Johannes Maly

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🖥 https://johannes-maly.github.io
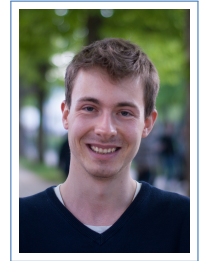
Positions

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

Teaching — Courses

11/2020– **Teaching at the Catholic University of Eichstaett/Ingolstadt**, Eichstaett.
now Lecturer for the following courses (Lecture+Exercise):
- "Mathematics for Economics" (Winter term 2021/22)
- "Introduction to Scientific Computing" (Summer term 2021)
- "Introduction to Numerical Analysis" (Winter term 2020/21)

02/2019– **Teaching at RWTH Aachen University**, Aachen.
10/2020 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- **Teaching at TUM**, Munich.
01/2019 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– **Patrik Hammer (Bachelor's Thesis)**, *Catholic University of Eichstaett/Ingolstadt*, Eichstaett.
now Topic: "On the uniform approximation property of neural networks"

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

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

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

Community Service

2021 **Conference chair of Online-ICCHA 2021**, *Virtual Conference*.

2017-now **Reviewer for scientific journals**.
- Applied Computational Harmonic Analysis
- Advances in Computational Mathematics
- Frontiers in Applied Mathematics and Statistics
- IEEE Transactions on Information Theory
- IEEE Transactions on Signal Processing
- Journal of the American Statistical Association
- Journal of Machine Learning Research
- Journal of Scientific Computing
- Mathematical Reviews/MathSciNet
- Numerical Algorithms

Visiting Researcher

11/2021	**Research stay**, *MFO*, Oberwolfach.
09/2021	**Research stay**, *Max Planck Institute for Mathematics in the Sciences*, Leipzig.
03/2019	**Research stay**, *Simula Research Laboratory*, Oslo.
03/2016–04/2016	**Research stay**, *Hausdorff Research Institute for Mathematics*, 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

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

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

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

[8] **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*.

[7] **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

[6] **J. Maly, T. Yang, S. Dirksen, H. Rauhut, and G. Caire**, "New challenges in covariance estimation: multiple structures and coarse quantization", 2021, *to appear in "Compressed Sensing in Information Processing"*, Springer.

[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

[9] **S. Dirksen, J. Maly, and H. Rauhut**, "Covariance Estimation under One-bit Quantization", 2021, *to appear in Proceedings in Applied Mathematics and Mechanics — PAMM*.

[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

September 2021   **Talk on "Robust Sensing of Low-Rank Matrices with Non-Orthogonal Sparse Decomposition"**, *Numerical Algebra and Optimization Seminar*, MPI MIS, Germany.

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

May 2021   **Talk on "Robust Sensing of Low-Rank Matrices with Non-Orthogonal Sparse Decomposition"**, *COMinDS YoungResearchers' Seminar*, Online.

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.