

Alicia M. Savelli | Curriculum Vitae

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I am a first year graduate student at the University of Toronto in the department of Astronomy & Astrophysics. My research interests lie in theoretical astrophysics, particularly in plasma astrophysics, relativity, and galaxy evolution. I come from a unique background as a secondary math and physics teacher, and as such I am incredibly passionate about science education, with community outreach and student supervision being among my top priorities.

Education

University of Toronto

PhD Astronomy & Astrophysics 2022 – 2027

Brock University

B.Sc. Physics (Honours) 2020 – 2022

- 90% cumulative average (4.0 GPA on 4 point scale)
- Top 15% of faculty every year
- Completed as a second degree (10.0 credits transferred from B.Sc. in Mathematics + 10.0 new credits)

Brock University

B.Sc. Mathematics (Honours), minor in Physics 2014 – 2019

- 88% cumulative average (4.0 GPA on 4 point scale)
- Top 15% of faculty every year

Brock University

B.Ed. 2014 – 2019

- Intermediate/Senior qualifications
- 94% cumulative average (4.0 GPA on 4 point scale)

Research Experience

PhD Mini Projects

CO emission in FIRE-2

Supervisor: Prof. Norm Murray May 2023 – August 2023

- Investigating CO emission as a tracer for H₂
- Running a chemistry solver and radiative transfer code to quantify the amount of CO in a GMC on a high-resolution run of the FIRE-2 simulations

Constraining theories of Modified Gravity with Milky Way Dynamics

Supervisor: Prof. Jo Bovy September 2022 – April 2023

- Applying constraints from Milky Way observables to existing MOND models
- Implementing modified potentials in galpy to make predictions for new MOND models
- Analyzing the results in comparison with pure CDM models
- Written proposal and final report with various opportunities to present to peers and faculty

Undergraduate Thesis

Exploring the Possibility of Faster-than-Light Travel in Our Universe

Supervisor: Prof. Barak Shoshany **Brock University** October 2020 – February 2022

- Used General Relativity and Mathematica to investigate the possibility of faster-than-light travel
- Extended the Alcubierre Warp Drive metric to 5 spacetime dimensions to successfully minimize the energy requirements to travel faster-than-light
- Proposal, midterm, and final presentations to faculty and interested public along with written thesis

submission

- Received additional credit for quality and quantity of research

Undergraduate Research Projects.....

Characterizing Analogues of the Milky Way in Cosmological Simulations

University of Toronto

Supervisors: Dr. Ted Mackereth & Prof. Josh Speagle

Summer 2021, Winter & Summer 2022

- Used Python and data from the EAGLE suite of cosmological simulations and IllustrisTNG to identify and analyze Milky Way Analogues
- Determined a "Milky Way-ness" parameter to assign a metric of similarity to each galaxy
- Studied various properties of the Milky Way analogues both at present-day and throughout their formation histories in order to investigate the uniqueness of the MW and its simulated analogues
- Midterm and final presentations, academic poster, and research summary delivered to faculty and interested public (for both summer terms)
- Attended multiple research group meetings and participated in department events at the University of Toronto

Publications

SF-R you sure? The Conflicting Role of SFR in Constraining the Evolution of Milky Way Analogues in Cosmological Simulations

Alicia Savelli, Joshua S. Speagle & J. Ted Mackereth

In prep.

Warp drives in 5 dimensions

Alicia Savelli & Barak Shoshany

In prep.

Scholarships, Awards & Honours

NSERC CGS-M

University of Toronto, Department of Astronomy & Astrophysics, \$17,500

2023 – 2024

Queen Elizabeth II/Walter John Helm Graduate Scholarships in Science & Technology

University of Toronto, Department of Astronomy & Astrophysics, \$15,000

2022 – 2023

David A. Dunlap Department of Astronomy & Astrophysics Entrance Scholarship

University of Toronto, Department of Astronomy & Astrophysics, \$10,000

2022, 2023

Summer Undergraduate Research Program (SURP) Fellowship

Dunlap Institute for Astronomy & Astrophysics, \$9,690

2022

Summer Undergraduate Research Program (SURP) Fellowship

Canadian Institute for Theoretical Astrophysics; Dunlap Institute for Astronomy & Astrophysics, \$9,595

2021

SURP Student Spotlight

Canadian Institute for Theoretical Astrophysics; Dunlap Institute for Astronomy & Astrophysics

2021

SURP Poster Contest – Runner Up

Canadian Institute for Theoretical Astrophysics; Dunlap Institute for Astronomy & Astrophysics

2021

Dean's Honour List

Brock University

2015, 2016, 2017, 2018

Brock Scholars Award

Brock University, \$8,000

2014, 2015, 2016, 2017

Ontario Scholar

Halton Catholic District School Board

2014

Eric Ford Scholarship <i>Top Hat Marching Orchestra, \$1,000</i>	2014
French Second Language Award <i>Halton Catholic District School Board, \$50</i>	2014

Conference Talks

CASCA 2023 <i>Characterizing Milky Way Analogues in Cosmological Simulations, Contributed Talk</i>	Penticton, BC June 2023
Linking the Galactic and Extragalactic <i>Characterizing Milky Way Analogues in Cosmological Simulations, Contributed Talk</i>	Wollongong, Australia December 2022
AAS 239th Meeting [Cancelled] <i>Analogues of the Milky Way in Cosmological Simulations, Contributed Talk</i>	Salt Lake City, UT January 2022
SDSS-V 2021 Collaboration Meeting <i>Analogues of the Milky Way in Cosmological Simulations, Lightning Talk</i>	Johns Hopkins University/Online August 2021

Conference Posters

CASCA 2022 <i>Characterizing Milky Way Analogues in Cosmological Simulations</i>	University of Waterloo/Online May 2022
SDSS-V 2021 Collaboration Meeting <i>Analogues of the Milky Way in Cosmological Simulations</i>	Johns Hopkins University/Online August 2021

Student Supervision

Characterizing Milky Way Analogues in Observations and Cosmological Simulations <i>Student: Eshal Arshad, Co-supervised with Prof. Josh Speagle</i>	University of Toronto May – August 2023
Exploring the Definition of Milky Way “Analogues” in Cosmological Simulations <i>Student: Ishika Bangari, Co-supervised with Prof. Josh Speagle</i>	University of Toronto January – April 2023

Teaching Experience

Teaching Assistant.....

University of Toronto <i>AST201</i>	Toronto, ON January – April 20223
<ul style="list-style-type: none"> - Co-led weekly tutorials - Participated in TA training and weekly TA meetings - Supervised and assisted students with observing projects - Invigilation 	
University of Toronto <i>AST101</i>	Toronto, ON September 2022 – December 2022
<ul style="list-style-type: none"> - Co-led weekly tutorials - Participated in TA training and weekly TA meetings - Supervised and assisted students with observing projects - Invigilation 	

Secondary Teacher.....

Wembley High Technology College <i>Secondary Maths Teacher</i>	London, UK September 2019 – July 2020
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- Taught five maths classes from the GCSE Foundation and Higher curricula to Key Stage 3 and Key stage 4 learners at various levels of academic achievement
- Developed and delivered engaging and differentiated lessons, managed classroom behaviour, regularly assigned and marked homework
- Year 9 form tutor
- Volunteered to participate in and organize extra curricular activities such as a tutoring club, a puzzles club, a maths news letter, and UKMT national maths challenges

St. John Henry Newman Catholic Secondary School (HWCDSB)

Stoney Creek, ON

Physics Student Teacher

March – May 2019

- B.Ed. Practicum
- Taught one SPH3U grade 11 university level physics class and two SPH4U grade 12 university level physics classes
- Entirely responsible for creating notes and lessons that delivered the curriculum, and developing and marking tests, quizzes, assignments, and lab experiments/reports
- Volunteered with the school’s concert band and lunchtime and after-school tutoring/homework clubs

Cathedral High School (HWCDSB)

Hamilton, ON

Math Student Teacher

November – December 2018

- B.Ed. Practicum
- Taught one MPM1D grade 9 academic level math class and one MCR3U grade 11 university level math class
- Entirely responsible for creating notes and lessons that delivered the curriculum, and developing and marking tests, quizzes, and assignments
- Volunteered with the after-school homework club

Primary Teacher.....

Prince of Wales South Public School (NDSB)

Thorold, ON

Student Teacher

October 2015 – March 2016

- B.Ed. Practicum
- Delivered Levelled Literacy Intevervention (LLI) program
- Helped students of all ages advance their reading levels in small groups of three to four students

Professional Primary, Secondary, & Post-Secondary Tutor.....

Oxford Learning Centres Inc.

Burlington & Stoney Creek, ON

Teacher

May 2017 – June 2022

- Tutored in groups of one to three high school students, and occasionally students at the college or primary levels
- Specialized in intermediate and senior level math, calculus, data management, and physics, but also tutored students in chemistry, general science, English, French, and more

Private Tutor

Independent Private Tutor

2014 – Present

- One-on-one private tutoring in all levels and categories of secondary math and science and first-year math and physics

Other.....

Education Quality and Accountability Office (EQAO)

Etobicoke, ON

Scorer

July 2019

- Scored academic- and applied-level grade 9 math EQAO tests

Brock University Mathematics Department

St. Catharines, ON

Exam Proctor

2015-2016

- Proctored first-year math midterms and final exams

Other Relevant Work Experience

ArcelorMittal Dofasco

Data Analyst

Hamilton, ON

Summer 2018

- Developed and enhanced queries and data reports to improve company efficiency, wrote macros to supplement reports
- Enhanced technical skills with Visual Basic, SQL, MS Excel, and MS Access

Outreach Experience

Discover the Universe

Educational Content Developer (paid position)

Dunlap Institute

May 2023 – Present

- Developing educational resources and training for teachers for the upcoming 2024 eclipse

Adventures in Science

Project Mentor

University of Toronto

October 2022 – May 2023

- Guided a group of high school students in developing a science project they will present to a group of elementary or middle school students
- Monthly meetings which consisted of one hour of science presentations directed at all students participating, and one hour of guided project development with my smaller group of mentees and co-mentor

Girls in STEM Workshop

Project Mentor

University of Toronto

November 2022

- Assisted with gravitational lensing workshop presented to middle school girls interested in science
- Assisted with telescope tour

Classroom presentation

Guest Speaker

HDSB

June 2022

- Gave presentation on students' interests in astronomy and some of my research to a grade 9 science class

Scientifically Yours

Project Leader

Brock University

May 2022

- Designed and co-led *Relatively Yours* workshop – an introduction to Special Relativity and spacetime diagrams for high school students
- Led scavenger hunt

Bay Area Science and Engineering Fair (BASEF)

Judge

Hamilton, ON

March 2019

- Interviewed students and scored projects

Mentorship Experience

Undergraduate Mentorship Program

Mentor

University of Toronto

October 2022 – April 2023

- Regular meetings with an upper-year undergraduate mentee
- Offered advice and guidance regarding circumstances including but not limited to final years of undergrad, transitioning out of undergrad, and applications to graduate school

Selected Workshops, Training, & Professional Development

Don't get caught in the dark! 2024 Eclipse Training & Resources

Co-presenter

STAO

August 2023

Graduate Student Workshop: Leading a scavenger hunt in Stellarium

Attendee

CASCA

June 2023

Michigan Cosmology Summer School

Student

University of Michigan

June 2023

Introduction to Python*Student***University of Toronto***May 2021***SURP Astro 101 Lecture Series***Summer Research Student***University of Toronto***Summer 2021***SURP Professional Development Series***Summer Research Student***University of Toronto***Summer 2021***SAFETALK Mental Health Training***Attendee, Certified***Brock University***March 2018*

Professional Memberships

Ontario College of Teachers (OCT)*Member ID: 698209**2019 – Present*

Media Appearances

SURP Project Showcase*Poster, Research Summary**2021***SURP Student Spotlight***Student of the Week interview**2021***A university mathematics department's adoption of constructionist math courses***MICA Project interview**2017*