Dr. Tim Adler

Curriculum Vitae

⌂ *Berlin, Germany*
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Employment

06.2025 – **Machine learning researcher**, *Bayer AG, Germany*
- Developing and deploying protein co-folding models to support pharmaceutical active agent research

06.2023 – 05.2025 **Senior data & applied scientist**, *hema.to GmbH, Germany*
- Developed, evaluated, and deployed a deep classifier in TensorFlow predicting new leukemia types based on flow cytometry data
- Unified inference setup with ONNX, significantly reducing deployment complexity and maintenance overhead by consolidating ML framework dependencies
- Implemented the CI/CD pipeline for all our production models as GitHub Actions
- Performed PostgreSQL database migration and developed dashboards to gain insight into our database state

04.2018 – 04.2023 **Machine learning researcher**, *Division of Intelligent Medical Systems, German Cancer Research Center (DKFZ), Germany*
- Developed an unsupervised deep learning model in PyTorch based on out-of-distribution detection to estimate human tissue oxygenation and validated the model in a patient study (90% success rate)
- Developed a framework to explore the well-posedness of inverse problems empirically using normalizing flows and validated the approach in the multispectral and photoacoustic medical imaging domain
- Led the endoscopy team (2020 – 2023) consisting of 4 – 7 Ph. D. students, coordinating weekly meetings, supervising conference submissions, and providing technical guidance
- Contributed to successful grant applications through conceptual input and technical writing, including an ERC consolidator grant
- Maintained research collaboration with the Visual Learning Lab at Heidelberg University

10.2012 – 02.2017 **Teaching & research assistant**, *Heidelberg University, Germany*
- Teaching assistant for five lectures in the mathematics bachelor and master degree program
- Evaluation of remotely sensed nitrogen oxides data for car emission measurements

01.2015 – 05.2015 **Lecturer, *Introduction to ordinary differential equations***, *University of North Carolina at Chapel Hill, USA*
- Independent conception of the course schedule, homework, tests, and grades

03.2012 – 09.2014 **Reviewer for the German accreditation system for university degree programs**
- Reviewer for mathematics, physics, and computer science programs throughout Germany

Education

04.2018 – 12.2022 **Computer Science (Dr. rer. nat.)**, *Heidelberg University, Germany*, Thesis: Uncertainty quantification in biophotonic imaging using invertible neural networks
Final grade: summa cum laude

02.2014 – 12.2017 **Mathematics (M. Sc.)**, *Heidelberg University, Germany*, Final grade: 1.0

10.2010 – 05.2016 **Physics (B. Sc.)**, *Heidelberg University, Germany*, Final grade: 1.1

08.2014 – 05.2015 **Exchange Graduate Student**, *University of North Carolina at Chapel Hill, USA*

10.2011 – 02.2014 **Mathematics (B. Sc.)**, *Heidelberg University, Germany*, Final grade: 1.0

09.2001 – 07.2010 **Abitur**, *Hartmanni-Gymnasium Eppingen, Germany*, Final grade: 1.0

Relevant technical skills

Programming	Python (strong), Bash, C++, R, SQL, Zsh (all advanced), Go, Rust (all basic)
Frameworks	PyTorch, Lightning, scikit-learn (all strong), Hugging Face, ONNX, TensorFlow, SQLAlchemy (all advanced), FastAPI (basic)
Tools	git, LaTeX, Ansible (all strong), GitHub Actions, Docker, GCP, ZenML, Kubernetes (all advanced), AWS, Terraform, Terragrunt (all basic)
OS	Linux, in particular Debianoids (strong)

Scholarships

2018 – 2022 **Helmholtz International Graduate School for Cancer Research**, *Scholarship*
- ○ Attended "Biology for non-biologists" (1 semester, topics: molecular biology, genome sequencing, etc.)

2013 – 2017 **German Academic Scholarship Foundation**, *Scholarship*
- ○ Attended workshops on computational biology (2 weeks) and protein biosynthesis (1 week)

2015 **Heidelberg Laureate Forum Foundation**, *Participation in the 3rd Heidelberg Laureate Forum*

2014 **Fulbright Commission**, *Travel grant*

Social commitment

2023 – 2024 **Akademie Danach**, *Germany*
- ○ Yearly retreat for Alumni of the German Academic Scholarship Foundation (participant-organized)
- ○ My workshop contributions: Statistical fallacies & paradoxes (2023), Geolocation of image data (2024)

2019 – 2022 **Life-Science-Lab (math working group)**, *Heidelberg, Germany*
- ○ Foster highly motivated high school students in STEM
- ○ Yearly topics: Group theory & the Rubik's cube, non-Euclidean geometry, knot theory

2010 – 2021 **NoName e. V.**, *Heidelberg, Germany*
- ○ Local Unix user group with weekly presentations
- ○ Presented topics: bias-variance tradeoff, ML ethics, elliptic curves, and key card security

2010 – 2017 **Student representation**, *Heidelberg University, Germany*
- ○ Member of diverse boards of academic administration (e. g., senate, faculty board, etc.)

Language skills

German (native), English (fluent), French (advanced), Spanish (beginner)

Hobbies

Guitar play, Yoga, Hiking, Spinning, Paragliding, Pen-and-Paper Roleplaying Games

First author publications

Leonardo Ayala* and Tim J Adler* et al. "Spectral imaging enables contrast agent-free real-time ischemia monitoring in laparoscopic surgery". In: *Science Advances* 9.10 (2023), eadd6778.

Tim J Adler* and Jan-Hinrich Nölke* et al. "Application-driven Validation of Posteriors in Inverse Problems". In: *arXiv preprint arXiv:2309.09764* (2023).

Tim J Adler et al. "Out of distribution detection for intra-operative functional imaging". In: *Uncertainty for Safe Utilization of Machine Learning in Medical Imaging and Clinical Image-Based Procedures*. Springer, 2019, pp. 75–82.

Tim J Adler et al. "Uncertainty handling in intra-operative multispectral imaging with invertible neural networks". In: *Medical Imaging with Deep Learning (MIDL)*. 2019.

Tim J Adler et al. "Uncertainty-aware performance assessment of optical imaging modalities with invertible neural networks". In: *International journal of computer assisted radiology and surgery* 14.6 (2019), pp. 997–1007.

*: Equal contribution

▬▬▬▬▬ Co-author publications

Patrick Godau et al. "Beyond Knowledge Silos: Task Fingerprinting for Democratization of Medical Imaging AI". In: *arXiv preprint arXiv:2412.08763* (2024).

Jan-Hinrich Nölke et al. "Photoacoustic quantification of tissue oxygenation using conditional invertible neural networks". In: *IEEE Transactions on Medical Imaging* (2024).

Andreas Deckert et al. "Comparison of Four Active SARS-CoV-2 Surveillance Strategies in Representative Population Sample Points: Two-Factor Factorial Randomized Controlled Trial". In: *JMIR Public Health and Surveillance* 9 (2023), e44204.

Kris K Dreher et al. "Unsupervised domain transfer with conditional invertible neural networks". In: *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. 2023, pp. 770–780.

Matthias Eisenmann et al. "Why is the winner the best?" In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*. 2023, pp. 19955–19966.

Tobias Roß et al. "Beyond rankings: Learning (more) from algorithm validation". In: *Medical image analysis* 86 (2023), p. 102765.

Thuy Nuong Tran et al. "Sources of performance variability in deep learning-based polyp detection". In: *International Journal of Computer Assisted Radiology and Surgery* (2023), pp. 1–12.

Amine Yamlahi et al. "Self-distillation for surgical action recognition". In: *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer. 2023, pp. 637–646.

Lena Maier-Hein et al. *Method and system for augmented imaging in open treatment using multispectral information*. US Patent App. 17/263,850. Jan. 2022.

Lucas-Raphael Müller et al. "Robust hand tracking for surgical telestration". In: *International Journal of Computer Assisted Radiology and Surgery* (2022), pp. 1–10.

Silvia Seidlitz et al. "Robust deep learning-based semantic organ segmentation in hyperspectral images". In: *Medical Image Analysis* (2022), p. 102488.

David Zimmerer et al. "MOOD 2020: A public Benchmark for Out-of-Distribution Detection and Localization on medical Images". In: *IEEE Transactions on Medical Imaging* (2022).

Leonardo Ayala et al. "Video-rate multispectral imaging in laparoscopic surgery: First-in-human application". In: *arXiv preprint arXiv:2105.13901* (2021).

Andreas Deckert et al. "Effectiveness and cost-effectiveness of four different strategies for SARS-CoV-2 surveillance in the general population (CoV-Surv Study): Study protocol for a two-factorial randomized controlled multi-arm trial with cluster sampling". In: *Trials* 22.1 (2021), pp. 1–9.

Janek Gröhl et al. "Learned spectral decoloring enables photoacoustic oximetry". In: *Scientific reports* 11.1 (2021), pp. 1–12.

Lena Maier-Hein et al. "Heidelberg colorectal data set for surgical data science in the sensor operating room". In: *Scientific data* 8.1 (2021), p. 101.

Jan-Hinrich Nölke et al. "Invertible neural networks for uncertainty quantification in photoacoustic imaging". In: *Bildverarbeitung für die Medizin 2021*. Springer, 2021, pp. 330–335.

Alexander Studier-Fischer et al. "Spectral organ fingerprints for intraoperative tissue classification with hyperspectral imaging". In: *bioRxiv* (2021).

Leonardo Ayala et al. "Light source calibration for multispectral imaging in surgery". In: *International Journal of Computer Assisted Radiology and Surgery* (2020), pp. 1–9.

Janek Gröhl et al. "Deep learning-based oxygenation estimation for multispectral photoacoustic imaging (Conference Presentation)". In: *Photons Plus Ultrasound: Imaging and Sensing 2020*. Ed. by Alexander A. Oraevsky et al. Vol. 11240. International Society for Optics and Photonics. SPIE, 2020.

Darya Trofimova et al. "Representing Ambiguity in Registration Problems with Conditional Invertible Neural Networks". In: *arXiv preprint arXiv:2012.08195* (2020).

Janek Gröhl et al. "Estimation of blood oxygenation with learned spectral decoloring for quantitative photoacoustic imaging (LSD-qPAI)". In: *arXiv preprint arXiv:1902.05839* (2019).

Thomas Kirchner et al. "Photoacoustics can image spreading depolarization deep in gyrencephalic brain". In: *Scientific reports* 9.1 (2019), pp. 1–9.

Edgar Santos Marcial et al. "The use of photoacoustics to measure cerebral blood volume and cerebral oxygenation". In: *Journal of cerebral blood flow and metabolism*. Vol. 39. Sage Publications Inc 2455 Teller Rd, Thousand Oaks, CA 91320 USA. 2019, pp. 481–481.

Janek Gröhl et al. "Confidence Estimation for Machine Learning-Based Quantitative Photoacoustics". In: *Journal of Imaging* 4.12 (2018), p. 147.