

# Alicia Savelli

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I am an undergraduate student going into my final year of a physics degree at Brock University with previous Bachelor's degrees in mathematics and education. 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

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### **Brock University**

*B.Sc. Physics (Honours)* 2020 – 2022

- 92% average in upper level courses (4.0 GPA on 4 point scale)
- 88% cumulative average (4.0 GPA on 4 point scale)
- Top 15% of faculty

### **Brock University**

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

- 93% average in upper level courses (4.0 GPA on 4 point scale)
- 88% cumulative average (4.0 GPA on 4 point scale)
- Top 15% of faculty

### **Brock University**

*B.Ed.* 2014 – 2019

- Intermediate/Senior qualifications
- Straight P1s(As) – 94% cumulative average (4.0 GPA on 4 point scale)

### **Notre Dame Catholic Secondary School**

*OSSD* 2010 – 2014

- Ontario Scholar with 90% average in top six grade 12 courses

## Research Experience

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### Undergraduate Thesis.....

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

**Brock University**

*Supervisor: Prof. Barak Shoshany*

2020 – 2021

- Using Mathematica and General Relativity to investigate the possibility of Faster-than-Light travel
- Extending the Alcubierre and Natario Warpdrive metrics to 5 spacetime dimensions
- Proposal, midterm, and final presentations to Faculty and interested public along with written thesis submission

### Research Projects.....

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

**University of Toronto**

*Supervisors: Dr. Ted Mackereth & Dr. Josh Speagle*

Summer 2021

- Used Python and data from the EAGLE suite of cosmological simulations to identify and analyze Milky Way Analogues (MWAs)

- 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

**Galactic Archaeology using Milky Way Survey Data and Simulations**  
Supervisors: Dr. Ted Mackereth & Dr. Josh Speagle

**University of Toronto**  
Winter 2022

## Publications

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**Exploring the Possibility of Faster-than-Light Travel in Our Universe**  
Alicia Savelli, Barak Shoshany

*In prep.*

## Scholarships, Awards & Honours

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**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

- 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

### **Top Hat Marching Orchestra Scholarship**

Top Hat Marching Orchestra, \$1,000

2014

### **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

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**SDSS-V 2021 Collaboration Meeting**  
Analogues of the Milky Way in Cosmological Simulations

**Johns Hopkins University/Online**  
August 2021

## Conference Posters

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**SDSS-V 2021 Collaboration Meeting**  
*Analogues of the Milky Way in Cosmological Simulations*

**Johns Hopkins University/Online**  
*August 2021*

## Teaching Experience

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### Secondary Teacher.....

**Wembley High Technology College** **London, UK**  
*Secondary Maths Teacher* *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 (HWCD SB)** **Hamilton, ON**  
*Physics Student Teacher* *April – 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 (HWCD SB)** **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 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** **Burlington & Hamilton, ON**  
*Teacher* *May 2017 – Present*

- Tutor in groups of one to three high school students, and occasionally students at the college or primary levels
- Specialize in intermediate and senior level math, calculus, data management, and physics, but

also tutor 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**

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#### **Education Quality and Accountability Office**

*Scorer*

**Etobicoke, ON**

July 2019

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

#### **Brock University Mathematics Department**

*Exam Proctor*

**St. Catharines, ON**

2015-2016

- Proctored first-year math midterms and final exams

### **Other Relevant Work Experience**

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#### **McDonalds Canada**

*Team Leader, Crew*

**Burlington, ON**

2013 – 2019

- Responsibilities included area and shift management, customer service, order taking & filling, and birthday parties
- Transferable skills to research and education include strong leadership & team management, collaboration, time management, stress management, organization, and communication

#### **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

### **Workshops, Training, & Professional Development**

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#### **Introduction to Python**

*Student*

**University of Toronto**

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**

*Summer Research Student*

**University of Toronto**

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**

**Brock University**

*Attendee*

*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**

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- **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 I/II/III, Introduction to Scientific Computing
- **Education:** Mathematics, Physics, Diversity, Special Education

## **Technical & Personal Skills**

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- **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:** Presenting, writing, teaching
- **Personal Skills:** Enthusiasm, organization, communication, time management, leadership, collaboration, perseverance, diligence

## **Professional Memberships**

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**Ontario College of Teachers (OCT)**

*Member ID: 698209*

*2019 – Present*

## **Extracurricular Activities**

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**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, Baseball, Volleyball*

**Brock University**

*2016-2018*

## Media Appearances

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### **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