

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.

Research Experience

Postgraduate Researcher

Sept 2021 – Present

University of Edinburgh

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
- Co-developed 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

July 2014 – Sept 2017

Graz University of Technology

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

Education

University of Edinburgh

Edinburgh, UK

PhD in Applied and Computational Mathematics

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

Graz, Austria

MSc in Telematics (with distinction)

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

Graz, Austria

BSc in Telematics

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

Villeneuve-d'Ascq, France

Erasmus Program

Sept 2011 – Jan 2012

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

Teaching Experience

University Tutor

Jan 2022 – Present

University of Edinburgh

Edinburgh, UK

- Subjects: Machine Learning in Python, Calculus, Linear Algebra, Stochastic and Ordinary Differential Equations

Teaching Assistant

2010 – 2015

Graz University of Technology

Graz, Austria

- Subjects: Convex Optimization, Analysis, Computer and communication networks

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

Skills and Expertise

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

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

Deep Learning Frameworks: PyTorch, TensorFlow

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

Management: Agile software development, Scrum, Coaching

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

Volunteering and Outreach

Committee member of Piscopia

2023 - Present

- Organizing activities supporting women and non-binary students doing 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 Balancakademie 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

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.*

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*.