Fredrik K. Gustafsson

Postdoctoral Researcher · University of Oxford

+447826918964 | fregu856@gmail.com | fregu856.com | fregu856 | fregu856

Education

Uppsala University
2018 - 2023 | Doctor of Philosophy (PhD), Machine Learning

Linköping University
2016 - 2018 | Master of Science (MSc), Electrical Engineering

Stanford University
2016 - 2017 | Graduate Exchange Student, Electrical Engineering

Linköping University
2013 - 2016 | Bachelor of Science (BSc), Applied Physics and Electrical Engineering

Professional Experience

Postdoctoral Research Assistant — *Oxford, UK*
University of Oxford, Institute of Biomedical Engineering — *Jul. 2025 - present*
- Machine learning for healthcare with a particular focus on biosignals and wearables, in the group of David Clifton.

Postdoctoral Researcher — *Stockholm, Sweden*
Karolinska Institutet, Department of Medical Epidemiology and Biostatistics — *Dec. 2023 - Jun. 2025*
- Machine learning and computer vision for computational pathology, in the group of Mattias Rantalainen.

PhD Student — *Uppsala, Sweden*
Uppsala University, Department of Information Technology — *Oct. 2018 - Nov. 2023*
- Thesis: *Towards Accurate and Reliable Deep Regression Models*.
- Supervisors: Thomas Schön & Martin Danelljan.

Contingent Worker — *Remote*
Facebook Reality Labs, FRL Research Pittsburgh — *Sep. 2021 - Dec 2021*
- Part-time internship extension.

Research Intern — *Remote*
Facebook Reality Labs, FRL Research Pittsburgh — *Jun. 2021 - Sep. 2021*
- 3D human pose estimation, working with Weipeng Xu (remote due to COVID-19).

Software Engineer — *Munich, Germany*
BMW Group — *Aug. 2018*
- Feature development for autonomous driving and advanced driver assistance systems.

MSc Thesis Student — *Gothenburg, Sweden*
Zenuity — *Jan. 2018 - Jun. 2018*
- 3D detection of vehicles in LiDAR and/or image data, using deep learning.

Summer Intern — *Gothenburg, Sweden*
Zenuity — *Jun. 2017 - Aug. 2017*
- Developed a deep learning demo/test platform based on a standard 1/10 scale RC car.

Summer Intern — *Trollhättan, Sweden*
T Engineering — *Jun. 2016 - Aug. 2016*
- Developed a web tool for visualization of car engine sensor data for a fleet of test vehicles.

Teaching Assistant *Linköping, Sweden*
Linköping University, Department of Mathematics *Aug. 2014 - Dec. 2015*

Publications

[Cited by –] 20 – 49 citations. [Cited by –] 50 – 99 citations. [Cited by –] 100 – 249 citations. [Cited by –] 250+ citations.

Citation counts based on Google Scholar, shown for papers with 20+ citations.

Preprints

[P5] **Scanner-Induced Domain Shifts Undermine the Robustness of Pathology Foundation Models**
Erik Thiringer, Fredrik K. Gustafsson, Kajsa Ledesma Eriksson, Mattias Rantalainen
Preprint

[P4] **Forward-only Diffusion Probabilistic Models**
Ziwei Luo, Fredrik K. Gustafsson, Jens Sjölund, Thomas B. Schön
Preprint

[P3] **Multi-Stain Modelling of Histopathology Slides for Breast Cancer Prognosis Prediction**
Abhinav Sharma, Fredrik K. Gustafsson, Johan Hartman, Mattias Rantalainen
Preprint

[P2] **Evaluating Computational Pathology Foundation Models for Prostate Cancer Grading under Distribution Shifts**
Fredrik K. Gustafsson, Mattias Rantalainen
Preprint

[P1] **Evaluating Deep Regression Models for WSI-Based Gene-Expression Prediction**
Fredrik K. Gustafsson, Mattias Rantalainen
Preprint

Journal Papers

[J5] **Taming Diffusion Models for Image Restoration: A Review**
Ziwei Luo, Fredrik K. Gustafsson, Zheng Zhao, Jens Sjölund, Thomas B. Schön
Philosophical Transactions of the Royal Society A, 2025

[J4] **Automated Segmentation of Synchrotron-Scanned Fossils**
Melanie A.D. During, Jordan K. Matelsky, Fredrik K. Gustafsson, Dennis F.A.E. Voeten, Donglei Chen, Brock A. Wester, Konrad P. Körding, Per E. Ahlberg, Thomas B. Schön
Fossil Record, 2025

[J3] **Evaluating Regression and Probabilistic Methods for ECG-Based Electrolyte Prediction**
Philipp Von Bachmann, Daniel Gedon, Fredrik K. Gustafsson, Antônio H. Ribeiro, Erik Lampa, Stefan Gustafsson, Johan Sundström, Thomas B. Schön
Scientific Reports, 2024

[J2] **How Reliable is Your Regression Model's Uncertainty Under Real-World Distribution Shifts?**
Fredrik K. Gustafsson, Martin Danelljan, Thomas B. Schön
Transactions on Machine Learning Research (TMLR), 2023

[J1] **Uncertainty-Aware Body Composition Analysis with Deep Regression Ensembles on UK Biobank MRI** [Cited by 20]
Taro Langner, Fredrik K. Gustafsson, Benny Avelin, Robin Strand, Håkan Ahlström, Joel Kullberg
Computerized Medical Imaging and Graphics, 2021

Conference Papers

[C6] **Controlling Vision-Language Models for Multi-Task Image Restoration** [Cited by 235]
Ziwei Luo, Fredrik K. Gustafsson, Zheng Zhao, Jens Sjölund, Thomas B. Schön
International Conference on Learning Representations (ICLR), 2024

[C5] **Image Restoration with Mean-Reverting Stochastic Differential Equations** [Cited by 325]
Ziwei Luo, Fredrik K. Gustafsson, Zheng Zhao, Jens Sjölund, Thomas B. Schön
The International Conference on Machine Learning (ICML), 2023

[C4] **Learning Proposals for Practical Energy-Based Regression**
Fredrik K. Gustafsson, Martin Danelljan, Thomas B. Schön
The International Conference on Artificial Intelligence and Statistics (AISTATS), 2022

[C3] **Deep Energy-Based NARX Models**
Johannes Hendriks, Fredrik K. Gustafsson, Antônio Ribeiro, Adrian Wills, Thomas B. Schön
The 19th IFAC Symposium on System Identification (SYSID), 2021

[C2] **How to Train Your Energy-Based Model for Regression** [Cited by 45]
Fredrik K. Gustafsson, Martin Danelljan, Radu Timofte, Thomas B. Schön
The British Machine Vision Conference (BMVC), 2020

[C1] **Energy-Based Models for Deep Probabilistic Regression** [Cited by 90]
Fredrik K. Gustafsson, Martin Danelljan, Goutam Bhat, Thomas B. Schön
The European Conference on Computer Vision (ECCV), 2020

Conference Workshop Papers

[W4] **Photo-Realistic Image Restoration in the Wild with Controlled Vision-Language Models** [Cited by 25]
Ziwei Luo, Fredrik K. Gustafsson, Zheng Zhao, Jens Sjölund, Thomas B. Schön
The IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPR Workshops), 2024

[W3] **Refusion: Enabling Large-Size Realistic Image Restoration with Latent-Space Diffusion Models** [Cited by 190]
Ziwei Luo, Fredrik K. Gustafsson, Zheng Zhao, Jens Sjölund, Thomas B. Schön
The IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPR Workshops), 2023

[W2] **Accurate 3D Object Detection using Energy-Based Models**
Fredrik K. Gustafsson, Martin Danelljan, Thomas B. Schön
The IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPR Workshops), 2021

[W1] **Evaluating Scalable Bayesian Deep Learning Methods for Robust Computer Vision** [Cited by 430]
Fredrik K. Gustafsson, Martin Danelljan, Thomas B. Schön
The IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPR Workshops), 2020

Theses

[T2] **Towards Accurate and Reliable Deep Regression Models**
Fredrik K. Gustafsson
PhD Thesis in Machine Learning, Uppsala University, 2023

[T1] **Automotive 3D Object Detection Without Target Domain Annotations**
Fredrik K. Gustafsson, Erik Linder-Norén
MSc Thesis in Electrical Engineering, Linköping University, 2018

Supervision Experience

Ziwei Luo, PhD student at Uppsala University
Co-supervisor, since Feb. 2024
Main supervisor: Thomas Schön, other co-supervisor: Jens Sjölund

Erik Thiringer, MSc Thesis student at Karolinska Institutet
Co-supervisor, Sep. 2024 - Feb. 2025
Main supervisor: Mattias Rantalainen
Subsequent position: Research Assistant at Karolinska Institutet

Teaching Experience

Uppsala University

Spr. 2023	**1RT495 Automatic Control II (MSc)**, Teaching Assistant *(problem-solving sessions, grading)*
Aut. 2022	**1RT700 Statistical Machine Learning (MSc)**, Teaching Assistant *(problem-solving sessions, grading)*
Aut. 2022	**1RT890 Empirical Modelling (MSc)**, Teaching Assistant *(problem-solving sessions, labs, grading)*
Spr. 2022	**1RT700 Statistical Machine Learning (MSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Aut. 2021 **1RT890 Empirical Modelling (MSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Spr. 2021 **1RT495 Automatic Control II (MSc)**, Teaching Assistant *(computer labs, labs)*

Spr. 2021 **1RT490 Automatic Control I (BSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Aut. 2020 **1RT890 Empirical Modelling (MSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Spr. 2020 **1RT700 Statistical Machine Learning (MSc)**, Lab Assistant

Spr. 2020 **1RT490 Automatic Control I (BSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Aut. 2019 **1RT490 Automatic Control I (BSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Spr. 2019 **Deep Learning (PhD)**, Teaching Assistant *(help desks, grading)*

Spr. 2019 **1RT700 Statistical Machine Learning (MSc)**, Lab Assistant

Spr. 2019 **1RT490 Automatic Control I (BSc)**, Teaching Assistant *(problem-solving sessions, grading)*

Linköping University

Aut. 2015 **TATA24 Linear Algebra (BSc)**, Teaching Assistant *(mentor sessions)*

Aut. 2015 **TATM79 Found. Course in Mathematics (BSc)**, Teaching Assistant *(supervisor sessions, grading)*

Aut. 2014 **TATA24 Linear Algebra (BSc)**, Teaching Assistant *(mentor sessions)*

Aut. 2014 **TAIU10 Calculus One Variable, Prep. Course (BSc)**, Teaching Assistant *(problem-solving sessions)*

Academic Service

Reviewing

MIDL
2026 (4 Papers), 2025 (4 Papers)

AISTATS
2026 (1 Paper), 2025 (2 Papers), 2024 (5 Papers), 2023 (3 Papers), 2022 (3 Papers)

ICLR
2026 (5 Papers), 2024 (5 Papers)

NeurIPS
2025 (5 Papers), 2024 (6 Papers), 2023 (6 Papers, *recognized as one of the top reviewers*)

ICML
2025 (5 Papers), 2024 (6 Papers)

TMLR
2025 (6 Papers), 2024 (3 Papers)

BRAVO Workshop at ICCV 2023, 1 Paper

BMVC
2023 (5 Papers), 2022 (6 Papers), 2021 (6 Papers), 2020 (1 Paper)

ICCV 2023, 4 Papers

AAAI
2023 (3 + 4 Papers), 2022 (4 + 2 Papers)

ECCV 2022, 8 Papers

CVPR 2022, 2 Papers

EBM Workshop at ICLR 2021, 3 Papers

ICRA 2021, 1 Paper

IFAC World Congress 2020, 2 Papers

Talks

Invited Talks

How Reliable is Your Regression Model's Uncertainty Under Real-World Distribution Shifts?
RISE Learning Machines Seminars, *Online*, Mar 2024 [slides] [video]

How Reliable is Your Regression Model's Uncertainty Under Real-World Distribution Shifts?
DFKI Augmented Vision Workshop, *Online*, Oct 2023 [slides]

Accurate 3D Object Detection using Energy-Based Models
Zenseact, *Online*, Jan 2021 [slides]

Evaluating Scalable Bayesian Deep Learning Methods for Robust Computer Vision
Zenuity, *Gothenburg, Sweden*, Jun 2019 [slides]

Contributed Talks

Building and Evaluating Computational Pathology Foundation Models for Breast Cancer
The Swedish e-Science Research Centre (SeRC) Annual Meeting, *Stockholm, Sweden*, May 2025 [slides]

On the Use and Evaluation of Computational Pathology Foundation Models for WSI-Based Prediction Tasks
The Scandinavian Seminar on Translational Pathology (ScanPath), *Uppsala, Sweden*, Nov 2024 [slides]

Evaluating Computational Pathology Foundation Models for Prostate Cancer Grading under Distribution Shifts
The 30th Mayo-KI Annual Scientific Research Meeting, *Stockholm, Sweden*, Oct 2024 [slides]

Awards

The Tryggve Holm medal for *"outstanding student achievements"* at Linköping University, 2018.

Open Source Contributions

`github.com/fregu856/deeplabv3`, 810 Stars

`github.com/fregu856/papers`, 405 Stars

`github.com/fregu856/3DOD_thesis`, 285 Stars

`github.com/fregu856/segmentation`, 245 Stars

`github.com/fregu856/evaluating_bdl`, 130 Stars

`github.com/fregu856/2D_detection`, 130 Stars

`github.com/fregu856/ebms_regression`, 105 Stars

`github.com/fregu856/CS224n_project`, 65 Stars

`github.com/fregu856/ebms_3dod`, 60 Stars

Academic Network

Co-Authors

Thomas Schön, Professor at Uppsala University
15 papers. Years with papers: 2025 - 2020

Ziwei Luo, PhD student at Uppsala University
6 papers. Years with papers: 2025 - 2023

Jens Sjölund, Assistant professor at Uppsala University
6 papers. Years with papers: 2025 - 2023

Martin Danelljan, Senior Research Engineer at Apple
6 papers. Years with papers: 2023 - 2020

Zheng Zhao, Assistant professor at Linköping University
5 papers. Years with papers: 2025 - 2023

Mattias Rantalainen, Associate professor at Karolinska Institutet
4 papers. Years with papers: 2026, 2024

Antônio H. Ribeiro, Assistant professor at Uppsala University
2 papers. Years with papers: 2024, 2021

Languages

Swedish (native), English (fluent).