Jacob Seifert

Curriculum Vitae

Utrecht
The Netherlands

✉ *Email* ▪ 🌐 *Portfolio* ▪ 🔗 *LinkedIn* ▪ 🎓 *Google Scholar*

Nationality: German

Languages: German (Native), English (Full Professional Proficiency), Dutch (Fluent)

Summary

Researcher with expertise in computational imaging, machine learning, optics and data science. Hungry to learn, implement, collaborate, and excited about understanding and visualizing data. Seeking to leverage my skills and experience to contribute to cutting-edge research, development and engineering.

Skills

Software & Architecture	Scientific Software Frameworks, Algorithm Design, Linux System Administration, Python (PyTorch, TensorFlow, Keras, NumPy, SciPy), Git
Machine Learning & Math	Differentiable Modeling, Inverse Problems, Physics-Informed Machine Learning, Deep Generative Models, Maximum Likelihood Estimation, Fisher Information Analysis, Stochastic Optimization
Optics & Experimental	Computational Imaging (Ptychography), Wavefront Shaping, Optimal Experimental Design, Visible & EUV Optics, Optical System Construction, Rapid Prototyping (CAD & 3D Printing)

Work

11/2024 – Present **Postdoctoral Researcher**, *Utrecht University, Nanophotonics Group*

Developing theoretical and experimental methods for optimizing estimation precision in semiconductor metrology. My work focuses on using estimation theory and optical control to identify maximum information states in complex scattering systems in collaboration with ASML Research.

01/2024 – 09/2024 **Postdoctoral Researcher**, *Advanced Research Center for Nanolithography (AR-CNL), Amsterdam*

Designed and implemented novel imaging algorithms to solve inverse problems in computational imaging, focusing on statistical methods and the modeling of event-based cameras.

Education

12/2018 – 12/2023 **Ph.D.**, *Nanophotonics Group, University Utrecht*

Thesis title: Differentiable Modeling for Computational Imaging (Defended on July 8th, 2024)

09/2017 – 08/2018 **Erasmus Research Internship**, *Molecular Biophysics Group, University Utrecht*

10/2015 – 08/2018 **M.Sc. in physics**, *Dresden University of Technology*

Master's thesis: Signal Optimization and Bleaching Reduction

in Stimulated Emission Depletion Microscopy

10/2011 – 09/2015   **B.Sc. in physics**, *Dresden University of Technology*
Bachelor's thesis: Establishment of a lifetime measuring setup for short-lived, blue OLEDs

Publication Highlights

2025   Sanchez, F.A.R., **Seifert, J.**, Karpavicius, A., Gouder, M. & Witte, S. "Event-based reconstructions in Computational Microscopy" *EPJ Web Conf.* **335**, 01006 (2025)

2024   Pelekanidis, A., Zhang, F., Gouder, M., **Seifert, J.**, Du, M., Eikema, K.S.E. & Witte, S. "Illumination diversity in multiwavelength extreme ultraviolet ptychography" *Photonics Res.* **13**, 2757-2771 (2024)

2024   Coene, W., Shao, Y., Weerdenburg, S., Senhorst, S., Horsten, R., Urbach, H.P., **Seifert, J.** & Mosk, A.P. "EUV imaging of nanostructures without lenses" *Proc. SPIE* **13115**, 22-25 (2024)

2024   Shao, Y., Weerdenburg, S., **Seifert, J.**, Urbach, H.P., Mosk, A.P. & Coene, W."Wavelength-multiplexed multi-mode EUV reflection ptychography based on automatic differentiation" *Light Sci. Appl.* **13**, 196 (2024)

2024   **Seifert, J.**, Shao, Y. & Mosk, A. P. "Noise-robust latent vector reconstruction in ptychography using deep generative models" *Opt. Express* **32**, 1020-1033 (2024)

2023   **Seifert, J.**, Shao, Y., van Dam, R., Bouchet, D., van Leeuwen, T. & Mosk, A. "Maximum-likelihood estimation in ptychography in the presence of Poisson-Gaussian noise statistics" *Opt. Lett.* **48**, 6027-6030 (2023)

2022   Maathuis, K., **Seifert, J.** & Mosk, A. P. "Sensor fusion in ptychography" *Opt. Continuum* **1**, 1909 (2022)

2021   **Seifert, J.**, Bouchet, D., Loetgering, L. & Mosk, A. P. "Efficient and flexible approach to ptychography using an optimization framework based on automatic differentiation" *OSA Continuum*, OSAC **4**, 121–128 (2021)

2021   Bouchet, D., **Seifert, J.** & Mosk, A. P. "Optimizing illumination for precise multi-parameter estimations in coherent diffractive imaging" *Opt. Lett., OL* **46**, 254–257 (2021)

Teaching

2024   **Computational Imaging**, *Utrecht University*, Lecture in physics master course

2018 – 2023   **Supervision of student projects**, *Nanophotonics group at Utrecht University*, daily supervision of a total of three M.Sc. and three B.Sc. graduates

2021 – 2023   **Rapid Prototyping: Lili's Proto Lab**, *Utrecht University*, Working as a coordinator of an emerging multi-disciplinary digital fabrication lab. This work involved planning, outreach, and building a community of makers comprised of students and employees

2019 – 2021   **Photon Physics**, *M.Sc. course at Utrecht University*, Teaching assistant for a course entailing a wide range of topics from modern photonics and optics with an emphasis on theory and computational methods

2021   **Experimental Design**, *M.Sc. course at Utrecht University*, Teaching assistant on the principles of planning, designing, documenting, and collaboratively executing physics experiments

Utrecht, 3rd December, 2025