Dr. Thomas C. Pekin

tcpekin@gmail.com • +49.177.892.0878 • LinkedIn
Urbanstraße 47C • 10967 Berlin • Germany

Summary

I'm a curious scientist and leader, passionate about the semiconductor industry, data analysis and handling, electron microscopy, materials science and advances I can help make in these areas. I have nearly a decade of experience writing code to acquire and analyze large amounts of data, particularly in novel *in situ* experiments, and more recent experience managing groups of people with the same interests.

Experience

Team Product Owner, High Performance Computing — Dec. '22 – Present
Carl Zeiss SMT, GmbH, Semiconductor Mask Solutions — *Jena, Germany*

- Currently lead a team of highly motivated scientists and developers working on high performance computing (HPC) solutions, which are then shared and integrated into the larger overall product.

Postdoctoral Researcher, Institut für Physik — Sept. '18 – Dec. '22
Humboldt-Universität zu Berlin, Structure Research and Electron Microscopy group — *Berlin, Germany*

- Led the successful development and experimental realization of a computational imaging technique known as ptychography on a Nion UltraSTEM microscope, in collaboration with several theorists, resulting in journal articles as well as conference presentations.
- Taught over 100 students Python, receiving extremely high reviews and positive feedback.
- Guided several bachelor and masters theses to completion and currently mentor PhD, masters, and bachelor students.
- Maintained active collaborations with researchers both internal and external to HU-Berlin.

Graduate Student Researcher, Materials Science and Engineering — Aug. '13 – Aug. '18
University of California, Berkeley, Prof. Andrew Minor — *Berkeley, CA*

- Was a primary researcher worldwide advancing 4D-STEM, with regards to both experimental technique and image analysis algorithm development. 280+ citations related to 4D-STEM.
- Investigated a wide variety of metallic materials (aluminum, steel, bulk metallic glasses, high entropy alloys), discovering fundamental mechanisms of deformation.
- Summarized and presented the results at several international conferences and published four first-author papers and several more as a contributing author.

Research Mentor, Science Undergraduate Laboratory Internships (SULI) — Apr. '17 – Aug. '17
National Center for Electron Microscopy, Lawrence Berkeley National Laboratory — *Berkeley, CA*

- Mentored an undergraduate student at Lawrence Berkeley National Lab, focusing on electron microscopy, data processing, and MATLAB. Student went on to apply for and complete a PhD.
- Successfully improved NCEM's amorphous materials characterization capabilities. Improvements were added to the open source py4DSTEM software package, of which I still am an active contributor.

Intern, Light Metals Systems — Aug. '16 – Nov. '16 and Aug. '14 – Nov. '14
General Motors, Research and Development — *Detroit, MI*

- Performed microstructural and chemical validations using a variety of TEM, SEM and STEM experiments on several novel aluminum alloys to verify the suppliers were delivering acceptable materials.
- Developed state of the art *in situ* experimental procedures on GM's JEOL microscope and successfully transferred my knowledge to R&D scientists.
- Materials researched can be found in a variety of Corvette and Cadillac products, from 2019 onwards.

Please refer to my LinkedIn profile for a more complete list of work experiences along with recommendations.

Education

Doctor of Philosophy in Materials Science and Engineering — 2013 – 2018
University of California, Berkeley — *Berkeley, CA*
Dissertation title: *in situ* Deformation Studies with Scanning Nanobeam Electron Diffraction

Master of Science in Materials Science and Engineering — 2013 – 2015
University of California, Berkeley — *Berkeley, CA*
Thesis title: Evaluation of neon focused ion beam milling for TEM sample preparation

Bachelor of Science in Materials Science and Engineering — 2009 – 2013
University of California, Berkeley — *Berkeley, CA*

Teaching

- Computational Physics 1 laboratory – Spring 2020, 2021, 2022 – Python and Matlab – Humboldt Universität zu Berlin (5.7/6 rating)
- F-Praktikum SEM – Fall 2021 – Advanced laboratory course on the SEM – Humboldt Universität zu Berlin
- MSE 241 – Spring 2014 – Graduate level practical hands-on TEM laboratory – U.C. Berkeley (4.91/5 rating)

Technical Skills

Project management & software development Agile, Scrum (and Scrum of Scrums), Azure DevOps, GitOps

Electron microscopy: Highly qualified using state-of-the-art transmission electron microscopes of all types, including the use of high framerate pixelated detectors (Gatan K2, Medepix, Dectris ELA) and spectroscopy (EDS/EELS). Very experienced using JEOL, ThermoFisher (FEI), and Nion microscopes. Highly experienced running the gamut of *in situ* and 4D-STEM experiments, often simultaneously. Interested and experienced in experimental technique development.

Significant experience using microscopes (SEM/FIB) for novel sample characterization and fabrication, including both traditional Ga FIBs as well as the Orion NanoFab, a He/Ne gas field ion source beam.

Significant experience writing code to automate image acquisition and analysis, including working with large datasets (>1 TB) in both MATLAB and Python.

Other technical skills: cryogenic TEM sample preparation, x-ray diffraction, mechanical testing, data analysis, atom force microscopy, microstructural sample preparation and analysis

Computer Skills

Advanced: Python (incl. Numpy, Scipy, Matplotlib, etc.), MATLAB, Git (and Github/Gitlab/Bitbucket etc.), Bash, Linux, LaTeX, Microsoft Office

Intermediate: Mathematica, Regex, Slurm, SQL, KaleidaGraph, Adobe suite

Publications, Service and Recognition

- Author of multiple peer-reviewed research publications cited more than 300 times as of August 2022 (Google Scholar)
- Eleven invited talks to both university departments as well as international conferences (list upon request)
- Reviewer for *Nature* and other peer-reviewed academic journals
- Winner, Best Postdoctoral Paper Award, and coauthor, Best Graduate Student Paper Award, Microscopy & Microanalysis 2021
- Symposium organizer at the Microscopy and Microanalysis (M&M) 2019 meeting and the Molecular Foundry User Meeting 2018
- Advisor to two PhD students, and several masters and bachelors students
- Active contributor to the py4DSTEM open source software package for 4D-STEM data analysis

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