiv.org/abs/2103.05523*.

[8] **F. Boßmann, S. Krause-Solberg, J. Maly, N. Sissouno**, "Structural Sparsity in Multiple Measurements", 2021, *arXiv preprint: https://arxiv.org/abs/2103.01908*.

[7] **A. Caragea, D. G. Lee, J. Maly, G. Pfander, and F. Voigtlaender**, "Quantitative approximation results for complex-valued neural networks", 2021, *arXiv preprint: https://arxiv.org/abs/2102.13092*.

[6] **H.–H. Chou, C. Gieshoff, J. Maly, and H. Rauhut**, "Gradient Descent for Deep Matrix Factorization: Dynamics and Implicit Bias towards Low Rank", 2020, *arXiv preprint: https://arxiv.org/abs/2011.13772*.

Accepted and Published Articles

[5] **Z. Kereta, J. Maly, and V. Naumova**, "Computational approaches to non-convex, sparsity-inducing multi-penalty regularization", 2021, *Inverse Problems*.

[4] **M. Iwen, F. Krahmer, S. Krause-Solberg, and J. Maly**, "On Recovery Guarantees for One-Bit Compressed Sensing on Manifolds", 2021, *Discrete and Computational Geometry*.

[3] **H. C. Jung, J. Maly, L. Palzer, and A. Stollenwerk**, "Quantized Compressed Sensing by Rectified Linear Units", 2021, *IEEE Transactions on Information Theory*.

[2] **M. Fornasier, J. Maly and V. Naumova**, "Robust Recovery of Low-Rank Matrices with Non-Orthogonal Sparse Decomposition from Incomplete Measurements", 2020, *Applied Mathematics and Computation*.

[1] **J. Maly and L. Palzer**, "Analysis of Hard-Thresholding for Distributed Compressed Sensing with One-Bit Measurements", 2018, *Information and Inference: A Journal of the IMA* .

Conference Papers

[8] **H. C. Jung, J. Maly, L. Palzer, and A. Stollenwerk**, "Quantized Compressed Sensing by Rectified Linear Units", 2021, *Proceedings in Applied Mathematics and Mechanics — PAMM 2021*.

[7] **A. Guth, C. Culotta-López, J. Maly, H. Rauhut, and D. Heberling**, "Polyhedral Sampling Structures for Phaseless Spherical Near-Field Antenna Measurements", 2020, *42nd Antenna Measurement Techniques Association Symposium (AMTA)* .

[6] **H. C. Jung, J. Maly, L. Palzer, and A. Stollenwerk**, "Quantized Compressed Sensing by Rectified Linear Units", 2020, *iTWIST'20 workshop*.

[5] **S. Dirksen, M. Iwen, S. Krause-Solberg, and J. Maly**, "Robust One-bit Compressed Sensing With Manifold Data", 2019, *International Conference on Sampling Theory and Applications (SampTA)*.

[4] **H. C. Jung, J. Maly, L. Palzer, and A. Stollenwerk**, "One-Bit Compressed Sensing by Convex Relaxation of the Hamming Distance", 2019, *SPARS workshop*.

[3] **Z. Kereta, J. Maly, and V. Naumova**, "Linear convergence and support recovery for non-convex multi-penalty regularisation", 2019, *SPARS workshop*.

[2] **M. Fornasier, J. Maly and V. Naumova**, "Robust Recovery of Low-Rank Matrices using Multi-Penalty Regularization", 2017, *NIPS workshop Optimization for Machine Learning, Long Beach*.

[1] **S. Krause-Solberg and J. Maly**, "A tractable approach for one-bit Compressed Sensing on manifolds", 2017, *International Conference on Sampling Theory and Applications (SampTA)*.

Scientific Presentations

Invited Presentations

July 2019 **Talk on "One-Bit Compressed Sensing with Manifold Data"**, *Applied Inverse Problems (AIP2019)*, Université Grenoble-Alpes, France.

March 2019 **Talk on "Distributed Compressed Sensing with One-Bit Measurements"**, *Simula Research Laboratory*, Oslo, Norway.

May 2018 **Talk on "Matrix Sensing Using Combined Sparsity and Low-Rank Constraints"**, *Inverse Problems: Modeling and Simulation (IPMS2018)*, Malta.

May 2017 **Talk on "Matrix Sensing Using Combined Sparsity and Low-Rank Constraints"**, *Applied Inverse Problems (AIP2017)*, Zhejiang University, China.

December 2016 **Talk on "Structured Compressed Sensing - Using Patterns in Sparsity"**, *CoSIP Winter Retreat*, TU Berlin, Germany.

Contributed Presentations

March 2021 **Talk on "Covariance Estimation under One-bit Quantization"**, *GAMM2021*, Online.

July 2019 **Poster on "Linear Convergence and Support Recovery for Non-Convex Multi-Penalty Regularisation"**, *Signal Processing with Adaptive Sparse Structured Representations (SPARS)*, INP-ENSEEIHT, France.

July 2019 **Poster on "One-Bit Compressed Sensing by Convex Relaxation of the Hamming Distance"**, *Signal Processing with Adaptive Sparse Structured Representations (SPARS)*, INP-ENSEEIHT, France.

June 2018 **Poster on "A Tractable Approach for One-Bit Compressed Sensing on Manifolds"**, *DS3 summer school*, École polytechnique, France.

March 2018 **Talk on "ATLAS: A Multi-Penalty Approach to Compressed Sensing of Low-Rank Matrices with Sparse Decomposition"**, *GAMM2018*, TU Munich, Germany.

May 2017 **Poster on "Robust Recovery of Low-Rank Matrices using Multi-Penalty Regularization"**, *Optimization for Machine Learning (OPT2017) as part of Neural Information Processing Systems (NeurIPS2017)*, Los Angeles, USA.

December 2017 **Poster on "Distributed Compressed Sensing with One-Bit Measurements"**, *3. International Matheon Conference on Compressed Sensing and its Applications*, TU Berlin, Germany.

May 2017 **Talk on "Matrix Recovery Using Combined Sparsity and Low-Rank Constraints"**, *Workshop on Approximation Theory and Applications (WOATA)*, Universität Wien, Austria.