

# Ian CHOW

## MSc. Astronomy Candidate | University of Western Ontario

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### RESEARCH INTERESTS

Astrostatistics, Machine Learning, Solar System/Exoplanet Dynamics, Meteors

### EDUCATION

PRESENT Sep. 2023	<b>University of Western Ontario</b> MSc. ASTRONOMY Cumulative GPA of <b>4.00/4.00</b> <b>Thesis</b> : Orbital and Physical Properties of Decameter-Sized Earth Impactors SUPERVISOR : Prof. Peter G. Brown	London, ON, Canada
May 2023 Sep. 2018	<b>University of Toronto</b> HONOURS BSc. ASTRONOMY & PHYSICS SPECIALIST, STATISTICS MAJOR, MATHEMATICS MINOR Graduated with High Distinction – Cumulative GPA of <b>3.60/4.00</b> <b>Astronomy Thesis</b> : Analyzing Radial Velocity Data from the Resonant Planetary System HD 45364 SUPERVISORS : Dr. Sam Hadden, Prof. Hanno Rein <b>Statistics Thesis</b> : Probabilistic Dimensionality Reduction Methods for Stellar Chemodynamics SUPERVISOR : Prof. Joshua S. Speagle	Toronto, ON, Canada

### ADDITIONAL RESEARCH POSITIONS

Aug. 2023 May 2023	<b>Dunlap Institute for Astronomy &amp; Astrophysics, University of Toronto</b> SUMMER UNDERGRADUATE RESEARCH ASSISTANT <b>Project</b> : Understanding the impact of Bayesian inference on ultra-light axion limits SUPERVISOR : Dr. Keir Rogers	Toronto, ON, Canada
Aug. 2022 May 2022	<b>Canadian Institute for Theoretical Astrophysics (CITA)</b> SUMMER UNDERGRADUATE RESEARCH FELLOW <b>Project</b> : Modelling Migration Scenarios of Resonant Planets Using Radial Velocity Data SUPERVISORS : Dr. Sam Hadden, Prof. Hanno Rein	Toronto, ON, Canada

### RELEVANT COURSEWORK

<b>Astrophysics</b>	Modern Astrophysics (stellar structure/evolution, nucleosynthesis, galaxies, cosmology), Small-Body and Planetary Formation & Dynamics, Classical Mechanics I/II, Thermal Physics, Quantum Mechanics, Classical & Relativistic Electrodynamics, Nonlinear Physics and Chaos, Time-Series Analysis
<b>Statistics</b>	Probability & Statistics, Data Analysis, Survey Sampling and Observational Data, Statistical Computation, Machine Learning

### PEER-REVIEWED PUBLICATIONS

#### FIRST AUTHOR

- Chow, I., & Brown, P.G.** “Decameter-Sized Earth Impactors – I : Orbital Properties”, accepted for publication in Icarus.
- Chow, I., & Hadden, S.** “Influence of Modeling Assumptions on the Inferred Dynamical State of Resonant Systems : A Case Study of the HD 45364 System”, in revision at ApJ.

### AWARDS, SCHOLARSHIPS, FELLOWSHIPS & HONOURS

2024	<b>NASA International Space Apps Challenge Global Finalist</b> , honour	NASA
2024-2025	<b>Ontario Graduate Scholarship</b> , \$15,000 CAD	University of Western Ontario
2023-2024	<b>Western Graduate Research Scholarship</b> , \$8,257 CAD	University of Western Ontario
2023	<b>SURP Poster Competition Award</b> , \$50 CAD	University of Toronto
2023	<b>Summer Undergraduate Research Program (SURP) Fellowship</b> , \$9,980 CAD	University of Toronto
2022	<b>Summer Undergraduate Research Fellowship (SURF)</b> , \$9,500 CAD	CITA

2021-2022 **Smith Solis Research Scholarship in Astronomy and Astrophysics**, \$1,250 CAD  
2020-2023 **Dean's List Scholar**, honour

*University of Toronto*  
*University of Toronto*

## TEACHING EXPERIENCE

My duties in the following course included delivering lectures and conducting in-class demonstrations, holding office hours, proctoring, grading and reviewing exams.

2024 **Astronomy 1021 : General Astronomy**, Teaching Assistant & Guest Lecturer *University of Western Ontario*

My duties in the following course included supervising lab sessions and grading lab reports.

2023-2024 **First-Year Physics Labs**, Teaching Assistant (x2) *University of Western Ontario*

My duties in the following courses included leading in-person tutorials and help centres, running midterm viewing sessions, proctoring, grading and reviewing exams.

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*

## RELEVANT PROFESSIONAL EXPERIENCE

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

Aug. 2019 | **Plantiga Technologies** *Vancouver, BC, Canada*  
Jun. 2019 | 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 (NumPy, 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 Data Analysis

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

### CONTRIBUTED TALKS

May 2024 **AAS Division on Dynamical Astronomy 55**, University of Toronto *Toronto, ON, Canada*

Aug. 2022 **2022 CITA Planet Day**, Canadian Institute for Theoretical Astrophysics *Toronto, ON, Canada*

### POSTER PRESENTATIONS

Jun. 2024 **2024 CASCA AGM**, University of Toronto/York University *Toronto, ON, Canada*

Jun. 2023 **2023 CASCA AGM**, NRC Herzberg Research Centre/University of British Columbia *Penticton, BC, Canada*



## OTHER ACADEMIC PRESENTATIONS

May 2024	<b>NASA Day</b> , NASA Meteoroid Environment Office. Student talk.	<i>Virtual</i>
Aug. 2023	<b>SURP Symposium</b> , University of Toronto. Poster.	<i>Toronto, ON, Canada</i>
Aug. 2022	<b>SURF Presentation</b> , Canadian Institute for Theoretical Astrophysics. Student talk.	<i>Toronto, ON, Canada</i>



## LEADERSHIP, VOLUNTEERING & EXTRACURRICULAR EXPERIENCE

PRESENT Jun. 2024	<b>Hume Cronyn Memorial Observatory</b> OUTREACH VOLUNTEER <ul style="list-style-type: none"> <li>Volunteered at astronomy Public Nights attended by 80+ visitors weekly at the University of Western Ontario's Cronyn Observatory</li> </ul>	<i>London, ON, Canada</i>
Jun. 2024 Sep. 2023	<b>Consensus Trivia</b> QUESTION WRITER/EDITOR <ul style="list-style-type: none"> <li>Wrote and edited trivia questions for <a href="#">Consensus Trivia</a>, a federally registered not-for-profit organization that runs team-based trivia tournaments for 80+ high school and collegiate teams across Canada</li> <li>Moderated and kept score for tournament games as a staffer</li> </ul>	
May 2023 Jan. 2019	<b>University of Toronto Academic Trivia Club</b> VICE PRESIDENT, COMPETITOR, TOURNAMENT ORGANIZER & QUESTION WRITER/EDITOR <ul style="list-style-type: none"> <li>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</li> <li>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</li> <li>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.</li> <li>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.</li> </ul>	<i>Toronto, ON, Canada</i>



## MEDIA COVERAGE

Oct. 2023	<b>SURP Student Spotlight</b> Interview	<i>Dunlap Institute for Astronomy &amp; Astrophysics, University of Toronto</i>
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## PROJECTS

<b>SKYSHIELD ORRERY</b> <a href="https://ia-chow.github.io/projects/skyshield-orrery">ia-chow.github.io/projects/skyshield-orrery</a> An interactive, physics-based digital Solar System orrery highlighting near-Earth objects and meteoroids. Developed by Dakota Cecil, Ian Chow, Simon Van Schuylenbergh and Maximilian Vovk for the 2024 <a href="#">NASA International Space Apps Challenge</a> and selected by NASA as <a href="#">one of 40 Global Finalists</a> out of 10 000 submitted projects. Hosted on a personal website. HTML CSS JavaScript	2024
<b>FASANO-FRANCESCHINI-TEST</b> <a href="https://github.com/wmpg/fasano-franceschini-test">github.com/wmpg/fasano-franceschini-test</a> A Python implementation for the multivariate extension of the two-sample Kolmogorov-Smirnov (K-S) statistical test described by <a href="#">Fasano &amp; Franceschini (1987)</a> . Used in <a href="#">Chow &amp; Brown (2025)</a> , accepted for publication in <i>Icarus</i> . Python	2024
<b>HERE I STAND CALCULATOR</b> <a href="https://ia-chow.github.io/projects/his/">ia-chow.github.io/projects/his/</a> An online calculator tool to compute the odds of various outcomes for the strategy board game <a href="#">Here I Stand</a> , written to familiarize myself with HTML, CSS and JavaScript. Hosted on a personal website. HTML CSS JavaScript	2020

## SKILLS

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**Programming** Python (NumPy, SciPy, Pandas, Matplotlib, Keras/TensorFlow, scikit-learn), MATLAB, R (ggplot, dplyr), HTML5 (Bootstrap), 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)

## OTHER AFFILIATIONS

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2024- **Institute for Earth and Space Exploration**

*University of Western Ontario*