

# Chaoying Gu | <https://arianagu.github.io/>

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## EDUCATION

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**UNIVERSITY OF CALIFORNIA, BERKELEY** Berkeley, CA, US 08/2022-present

PhD student in Electrical Engineering, major in signal processing, GPA: **4.0/4.0**

**Research focus:** Signal processing, image reconstruction and inverse problems solving in computational imaging.

Expected date of completion: 05/2027

**PEKING UNIVERSITY** Beijing, China 09/2018-07/2022

BS in Electronic and Information Engineering, Overall GPA: **3.776/ 4.000** (1/50 in EIE Dept.)

*Awards and Honors*

AEON scholarship

01/2021

Merit Student, Peking University

09/2019&09/2020&09/2021

## PUBLICATIONS

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Leyla Kabuli, **Chaoying Gu**, Laura Waller. "Replica Artifacts in Phase Mask-Based Lensless Imaging Systems." *Computational Optical Sensing and Imaging*. Optica Publishing Group, 2023.

- Improved the diffuser-based lensless imaging by systematically studying structured artifacts in reconstruction.

**Chaoying Gu**, Talha Sultan, Khadijeh Masumnia-Bisheh, Laura Waller, Andreas Velten. "Fast Non-line-of-sight Imaging with Non-planar Relay Surfaces." *IEEE International Conference on Computational Photography (ICCP)*. IEEE, 2023.

- Proposed a novel computational method that effectively performs 3D diffraction propagation for arbitrary surfaces.
- Achieved orders of magnitude better complexity compared to state-of-the-art algorithms without quality degradation, validated on experimental data.

Kevin C. Zhou, **Chaoying Gu**, Grace Jiang, Nicholas Antipa, Roarke W. Horstmeyer, Laura Waller.

"High-throughput computational microscopy with diffractive multiplexing across a gigapixel sensor array." *Computational Optical Imaging and Artificial Intelligence in Biomedical Sciences*. SPIE, 2024.

- Implemented a patch-based deconvolution method for fast and memory-efficient reconstruction for high-throughput multiplexed imaging that involves deconvolving a diffraction pattern.

**Chaoying Gu**, Antoine Islegen-Wojdyla, Markus Benk, Kenneth A. Goldberg, Laura Waller. "Towards Full Field-of-View Fourier Ptychography for Extreme Ultraviolet Microscope." *IEEE Conference on Computational Imaging Using Synthetic Apertures (CISA)*. IEEE, 2024.

- Extensively evaluated the reconstruction quality of existing algorithms under EUV microscope aberration.
- Achieved a 36-fold increase in the usable field-of-view from the nominal  $5 \times 5 \mu\text{m}^2$  diffraction-limited area.

## RESEARCH PROJECTS

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### Enhanced EUV Mask Imaging Using Fourier Ptychographic Microscopy (FPM)

- Utilized binary pseudo-random patterns (BPRP) and compared various FPM reconstruction algorithms using both simulated and experimental data from the SHARP EUV microscope at Lawrence Berkeley National Laboratory.
- Demonstrated robust performance in reconstructing elliptical pupils and attenuated phase shift masks, validating FPM as a candidate for advanced EUV mask imaging applications.

### Neural Network-Accelerated Reconstruction for High-Spatiotemporal-Throughput Video Microscopy of Freely Moving Organisms

- Developed an end-to-end neural network to accelerate optimization-based reconstruction, employing a patch-based strategy to adapt U-Net for gigapixel image reconstruction with diffractive multiplexing across a sensor array.

## EXPERIENCE

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### Google APAC Software Product Sprint

6/2020

- Implemented a personalized social application based on Django, Django REST, MySQL and Dart.
- Recognized as the top contributing participant by group members.

## TEACHING

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- Teaching assistant, *Analysis and Design of Analog Circuits*, Peking University

9/2021-6/2022

## TECHNICAL SKILLS

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Programming: Python (PyTorch), MATLAB, C++, C#

Software: LaTeX, HTML, Origin