

Teresa Klatzer

PhD Researcher at the University of Edinburgh, UK | E-mail | Website | Scholar Profile | Github | LinkedIn
Nationality: Austrian | Languages: German, English, French

Summary

Passionate researcher at the intersection of machine learning, Bayesian computation, and imaging inverse problems with a strong background in computer science and mathematics. Skilled in Python, PyTorch, and various ML libraries. Excellent problem-solving, writing, and collaboration abilities. Seeking a challenging interdisciplinary research position to contribute to cutting-edge science and foundational AI research.

Education

University of Edinburgh

PhD in Applied and Computational Mathematics

Edinburgh, UK
Sept 2021 – Aug 2025 (ongoing)

- Supervisors: Prof Konstantinos Zygalakis and Prof Marcelo Pereyra
- Research project: Bayesian computation for low-photon imaging

Graz University of Technology, Austria

MSc in Telematics (with distinction)

Graz, Austria
Oct 2012 – Sept 2014

- Interdisciplinary study: Information technology, electrical engineering, computer science
- Majors in Computational Intelligence and Software Technology
- Master's thesis: Bi-level Optimization for Support Vector Machines, supervised by Prof Thomas Pock
- Master's project: State Estimation with Recurrent Neural Networks, supervised by Prof Robert Legenstein

Graz University of Technology, Austria

BSc in Telematics

Graz, Austria
Oct 2008 – Sept 2012

- Bachelor's thesis: Simulation of Global Data Centre Traffic, supervised by Dr Stefan Kraxberger

Université Lille 1 Science et Technologies, France

Erasmus Program

Villeneuve-d'Ascq, France
Sept 2011 – Jan 2012

- Project: Map Reduce Programming for Machine Learning Algorithms on Graphs, supervised by Marc Tommasi and Gemma C. Garriga at INRIA

Research Experience

Postgraduate Researcher

University of Edinburgh

Sept 2021 – Present
Edinburgh, UK

- Developed algorithms for efficient Bayesian computation incorporating machine learning models using PyTorch and Matlab
- Achieved state-of-the-art results for reconstructing photon-starved imaging data with integrated uncertainty quantification
- Contributed to convergence proofs for convex and data-driven machine learning priors
- Executed large-scale experiments using server infrastructure, benchmarked results, and published source code for reproducibility

Research Assistant

Graz University of Technology

July 2014 – Sept 2017
Graz, Austria

- Conducted research in the Computer Vision, Learning and Optimization Group, led by Prof Thomas Pock
- Contributed to the development of variational networks to solve a wide range of image reconstruction problems, including joint denoising and demosaicing, super-resolution, joint reconstruction and classification and medical image reconstruction
- Developed algorithms using convex and non-convex optimization strategies, bi-level optimization and algorithm unrolling
- Co-developed learning frameworks using Theano, TensorFlow, PyTorch and C++/CUDA

Leadership Experience

Product Owner and Agile Coach

April 2020 – Aug 2021

Black Tusk GmbH

Graz, Austria

- Directed the development of medical software products, ensuring alignment with DIN EN ISO 13485 regulatory standards
- Managed product and portfolio strategies for interoperability solutions in healthcare, leveraging the HL7 FHIR standard
- Conducted customer interviews and performed comprehensive requirements engineering
- Facilitated Agile practices within the organization, mentoring teams in Scrum and Agile practices

Product Owner

Nov 2018 – March 2020

Denovo GmbH

Graz, Austria

- Directed several digitization projects within a fixed-price Agile framework, using Scrum practices
- Managed product backlogs, prioritized features to maximize business value, and fostered strong client relationships
- Led the development and deployment of an AI-driven tool for waste management

Project Manager for Digital Business Solutions

Jan 2018 – Oct 2018

Scoop and Spoon GmbH

Graz, Austria

- Led the development of software products, with responsibility for budget, time, project quality and controlling
- Led a pilot project integrating voice assistant technology for marketing
- Acted as key liaison between teams and all stakeholders

Publications

Klatzer, T., Dobson, P., Altmann, Y., Pereyra, M., Sanz-Serna, J. M., & Zygalakis, K. C. (2024). Accelerated Bayesian imaging by relaxed proximal-point Langevin sampling. *SIAM Journal on Imaging Sciences*, 17(2), 1078–1117.

Effland, A., Hölzel, M., Klatzer, T., Kobler, E., Landsberg, J., Neuhäuser, L., Pock, T., & Rumpf, M. (2018). Variational networks for joint image reconstruction and classification of tumor immune cell interactions in melanoma tissue sections. *Bildverarbeitung in der Medizin*, 334–340.

Hammernik, K., Klatzer, T., Kobler, E., Recht, M. P., Sodickson, D. K., Pock, T., & Knoll, F. (2018). Learning a variational network for reconstruction of accelerated mri data. *Magnetic Resonance in Medicine*, 79(6), 3055–3071.

Klatzer, T., Soukup, D., Kobler, E., Hammernik, K., & Pock, T. (2017). Trainable regularization for multi-frame superresolution. In V. Roth & T. Vetter (Eds.), *Pattern recognition* (pp. 90–100). Springer International Publishing.

Kobler, E., Klatzer, T., Hammernik, K., & Pock, T. (2017). Variational networks: Connecting variational methods and deep learning. *Pattern Recognition. GCPR German Conference on Pattern Recognition (GCPR)*, 281–293.

Klatzer, T., Hammernik, K., Knobelreiter, P., & Pock, T. (2016). Learning joint demosaicing and denoising based on sequential energy minimization. *IEEE International Conference on Computational Photography (ICCP)*, 1–11.

Klatzer, T., & Pock, T. (2015). Continuous hyper-parameter learning for support vector machines. *Proceedings of the 20th Computer Vision Winter Workshop, Seggau, Austria*.

Talks and Posters

WiML Workshop at NeurIPS, Vancouver, Canada. (2024). *Poster and contributed talk title: Mirror Langevin Dynamics with Plug-and-Play Priors for Poisson Inverse Problems*.

ICMS Workshop UQIP124: UQ for Inverse Problems and Imaging, Edinburgh, UK. (2024). *Talk title: Bayesian Computation with Plug and Play Priors for Poisson Inverse Problems*.

Mini-symposium "Deep Unrolled Methods for Inverse Imaging Problems" at SIAM Imaging in Atlanta, Georgia, USA. (2024). *Talk title: Bayesian Computation with Plug and Play Priors for Poisson Inverse Problems*.

ICMS workshop on Imaging Inverse Problems and Generating Models: Sparsity and Robustness versus Expressivity, Edinburgh, UK. (2024). *Poster title: Bayesian Computation with Plug-and-Play Priors for Poisson Inverse Problems*.

Mini-symposium "Advances in Bayesian Inverse Problems" at SIAM Conference of Uncertainty Quantification 2024, Trieste, Italy (Invited). (2024). *Talk title: Accelerating MCMC for UQ in Imaging Science by Relaxed Proximal-point Langevin Sampling*.

Applied Inverse Problems (AIP) Conference in Göttingen, Germany. (2023). *Talk title: Accelerating MCMC for imaging science by using an implicit Langevin algorithm.*

Mathematics and Image Analysis (MIA) in Berlin, Germany. (2023). *Poster title: Accelerating MCMC by using an implicit method with applications in imaging science.*

ICMS Workshop on Interfacing Bayesian Statistics, Deep Learning, and Mathematical Analysis for Imaging Inverse Problems, Edinburgh, UK. (2023). *Poster title: Accelerating MCMC by using an implicit method with applications in imaging science.*

Mini-symposium on "Non-standard regularisation: theory and applications" at the Applied Inverse Problems (AIP) conference in Hangzhou, China. (2017). *Talk title: Deep Regularization.*

Interdisciplinary data science workshop on "Mathematical imaging with partially unknown models" in Cambridge, UK. (2017). *Talk title: Learning Variational Networks for Solving Inverse Problems in Imaging.*

International Conference on Computational Photography, Chicago, IL. (2016). *Talk title: Joint Demosaicing and Denoising Based on Sequential Energy Minimization.*

Honors and Awards

SIAM Travel Award and Laura Wisewell Travel Scholarship	2024
▪ Travel funding to attend the SIAM Imaging Science conference in Atlanta, GA, USA.	
Laura Wisewell Travel Scholarship	2023
▪ Travel funding to attend the Mathematics and Image Analysis conference in Berlin, Germany.	
Best Paper Award	2017
▪ German Conference on Pattern Recognition, Basel, Switzerland	
▪ Paper title: "Variational Networks: Connecting Variational Methods and Deep Learning"	
Best Paper Award	2015
▪ Computer Vision Winter Workshop, Seggau, Austria	
▪ Paper title: "Continuous Hyper-parameter Learning for Support Vector Machines"	
Scholarship of Excellence	2012
▪ Graz University of Technology	

Teaching Experience

University Tutor	Jan 2022 – Present
<i>University of Edinburgh</i>	<i>Edinburgh, UK</i>
▪ Subjects: Machine Learning in Python, Calculus, Linear Algebra, Stochastic and Ordinary Differential Equations	
Teaching Assistant	2010 – 2015
<i>Graz University of Technology</i>	<i>Graz, Austria</i>
▪ Subjects: Convex Optimization, Analysis, Computer and communication networks	

Skills and Expertise

Research areas: Computational Statistics, Probabilistic Methods, Machine Learning, Uncertainty Quantification, Generative AI, Neural Networks, Variational Networks, Optimization, Inverse Problems, Imaging Science, Computer Vision

Programming Languages: Python, Matlab, C++, C, CUDA, Java

Deep Learning Frameworks: PyTorch, TensorFlow

Libraries & Tools: Git, NumPy, Pandas, Scikit-learn, OpenCV, DeepInV, Hadoop

Management: Agile Software Development, Scrum, Coaching

Volunteering and Outreach

- Committee member of Piscopia** 2023 - Present
- Organizing activities supporting women and non-binary students pursuing a PhD in Mathematics
- Presenter at the Edinburgh Science Festival** April 2023
- Performed stand-up comedy "My life with inverse problems" explaining my PhD topic to a general audience
- Co-founder of a Youtube channel "Warum nicht leicht"** 2020 - 2021
- Produced educational videos and other content about personal development
- Founding member of a dance association, Salsativity.org, Graz, Austria** 2018

Certifications

- Life coaching and Counselling certification at Balanckademie in Graz, Austria** 2018-2020
- 600h training and 750h practice

References

Prof Konstantinos Zygalakis, University of Edinburgh, k.zygalakis@ed.ac.uk
Prof Marcelo Pereyra, Heriot-Watt University, Edinburgh, m.pereyra@hw.ac.uk
Dr Tobías I. Liaudat, IRFU, CEA Paris-Saclay, Gif-sur-Yvette, France, tobiasliaudat@gmail.com
Dr Paul Dobson, Heriot-Watt University, Edinburgh, p.dobson_1@hw.ac.uk