

Hung-Hsiang (Eric) Chiu

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Education

National Taiwan University (NTU)

B.S. in Electrical Engineering (EE)

Taipei, Taiwan

09/2019-06/2023

- Overall GPA: **4.23/4.30**, Rank: **8/189 (4%)**, Scholarship: Fu Bell Scholarship (USD 3,300) x 7
- Research Interests: **Optics, Photonics, Metasurfaces, MicroLEDs, Computational Displays**

Publications

[1] K.-H. Chang, J.-H. Lai, M.-S. Tsai, **Hung-Hsiang Chiu** et al., "In-situ study of multi-wavelength NIR OPOs and yellow-orange lasers from monolithic nonlinear photonic crystal," *Optics & Photonics Taiwan International Conference*, 2023.

[2] Yu Fu*, **Hung-Hsiang Chiu***, Homer H. Chen, "A space-variant lighting representation for photorealistic rendering of augmented content," *IEEE Transactions on Visualization and Computer Graphics*. (**Waiting for Submission**) (* indicates equal contribution)

Research Experience

Ferroelectric Photonics and Electronics Device (FePED) Lab, NTU

Taipei, Taiwan

Undergraduate Researcher, supervised by Prof. Lung-Han Peng

09/2022-Present

- Multi-wavelength Yellow-orange Laser Generation by Dual Optical Parametric Oscillations (OPOs) [1]
 - Proposed a **dual-OPO design** followed by serial upconversions that generate yellow-orange lasers, achieving **33% and 25% slope efficiencies** for signals and idlers, respectively.
 - Explained the change in cavity mode due to different pump beam intensity profiles on dual-OPO gain structures.
 - Performed MATLAB simulations of the optical field in the cavity by Fresnel diffraction and nonlinear optics methods.
- LED Epitaxial Wafer Thickness Measurement by Conoscopy
 - Derived and experimentally verified formulas for conoscopic interference patterns of crystals between polarizers.
 - Designed and set up low-cost conosopes to measure LED wafer thickness.
- A Red Laser Implementation with Glass
 - Doped glass with LiNbO_3 for waveguide formation, polished glass, and designed cavity structures.

Multimedia Processing and Communications (MPAC) Lab, NTU

Taipei, Taiwan

Undergraduate Researcher, supervised by Prof. Homer H. Chen

03/2022-Present

- Photorealistic Rendering for Augmented Reality [2]
 - Proposed a novel lighting representation for photorealistic AR rendering by parametrizing light sources with Bézier curves, outperforming a common representation qualitatively and quantitatively (**44% perceptual loss drop**).
 - Designed **transformer-based deep learning models** to predict our representation from a single RGB image.

Selected Projects

A Spectrometer for Optical Coherence Tomography (OCT) with a Diffraction Grating

- Derived the dispersion formula for a diffraction grating and implemented an OCT spectrometer with Zemax, achieving no vignetting, low aberrations, and diffraction-limit-approaching spot radii.

Acceleration Algorithms for Synthesizing Binary Computer-Generated Holograms (CGH)

- Proposed three acceleration strategies for Direct Binary Search, a binary CGH synthesis method, achieving **6.5x speed-up** without a magnitude RMSE increase.

Honors and Awards

3rd Place, NTUEE Undergraduate Innovation Award (A competition between NTUEE research projects)

07/2022

Dean's List Award (Given to the top 5% of students), Dept. of EE at NTU

11/2021

Best Solver Award, MakeNTU (the largest nationwide student hardware hackathon in Taiwan)

10/2020

Teaching and Work Experience

Department of Electrical Engineering, NTU
TA for *Electrical Engineering Lab (photonics)*, lectured by Prof. Lung-Han Peng et al.

Taipei, Taiwan
02/2023-06/2023

- Designed a new experiment on light intensity measurement under different voltages applied to liquid crystals.
- Wrote course materials and delivered lectures about the experiment's principles and workflow.

Department of Electrical Engineering, NTU
Programming Tutor

Taipei, Taiwan
02/2021-06/2021

- Held weekly seminars to assist NTU students having trouble with programming and algorithms.

VIA Technologies
Software Engineer - Deep Learning / Computer Vision

New Taipei City, Taiwan
07/2020-08/2020

- Proposed and implemented an anchor-free object detection method using generative adversarial networks.

Leadership Experience

Table Tennis Team, Dept. of EE at NTU
Captain

Taipei, Taiwan
09/2021-06/2022

- Led a team of 30+ members and won 1st and 3rd place in the NTU Cup and the National EE Cup, respectively.
- Held interdepartmental tournaments, organized weekly practice, and gave personalized instructions.
- Maintained a venue booking system that automated and accelerated the workflow of renting table tennis courts online.

Skills

Programming	C++, Python, MATLAB, JavaScript, Verilog
Optical System Design Tools	Zemax
Toolbox / Libraries	PyTorch, NumPy, scikit-learn, React, \LaTeX
Languages	Chinese (Native), English (TOEFL: 111/120), French (Basic), Russian (Basic)