

# Alicia M. Savelli | Curriculum Vitae

✉ alicia.savelli@mail.utoronto.ca • 🌐 aliciasavelli.github.io/

Last updated: September 7, 2022

I am a first year graduate student at the University of Toronto in the department of Astronomy & Astrophysics. I come from a unique background as a secondary math and physics teacher before I became an undergraduate research assistant. I am extremely passionate about astronomy, physics, mathematics, research, and teaching, and have significant experience and skills to support me in a career in science. I am interested in the fields of cosmology, galaxy formation and evolution, and relativity.

## Education

---

### University of Toronto

*PhD Astronomy & Astrophysics*

2022 – 2027

### Brock University

*B.Sc. Physics (Honours)*

2020 – 2022

- 93% average in upper year courses (4.0 GPA on 4 point scale)
- 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 in 2 years)

### Brock University

*B.Sc. Mathematics (Honours), minor in Physics*

2014 – 2019

- 93% average in upper year courses (4.0 GPA on 4 point scale)
- 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
- Straight P1s(As)
- 94% cumulative average (4.0 GPA on 4 point scale)

## Research Experience

---

### Undergraduate Thesis

---

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

**Brock University**

*Supervisor: Prof. Barak Shoshany*

*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
- Proposal, midterm, and final presentations to faculty and interested public along with written thesis submission
- Received additional credit for quality and quantity of research

### 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 Illustris TNG100 to identify and analyze Milky Way Analogues
- Determined a "Milky Way-ness" parameter and studied its effect on various properties of the MWAs both at present-day and throughout their formation histories

- Midterm and final presentations, academic poster, and research summary delivered to faculty and interested public

## Publications

---

### Warp drives in 5 dimensions

*Alicia Savelli & Barak Shoshany*

*In prep. (expected November 2022)*

### Characterizing Analogues of the Milky Way in Cosmological Simulations

*Alicia Savelli, Ted Mackereth & Josh Speagle*

*In prep. (expected November 2022)*

## Scholarships, Awards & Honours

---

### 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

- \$5,000/year for first 2 years in Direct-Entry PhD program

### 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, 2021, 2022

- Awarded to students with an 80% average or greater each academic year
- Received every year of B.Sc. (Math) & B.Sc. (Physics) degrees
- Additional distinction of top 15% of the faculty

### Brock Scholars Award

*Brock University, \$8,000*

2014, 2015, 2016, 2017

- Entrance scholarship for incoming averages of 90% or greater
- \$2,000/year for a maximum of 4 years, renewed if average is maintained at 80% or greater

### Ontario Scholar

*Halton Catholic District School Board*

2014

- Distinction for graduating students with an average of 79.5% or greater in top six grade 12 courses

### Eric Ford Scholarship

*Top Hat Marching Orchestra, \$1,000*

2014

- Scholarship awarded to support music instruction or further studies in the field of music

### French Second Language Award

*Halton Catholic District School Board, \$50*

2014

- Awarded to graduating student with the highest mark in a grade 12 French course

## Conference Talks

---

### **Linking the Galactic and Extragalactic**

*Characterizing Milky Way Analogues in Cosmological Simulations, Contributed Talk*

**Wollongong, Australia**

*December 2022*

### **CUPC 2022 [Expected]**

*Warp Drives in 5 Dimensions*

**University of Guelph**

*October 2022*

### **AAS 239<sup>th</sup> Meeting [Cancelled]**

*Analogues of the Milky Way in Cosmological Simulations, Contributed Talk*

**Salt Lake City, UT**

*January 2022*

### **SDSS-V 2021 Collaboration Meeting**

*Analogues of the Milky Way in Cosmological Simulations, Lightning Talk*

**Johns Hopkins University/Online**

*August 2021*

## Conference Posters

---

### **CASCA 2022**

*Characterizing Milky Way Analogues in Cosmological Simulations*

**University of Waterloo/Online**

*May 2022*

### **SDSS-V 2021 Collaboration Meeting**

*Analogues of the Milky Way in Cosmological Simulations*

**Johns Hopkins University/Online**

*August 2021*

## Teaching Experience

---

### Secondary Teacher.....

#### **Wembley High Technology College**

*Secondary Maths Teacher*

**London, UK**

*September 2019 – July 2020*

- 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)**

*Physics Student Teacher*

**Stoney Creek, ON**

*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)**

*Math Student Teacher*

**Hamilton, ON**

*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)**

*Student Teacher*

**Thorold, ON**

*October 2015 – March 2016*

- B.Ed. Practicum
- Delivered Levelled Literacy Intervention (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

Hamilton, ON

Data Analyst

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

### Scientifically Yours

Brock University

Project Leader

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)

Hamilton, ON

Judge

March 2019

- Interviewed students and scored projects

## Selected Workshops, Training, & Professional Development

### Introduction to Python

University of Toronto

Student

May 2021

- 2-week intensive introductory course to coding and data analysis with Python
- Covered topics such as advanced plotting, statistical analysis, and machine learning

### SURP Astro 101 Lecture Series

University of Toronto

Summer Research Student

Summer 2021

- Summer series of weekly introductory astronomy lectures
- Topics covered included planets & exoplanets, galaxy formation & evolution, instrumentation, statistics, cosmology, and black holes

**SURP Professional Development Series***Summer Research Student***University of Toronto***Summer 2021*

- Summer series of weekly professional development workshops and seminars
- Topics covered included careers in astronomy, grad school applications and experiences, and presenting research

**Shutdown STEM***Attendee***University of Toronto***July 2021*

- Day-long workshop within the Astronomy & Astrophysics department pertaining to action against racism with a special focus on Indigenous peoples
- Workshop included presentations, discussions, and activities such as researching and letter-writing

**SAFETALK Mental Health Training***Attendee***Brock University***March 2018*

- Training in speaking to young people about their mental health and the best ways to be available and offer support
- Awarded certificate

## Relevant Coursework

---

- **Astronomy:** Introduction to Astronomy, Planetary Science
- **Physics:** Classical Mechanics, Electromagnetism, Quantum Mechanics, Statistical Mechanics & Thermal Physics, Optics, Special & General Relativity, Experimental Physics
- **Mathematics:** Calculus, Vector Calculus, Differential Equations, Linear Algebra, Statistics, Mathematical Physics, Differential Geometry
- **Computer Programming:** Mathematics Integrated with Computers and Applications (3 part course taken over 3 years), Introduction to Scientific Computing
- **Education:** Mathematics, Physics, Diversity, Special Education

## Technical & Personal Skills

---

- **Programming Languages:** Python, Visual Basic, SQL, Physica, Extrema
- **Software:** Maple, Mathematica, L<sup>A</sup>T<sub>E</sub>X, Git
- **Operating Systems:** Windows, Linux
- **Professional Skills:** Teaching, writing, presenting
- **Personal Skills:** Enthusiasm, curiosity, organization, communication, time management, leadership, collaboration, perseverance, diligence

## Professional Memberships

---

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

## Extracurricular Activities

---

**Burlington Concert Band***1<sup>st</sup> Clarinet***Burlington, ON***2018-2019***Brock University Winds Ensemble***2<sup>nd</sup> Clarinet***St. Catharines, ON***2014-2018***Brock Intramural Sports***Soccer, Softball, Volleyball***Brock University***2016-2018*

## Media Appearances

---

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