VLADYSLAV GAPYAK

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Experience

Darmstadt University of Applied Sciences Darmstadt, Germany
Ph.D. student in Applied Informatics *Feb. 2022 – current*

- Topic: *Robust and efficient algorithms for image reconstruction with applications to Magnetic Particle Imaging.*
- Research interests: inverse problems and artificial intelligence with applications to medical imaging.

Education

University of Padua Padova, Italy
Master's degree in Mathematics, GPA: 28.95/30, Final mark: 110/110 *Oct. 2019 – Sep. 2021*

- Thesis: *Survival strategies in changing environments.*
- Supervisors: Prof. Sandro Azaele, Prof. Marco Formentin, Prof. Amos Maritan.
- Main curriculum: probability theory, mathematical analysis and stochastic processes.

University of Padua Padova, Italy
Bachelor's degree in Mathematics, GPA: 24.657/30, Final mark: 96/110 *Oct. 2015 – Oct. 2019*

- Thesis: *"Differentiability of Lipschitz functions" (in Italian).*
- Supervisor: Prof. Roberto Monti.

I.I.S. Isaac Newton Camposampiero (PD), Italy
Diploma di liceo scientifico P.N.I. *Sep. 2009 – Jul. 2014*

Journal Papers

- Gapyak V., März T., Weinmann A.: *Reconstruction Formulae for 3D Field-Free Line Magnetic Particle Imaging*, (2023), in Revision, arXiv:2309.06254;
- Gapyak V., Rentschler C. E., Weinmann A., März T.: *An ℓ^1-Plug-and-Play Approach for MPI Using a Zero Shot Denoiser with Evaluation on the 3D Open MPI Dataset*, (2025), Phys. Med. Biol., 70 025028, 10.1088/1361-6560/ada5a1;
- Gapyak V., März T., Weinmann A.: *Variational Model-Based Reconstruction Techniques for Multi-Patch Data in Magnetic Particle Imaging*, (2024), Journal of Computational and Applied Mathemtics, (451), 10.1016/j.cam.2024.116046;
- Gapyak V., März T., Weinmann A. : *Quality-Enhancing Techniques for Model-Based Reconstruction in Magnetic Particle Imaging*, (2022) Mathematics 2022, 10, 3278. 10.3390/math10183278;

Conference Proceedings

- Gapyak V., März T., Weinmann A. : *Noise Estimation in Zero-Shot Plug-and-Play Reconstruction for 3D MPI Data*, (2023) in AIP: Conference Proceedings, AIP Publishing LLC, (Accepted);
- Gapyak V., März T., Weinmann A. : *Model-Based Reconstruction of 2D Distributions from 1D Multi-Patch Data in Magnetic Particle Imaging*, (2023) in AIP: Conference Proceedings, AIP Publishing LLC, (Accepted);
- Gapyak V., März T., Weinmann A. : *Quality-Enhancing Techniques for a Two-Stage Model-Based Approach in Magnetic Particle Imaging*, AIP Conf. Proc. 3094, 440002 (2024) 10.1063/5.0213070;

- März T., Gapyak V., Weinmann A. : *A Flexible Mode-Based Regularized Reconstruction Approach for Magnetic Particle Imaging*, AIP Conf. Proc. 3094, 440001 (2024) 10.1063/5.0212522;
- März T., Gapyak V., Weinmann A.: *A Two-Stage Model-Based regulariyed Reconstruction Approach for Magnetic Particle Imaging*, AIP Conf. Proc. 2939, 100008 (2023) 10.1063/5.0178921;

Talks

- *Machine Learning for System-Matrix-Based Reconstruction in Magnetic Particle Imaging*, ICNAAM 2024, 15 September 2024, Heraklion, Greece.
- *Learning-Based Reconstruction in Magnetic Particle Imaging*, AMEE 2024, 9 June 2024, Sozopol, Bulgaria.
- *A Zero-Shot L1-Plug-and-Play Approach for System-Matrix-Based MPI*, ICNAAM 2023, Poster Presentation at IWMPI 2024, 14.3.2024, Flüeli-Ranft, Switzerland.
- *Reconstruction Techniques for 3D Field-FreeLine Magnetic Particle Imaging*, ICNAAM 2023, 15 September 2023, Heraklion, Greece.
- *Model-Based Reconstruction Techniques for Multi-Patch Data in Magnetic Particle Imaging*, AMEE 2023, 11 June 2023, Sozopol, Bulgaria.
- *Quality-Enhancing Techniques for a two-stage Model-Based Approach for Magnetic Particle Imaging*, ICNAAM 2022, 23 September 2022, Heraklion Greece.

Teaching

- Lecturer in *Complex Analysis*, winter semester 2024/2025
- *Differential Geometry* Lecturer Prof. Weinmann, summer semester 2023/2024
- Seminar: *Generative Models for Computer Vision*, with Prof. Andreas Weinmann, Winter Semester 2023/2024;
- Complex Analysis, Lecturer Prof. Weinmann, Winter Semester 2023/2024;
- Seminar: *Inverse Problems, Imaging and Learning*, with Prof. Thomas März, Summer Semester 2022/2023;
- Complex Analysis, Lecturer Prof. Weinmann, Winter Semester 2022/2023;
- Ordinary Differential Equations, Lecturer Prof. Weinmann, Winter Semester 2022/2023;
- Seminar: *Regularization meets Machine Learning*, with Pro. Weinmann, Summer Semester 2021/2022

Thesis Supervisor

- *A PnP-Technique with Integrated Super-resolution for MPI*, Master Degree in Applied Mathematics, Jan. 2025 - Current
- *Machine Learning-Based Regularization for Magnetic Particle Imaging*, Master Degree in Data Science, Oct. 2022 - Jun. 2023 (with Prof. Weinmann)

Technical skills

Programming: Python (NumPy, Pytorch)
Operating systems: Windows, Linux
Developer Tools: Git

Additional information

Languages: Italian (Native), English (C2 - IELTS 8.5), German (B2), Russian (B1)
Nationality: Italian