

# Jessica Speedie

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

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## RESEARCH INTERESTS

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

## EDUCATION

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

## EMPLOYED RESEARCH POSITIONS

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

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

## FUNDING & AWARDS

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

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

## LEAD-AUTHOR PUBLICATIONS

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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

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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

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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

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




## SEMINARS AND LUNCH TALKS

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<b>Department of Physics &amp; Astronomy</b> , McMaster University, Hamilton, ON, Canada	Jan. 2024
<b>NRC Herzberg Astronomy &amp; Astrophysics Research Centre</b> , DAO Science Tea, Victoria, BC, Canada	Nov. 2023
<b>Center for Simulational Physics, University of Georgia</b> , Athens, GA, USA	Aug. 2023

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

## CONFERENCE TALKS

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

## CONFERENCE POSTERS

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

## PRESS

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

## PUBLIC OUTREACH & EDI EFFORTS

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

## SERVICE TO MY INSTITUTION IN ROLES OF LEADERSHIP

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

## SERVICE TO MY PROFESSION

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

## TEACHING RECORD (AS A GRADUATE STUDENT)

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



## TEACHING RECORD (AS AN UNDERGRADUATE STUDENT)

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<b>McMaster University</b>	Sep. 2018 - Apr. 2020
Teaching Assistant, School of Interdisciplinary Science ( <i>Total: 16 months</i> )	Hamilton, ON
<ul style="list-style-type: none"><li>◦ <b>Advanced Calculus (ISCI 2A18; 50 students)</b> 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.</li><li>◦ <b>Advanced Calculus (ISCI 2A18; 55 students)</b> 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.</li></ul>	

## PROFESSIONAL DEVELOPMENT & CERTIFICATIONS

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

## FUNDED RESEARCH VISITS

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



## COMPUTATIONAL EXPERTISE

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**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

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### 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

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**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

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### 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)