

Jessica Speedie

PhD Candidate, Department of Physics & Astronomy, University of Victoria, BC, Canada

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RESEARCH INTERESTS

Earliest stages of planet formation, planet-disk interactions, kinematics, radio observations, hydrodynamic simulations

EDUCATION

University of Victoria Ph.D. Candidate, Department of Physics & Astronomy, GPA: 8.40/9.0	Sep. 2020 - [Aug. 2025] Victoria, BC, Canada
McMaster University B.Sc., Honours Integrated Science (Physics), GPA: 11.6/12.0, <i>Summa Cum Laude</i>	Sep. 2016 - Apr. 2020 Hamilton, ON, Canada
Humber College of Creative & Performing Arts B.Mus. (<i>Not Completed</i>), Jazz Performance (Guitar), GPA: 90%	Sep. 2015 - Apr. 2016 Toronto, ON, Canada
Humber College of Creative & Performing Arts College Certificate, Introduction to Commercial Jazz (Guitar), GPA: 90%	Sep. 2014 - Apr. 2015 Toronto, ON, Canada

EMPLOYED RESEARCH POSITIONS

🔗 indicates number of 1st-author papers resulting from appointment; 📄 means submitted; 📖 means undergraduate journal

Department of Physics & Astronomy, University of Victoria 🔗🔗🔗 Graduate Student Researcher. Advisor: Dr. Ruobing Dong	Sep. 2020 - Present Victoria, BC, Canada
Department of Physics & Astronomy, McMaster University 🔗 Undergraduate Research Assistant. Advisor: Ralph Pudritz	May - Jul. 2020 Hamilton, ON, Canada
Canadian Institute for Theoretical Astrophysics (CITA), University of Toronto 🔗 Summer Undergraduate Research Program (SURP). Advisor: Dr. J. J. Zanazzi	May - Aug. 2019 Toronto, ON, Canada
Institute for Research on Exoplanets (iREx), University of Montréal 📖 Trottier Summer Intern. Advisor: Dr. David Lafrenière	May - Aug. 2018 Montréal, QC, Canada
Department of Physics & Astronomy, McMaster University 📖 Undergraduate Research Assistant. Advisor: Dr. Laura Parker	Jul. - Aug. 2017 Hamilton, ON, Canada

FUNDING & AWARDS

\$10,000 USD · ALMA Ambassador (Cycle 11) , National Radio Astronomy Observatory (NRAO)	2024
\$105,000 CAD · NSERC Canada Graduate Scholarship (Doctoral) , University of Victoria	2022-2025
4x \$5,000 CAD · President's Research Scholarship , University of Victoria	2020, 2021, 2022 & 2023
2x \$1,500 CAD · University of Victoria Graduate Award , University of Victoria	2021 & 2022
\$5,125 CAD · The R. M. Petrie Memorial Fellowship , University of Victoria	2021
\$5,200 CAD · NSERC Michael Smith Foreign Study Supplement , University of Victoria	2021
\$17,500 CAD · NSERC Canada Graduate Scholarship (Master's) , University of Victoria	2020
\$15,000 CAD · British Columbia Graduate Scholarship (superseded by NSERC CGSM), University of Victoria	2020
Nominated for Chancellor's Gold Medal by Department of Physics & Astronomy, McMaster University	2019
\$800 CAD · The University Senate Scholarship , McMaster University	2019
\$625 CAD · The Boyd McLay Scholarship in Physics , McMaster University	2019
\$9,500 · NSERC Undergraduate Student Research Award , University of Toronto	2019
\$8,400 CAD · NSERC Undergraduate Student Research Award (declined), McMaster University	2019
\$1,600 CAD · The Gladys A. Young Scholarship , McMaster University	2018
\$600 CAD · The Gerald and Verna Simpson Memorial Scholarship , McMaster University	2018
\$6,000 CAD · Trottier Excellence Grant for Summer Interns , University of Montréal	2017
\$500 CAD · Peter Harris Memorial Award , Humber College of Creative & Performing Arts	2016

\$300 CAD · CJA Sousa Liberal Studies Achievement Award , Humber College of Creative & Performing Arts	2015
\$2,500 CAD · Academic Award of Excellence , Humber College of Creative & Performing Arts	2015
\$1,750 CAD · RBC Scholarship for Emerging Artists , Merriam School of Music	2014

LEAD-AUTHOR PUBLICATIONS

4. **Speedie, J.** & Dong, R. (2022). Testing Velocity Kinks as a Planet Detection Method: Do velocity kinks in surface gas emission trace planetary spiral wakes in the midplane continuum? *The Astrophysical Journal Letters*, 940(2), L43.
3. **Speedie, J.**, Booth R.A. & Dong, R. (2022). Observing Planet-driven Dust Spirals with ALMA. *The Astrophysical Journal*, 930, 40 (22pp).
2. **Speedie, J.**, Pudritz R.E., Cridland A.J., Meru F. & Booth, R.A. (2022). Turbulent Disk Viscosity and the Bifurcation of Planet Formation Histories. *Monthly Notices of the Royal Astronomical Society*, 510(4), 6059-6084.
1. **Speedie, J.** & Zanazzi, J. J. (2020). The Structure and Stability of Extended, Inclined Circumplanetary Disk or Ring Systems. *Monthly Notices of the Royal Astronomical Society*, 497(2), 1870–1883.

(Published in undergraduate-refereed journals)

2. **Speedie, J.** & Lafrenière, D. (2018). Improved Surface Gravity and Mass Constraints for Substellar Objects from Spectral Line Profile Measurements at High Resolution in the Near-Infrared. *The iScientist*, 4(1), 3-14.
1. **Speedie, J.** & Parker, L.C. (2017). Star Formation and Morphology of Galaxies in Local Compact Groups. *The iScientist*, 3(1), 3-12.

MANUSCRIPTS SUBMITTED

2. **Speedie, J.**, Dong, R., Hall, C., Longarini, C., Paneque-Carreno, T., Veronesi, B., Lodato, G., Wang, Y., Teague, R. & Hashimoto, J. Kinematic evidence of gravitational instability in the planet-forming disk around AB Aurigae. *Submitted to Nature*, 11 Dec. 2023.
1. Stevenson, E.T., Ribas, A., **Speedie, J.**, Booth, R.A., & Clarke, C. Searching for planet-driven dust spirals in ALMA visibilities. *Submitted to MNRAS*, 8 Dec. 2023.



NON-REFEREED CONTRIBUTIONS & WHITE PAPERS

6. Benneke, B., Cowan, N., Rowe, J. et al. (including **Speedie, J.**), (2019). Exoplanet instrumentation in the 2020s: Canada's pathway towards searching for life on potentially Earth-like exoplanets. *Canadian Long Range Plan for Astronomy and Astrophysics White Papers*, LRP2020.
5. Cappalletto, N., Hosein, H., Pasquariello, M., **Speedie, J.** (2018). Manipulating Wine Colour. Terroir (Wine Science Magazine). *MacSphere: iSci Undergraduate Publications*.
4. **Speedie, J.**, Mahataji, K., D'Ercole, J., Raufdeen, F. (2018). Climate Model Diversity: Future Climate Predictions from the CMIP5 Multi-Model Ensemble. *MacSphere: iSci Undergraduate Publications*.
3. **Speedie, J.**, Mahataji, K., D'Ercole, J., Raufdeen, F. (2018). Motions and Notions - How to Love Uncertainty in Climate Science. *MacSphere: iSci Undergraduate Publications* (Podcast).
2. **Speedie, J.** & Simon, C. (2018). Earthism in Planetary Science. *History of the Earth*, 8(1), 86-91.
1. **Speedie, J.** (2018). The Map that Changed the World of Mars. *Synopsis (interdisciplinary science blog)*.

SUCCESSFUL PROPOSALS FOR TELESCOPE OBSERVING TIME

PI · 9.7 hours · ALMA Radio Telescope (Chile), Program ID: 2023.1.00491.S <i>Kinematic signatures of gravitational instability in the AB Aurigae planet-forming disk</i>	2023
PI · 13.4 hours · ALMA Radio Telescope (Chile), Program ID: 2022.1.01266.S <i>Putting kinematic planetary detection techniques to the test in HD 97048</i>	2022
Co-I · 9.1 hours · ALMA Radio Telescope (Chile) <i>Inspecting the planetary signature in the continuum emission of the disc around HD 97048</i>	2022

SEMINARS AND LUNCH TALKS

NRC Herzberg Astronomy & Astrophysics Research Centre , DAO Science Tea, Victoria, BC, Canada 	Nov. 2023
Center for Simulation Physics, University of Georgia , Athens, GA, USA	Aug. 2023
University of Victoria Astronomy Summer Seminar , Victoria, BC, Canada 	Jul. 2023

Center for Integrative Planetary Science (CIPS) , University of California Berkeley, CA, USA (online)	Mar. 2023
National Radio Astronomy Observatory (NRAO) / UVa , TUNA Lunch Talk, Charlottesville, VA, USA	Nov. 2022
Institute of Astronomy, University of Cambridge , Cambridge, UK	Aug. 2022
Department of Physics & Astronomy, University College London , London, UK	Aug. 2022
Astronomy & Astrophysics Group, University of Warwick , Coventry, UK	Jul. 2022
Department of Physics & Astronomy, Queen Mary University , London, UK	Jul. 2022
Stars & Planets Group, Imperial College London , London, UK	Jul. 2022
Astrophysics Seminar, University of Leicester , Leicester, UK	Jun. 2022
Department of Astronomy, Institute for Advanced Study, Tsinghua University , Beijing, China (online)	Jun. 2022
Jets and Accretion Discs Study Group, Joint ALMA Observatory , Santiago, Chile (online)	May 2022
Planet Formation Group, Center for Computational Astrophysics, Flatiron Institute , NY, USA (online)	Mar. 2022
Center for Astrophysics, Harvard & Smithsonian , Cambridge, MA, USA (online)	Nov. 2021
University of Victoria Astronomy Summer Seminar , Victoria, BC, Canada (online)	Aug. 2021

CONFERENCE TALKS

Disks and Planets Across ESO Facilities , European Southern Observatory Garching, Germany (online) 📺	Nov. 2022
CITA Planet Day , Canadian Institute for Theoretical Astrophysics, University of Toronto, ON	Aug. 2022
Canadian Astronomical Society Annual General Meeting , University of Waterloo, ON (online)	May 2022
Planet-forming Disks: From Surveys to Answers , Leiden, The Netherlands (online) ▶	Sep. 2021
Five Years After HL Tau: A new era in planet formation , Euro. Southern Observatory, Chile (online) ▶	Dec. 2020
Synthesis Undergraduate Research Symposium , McMaster University, Hamilton, ON	Apr. 2019
Canadian Conference for Undergraduate Women in Physics , Ottawa, ON 🌟 1st prize best talk (\$100)	Jan. 2019
Synthesis Undergraduate Research Symposium , McMaster University, Hamilton, ON	Apr. 2018

CONFERENCE POSTERS

ALMA At 10 Years: Past, Present, and Future , Puerto Varas, Chile 📖	Dec. 2023
Canadian Astronomical Society Annual General Meeting , Dominion Radio A. Observatory, BC (online) 📖	May 2021
Circumplanetary Disks & Satellite Formation Conference II , ETH Zürich, Switzerland (online) 📖	Mar. 2021
Five Years After HL Tau: A new era in planet formation , Euro. Southern Observatory, Chile (online) 📖	Dec. 2020
Physics Undergraduate Conference , Western University, London, ON 📖 🌟 Runner-up best poster	Mar. 2018

PRESS

Canadian Astronomical Society (CASCA), Graduate Student Highlight 🔗	Sep. 2022
Monthly article in which CASCA selects one outstanding Canadian graduate student and highlights their research	Canada
National Radio Astronomy Observatory (NRAO), ngVLA Science Showcase, eNews Article 🔗	Apr. 2022
Article Title: <i>An ngVLA Avenue to Measure the Planet Formation Budget</i>	Charlottesville, VA
McMaster Department News, 1st Prize Best Talk, Canadian Conference for UGrad. Women in Phys. 🔗	Jan. 2019
Talk Title: <i>Telling giant planets from brown dwarfs: an observational test with SPIRou</i>	Ottawa, ON
Institute for Research on Exoplanets, Summer Internship Text Interview 🔗	Sep. 2018
Trottier Research Project and Experience Q&A-style interview	Montréal, QC

PUBLIC OUTREACH & EDI EFFORTS

Indigenous Plan Implementation Project	Apr. 2022 - 2023
Graduate representative during departmental implementation of strategies in UVic 2022 Indigenous Plan	University of Victoria
Verna J. Kirkness Program for Indigenous Youth	May 2021
Promoting Post-Secondary Education in Astronomy (online presentation)	University of Victoria
McMaster Undergraduate Academic Astronomy Club Research & Industry Symposium	Mar. 2021
Promoting Graduate Research in Planet Formation (online presentation)	McMaster University

SERVICE TO MY INSTITUTION IN ROLES OF LEADERSHIP

Vice Chair , Canadian Astronomical Society Graduate Student Committee	2023-Present
University of Victoria Representative , Canadian Astronomical Society Graduate Student Committee	2022-2023
Phys. & Astro. Department Representative , Graduate Student Society Representative Council, UVictoria	2021-2022
Vice Chair , Physics & Astronomy Graduate Student Association, University of Victoria	2021-2022
Student Affairs Officer , Physics & Astronomy Graduate Student Association, University of Victoria	2020-2021
Co-President , McMaster Undergraduate Academic Astronomy Club (MUAAC), McMaster University	2018-2020
Vice President of Functions , McMaster Undergraduate Academic Astronomy Club, McMaster University	2017-2018
First-year Representative , McMaster Undergraduate Academic Astronomy Club, McMaster University	2016-2017

SERVICE TO MY PROFESSION

Square Kilometer Array (SKA) Cradle of Life Working Group , Associate member	since May 2023
Canadian Advanced Network for Astronomical Research Science Platform User Group	since Feb. 2023
Academic Journal Referee , <i>Monthly Notices of the Royal Astronomical Society</i> (N=1)	since Mar. 2022
Grant Program External Reviewer , UK National High Performance Computing Resources (N=1)	since Dec. 2021



TEACHING RECORD (AS A GRADUATE STUDENT)

University of Victoria	Sep. 2020 - Apr. 2021
Teaching Assistant, Department of Physics & Astronomy (<i>Total: 8 months</i>)	Victoria, BC
<ul style="list-style-type: none">◦ Concepts in Modern Astronomy (ASTR 150; 20 students) with Dr. Sara Ellison (<i>Jan.-Apr. 2021</i>). Prepared and led 3hr online demonstrations of astronomy lab experiments; marked lab reports.◦ Introductory Physics (PHYS 110; 30 students) with Drs. Travis Martin & Mark Laidlaw (<i>Sep.-Dec. 2020</i>). Prepared and taught 1.5hr online demonstrations of physics lab experiments 3 times weekly to 50+ students; proctored online quizzes.	

TEACHING RECORD (AS AN UNDERGRADUATE STUDENT)

McMaster University	Sep. 2018 - Apr. 2020
Teaching Assistant, School of Interdisciplinary Science (<i>Total: 16 months</i>)	Hamilton, ON
<ul style="list-style-type: none">◦ Advanced Calculus (ISCI 2A18; 50 students) with Dr. George Dragomir (<i>Sep. 2019 - Apr. 2020</i>). Prepared and taught bi-weekly 1hr blackboard tutorials; marked assignments, quizzes and exams; substituted for class lectures.◦ Advanced Calculus (ISCI 2A18; 55 students) with Dr. George Dragomir (<i>Sep. 2018 - Apr. 2019</i>). Prepared and taught bi-weekly 1hr blackboard tutorials to class of 50+ students; marked assignments, quizzes and exams.	

PROFESSIONAL DEVELOPMENT & CERTIFICATIONS

ALMA Data Reduction Workshop	Oct. 2022
Calibration, cleaning, clean masking, by ALMA Ambassador Dr. Allison Towner	University of Florida (online)
Intro to Coding with HTML & CSS, Certificate 	Sep. 2022
University of Victoria Libraries – Digital Scholarship Commons	University of Victoria, BC
ALMA Data Reduction Virtual Workshop	Sep. 2020
Tools for analysis of protoplanetary disks by Dr. Nienke van der Marel & Dr. Logan Francis 	University of Victoria, BC
Teaching Assistant Development Workshop	Sep. 2019
TA Professionalism, Academic Integrity, Marking Effectively	McMaster University, ON
ALMA Proposal Writing Workshop	Apr. 2019
Interferometry Basics, Proposal Prep. & OT Overview, by ALMA Ambassador Dr. Toby Brown	University of Toronto, ON

FUNDED RESEARCH VISITS

Center for Simulational Physics, University of Georgia	1w, Aug. 2023
Visiting graduate researcher. Host: Dr. Cassandra Hall	Athens, GA
National Radio Astronomy Observatory (NRAO) / North American ALMA Science Center (NAASC)	1w, Nov. 2022
Data Reduction Visitor. Support team: Dr. Ryan Loomis, Sarah Wood, Tristan Ashton	Charlottesville, VA
Astrophysics Group, Imperial College London	8w, Jun-Aug. 2022
Visiting graduate researcher. Host supervisor: Dr. Richard Booth	London, UK

COMPUTATIONAL EXPERTISE

Languages: python, C/C++, HTML/CSS, \LaTeX

Astronomical Tools: ALMA Observing Tool (OT), CARTA, SAOImage DS9, glue-viz

Code Frameworks: CASA (reduction and imaging of radio interferometry observations)

MCFOST (3D continuum and line radiative transfer code)

FARGO3D (multifluid hydrodynamics code) on GPU clusters, e.g. Speedie et al. (2022b) [↗](#)

REBOUND (*N*-body code) on CPU parallel, e.g. Speedie & Zanazzi (2020) [↗](#)

PANDEXO (JWST simulator), e.g. 2nd-year Undergraduate Enrichment Project (2018) [↗](#)

OBSERVING EXPERIENCE

I'Observatoire du Mont-Mégantic

May 2018

3 full nights of observations using OMM's 1.6m telescope

Notre-Dame-des-Bois, QC, Canada

- **Instruments:** CPaPIR (Caméra PanorAmique Proche Infra-Rouge), PESTO (Planètes Extra-Solaires en Transit et Occultation)
- **Scientific targets:** détermination de l'occurrence du transit de Kepler-88 b (KOI-142); observations profondes de galaxies; obtenir des belles images pour le calendrier de l'observatoire (OPIOMM)
- **Duties:** Object airmass minimization, filter initialization, telescope positioning, conducting focus and bias, finding chart comparison, launch scripts, dome and sky flats, observation log

WORKSHOP, SCHOOL & CONFERENCE PARTICIPATION

Flatiron Computational Fluid Dynamics for Astrophysics Summer School, Flatiron Institute, NY Jul.-Aug. 2023

NRAO 19th Synthesis Imaging Workshop, Charlottesville, VA Jun. 2023

New Eyes on the Universe: SKA and ngVLA, Vancouver, BC May 2023

1st DUSTBUSTERS School on Protostellar Discs and Planet Formation, Gargnano del Garda, Italy May 2022

Distorted Astrophysical Discs: New Insights & Future Directions, Kavli Institute, Cambridge, UK (online) May 2021

Exomoon Discussion Event, Columbia University, New York (online) Nov. 2020

IMPRS 15th Summer School: Planet Formation in Protoplanetary Disks, Heidelberg, Germany (online) Aug. 2020

Exoplanets III, Max Planck Institute for Astronomy & Center for Astronomy of Heidelberg University (online) Jul. 2020

Sagan Exoplanet Summer Workshop, NASA Exoplanet Science Institute, Caltech, Pasadena, CA (online) Jul. 2020

Canadian Astronomical Society Annual General Meeting, York University, Toronto, ON (online) May 2020

Science of Early Life, The Origins Institute, McMaster University, Hamilton, ON Jun. 2018

Gravitational Waves Fall Meeting, American Physical Society, Union College, Schenectady, New York Nov. 2017

PUBLIC TEACHING

Sherway Academy of Music

2015 - 2016

Guitar Teacher (Contact: Bill Zufelt)

85 31st St, Toronto, ON

- Prepared and taught weekly guitar and electric bass lessons for students ages 14-60; accompanied students during annual recitals.

CJ's Skateboard Park & School

2011-2015

Skateboarding & Inline Skating Instructor (Contact: Jay Mandarin)

60 Horner Ave, Etobicoke, ON (since relocated)

- Gave weekly individual and group skateboarding and inline skating lessons to children and adults with and without disabilities (autism, deafness)
- Acted as ambassador for females in skateboarding at live vert ramp demonstrations and on public news television broadcasts (e.g. Breakfast Television [▶](#), 8:54)