Tianqi (Eric) Hu

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EDUCATION

MANLIUS PEBBLE HILL SCHOOL | SAT: 1570 | GPA: 3.94/4 **Syracuse, NY, Expected 2027**

JOHNS HOPKINS UNIVERSITY | Introduction to Astronomy (1 College Credit, Grade: A) **Baltimore, MD, Summer 2023**

RESEARCH & STEM EXPERIENCE

J^2 LAB (MAE ENGINEERING AT CORNELL UNIVERSITY) **Ithaca, NY**

Student Researcher - Nanomaterials & Computational Materials Science (PI: Prof. Jingjie Yeo)

Project: Helium Bubble Desorption Kinetics in Tungsten Lattices June 2026 - Present

- Modeled temperature-dependent helium cluster escape within bcc tungsten lattices using LAMMPS molecular dynamics and OVITO, simulating thermal damage mechanisms in plasma-facing nuclear materials.
- Engineered a Python data pipeline implementing sliding window algorithms and Radius of Gyration (R_g) metrics to isolate atomic bursting events and quantify cluster dissociation trajectories over time.
- Calculated per-atom potential energies and coordination contact distributions across varied cluster depths, mapping the spatial energy barriers that drive core trapping and sequential outer-to-inner desorption.

Project: Nanomechanics of Shear-Stiffening Conductive Polymers Dec 2024 - May 2026

- Investigated the nanomechanics of PANI-PAMPSA micellar polymers using multiscale coarse-grained (MSCG) molecular dynamics simulations in LAMMPS and Python-based computational analysis (**40 hours/month**).
- Built computational algorithms to process **1+ TB of molecular trajectory data** across **576 polymer chains** under **12+ deformation states**, quantifying chain entanglement through **3 topological metrics**.
- Co-authored (2nd) "Nanomechanics of Shear Rate-Dependent Stiffening in Micellar Electrically Conductive Polymers," published in Macromolecules (ACS), providing a molecular-level framework for designing rate-adaptive flexible electronics.
- Presented research on polymer nanomechanics at Nanyang Technological University, Singapore (Aug 2026).

INDEPENDENT ACADEMIC RESEARCH **Syracuse, NY**

Independent Researcher - Computational Optical Imaging May 2024 - Dec 2025

- Built a 3D microscope imaging system using the Transport of Intensity Equation (TIE), acquiring high-resolution through-focus stacks (in-focus, under-focused, over-focused) via a 3072×2048 CMOS sensor with symmetric axial focal offsets.
- Developed a Fourier transform-based TIE solver in MATLAB to rapidly resolve Poisson equations, enabling robust phase retrieval and 3D reconstruction from 3-image focal stacks.
- Reduced equipment cost to $500 per microscope, saving about **50%** compared to traditional commercial 3D microscopes.
- Published a first-author paper, "3D Microscope Imaging System based on the Transport of Intensity Equation," in the Transactions on Computer Science and Intelligent Systems Research (indexed in Web of Science).

NEW YORK STATE SCIENCE FAIR (CNYSEF) **Syracuse, NY**

4 major awards: High Honors (Top Award), IEEE, Lockheed Martin, and Terra Science special awards. Mar 2025

LEADERSHIP & ACTIVITIES

RURAL STEM OUTREACH PROJECT **Bazhong, Sichuan**

Project Lead & Volunteer Educator at Tuxing School March 2026 - June 2026

- Secured **$6,000** in sponsorship, deployed **7 laptops,** and implemented **4 prototypes** of 3D microscopic imaging systems.
- Instructed **100+ students** in hands-on STEM labs and **4 local teachers** to operate the MATLAB-equipped imaging systems.

Volunteer Educator March 2024 - June 2024

- Instructed **40+ elementary students** in foundational English, improving conversational skills.

OLDLADS SENIOR SOCCER CLUB **Syracuse, NY**

Founder & Lead Organizer Aug 2025 - Present

- Founded a community club for 45+ seniors (55+). Organized weekly low-impact training and refereed weekend scrimmages.

INDEPENDENT MATERIALS ENGINEERING PROJECT **Syracuse, NY**

Materials Research & Hardware Prototyper Feb 2026 - Present

- Prototyped soccer knee pads using PANI-PAMPSA shear-stiffening polymers; conducted field tests with 36 senior players to analyze mechanical fatigue and polymer-fabric delamination under live match conditions.

MODEL UNITED NATIONS (MUN) **Syracuse, NY**

Senior Delegate Dec 2023 - Present

- Awarded **Best Delegate** (Central NY MUN, 16/1000 delegates); **Best New Delegate** (MPHMUN, 7/400 delegates)

PHILOSOPHY CLUB **Syracuse, NY**

Founder Aug 2024 - Present

- Founded the philosophy club and designed a syllabus on classical Greek philosophy, scaling members from 0 to 20+ students.
- Conducted 4 months of bi-weekly academic discussions with Cornell PhD candidates, refining philosophical frameworks.
- Hosted school-wide debates (e.g., "Apocalypse Debate") and extended philosophical seminar in the Manlius community.

VARSITY ATHLETICS **Syracuse, NY**

Athlete Aug 2023 - Present

- Varsity Tennis: Captain (Gr. 11); Starter (Gr. 10); NYSPHSAA Section III Champions & All-Section First Team Recognition.
- Varsity Soccer: Starter, Central Defensive Midfielder (Gr. 9 – Present)

SPANISH CLUB **Syracuse, NY**

Secretary & 4-Year Member Aug 2023 - Present

- Managed communications and event logistics for the largest cultural club at Manlius Pebble Hill School.
- Facilitated biweekly meetings and coordinated Hispanic heritage events to promote language immersion and cultural diversity.

SKILLS

Technical: Python, MATLAB, C++, MD Simulation, Data Visualization | Languages: Chinese (Native), Spanish (Intermediate)