Ivy Mica Yixian Huang[†]

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I am broadly interested in wave transport and sensing or imaging systems. I aim to develop and characterize new instrumentation to understand more about our universe.

> EXPERIENCE

Internship at Brookhaven National Lab　　　summers of 2023 and (soon) 2024, Upton NY

- Worked with Justine Haupt on realizing a 20 km free-space quantum link.
- Wrote software to use deformable mirrors to simulate atmospheric von Kármán turbulence.
- Developed *anyloop*: open-source software for adaptive optics and other feedback systems.
- Controlled a MEMS fast steering mirror to correct tip/tilt aberration for quantum telescopes.
- Listed as coauthor on poster for Optica *Quantum 2.0* conference.

Summer research fellow at Caltech　　　2022-06 to 2022-08, Pasadena CA

- Designed and assembled 32-channel analog modulation electronics for spacetime-modulated optical metasurface (mentioned briefly in doi.org/10.1515/nanoph-2022-0594).
- Helped characterize effectiveness of metasurface modulation with optical bench setups, conducting Fourier plane imaging and working with fiber amplifiers, photodetectors, etc.

Student physics researcher at Wesleyan　　　2021-02 to present, Middletown CT

- Conducted research with Prof. Fred Ellis on balancing an asymmetric, lossy gyrator system at 7 kHz to create a chiral steady state using only a Raspberry Pi sound card and custom software.
- Wrote a Python library in C to allow for stereo feedback loops to be adjusted finely in phase shift, linear recursive filtering, and complex gain, sampling at 192 kHz with low latency.
- Currently applying this process to a coupled cantilever system, hoping to carefully control induced gain and loss to demonstrate *PT*-symmetry and exceptional-point degeneracy.

Intern at Strategic Robotic Systems　　　2019-09 to 2021-01, Redmond WA

- Worked in production of Unmanned Underwater Vehicles including soldering, quality control, firmware flashing, and wireless link prototyping.
- Developed a training simulator in Unity including bathymetry data and realtime sonar simulation.

High school cybersecurity club　　　2018-09 to 2020-06, Bellevue WA

- Created hands-on lectures and labs for club members and students at a local middle school.
- Competed in a 5-member team that placed 3rd across national high schools in PicoCTF 2018 (largest high school cybersecurity competition in the world) and 3rd again in HSCTF 2018.
- Specialized in reverse-engineering; extensively practiced reading and writing assembly.

Internship at Lightsphere AI　　　various times during 2016 to 2018, Bellevue WA

- Worked on image processing algorithms for machine learning in Python and OpenCV.

[†]　Some people also know me as Ian Huang. You may refer to me by either name.

> EDUCATION

Wesleyan University, Middletown CT   (2020 to 2024, BA in **physics** & **astronomy**; 3.96 GPA)

Interlake High School, Bellevue WA   (2016 to 2020, IB diploma of 2019-05)

> COURSES TAKEN + SCHEDULED

Some courses I've completed:
- Waves and Oscillations (A), Quantum Mechanics I (A+), **Quantum Mechanics II** (A+);
- Observational Astronomy (A), **Radio Astronomy** (A), Galactic Astronomy (A+);
- Special Relativity (A+), **Electricity and Magnetism** (A+);
- Nonlinear Dynamics and Chaos (A+), Thermal/Statistical Physics (A);
- Advanced Topics in Condensed Matter (CR), Electronics Lab (CR);
- Seminars in Advanced Research, Condensed Matter, and Astronomical Pedagogy.

Courses I'm currently taking:
- **Experimental Optics**,
- Galaxies, Quasars, and Cosmology,
- General Relativity.

> SKILLS

- Writing **C**, **Julia**, **Python**; have also worked in x86 Assembly, C++, Bash, Go, Java, etc.
- Programmatic control of **oscilloscopes**, **signal generators**, **vector network analyzers**.
- **Computational methods** and 2D/3D **data visualization** in Julia, Python, and SageMath.
- Designing mixed-signal printable circuit boards in KiCad.
- 2D communication design, photography, image manipulation (manual and scripted).
- 3D modeling (Blender, some SolidWorks and FreeCAD) and simulation development (Unity).
- Amateur radio operation (FCC-licensed); designed 21 MHz transmitter (project on hiatus).
- Hardware and software reverse-engineering; side interest in electronics repair.

> MISCELLANEOUS WORK

- Residential advisor, course assistant, and makerspace monitor at Wesleyan University.
- Improving student housing conditions on Wesleyan's Undergraduate Residential Life Committee.
- Contributor to various open-source community projects, e.g. Radare2/Rizin, SwayWM, GNU IMP.

> HONORS

- Johnston Prize of 2021, Wesleyan University physics department
- CSAW 2020 US–Canada finalist, NYU Tandon School of Engineering
- picoCTF 2018 3rd place team, Carnegie Mellon University

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