

Martin Zach

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PERSONAL INFORMATION

Name: Martin Zach
Date (place) of birth: 22.12.1996 (Deutschlandsberg)
Citizenship: Austria

PROFESSIONAL

Postdoctoral Researcher Sep. 2024 – present
Research, co-supervision of Ph.D. students, teaching assistant

University Assistant Sep. 2022 – Sep. 2024
Teaching and research obligations, co-supervision of master's theses.

Project Assistant (full-time from Apr. 2021) Apr. 2020 – Sep. 2022
Supervision of practical exercises in courses.

TEACHING

Image Processing 1, Image Processing 2 2024 – present
2 semester hours each, lecture and integrated practicals. Teaching assistant for practicals.

Image Processing and Pattern Recognition 2020 – 2023 (WS)
2 + 1 semester hours, lecture and separated practicals. Designing and grading practicals.

Convex Optimization 2021 – 2024 (SS)
3 semester hours, lecture with integrated practicals. Lecturing, designing and grading practicals.

SUPERVISED MASTERS THESES

Moritz Erlacher, “Joint Non-Linear MRI Inversion with Diffusion Priors” Jan. 2024
Ingmar Lercher, “Arrhythmia Detection Based on PPG Signals Using a CNN” Jan. 2024
Lukas Glaszner, “Towards a General Data-Driven Prior for Undersampled Magnetic Resonance Imaging Reconstruction” Oct. 2024

SCIENTIFIC AWARDS

OAGM Best Paper Award, “Real-World Video Restoration Using Noise2Noise” 2020
OCG Best Paper Award, “Joint Non-Linear MRI Inversion with Diffusion Priors” 2023

EDUCATION

Ph.D. in Informatics May 2021 – Sep. 2024
Graz University of Technology, AT-8010 Graz *With distinction*
“Generative Models as Regularizers for Inverse Problems in Imaging”
Supervisor: Thomas Pock, Examiner: Michael Unser

M.Sc. in Biomedical Engineering May 2018 – May 2021
Graz University of Technology, AT-8010 Graz *With distinction*
“Generative Regularizers in Computed Tomography”
Supervisor: Thomas Pock

M.Sc. in Information and Computer Engineering May 2018 – May 2021
Graz University of Technology, AT-8010 Graz *With distinction*
“Structured Learning for Energy-Based Models in Image Restoration”
Supervisor: Thomas Pock

B.Sc. in Biomedical Engineering
Graz University of Technology, AT-8010 Graz

Oct. 2014 – May 2018

Senior High School,
BORG Deutschlandsberg, AT-8530 Deutschlandsberg

Sep. 2010 – Jul. 2014
With distinction

RESEARCH INTERESTS

- Medical image reconstruction
- Variational methods
- Data-driven priors

PERSONAL INTERESTS

- Weight training
- Skiing
- Open source software

LIST OF PUBLICATIONS

- [1] Moritz Erlacher and **Martin Zach**. *Joint Non-Linear MRI Inversion with Diffusion Priors*. To appear in Proceedings of the OAGM Workshop 2023. 2023. arXiv: [2310.14842](https://arxiv.org/abs/2310.14842) [eess.IV]. URL: <https://arxiv.org/abs/2310.14842>.
- [2] Lukas Glaszner and **Martin Zach**. *Bigger Isn't Always Better: Towards a General Prior for Medical Image Reconstruction*. To appear in the GCPR 2024 proceedings. 2025. arXiv: [2501.07376](https://arxiv.org/abs/2501.07376) [eess.IV]. URL: <https://arxiv.org/abs/2501.07376>.
- [3] Laurenz Nagler, **Martin Zach**, and Thomas Pock. *Product of Gaussian Mixture Diffusion Model for non-linear MRI Inversion*. Under review. 2025. arXiv: [2501.08662](https://arxiv.org/abs/2501.08662) [eess.IV]. URL: <https://arxiv.org/abs/2501.08662>.
- [4] Federica Porta, Silvia Villa, Marco Viola, and **Martin Zach**. “On the Inexact Proximal Gauss–Newton Methods for Regularized Nonlinear Least Squares Problems”. In: *Advanced Techniques in Optimization for Machine Learning and Imaging*. Ed. by Alessandro Benfenati, Federica Porta, Tatiana Alessandra Bubba, and Marco Viola. Singapore: Springer Nature Singapore, 2024, pp. 151–165. ISBN: 978-981-97-6769-4.
- [5] Emanuele Santellani, **Martin Zach**, Christian Sormann, Mattia Rossi, Andreas Kuhn, and Friedrich Fraundorfer. “GMM-IKRS: Gaussian Mixture Models for Interpretable Keypoint Refinement and Scoring”. In: *Computer Vision – ECCV 2024*. Ed. by Aleš Leonardis, Elisa Ricci, Stefan Roth, Olga Russakovsky, Torsten Sattler, and Gül Varol. Cham: Springer Nature Switzerland, 2024, pp. 77–93. ISBN: 978-3-031-72980-5.
- [6] **Martin Zach**, Florian Knoll, and Thomas Pock. “Stable Deep MRI Reconstruction Using Generative Priors”. In: *IEEE Transactions on Medical Imaging* 42.12 (2023), pp. 3817–3832. DOI: [10.1109/TMI.2023.3311345](https://doi.org/10.1109/TMI.2023.3311345).
- [7] **Martin Zach** and Erich Kobler. “Real-World Video Restoration using Noise2Noise”. English. In: *Joint Austrian Computer Vision and Robotics Workshop 2020*. 2020 Jointed Austrian Computer Vision and Robotics Workshop, ACVRW '20 ; Conference date: 17-09-2020 Through 18-09-2020. Verlag der Technischen Universität Graz, 2020, pp. 145–150. DOI: [10.3217/978-3-85125-752-6-33](https://doi.org/10.3217/978-3-85125-752-6-33).
- [8] **Martin Zach**, Erich Kobler, Antonin Chambolle, and Thomas Pock. “Product of Gaussian Mixture Diffusion Models”. In: *Journal of Mathematical Imaging and Vision* 66.4 (Mar. 2024), pp. 504–528. ISSN: 1573-7683. DOI: [10.1007/s10851-024-01180-3](https://doi.org/10.1007/s10851-024-01180-3). URL: <http://dx.doi.org/10.1007/s10851-024-01180-3>.
- [9] **Martin Zach**, Erich Kobler, and Thomas Pock. “Computed Tomography Reconstruction Using Generative Energy-Based Priors”. English. In: *Proceedings of the OAGM Workshop 2021*. Ed. by Markus Seidl, Matthias Zeppelzauer, and Peter M. Roth. 44th OAGM Workshop 2021: Computer Vision and Pattern Analysis Across Domains : ÖAGM 2021 ; Conference date: 24-11-2021 Through 25-11-2021. Verlag der Technischen Universität Graz, Dec. 2021, pp. 52–58. DOI: [10.3217/978-3-85125-869-1-09](https://doi.org/10.3217/978-3-85125-869-1-09).
- [10] **Martin Zach**, Thomas Pock, Erich Kobler, and Antonin Chambolle. “Explicit Diffusion of Gaussian Mixture Model Based Image Priors”. In: *Scale Space and Variational Methods in Computer Vision*. Ed. by Luca Calatroni, Marco Donatelli, Serena Morigi, Marco Prato, and Matteo Santacesaria. Cham: Springer International Publishing, 2023, pp. 3–15. ISBN: 978-3-031-31975-4.

- [11] **Martin Zach**, Kuan-Chen Shen, Ruiming Cao, Michael Unser, Laura Waller, and Jonathan Dong. *Perturbative Fourier Ptychographic Microscopy for Fast Quantitative Phase Imaging*. Under review. 2025. arXiv: [2501.07308](https://arxiv.org/abs/2501.07308) [physics.optics]. URL: <https://arxiv.org/abs/2501.07308>.

See also [Google Scholar](#).