

Jessica Speedie

STUDENT · TEACHER · ASPIRING ASTROPHYSICIST

University of Victoria BC, Canada

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Education

Master of Science

Victoria, BC, Canada

UNIVERSITY OF VICTORIA, DEPARTMENT OF PHYSICS & ASTRONOMY

2020-[2022]

- 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

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 - MCMMASTER 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 - MCMMASTER 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 - MCMMASTER UNIVERSITY

Mar-Apr. 2018

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

Publications

Speedie, J., Booth R.A. & Dong, R. (Submitted to AAS). **Observing Planet-driven Dust Spirals with ALMA.**

Speedie, J., Pudritz R.E., Cridland A.J., Meru F. & Booth, R.A. (2021). **Turbulent Disk Viscosity and the Bifurcation of Planet Formation Histories**, *MNRAS*, 10.1093/mnras/stab3180.

Speedie, J., & Zanazzi, J. J. (2020). **The Structure and Stability of Extended, Inclined Circumplanetary Disk or Ring Systems**, *MNRAS*, 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

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

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

CJ's Skateboard Park & School

on/off 2011-2016

SKATEBOARD & INLINE SKATES INSTRUCTOR — (CONTACT: JAY MANDARINO)

60 Horner Ave, Etobicoke, ON, Canada

- **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

Outreach & Service

GRADUATE LEADERSHIP

Physics & Astronomy Graduate Student Association (PAGSA)

2020-2021

STUDENT AFFAIRS OFFICER (2020-2021)

Victoria, BC, Canada

- **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

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|-----------|---|--------------------|
| May 2021 | Verna J Kirkness Program for Indigenous Youth Promoting Post-Secondary Education in Astronomy | UVictoria (Online) |
| Mar. 2021 | McMaster Undergraduate Academic Astronomy Club (MUAAC): Research & Industry Symposium Graduate Research in Planet Formation | McMaster (Online) |

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

Conferences

TALKS

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| Sep. 2021 | Planet-forming Disks: From Surveys to Answers "Detectability of Planet-Driven Spiral Arms in the Dust Component of Protoplanetary Disks with ALMA" | Leiden (Online) |
| Aug. 2021 | University of Victoria Astronomy Summer Seminar "Detectability of Planet-Driven Spiral Arms in the Dust Component of Protoplanetary Disks with ALMA" | Victoria (Online) |
| Dec. 2020 | Five Years After HL Tau: A new era in planet formation "Outward Planet Migration in a Low Viscosity HL Tau Disk" | ESO, Chile (Online) |
| Apr. 2020 | Undergraduate Honours Thesis Presentation "Formation and Evolution of Rings Systems in Planet Forming Disks" | McMaster University |
| Apr. 2019 | Synthesis Undergraduate Research Symposium "Exploring Molecular Line and Radio Continuum Emission Ratios in 7 Nearby Galaxies with the ALMA Archive" | McMaster University |
| Jan. 2019 | Canadian Conference for Undergraduate Women in Physics (CCUWiP) "Telling Giant Planets from Brown Dwarfs: Observational tests with SPIRou" [1st prize best talk, \$100] | University of Ottawa |
| Apr. 2018 | Synthesis Undergraduate Research Symposium "Observability of Super-Earth GJ 1132b Atmospheres with JWST" | McMaster University |

POSTERS

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

ATTENDED

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

Computing

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| 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) |

Press

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|-----------|--|--------------|
| 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

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| Sep. 2020 | ALMA Data Reduction Workshop Virtual workshop on tools for analysis of protoplanetary disks - Nienke van der Marel & Logan Francis, UVic | Victoria, BC |
| Sep. 2019 | Teaching Assistant Development Workshop TA Professionalism, Academic Integrity, Marking Effectively - McMaster University | Hamilton, ON |
| Apr. 2019 | ALMA Proposal Writing Workshop 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 **[ASTR 580] Planet-Disk Interactions: Density Wave Theory**, Dr. Ruobing Dong *Victoria, BC*
- 2021 **[ASTR 580] Planet Formation in Protoplanetary Disks**, Dr. Ruobing Dong
- 2020 **[ASTR 511] Advanced Topics in Astronomy: Exoplanets**, Dr. Ruobing Dong
- 2020 **[PHYS 515] Data Analysis Techniques in Physics & Astronomy**, Drs. Dean Karlen, Justin Albert & Sara Ellison

MCMASTER UNIVERSITY (UNDERGRADUATE)

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