

# Jessica Speedie

STUDENT · TEACHER · ASPIRING ASTROPHYSICIST

University of Victoria BC, Canada

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## Education

### Ph.D. Student, Astronomy

Victoria, BC, Canada

UNIVERSITY OF VICTORIA, DEPARTMENT OF PHYSICS & ASTRONOMY

2020 -

- Graduate Program in Astronomy & Astrophysics · GPA: 8.25/9
- Supervisor: Dr. Ruobing Dong

### Honours Bachelor of Science

Hamilton, ON, Canada

MCMASTER UNIVERSITY, SCHOOL OF INTERDISCIPLINARY SCIENCE

2016-2020

- Integrated Science (Physics) · *Summa Cum Laude* · GPA: 11.6/12.0
- Thesis Supervisor: Dr. Ralph Pudritz, Department of Physics & Astronomy

### Bachelor of Music (not completed)

Toronto, ON, Canada

HUMBER COLLEGE OF CREATIVE & PERFORMING ARTS

2015-2016

- Jazz Performance (Guitar) · GPA: 90%

### College Certificate

Toronto, ON, Canada

HUMBER COLLEGE OF CREATIVE & PERFORMING ARTS

2014-2015

- Introduction to Commercial Jazz (Guitar) · GPA: 90%

## Research

### EMPLOYED POSITIONS

#### Graduate Student Researcher

Victoria, BC, Canada

DEPARTMENT OF PHYSICS & ASTRONOMY - UNIVERSITY OF VICTORIA

Sep. 2020 - Present

- Supervisor: Dr. Ruobing Dong. Collaborators: Dr. Richard Booth
- Topic of research: Observational signatures of planet formation in protoplanetary disks

#### Undergraduate Research Assistant

Hamilton, ON, Canada

DEPARTMENT OF PHYSICS & ASTRONOMY - MCMASTER UNIVERSITY

May - Jul. 2020

- Supervisor: Dr. Ralph Pudritz. Collaborators: Dr. Alex Cridland, Dr. Farzana Meru & Dr. Richard Booth
- Project title: *Outward Planet Migration & Formation in Low Viscosity Disks*

#### Canadian Institute for Theoretical Astrophysics (CITA)

Toronto, ON, Canada

SUMMER UNDERGRADUATE RESEARCH PROGRAM (SURP) - UNIVERSITY OF TORONTO

May-Aug 2019

- Supervisor: Dr. J.J. Zanazzi
- Project title: *The Stability of Extended Disk and Ring Systems, with Application to J1407b*

#### Institute for Research on Exoplanets (iREx)

Montréal, QC, Canada

TROTTIER SUMMER INTERN - UNIVERSITÉ DE MONTRÉAL

May-Aug 2018

- Supervisor: Dr. David Lafrenière
- Project title: *Improved Mass Constraints for Substellar Objects from Spectral Line Profile Measurements at High Resolution in the Near Infrared*

#### Undergraduate Research Assistant

Hamilton, ON, Canada

DEPARTMENT OF PHYSICS & ASTRONOMY - MCMASTER UNIVERSITY

Jul-Aug 2017

- Supervisor: Dr. Laura Parker
- Project title: *Star Formation and Morphology of Galaxies in Local Compact Groups*

## CURRICULUM PROJECTS

## Undergraduate Honours Thesis

Hamilton, ON, Canada

DEPARTMENT OF PHYSICS & ASTRONOMY - MCMASTER UNIVERSITY

Sep. 2019 - Apr. 2020

- Supervisor: Dr. Ralph Pudritz
- Collaborators: Dr. Alex Cridland (Leiden University), Dr. Farzana Meru (University of Warwick) & Dr. Richard Booth (University of Cambridge)
- Thesis title: *Formation and Evolution of Ring Systems in Planet Forming Disks*

## Integrated Science Independent Project

Hamilton, ON, Canada

DEPARTMENT OF PHYSICS & ASTRONOMY - MCMASTER UNIVERSITY

Jan-Apr. 2019

- Supervisor: Dr. Christine Wilson
- Project title: *Exploring Molecular Line and Continuum Emission in 7 Nearby Galaxies with the ALMA Archive*

## Integrated Science Enrichment Project

Hamilton, ON, Canada

DEPARTMENT OF PHYSICS & ASTRONOMY - MCMASTER UNIVERSITY

Mar-Apr. 2018

- Supervisor: Dr. Ralph Pudritz
- Project title: *Observability of Super-Earth GJ1132b Atmospheres with JWST*

## Publications

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**Speedie, J.,** Booth R.A. & Dong, R. (2022). [Observing Planet-driven Dust Spirals with ALMA](#), *The Astrophysical Journal*.

**Speedie, J.,** Pudritz R.E., Cridland A.J., Meru F. & Booth, R.A. (2021). [Turbulent Disk Viscosity and the Bifurcation of Planet Formation Histories](#), *Monthly Notices of the Royal Astronomical Society*, 510(4), 6059-6084.

**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.

## UNDERGRADUATE REFEREED

**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.

**Speedie, J.,** & Parker, L.C. (2017). [Star Formation and Morphology of Galaxies in Local Compact Groups](#). *The iScientist*, 3(1), 3-12.

## NON-REFEREED CONTRIBUTIONS

Cappalletto, N., Hosein, H., Pasquariello, M., **Speedie, J.** (2018). [Manipulating Wine Colour](#). Terroir Wine Science Magazine. MacSphere: iSci Undergraduate Publications.

**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.

**Speedie, J.,** Simon, C., & iSci Class of 2020 (2018). [Earthism in Planetary Science](#). *History of the Earth*, 8(1), 86-91.

**Speedie, J.** (2018). [The Map that Changed the World of Mars](#). Synopsis (interdisciplinary science blog).

## DISSERTATIONS

**Speedie, J.,** & Wilson, C. (2019). [Exploring Molecular Line and Radio Continuum Emission Ratios in 7 Nearby Galaxies with the ALMA Archive](#) (ISCI 3A12 Independent Project).

**Speedie, J.,** Brooks, K., & Pudritz, R. (2018). [Observability of Super-Earth GJ1132b Atmospheres with JWST](#) (ISCI 2A18 Enrichment Project).

## PODCASTS

**Speedie, J.,** Mahataji, K., D'Ercole, J., Raufdeen, F. (2018). [Motions and Notions - How to Love Uncertainty in Climate Science](#). MacSphere: iSci Undergraduate Publications.

## Awards

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### University of Victoria Graduate Award

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$1,500 CAD

Feb. 2022

- Based on the student's progress through their program and a recommendation from the department.

### The R. M. Petrie Memorial Fellowship

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$5,125 CAD

Nov. 2021

- Awarded annually to one or two highly qualified students working toward the MSc or PhD degree in astronomy at the University of Victoria.

### NSERC Michael Smith Foreign Study Supplement (MSFSS)

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$5,200 CAD

Aug. 2021

- To support high-calibre Canadian graduate students in building global linkages and international networks through the pursuit of exceptional research experiences at research institutions abroad.

### University of Victoria Graduate Award

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$1,500 CAD

July 2021

- Based on the student's progress through their program and a recommendation from the department.

### President's Research Scholarship

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$5,000 CAD

Aug. 2020

- Based on a recommendation from the department; intended as a top-up to federal council scholarships such as the NSERC CGS-M.

### NSERC Canada Graduate Scholarship Master's Program (CGS-M)

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$17,500 CAD

Apr. 2020

- The CGS-M program provides financial support to high-calibre scholars who are engaged in eligible Master's programs in Canada.

### British Columbia Graduate Scholarship

Victoria, BC, Canada

UNIVERSITY OF VICTORIA - \$15,000 CAD (SUPERSEDED BY NSERC CGS-M)

Jan. 2020

- A merit based, research focused award; the most prestigious fellowship offered by the provincial government to graduate students in BC.

### Chancellor's Gold Medal: Nominated (Not Awarded)

Hamilton, ON, Canada

McMASTER UNIVERSITY - NOMINATED BY THE DEPARTMENT OF PHYSICS & ASTRONOMY

Oct. 2019

- To be awarded to the student who has completed the penultimate year of any four-level program, and who ranks highest in scholarship, leadership and influence.

### The University Senate Scholarship

Hamilton, ON, Canada

McMASTER UNIVERSITY - \$800 CAD

Aug. 2019

- Awarded to undergraduate students who attain high Fall-Winter Averages.

### The Boyd McLay Scholarship in Physics

Hamilton, ON, Canada

McMASTER UNIVERSITY - \$625 CAD

Aug. 2019

- To be awarded to a student enrolled in Level III of an Honours program in Physics with a high Fall-Winter Average.

### NSERC Undergraduate Student Research Award (USRA)

Toronto, ON, Canada

UNIVERSITY OF TORONTO - \$9,500 CAD

Feb. 2019

- A prestigious grades-based award to nurture the student's interest and fully develop their potential for a research career in the natural sciences and engineering

### NSERC Undergraduate Student Research Award (USRA)

Hamilton, ON, Canada

McMASTER UNIVERSITY - \$8,400 CAD (DECLINED)

Feb. 2019

- A prestigious grades-based award to nurture the student's interest and fully develop their potential for a research career in the natural sciences and engineering

### The Gladys A. Young Scholarship

Hamilton, ON, Canada

McMASTER UNIVERSITY - \$1,600 CAD

Jul. 2018

- Awarded to the student who has completed Level I and an additional 30 - 65 units of an Honours program in Mathematics or Physics with the highest Fall-Winter Average.

## The Gerald and Verna Simpson Memorial Scholarship

Hamilton, ON, Canada

McMASTER UNIVERSITY - \$600 CAD

Jul. 2018

- Awarded to the student who has completed Level I and an additional 30 - 45 units of an Honours Physics program with the highest Fall-Winter Average.

## Trottier Excellence Grants for Summer Interns (iREx)

Montréal, QC, Canada

UNIVERSITÉ DE MONTRÉAL - \$6,000 CAD

Dec. 2017

- A 4-month research fellowship at the Institute for Research on Exoplanets (one of six grants awarded)

## Peter Harris Memorial Award

Toronto, ON, Canada

HUMBER COLLEGE OF CREATIVE & PERFORMING ARTS - \$500 CAD

Apr. 2016

- Presented to a student in the Guitar Profile in the Bachelor of Music Program with strong academic and performance skills

## CJA Sousa Liberal Studies Achievement Award

Toronto, ON, Canada

HUMBER COLLEGE OF CREATIVE & PERFORMING ARTS - \$300 CAD

Apr. 2015

- Presented to a student in a Liberal Studies course who has achieved a high academic standing and has demonstrated strong interpersonal skills, enthusiasm and commitment to learning, as recommended by faculty to the Dean

## Academic Award of Excellence

Toronto, ON, Canada

HUMBER COLLEGE OF CREATIVE & PERFORMING ARTS - \$2,500 CAD

Apr. 2015

- Presented to a student in the Introduction to Commercial Jazz Program for achieving the highest overall average

## RBC Scholarship for Emerging Artists

Oakville, ON, Canada

MERRIAM SCHOOL OF MUSIC - \$1,750 CAD

May 2014

- Scholarship money to assist those music makers who have been nurtured by Merriam and will go on to study music at an accredited post-secondary school

## Talks

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Apr. 2022	<b>Jets and Accretion Discs Study Group   Joint ALMA Observatory</b> “Observing Planet-Driven Dust Spirals with ALMA”	Santiago (Online)
Mar. 2022	<b>Planet Formation Group   Center for Computational Astrophysics   Flatiron Institute</b> “Observing Planet-Driven Dust Spirals with ALMA”	NY (Online)
Nov. 2021	<b>Center for Astrophysics   Harvard &amp; Smithsonian</b> “Observing Planet-Driven Dust Spirals with ALMA”	Cambridge (Online)
Sep. 2021	<b>Planet-forming Disks: From Surveys to Answers</b> “Detectability of Planet-Driven Spiral Arms in the Dust Component of Protoplanetary Disks with ALMA”	Leiden (Online)
Aug. 2021	<b>University of Victoria Astronomy Summer Seminar</b> “Detectability of Planet-Driven Spiral Arms in the Dust Component of Protoplanetary Disks with ALMA”	Victoria (Online)
Dec. 2020	<b>Five Years After HL Tau: A new era in planet formation</b> “Outward Planet Migration in a Low Viscosity HL Tau Disk”	ESO, Chile (Online)
Apr. 2020	<b>Undergraduate Honours Thesis Presentation</b> “Formation and Evolution of Rings Systems in Planet Forming Disks”	McMaster University
Apr. 2019	<b>Synthesis Undergraduate Research Symposium</b> “Exploring Molecular Line and Radio Continuum Emission Ratios in 7 Nearby Galaxies with the ALMA Archive”	McMaster University
Jan. 2019	<b>Canadian Conference for Undergraduate Women in Physics (CCUWiP)</b> “Telling Giant Planets from Brown Dwarfs: Observational tests with SPIRou” [1st prize best talk, \$100]	University of Ottawa
Apr. 2018	<b>Synthesis Undergraduate Research Symposium</b> “Observability of Super-Earth GJ 1132b Atmospheres with JWST”	McMaster University

## Posters

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May 2021	<b>Canadian Astronomical Society / Société Canadienne d'Astronomie (CASCA) Annual General Meeting</b> "Observing Planet-Driven Spiral Arms in the Dust Component of Protoplanetary Disks with ALMA"	(Online)
Mar. 2021	<b>Circumplanetary Disks &amp; Satellite Formation Conference II</b> "The Structure and Stability of Extended Circumplanetary Disks (or Exorings)"	ETH Zürich (Online)
Dec. 2020	<b>Five Years After HL Tau: A new era in planet formation</b> "The Structure and Stability of Extended Circumplanetary Disks (or Exorings)"	ESO, Chile (Online)
Mar. 2018	<b>Physics Undergraduate Conference (PhUnC)</b> "Star Formation and Morphology of Galaxies in Local Compact Groups" [Runner-up for best poster]	Western University

## Conferences/Workshops

May 2022	<b>1st DUSTBUSTERS School on Protostellar Discs and Planet Formation</b> Gargnano del Garda, Italy	BS, Italy
May 2021	<b>Distorted Astrophysical Discs Workshop: New Insights &amp; Future Directions</b> Kavli Institute, Cambridge, UK	(Online)
Nov. 2020	<b>Exomoon Discussion Event</b> Hosted by Dr. David Kipping, Columbia University, New York	(Online)
Aug. 2020	<b>IMPRS 15th Summer School: Planet Formation in Protoplanetary Disks</b> International Max Planck Research School, Heidelberg, Germany	(Online)
July 2020	<b>Exoplanets III</b> Max Planck Institute for Astronomy & Center for Astronomy of Heidelberg University	(Online)
July 2020	<b>Sagan Exoplanet Summer (Virtual) Workshop</b> NASA Exoplanet Science Institute (NExSci), California Institute of Technology, Pasadena, CA	(Online)
May 2020	<b>Canadian Astronomical Society / Société Canadienne d'Astronomie (CASCA)</b> Annual Meeting, York University	(Online)
June 2018	<b>Science of Early Life</b> The Origins Institute, McMaster University	Hamilton, ON
Nov. 2017	<b>Gravitational Waves Fall Meeting</b> American Physical Society, Union College	Schenectady, NY

## Teaching

### ACADEMIC TEACHING ASSISTANTSHIPS

#### As a Graduate Student at the University of Victoria

2020-Pres.

**CONCEPTS IN MODERN ASTRONOMY — ASTR 150 WITH DR. SARA ELLISON** (JAN-APR. 2021)

Victoria, BC, Canada

- **Duties:** Prepared and led 3hr online demonstrations of astronomy lab experiments; marked lab reports

**INTRODUCTORY PHYSICS — PHYS 110 WITH DRs. TRAVIS MARTIN & MARK LAIDLAW** (SEP-DEC. 2020)

- **Duties:** Prepared & taught 1.5hr online demonstrations of physics lab experiments 3 times weekly to 50+ students; proctored online quizzes

#### As an Undergraduate Student at McMaster University

2018-2020

**ADVANCED CALCULUS — ISCI 2A18 WITH DR. GEORGE DRAGOMIR** (SEP 2019 - APR. 2020)

Hamilton, ON, Canada

- **Duties:** Taught bi-weekly 1hr blackboard tutorials; marked assignments and quizzes; invigilated and marked exams; substituted for class lectures

**ADVANCED CALCULUS — ISCI 2A18 WITH DR. GEORGE DRAGOMIR** (SEP 2018 - APR. 2019)

- **Duties:** Prepared and taught bi-weekly 1hr blackboard tutorials to class of 50+ students; marked assignments, quizzes and exams

### PUBLIC TEACHING

#### Sherway Academy of Music

2015-2016

**GUITAR TEACHER** — (CONTACT: BILL ZUFELT)

85 31st St, Toronto, ON, Canada

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

- **Duties:** Gave weekly individual and group skateboarding & inlining lessons to children and adults with & without special needs (autism, deafness)
- Acted as ambassador for females in skateboarding at live vert ramp demonstrations and on public news television broadcasts

## Computing

- Programming** Python (packages: astropy, pandas, matplotlib, scipy, numpy), C/C++, Linux shell scripting, HTML, ~~TeX~~
- Astronomy** SAOImage DS9, CASA
- Frameworks** PANDEXO (JWST simulator), REBOUND (N-body code - CPU parallel), FARGO3D (multifluid HD/MHD code - GPU clusters)

## Outreach & Service

### GRADUATE LEADERSHIP

#### Graduate Student Society: Graduate Representative Council

2021-Pres.

PHYSICS &amp; ASTRONOMY CO-REPRESENTATIVE (2021-2022)

Victoria, BC, Canada

- **Duties:** Gather and communicate the interests and concerns of Physics & Astronomy graduate students to the Council; serve on Finance Committee

#### Physics & Astronomy Graduate Student Association (PAGSA)

2020-Pres.

VICE CHAIR (2021-2022)

Victoria, BC, Canada

- **Duties:** To act as second in command in organizing educational and social events for Physics & Astronomy graduate student community; keep complete and accurate records of all written dealings with outside groups and organizations; maintain PAGSA website

STUDENT AFFAIRS OFFICER (2020-2021)

- **Duties:** To design educative programs and strategies to prevent issues pertaining to equity, diversity, inclusion, and wellness for Physics & Astronomy graduate students; and to maintain a list of resources available for students in consultation with organizations such as the Graduate Student Society, Faculty of Graduate Studies, and the University

May 2021 Verna J Kirkness Program for Indigenous Youth

UVictoria (Online)

Promoting Post-Secondary Education in Astronomy

Mar. 2021 McMaster Undergraduate Academic Astronomy Club (MUAAC): Research &amp; Industry Symposium

McMaster (Online)

Promoting Graduate Research in Planet Formation

### UNDERGRADUATE LEADERSHIP

#### McMaster Undergraduate Academic Astronomy Club (MUAAC)

2016-2020

CO-PRESIDENT (2018-2019 AND 2019-PRESENT)

Hamilton, ON, Canada

- **Duties:** To unite undergraduate students under a common theme of education and awareness in the scientific field of astronomy; and to integrate the astronomy programs at McMaster (eg. the W.J. McCallion Planetarium, Sidewalk Astronomy, the Origins Institute) as well as local institutions (eg. University of Western Ontario's Astronomy Department and Cronyn Observatory)

VICE PRESIDENT OF FUNCTIONS (2017-2018)

- **Duties:** Communicated with faculty members, graduate students and other astronomy affiliations on campus to organize collaborative events

FIRST-YEAR REPRESENTATIVE (2016-2017)

- **Duties:** Acted as the voice of first year undergraduate students to ensure the club meets their needs and interests

## Press

Jan. 2019 Canadian Conference for Undergraduate Women in Physics, McMaster Department News [First Prize Best Talk](#)

Ottawa, ON

Sep. 2018 Institute for Research on Exoplanets, Summer Internship Research Project & Experience [Text Interview](#)

Montréal, QC

## Professional Development

Sep. 2020	<b>ALMA Data Reduction Workshop</b> Virtual workshop on tools for analysis of protoplanetary disks - Nienke van der Marel & Logan Francis, UVic	Victoria, BC
Sep. 2019	<b>Teaching Assistant Development Workshop</b> TA Professionalism, Academic Integrity, Marking Effectively - McMaster University	Hamilton, ON
Apr. 2019	<b>ALMA Proposal Writing Workshop</b> Interferometry Basics, Proposal Prep & OT Overview, ALMA Simulator Walkthrough - University of Toronto	Toronto, ON

## Observing

### l'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 Occultations)
- **Duties:** Object airmass minimization, filter initialization, telescope positioning, conducting focus and bias, finding chart comparison, launch scripts, dome and sky flats, observation log
- **Scientific targets:** détermination de l'occurrence du transit de Kepler-88 b (KOI-142); observations profondes de galaxies; et obtenir des belles images pour le calendrier de l'observatoire (OPIOMM)

## Professional Organizations

Canadian Astronomical Society (CASCA) [01/2020] · The Planetary Society [03/2017] · Canadian Association of Physicists (CAP) [02/2017]

## Select Coursework

### UNIVERSITY OF VICTORIA (MASTER'S)

2021	<b>[ASTR 580] Planet-Disk Interactions: Density Wave Theory</b> , Dr. Ruobing Dong	Victoria, BC
2021	<b>[ASTR 580] Planet Formation in Protoplanetary Disks</b> , Dr. Ruobing Dong	
2020	<b>[ASTR 511] Advanced Topics in Astronomy: Exoplanets</b> , Dr. Ruobing Dong	
2020	<b>[PHYS 515] Data Analysis Techniques in Physics &amp; Astronomy</b> , Drs. Dean Karlen, Justin Albert & Sara Ellison	

### MCMASTER UNIVERSITY (UNDERGRADUATE)

2020	<b>[ASTRON 3X03] Galaxies &amp; Cosmology</b> , Dr. Laura Parker	Hamilton, ON
2020	<b>[PHYS 3K03] Thermodynamics &amp; Statistical Mechanics</b> , Dr. An-chang Shi	
2019-20	<b>[PHYS 3MM3, 4F03] Quantum Mechanics 1&amp;2</b> , Dr. Erik Sorenson, Dr. Duncan O'Dell	
2019	<b>[ASTRON 3Y03] Stellar Structure</b> , Dr. Alison Sills	
2019	<b>[PHYS 4B03] Electromagnetic Theory</b> , Dr. Sung-sik Lee	
2018-19	<b>[MATH 3C03, 3D03] Mathematical Physics 1&amp;2</b> , Dr. Dario Valdebenito	
2018	<b>[PHYS 2G03] Scientific Computing</b> , Dr. James Wadsley	
2017-18	<b>[PHYS 2B03, 2BB3] Electricity &amp; Magnetism 1&amp;2</b> , Dr. David Venus, Dr. Takashi Imai	