

# Florian A. Schiffers

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

☎ (+1) 872 2356608 | ✉ florianschiffers@gmail.com | 🌐 www.florianschiffers.com | 📺 florianschiffers | 🎓 Google Scholar

**Vision scientist** specializing in **AI-driven algorithms** for computational imaging, 3D reconstruction, and optical systems. Leveraging my **physics** background, I bridge **machine learning** with **imaging** to enhance machine perception. Contributing to SIGGRAPH, ICCV, or ICCP, I've advanced techniques in **3D-Vision** and **display**. Passionate about teaching and mentoring, I've developed strong **leadership** and **communication** skills.

## Education

**Ph.D. in Computer Science** NORTHWESTERN UNIVERSITY with Prof. Oliver Cossairt AND Prof. Aggelos Katsaggelos *Evanston, USA*

**Thesis:** 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

Implemented multiview appearance models (e.g. *Lightfield and NeRF*) to learn physical diffraction processes for creating realistic 3D images

**M.Sc. in Physics and M.Sc. (Hons.) in Advanced Optical Technologies** FAU ERLANGEN *Erlangen, Germany*

**Specialization:** Medical and computational physics, image processing, machine learning, 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 optical benchtop-prototypes and evaluated the experimental performance against 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 light-field supervision *09/2022–03/2023*

Created an open-source 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 pphthalmology (*Fundus Imaging*) *03/2017–12/2017*

**Siemens Healthineers (Therapy Systems)** RESEARCH SCIENTIST with Thomas Pfeiffer 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 reduction of beam hardening in phase-contrast X-ray tomography *04/2016–06/2017*

**Max-Planck Institute for Science of Light** RESEARCH ASSISTANT 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

<b>Programming</b>	Python, Matlab, Java, CUDA, C/C++, GIT, Linux, HPC/SLURM
<b>Machine Learning</b>	PyTorch, Lightning, deep learning, generative models, optimization
<b>Computer Vision</b>	Image processing ( <i>OpenCV, Kornia</i> ), medical imaging ( <i>segmentation, reconstruction</i> ), 3D reconstruction and lightfields
<b>Languages</b>	German ( <i>native</i> ), English ( <i>professional</i> ), French ( <i>conversational</i> ), Spanish ( <i>conversational</i> ), Chinese ( <i>basic use</i> )

## Other Accomplishments

**Teaching Experience** Developed and taught 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** Mentored undergraduate and graduate students in research projects related to computer vision and machine learning

**Awards and Funding** Secured about \$20000 in funding from DAAD-IFI, Northwestern Alumnae, and various student awards

## Open-Source Projects

<b>HoloTorch</b>	AI-powered framework for coherent imaging and display using PyTorch and Lightning
<b>SkinScan</b>	Python framework for optical 3D reconstruction using various structured light techniques
<b>Sinogram Inpainting</b>	Physics-inspired image reconstruction framework for x-ray tomography using PyTorch

## Selected Publications (~30 publications in total)

**HoloChrome: Polychromatic Illumination for Speckle Reduction in Holographic Displays** SUBMITTED *Journal*

F. Schiffers, N. Matsuda, G. Kuo, D. Lanman, O. Cossairt *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*