Ian Chow

MSc. Astronomy Candidate | University of Western Ontario

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Research Interests

Meteors, Exoplanets, Astrostatistics, Machine Learning, Dynamics, Numerical and Computational Methods

Education

PRESENT | **University of Western Ontario** — *London, ON, Canada*
Sep. 2023 | MSc. Astronomy
Cumulative GPA of **4.00/4.00**
Thesis : Orbital and Physical Properties of Decameter-Sized Earth Impactors
Supervisor : Prof. Peter G. Brown

May 2023 | **University of Toronto** — *Toronto, ON, Canada*
Sep. 2018 | HBSc. Astronomy & Physics Specialist, Statistics Major, Mathematics Minor
Graduated with High Distinction – Cumulative GPA of **3.60/4.00**
Astronomy Thesis : Analyzing Radial Velocity Data from the Resonant Planetary System HD 45364
Supervisors : Dr. Sam Hadden, Prof. Hanno Rein
Statistics Thesis : Probabilistic Dimensionality Reduction Methods for Stellar Chemodynamics
Supervisor : Prof. Joshua S. Speagle

Additional Research Positions

Aug. 2023 – May 2023 | **Dunlap Institute for Astronomy & Astrophysics, University of Toronto** — *Toronto, ON, Canada*
Summer Undergraduate Research Assistant
Project : Understanding the impact of Bayesian inference on ultra-light axion limits
Supervisor : Dr. Keir Rogers

Aug. 2022 – May 2022 | **Canadian Institute for Theoretical Astrophysics (CITA)** — *Toronto, ON, Canada*
Summer Undergraduate Research Fellow
Project : Modelling Migration Scenarios of Resonant Planets Using Radial Velocity Data
Supervisors : Dr. Sam Hadden, Prof. Hanno Rein

Peer-Reviewed Publications

First Author

1. **Chow, I.**, & Brown, P.G. "Decameter-Sized Earth Impactors – I : Orbital Properties", submitted to *Icarus*.
2. **Chow, I.**, & Hadden, S. "Influence of Modeling Assumptions on the Inferred Dynamical State of Resonant Systems : A Case Study of the HD 45364 System", submitted to *ApJ*.

Awards, Scholarships, Fellowships & Honours

2024-2025 | **Ontario Graduate Scholarship**, $15,000 CAD — *University of Western Ontario*
2023-2024 | **Western Graduate Research Scholarship**, $8,257 CAD — *University of Western Ontario*
2023 | SURP Poster **Competition Award**, $50 CAD — *University of Toronto*
2023 | **Summer Undergraduate Research Program (SURP) Fellowship**, $9,980 CAD — *University of Toronto*
2022 | **Summer Undergraduate Research Fellowship (SURF)**, $9,500 CAD — *CITA*
2021-2022 | **Smith Solis Research Scholarship in Astronomy and Astrophysics**, $1,250 CAD — *University of Toronto*
2020-2023 | **Dean's List Scholar**, honour — *University of Toronto*

Teaching Experience

I have instructed undergraduate students in the following courses. My duties included delivering lectures in class, leading in-person tutorials and help centres, running midterm viewing sessions, proctoring, grading and reviewing exams, supervising lab sessions and grading lab reports.

2024	**Astronomy 1021 : General Astronomy**, Teaching Assistant	*University of Western Ontario*
2023-2024	**First-Year Physics Labs**, Teaching Assistant (x2)	*University of Western Ontario*
2024	**Physics 1402 : Physics for Engineering Students II**, Teaching Assistant	*University of Western Ontario*
2023	**Physics 1201 : Physics for the Sciences I**, Teaching Assistant	*University of Western Ontario*

Selected Professional Experience

Sep. 2020 – Jun. 2020 | **Innovere Medical** | *Markham, ON, Canada*

Software Developer

- Automated detection of dropouts in time-series audio data from an MRI scanner's wireless audio system using power spectrum analysis in MATLAB and Python, eliminating 20+ hours of work weekly
- Developed and tested TechSmart, an in-house multimedia app for patient use during MRI scans, with company's software development team

MATLAB | Python | Signal Processing | Software Development

Aug. 2019 – Jun. 2019 | **Plantiga Technologies** | *Vancouver, BC, Canada*

Software Developer

- Developed methods to compute physical fitness heuristics from time-series acceleration (g-force) data, using signal processing techniques like digital filtering and convolution in Python (SciPy, Pandas) to improve detection of foot impacts
- Field-tested and validated hardware such as sensor shoe insoles that track movement
- Acquired data from company partners such as physiotherapy clinics, universities (University of British Columbia, Simon Fraser University), and sports organizations (Houston Rockets, US Tennis Association)
- Wrote documentation of company products and services for clients

Python | Signal Processing | Biomechanics | Data Analytics

Aug. 2017 – Jun. 2017 | **Synced Review** | *Toronto, ON, Canada*

Research Intern

- Conducted literature review focusing on advancements in reinforcement learning used in adversarial-search board and video game artificial intelligence programs for a company report
- Worked with company team to research and edit review articles on industry trends in machine learning and robotics technology

Machine Learning | Artificial Intelligence | Literature Review

Conference Presentations

2024 CASCA AGM	"Properties of Decameter Earth Impactors." Poster.	*Toronto, ON, Canada*
2024 DDA 55 Meeting	"The Dynamical Origin of Decameter Earth Impactors." Contributed talk.	*Toronto, ON, Canada*
2023 CASCA AGM	"Identifying birth environments of isolated stars : a probabilistic dimensionality reduction model for stellar chemical abundances." Poster.	*Penticton, BC, Canada*
2022 Planet Day	"Modelling Migration Scenarios of Resonant Planets Using Radial Velocity Data." Contributed talk.	*Toronto, ON, Canada*

Departmental Presentations & Seminars

2024 NASA Day	"The Dynamical Origin of Decameter Earth Impactors." Invited talk (Virtual).	*NASA Meteoroid Environment Office*
2023 SURP Symposium	"Understanding the impact of Bayesian inference on ultra-light axion limits." Poster.	*University of Toronto*
2022 SURF Presentation	"Modelling Migration Scenarios of Resonant Planets Using Radial Velocity Data." Invited talk.	*University of Toronto*

Leadership, Volunteering & Extracurricular Experience

PRESENT – Jun. 2024 | **Hume Cronyn Memorial Observatory** — *London, ON, Canada*
Volunteer

- Volunteered at astronomy Public Nights attended by 80+ visitors weekly at the University of Western Ontario's Cronyn Observatory

Jun. 2024 – Sep. 2023 | **Consensus Trivia**
Question Writer/Editor

- Wrote and edited trivia questions for Consensus Trivia, a federally registered not-for-profit organization that runs team-based trivia tournaments for 80+ high school and collegiate teams across Canada
- Moderated and kept score for tournament games as a staffer

May 2023 – Jan. 2019 | **University of Toronto Academic Trivia Club** — *Toronto, ON, Canada*
Vice President, Competitor, Tournament Organizer & Question Writer/Editor

- Elected Vice President of the University of Toronto's Academic Trivia Club during the 2020-2021 and 2021-2022 academic years organizing twice-weekly practices and social events, managing club Facebook group and Discord server with 300+ members, and moderating practices and tournament games
- Represented the University of Toronto at 30+ trivia (quiz bowl) tournaments across Canada and the U.S. as a competitor with several top finishes at North American championships, such as leading the team to fourth place at the 2022 Division II Intercollegiate Championship Tournament in Chicago
- Organized and directed several collegiate and high school tournaments, including the 2021 University of Toronto Collegiate Novice and the 2022 University of Ottawa ACF Fall tournaments, played by 30+ collegiate teams in total across Canada and the U.S.
- Wrote and edited trivia questions across a wide range of academic disciplines (including astronomy and physics) for 2022 WORKSHOP, 2023 Canadian Novice, and 2024 MRNA III, collegiate tournaments played by 80+ teams in total across Canada, the U.S., and the U.K.

Media Experience

Oct. 2023 **SURP Student Spotlight** Interview — *Dunlap Institute for Astronomy & Astrophysics, University of Toronto*

Projects

fasano-franceschini-test 2024
github.com/wmpg/fasano-franceschini-test
A Python implementation for a multidimensional extension of the two-sample Kolmogorov-Smirnov test proposed by Fasano & Franceschini (1987).
Python

Here I Stand Calculator 2020
ia-chow.github.io/Projects/HIS/
An online calculator tool to compute the odds of various outcomes for the strategy board game Here I Stand, written to familiarize myself with HTML, CSS and JavaScript. Hosted on a personal website.
HTML CSS JavaScript

Skills

Programming Python (NumPy, SciPy, Pandas, Matplotlib, Keras/TensorFlow, scikit-learn), MATLAB, R (ggplot, dplyr), HTML, CSS, JavaScript (Node.js)
Software LaTeX, Git/GitHub, Jupyter Notebook, Anaconda, R Suite, Bash, Linux (ssh), Microsoft Excel
Languages English (fluent), French (intermediate), Cantonese (spoken)