Clemens Schmid

Situlistrasse 44
80939 München
+49 176 32680891

📧 cschmid@tuta.io
🔗 clemisch.github.io

PhD candidate in biomedical imaging with X-rays at TUM. Interested in new X-ray imaging methods, computational physics, and the use of modern tools to advance scientific computing in an efficient and human-friendly manner.

Research interests

Inverse problems, computational physics, and image processing in the context of medical imaging.

Nonlinear optimization with focus on statistical-iterative reconstruction methods; so far especially for computed tomography and phase-contrast with X-rays.

Using modern AI tooling for fast prototyping in signal processing and medical imaging.

Skills

Computational physics, image processing, and data analysis in Python and C++. According libraries: numpy, JAX, matplotlib, scipy, ctypes, numba, autograd, openMP, Eigen, boost.

Interdisciplinary scientific collaboration with clinical and industrial partners on a complex, multi-year project.

Administration of GNU/Linux operating systems and IT infrastructure in an academic environment.

Experience with analog and digital electronics. Basic knowledge about FPGAs and PCB design.

Languages: German (native), English (fluent), French (basic).

Work experience

Technical University of Munich / Research fellow

NOVEMBER 2018 - JULY 2022, MUNICH

Development of novel statistical reconstruction algorithms for clinical computed tomography with grating-based X-ray differential phase-contrast.

Design and maintenance of software libraries for image processing and tomographic reconstruction in the research group.

Presenting scientific results in peer-reviewed journals and international conferences.

Tutoring supervision for lecture "Image processing in physics". Supervision of multiple Master theses.

Prof. Franz Pfeiffer, Chair of Biomedical Physics, Department of Physics.

Massachusetts General Hospital / Research fellow

JUNE 2019 - JANUARY 2020, BOSTON (USA) & MUNICH

Development of a reconstruction framework for limited-angle X-ray computed tomography at a compact proton therapy prototype.

Susu Yan PhD, Department of Radiation Oncology, Massachusetts General Hospital.

Education

Technical University of Munich / Dissertation

NOVEMBER 2018 - TODAY, MUNICH

Dissertation on the topic of "Processing Algorithms for Grating-Based X-Ray Phase Contrast with a Clinical CT Prototype".

Technical University of Munich / M.Sc. in Physics

SEPTEMBER 2015 - JULY 2018, MUNICH

Final grade: 1.6

Master thesis on "Monte Carlo Scatter Correction for Material Decomposition in Spectral Computed Tomography" at the Chair of Biomedical Physics, TUM Department of Physics. (Grade: 1.0)

Technical University of Munich / B.Sc. in Physics

SEPTEMBER 2012 - DECEMBER 2015, MUNICH

Final grade: 2.2

Bachelor thesis on "Test of Fast Readout Electronics for Drift Tube Detectors" at the Max Planck Institute for Physics. (Grade: 1.3)

Katharinen-Gymnasium Ingolstadt / Abitur

SEPTEMBER 2004 - JULY 2012, INGOLSTADT

Final grade: 1.5

Publications

C. Schmid *et al.*, *"Modeling vibrations of a tiled Talbot-Lau interferometer on a clinical CT system"*, IEEE Transactions on Medical Imaging, 2022.

C. Schmid *et al.*, *"Dark-Field Imaging on a Clinical CT System: Modeling of Interferometer Vibrations"*, 7th International Conference on Image Formation in X-Ray Computed Tomography, 2022.

M. Viermetz*, N. Gustschin*, **C. Schmid** *et al.*, *"Dark-field computed tomography reaches the human scale"*, Proceedings of the National Academy of Sciences, 2022.

M. Viermetz, N. Gustschin, **C. Schmid** *et al.*, *"Technical design considerations of a human-scale Talbot-Lau interferometer for dark-field CT"*, IEEE Transactions on Medical Imaging, 2022.

M. Viermetz, N. Gustschin, **C. Schmid** *et al.*, *"Initial Characterization of Dark-Field CT on a Clinical Gantry"*, IEEE Transactions on Medical Imaging, 2022.

J. Haeusele, **C. Schmid** *et al.*, *"Advanced Phase-Retrieval for Stepping-Free X-Ray Dark-Field Computed Tomography"*, IEEE Transactions on Medical Imaging, 2023.