Laura R. Chin

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Education

Boston University, Boston, MA — GPA: 3.85/4.00
Doctor of Philosophy in Astronomy — *Anticipated 2029*
Advisor: Chuanfei Dong

Wellesley College, Wellesley, MA — GPA: 3.93/4.00
Bachelors of Arts in Astrophysics, Computer Science (Minor) — *May 2023*
Graduated *summa cum laude* with honors in astrophysics
Advisors: Wesley Andrés Watters, Glenn Stark

Research Experience

Graduate Research Fellow — Jan. 2024 – Present
Boston University — *Boston, MA*

Modeling atmospheric ion escape from rocky exoplanets.

- BATS-R-US MS-MHD simulations of nonthermal ion escape.
- Examining connection between atmospheric loss and planetary attributes.
- Determining impact of stellar conditions.

Astrophysics Honors Thesis — Sep. 2022 – May 2023
Wellesley College — *Wellesley, MA*

Exploring applications of machine learning in astronomy research.

- Supervised learning to extract shape characteristics from non-stereo satellite images of impact craters. (cont. **Science Center Summer Research Program** work)
- Unsupervised learning to detect anomalies in large sky and surface image datasets .

Summer Undergraduate Program for Planetary Research — Jun. 2022 – Aug. 2022
Princeton University — *Princeton, NJ*

Investigated the relationship between rocky planet radius and atmospheric loss.

- Utilized the BATS-R-US MS-MHD code to simulate nonthermal stellar wind-driven ion escape from Venus-like atmospheres.
- Uncovered novel non-monotonic escape rate trend with planetary radius.

Independent Study — Jan. 2022 – May 2022
Wellesley College and SOLEIL Synchrotron — *Wellesley, MA and Paris, France*

Experimentally simulated N_2 self-shielding in Earth's upper atmosphere using DESIRS beamline.

- Maintained cold ion trap & oversaw nocturnal experiment functionality, enabling experiment to remain on track.
- Determined $^{15}N/^{14}N$ ratio of collected NO after irradiation to measure effect of self-shielding on isotope ratios.

Science Center Summer Research Program — Jun. 2021 – Mar. 2022
Wellesley College — *Wellesley, MA*

Applied machine learning algorithm to study non-stereo satellite images of impact craters.

- Generated training dataset of 100,000 synthetic crater images using Python and Persistence of Vision Raytracer.
- Trained Support Vector Regression algorithm to extract depth/diameter ratios from synthetic and real satellite images.
- Achieved r^2 scores as high as 0.963 for synthetic dataset and 0.631 for Mars Reconnaissance Orbiter dataset.

Astronomy Dept. Research Assistant — Jan. 2020 – Jun. 2021
Wellesley College — *Wellesley, MA*

Supported research on the automated detection of impact craters by evaluating software performance.

- Used Python program to check and correct results of computer vision software that identifies impact craters in spacecraft imagery and digital elevation models.
- Enhanced familiarity with Python and Linux. Learned to adapt to a new field and work effectively with team members.

Awards

Dean's Fellowship | *Boston University* Sep. 2023
- Provides a semester stipend and scholarship for exceptional students to focus primarily on their degree coursework with no departmental research or teaching responsibilities.

Phyllis J. Fleming Prize for Distinction in Physics | *Wellesley College Physics Dept.* May 2023
- Presented annually to one or more graduating Wellesley College physics majors for excellence in physics.

Jerome A. Schiff Fellowship | *Wellesley College* Nov. 2022
- Awarded annually to Wellesley students who demonstrate excellence in research. Funded **Astrophysics Honors Thesis**.

Annie Jump Cannon Fellowship | *Wellesley College Astronomy Dept.* Jun. 2021
- Awarded annually to a promising young researcher in the Wellesley Astronomy Dept. Funded **Science Center Summer Research Program**.

Massachusetts Space Grant | *Massachusetts Space Grant Consortium* Jan. 2020
- Awarded to Massachusetts college and university students (especially women and minorities) to enable work on cutting-edge NASA–related research. Funded **Astronomy Dept. Research Assistant** work.

Publications and Presentations

Chin, L.R., Dong, C., Lingam, M. (2024) *Role of Rocky Planetary Radius on Atmospheric Escape and Implications for Habitability.*(accepted) arXiv preprint arXiv:2401.16211.

Chin, L.R., Dong, C., Lingam, M. (2022) *Role of Rocky Planetary Radius on Atmospheric Escape and Implications for Habitability.* (P44A-04) 2022 AGU Fall Meeting (abstract) (poster)

Chin, L.R., Watters, W.A., Chickles, E.T., Fassett, C.I. (2021) *Application of Support Vector Regression to Derive Crater Depth/Diameter from Satellite Images.* Lunar Planet. Sci. LIII, 2157 (abstract) (poster)

Employment

Physics Dept. Learning Assistant | *Wellesley College* Sep. 2020 – May 2023
- PHYS 107: Principles and Applications of Mechanics with Laboratory
- Facilitated weekly meetings and office hours to answer questions, expand on topics, and improve problem solving strategies
- Assisted professors in labs and lectures. Advised new faculty on class structure, exam format, student support networks.
- Developed successful teaching methods, understanding of diverse physics backgrounds, and leadership and mentorship skills through experiences with students and studying contemporary pedagogical techniques in physics.

Physics Dept. Grader | *Wellesley College* Sep. 2021 – Dec. 2021
- Evaluated weekly homework assignments and offered constructive feedback to students.

Organizations

Inclusive Astronomy | *Member* Sep. 2023 – Present
- Initiative driven by BU Astronomy graduate students to promote city-wide outreach activities — including Science Train and ASTRO365 Interactive Nights — and intra-department DEI efforts.
- **Science Train**: Boarding the MBTA to educate and engage in conversation with riders about astronomy topics.
- **ASTRO 365 Interactive Nights**: Inviting students from local under-resourced/under-represented schools to BU to learn about astronomy, use the Coit Observatory historic telescopes, and discuss pathways in STEM.

Sigma Xi Scientific Research Honor Society | *Associate Member* May 2023 – Present
- International honor society of science and engineering. Invitation extended in recognition of scientific research conducted at Wellesley College.

American Geophysical Union | *Student Member* Aug. 2022 – Present
- Global community of Earth and space sciences experts and enthusiasts.
- Virtually presented **SUPPR** research at AGU Fall Meeting in December 2022.

Technical Skills

Advanced	Python, Linux, LaTeX
Intermediate	Fortran, IDL, Java, AstroImageJ
Beginner	Arduino, HTML, CSS, Javascript

Interests

Academic: Planetary and Exoplanetary Studies, Astrobiology, Machine Learning, Numerical Modeling
Recreational: Short Fiction, Poetry, Photography, Knitting, Bouldering, Rugby