Luocheng Huang

Graduate Researcher

luocheng@uw.edu | 801-888-8159 | Seattle, WA
0000-0002-6684-3954 | Luochenghuang | https://huanghub.com

Education

Sep 2019 – Jun 2023 | **University of Washington, Seattle**
Ph.D. in Electrical and Computer Engineering

Jun 2017 – Sep 2019 | **University of Washington, Seattle**
Master of Science in Materials Science and Engineering

Sep 2013 – Jun 2017 | **University of Washington, Seattle**
Bachelor of Science in Materials Science and Engineering

Experience

Sep 2019 – Jun 2023 | **University of Washington, Seattle**
Graduate research assistant

2021

All-silicon LWIR Metalens
- Built a metalens imaging platform in the long wavelength infrared (LWIR) regime [3].
- Designed polarization sensitive meta-optics in the LWIR regime, which are currently being characterized.

Inverse Designed Achromatic LWIR
- Inverse designed an achromatic LWIR imaging system, which is currently being fabricated. The optimization of the optics is enabled by techniques such as automatic differentiation and deep learning.

Liquid Crystal Tunable Metasurface
- Designed metasurfaces with tunable functionalities such as notch filters and beam steering using liquid crystal. Fabricated these metasurface for liquid crystal integration.

2020

Extended Depth of Focus Metasurface
- Built an achromatic imaging platform combining the form factor of ultra-thin metasurface and computational imaging [6]. This imaging system utilizes the extended depth of focus (EDOF) property to enable full-color imaging.

Forward Designed Composite Metasurface
- Developed a doublet metasurface fabrication process flow. Designed metasurface doublets using Zemax. Developed python script to automate optimization and analyses on Zemax.

Optical Neural Network
- Designed an incoherent optical neural network capable of classifying MNIST characters using a meta-optical doublet. The device is currently being fabricated.

2019

Simulation Parallelization
- Developed pipelines to run RCWA and FDTD simulations on the UW high performance computing cluster to considerably speed up the simulation workflows.

Jul 2018 – Jun 2019 | **American Institutional Assets, Seattle**
Intern
- Successfully developed an organic liquid fertilizer that has anti-bacterial, anti-fungal, and anti-parasitic properties. Also drip irrigation compatible.

Oct 2017 – Jun 2018 | **University of Washington – DIRECT Program**
Trainee
- Developed Thermoelectric Materials Artifical Neural Network (TEMANN), a python package that can be used to predict Seebeck coefficients for novel materials. https://github.com/Luochenghuang/TEMANN/
- Completed courses on various topics concerning artificial neural networks including architectures, hyper-parameter tuning, regularization, optimization, etc.

Leadership and Teaching Experience

Sep 2019 – Jun 2021 | **University of Washington, Seattle**
Teaching assistant
- Held quiz sections and office hours for EE215 and EE299.

Sep 2016 – Jun 2017 | **American Ceramic Society – Keramos UW Chapter**
President
- Organized weekly meetings, and coordinated out reach events.

Technical Skills

Optics	Alignment, PSF/Strehl Ratio measurement, optical stage and scientific camera automation (visible/LWIR), visible/LWIR sources, lasers, fiber optics, spectrometers, power meters.
Programming	Python, MATLAB, Java, JavaScript, HTML/CSS, LaTeX
Softwares	Zemax OpticStudio, Lumerical FDTD, SolidWorks, Proxmox, HAProxy, Tensorflow, SLURM
Nanofabrication	ABM Semi-Auto aligner, Heidelberg DWL66$^+$, spin coater, Profilometer (DektakXT), EBeam Lithography (JBX6300FS), ellipsometer (Woollam Alpha SE), SEM, Optical Microscopy, Quorum sputter coater, E-beam Evaporator (SEC-600), ICP-Fluorine etcher, Evatec LLS EVO Sputter System, Barrel Asher, SPTS PECVD, Disco Wafer Dicer.
Maker skills	Soldering, breadboarding, table/band/scroll/miter/oscillating saw, jigsaw, router, planer, orbital/belt sander, lathe, 3D printing.

Publications

2022 [1] **L. Huang**, S. Colburn, A. Zhan, and A. Majumdar. "Full-Color Metaoptical Imaging in Visible Light". In: *Advanced Photonics Research* (2022), p. 2100265. DOI: 10.1002/adpr.202100265.

2021 [2] E. Bayati, A. Wolfram, S. Colburn, **L. Huang**, and A. Majumdar. "Design of achromatic augmented reality visors based on composite metasurfaces". In: *Applied Optics* 60.4 (2021), pp. 844–850.

[3] **L. Huang**, Z. Coppens, K. Hallman, Z. Han, K. F. Böhringer, N. Akozbek, A. Raman, and A. Majumdar. "Long wavelength infrared imaging under ambient thermal radiation via an all-silicon metalens". In: *Optical Materials Express* 11.9 (2021), pp. 2907–2914. DOI: 10.1364/OME.434362.

[4] E. Tseng, S. Colburn, J. Whitehead, **L. Huang**, S.-H. Baek, A. Majumdar, and F. Heide. "Neural nano-optics for high-quality thin lens imaging". In: *Nature Communications* 12.1 (Nov. 2021). DOI: 10.1038/s41467-021-26443-0.

[5] J. E. Whitehead, A. Zhan, S. Colburn, **L. Huang**, and A. Majumdar. "Fast Extended Depth of Focus Meta-Optics for Varifocal Functionality". In: *arXiv preprint arXiv:2106.15807* (2021).

2020 [6] **L. Huang**, J. Whitehead, S. Colburn, and A. Majumdar. "Design and analysis of extended depth of focus metalenses for achromatic computational imaging". In: *Photonics Research* 8.10 (2020), pp. 1613–1623. DOI: 10.1364/PRJ.396839.

2018 [7] S. Colburn, A. Zhan, E. Bayati, J. Whitehead, A. Ryou, **L. Huang**, and A. Majumdar. "Broadband transparent and CMOS-compatible flat optics with silicon nitride metasurfaces". In: *Optical Materials Express* 8.8 (2018), pp. 2330–2344.

Honors

2016 | **Livingston Wernecke Memorial Scholarship, UW**
James I. Mueller Scholarship, UW

2014 | **Composers Guild 44th Annual Composition Contest, Utah**
Utah Best of Young Composer & 2nd Prize & Best of Age Group, Utah

2013 | **National Scholastic Art & Writing Silver Medalist, New York**
Utah State Math Contest 1st Team Award & Finalist, Utah