Valentin Bacher

DPhil Student in Computer Science

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Education

since 2025 — **DPhil in Computer Science** — Oxford, United Kingdom
University of Oxford
Working on 3D reconstruction, ultrasound image formation, and clinically relevant image enhancement using machine learning and radiance fields. Supervised by Prof. Ana IL Namburete and Dr. Michael Gray.

2021–2023 — **MSc in Medical Image and Data Processing** — Erlangen, Germany
Friedrich-Alexander-Universitaet Erlangen-Nuernberg
Deep learning, computer vision, and machine learning in medicine. Grade 1.0, top 3%.

2021–2023 — **MSc in Computational Engineering** — Erlangen, Germany
Friedrich-Alexander-Universitaet Erlangen-Nuernberg
Double degree focused on algebra, numerics, and high-performance computing. Grade 1.1, top 5%.

2021–2023 — **MSc in Computational Science** — Lugano, Switzerland
Universita della Svizzera italiana
Double degree focused on statistics, numerics, and high-performance computing. Grade 9.74, summa cum laude.

2017–2021 — **BSc in Medical Engineering** — Erlangen, Germany
Friedrich-Alexander-Universitaet Erlangen-Nuernberg
Computer science, signal processing, electrical engineering, and deep learning. Grade 1.4, top 2%.

2008–2016 — **Abitur (A-Levels)** — Ditzingen, Germany
Gymnasium in der Glemsaue
Grade 1.0, Highest achievable grade, best in class, top 2% in Baden-Württemberg (state).

Research Experience

2024 — **Research Assistant** — Oxford, United Kingdom
University of Oxford, Department of Computer Science
- Evaluated physics-informed ultrasound simulation.
- Ultrasound image formation to guide later doctoral research.

2023 — **Visiting Researcher** — Oxford, United Kingdom
University of Oxford, Department of Computer Science
- Completed master's thesis work on artefact reduction in slice-to-volume ultrasound reconstruction.
- Combined computer vision, physics-informed machine learning, and fetal ultrasound analysis.

2020–2022 — **Working Student** — Forchheim, DE
Siemens Healthineers GmbH
- Developed AI-based metal artefact reduction techniques in mobile C-Arms.
- Worked on CT reconstruction, image segmentation, and metal artefact reduction.

2020 — **Visiting Researcher** — Stanford, CA, United States
Stanford University, Radiological Sciences Laboratory
- Worked on learning projection matrices for marker-free motion compensation in weight-bearing CT.
- Integrated known-operator learning with CT reconstruction constraints.

Selected Publications

[1] V. Bacher, P. H. Yeung, B. Kainz, M. K. Wyburd, N. K. Dinsdale, M. Gray, and A. I. Namburete, Shadow reduction in ultrasound imaging using differentiable simulation and radiance field decomposition, **Priority application filed, Patent pending. Will be submitted to Medical Image Analysis in August 2026. Project page, Preprint and code will be released upon submission.** 2026.

[2] J. Bai, V. Bacher, et al., "Beyond benchmarks of iugc: Rethinking requirements of deep learning method for intrapartum ultrasound biometry from fetal ultrasound videos," Medical Image Analysis, 2026. DOI: 10.1016/j.media.2026.104043.

[3] Y. Gao, V. Bacher, and A. I. NAmburete, "Learning to annotate, optimizing to estimate: A de-amortized inference framework for ultrasound confidence maps," in Proceedings of the 29th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), **Accepted as Poster. Will be published in October 2026.** 2026. [Online]. Available: https://openreview.net/forum?id=QMFRkbu1tD.

[4] V. Bacher, C. Syben, A. Maier, and A. Wang, "Learning projection matrices for marker-free motion compensation in weight-bearing ct scans," in Proceedings of the 16th Virtual International Meeting on Fully 3D Image Reconstruction in Radiology and Nuclear Medicine, **Best Paper Award nomination**, 2021, pp. 327–330. DOI: 10.48550/arXiv.2110.04143.

Teaching and Outreach

2024–present — **Computer Science Outreach** — Oxford, United Kingdom
University of Oxford
Introductory medical image processing and machine learning sessions for prospective students.

2020–2021 — **Teaching Assistant, Deep Learning** — Erlangen, Germany
Friedrich-Alexander-Universitaet Erlangen-Nuernberg
Supported neural networks, convolutional models, recurrent models, coding sessions, and assessment.

2019–2020 — **Teaching Assistant, Signals and Systems I** — Erlangen, Germany
Friedrich-Alexander-Universitaet Erlangen-Nuernberg
Supported continuous signals, linear systems, transforms, state-space methods, and sampling.

2018–2019 — **Teaching Assistant, Foundations of Electrical Engineering I** — Erlangen, Germany
Friedrich-Alexander-Universitaet Erlangen-Nuernberg
Supported electrostatics, circuits, AC analysis, semiconductor devices, and basic circuit design.

Awards and Funding

since 2025 — **Clarendon Scholarship** — Oxford, United Kingdom
University of Oxford

2023 — **IFI International Research Stay Funding** — Oxford, United Kingdom
German Academic Exchange Service (DAAD)

2023 — **ERASMUS Mobility Scholarship** — Lugano, Switzerland
Friedrich-Alexander-Universitaet Erlangen-Nuernberg

2019–2023 — **Scholarship** — Erlangen, Germany
German Academic Scholarship Foundation

2019–2023 — **Scholarship** — Erlangen, Germany
Max-Weber-Programm

2021 — **Best Paper Award Nomination**
Fully 3D Image Reconstruction in Radiology and Nuclear Medicine

Personal Development

since 2026 — **Clarendon Scholars Association**, Alumni Officer — Oxford, United Kingdom

since 2025 — **Oxford University Mountaineering Club**, Treasurer — Oxford, United Kingdom

2017–2023 — **Student Association for Medical Engineering Studies**, Member — Erlangen, Germany

2020–2021 — **Local Group of the German Academic Scholarship Foundation**, Spokesperson — Erlangen, Germany

2017–2020 — **ETG - Local Student Group of the VDE e.V.**, Member — Erlangen, Germany