Florian A. **Schiffers**

MACHINE LEARNING · COMPUTATIONAL PHOTOGRAPHY · PH.D. IN COMPUTER SCIENCE

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I am a **Vision Scientist** specializing in **AI-Driven Algorithms**, with contributions to SIGGRAPH, ICCV, ICCP, and Nature. My expertise spans **Machine Learning, Image Reconstruction, Optical Systems, and Computational Photography**. In addition to my engineering pursuits, my passion for teaching and mentoring has helped me develop leadership and communication skills, enabling me to effectively guide and motivate my peers.

Education

Ph.D. in Computer Science NORTHWESTERN UNIVERSITY *with Prof. Oliver Cossairt* AND *Prof. Aggelos Katsaggelos* — *Evanston, USA*
with Focus on Machine Learning Algorithms for Hardware/Software Co-Design of Computational Imaging and Display — *09/2018–12/2024*
Led cross-functional Development of a 3D CT Scanner and CV Algorithms to analyze large 4D datasets for Swarm Robotics inspired by Army Ants
Led interdisciplinary team on Deep Learning in Cardiac Imaging, resulting in publications on Segmentation and Reconstruction
Managed Projects with Industry Partners (*Sony, Meta, Zoloz*) and communicated Research Milestones through Publications and Presentations

M.Sc. in Physics and M.Sc. (Hons.) in Advanced Optical Technologies FAU ERLANGEN — *Erlangen, Germany*
Specialized in Medical and Computational Physics, Image Processing, Machine Learning, and Computational Optics — *10/2014–07/2017*

Erasmus Exchange STUDY ABROAD PROGRAMS (7 MONTHS EACH) — *France and Spain*
at Universite de Bordeaux, France (*Computer Graphics*) and Universidad de Cantabria, Spain (*Photonics*) — *2014 and 2016*

Scientific and Working Experience

Meta Reality Labs (*Display System Research*) RESEARCH INTERN *with Oliver Cossairt and Douglas Lanman* — *Seattle, WA, USA*
Developed and Evaluated ML-Algorithms for Reducing Noise in Holographic Display using Hyperspectral Multiplexing — *12/2023–05/2024*
Designed and Implemented the Optical Benchtop-Prototype and Evaluated the Experimental Performance compared to Baseline Literature

Meta Reality Labs (*Display System Research*) RESEARCH INTERN *with Nathan Matsuda and Grace Kuo* — *Remote Internship*
Developed AI-driven Phase-Retrieval Algorithms for Holographic 3D Displays via Lightfield Supervision — *09/2022–03/2023*
Created an OpenSource Automatic Differentiation Framework for AI-inspired Computational Imaging And Display — *09/2021–03/2022*

Department of Biomedical Engineering, Peking University RESEARCH STAY *with Prof. Qiushi Ren* — *Peking, China*
Developed Generative AI (*GAN*) for Medical Applications in Ophthalmology (*Fundus Imaging*) — *03/2017–12/2017*

Siemens Healthineers (*Therapy Systems*) RESEARCH SCIENTIST *with Thomas Pheiffer and Philip Mewes* — *Forchheim, Germany*
Implemented Algorithms for Robotic Navigation Prototypes for Image-Guided Spine Surgery (*Matlab, KUKA KRL, Java*) — *01/2018–04/2018*
Optimized Registration/Segmentation Techniques for Robotic Navigation in Minimal Invasive Liver Surgery (*Matlab, Python, C++*) — *03/2016–05/2017*

Pattern Recognition Lab, FAU Erlangen MASTER THESIS *with Prof. Andreas Maier and Dr. Christian Riess* — *Erlangen, Germany*
Developed Reconstruction Algorithms (*in Java*) for Grating-Based X-Ray Tomography — *04/2016–06/2017*

Max-Planck Institute for Science of Light RESEARCHER *with Prof. Gerd Häusler and Prof. Florian Willomitzer* — *Erlangen, Germany*
Investigated the Physical and Information Theoretical Limits of Optical 3D sensing with Structured Light — *07/2012–10/2015*
Optimized Camera and System Calibration Pipelines for Multi-View 3D reconstruction, enhancing accuracy, robustness, and reducing cost

Skills

Programming	Python, Matlab, Java, CUDA, C/C++, GIT, Linux, HPC/SLURM
Machine Learning	PyTorch, Lightning, Deep Learning, Generative Models, Optimization
Computer Vision	Image Processing (*OpenCV, Kornia*), Medical Imaging (*Segmentation, Reconstruction*), 3D Reconstruction
Languages	German (*native*), English (*professional*), French (*limited*), Spanish (*limited*), Chinese (*basic use*)

Other Accomplishments

Teaching Experience	Taught and developed multiple courses as Full Instructor from 2020-2024 at Northwestern University: *Machine Learning, Computational Photography and two seminar series (Computer Graphics, Computational Optics)*
Student Supervision	Supervised multiple Master's Theses and Individual Research Projects (*Various topics in Computational Imaging, Computer Graphics, Medical Imaging Deep Learning, and 3D Imaging and Display technologies*)
Awards and Funding	Secured about $20000 in funding from DAAD-IFI, Northwestern Alumnae, and various student awards

Open-Source Projects

HoloTorch	AI-powered Framework for Coherent Imaging and Display using PyTorch and Lightning
SkinScan	Python Framework for Optical 3D reconstruction using various Structured Light Techniques
Sinogram Inpainting	Physics-inspired Image Reconstruction Framework for X-ray Tomography using PyTorch

Selected Publications (~30 publications in total)

HoloChrome: Polychromatic Illumination for Speech Reduction in Holographic Displays SUBMITTED — *Journal*
F. Schiffers, N. Matsuda, G. Kuo, D. Lanman, O. Cosairt — *November 2024*

SeLFVi: Self-Supervised Light-Field Video Reconstruction From Stereo Video — *ICCV 2021*
P. Shedligeri, **F. Schiffers**, S. Ghosh, O. Cossairt, K. Mitra — *September 2021*

Computationally Efficient IMplicit Training Strategy for UNrolled NEtworks (IMUNNE) — *IEEE TBME*
N. Iakovlev, **F. Schiffers**, ..., A. Katsaggelos, D. Kim — *July 2024*

Multisource holography — *SIGGRAPH ASIA 2023*
G. Kuo, **F. Schiffers**, D. Lanman, O. Cossairt, N. Matsuda — *December 2023*

Stochastic Light Field Holography — *ICCP 2023*
F. Schiffers, P. Chakravarthula, N. Matsuda, G. Kuo, E. Tseng, D. Lanman, F. Heide, O. Cossairt — *July 2023*