

# Daniella Morrone

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I am a 4th year undergraduate student at the University of Toronto, pursuing an Astronomy & Physics Specialist and minors in both Mathematics and French Language. I am an aspiring early career researcher who is passionate about astronomy and has significant experience and skills to support a career in research. My research interests include exoplanets, galaxy formation and evolution, and cosmology.

## Education

### University of Toronto

*H.B.Sc. Astronomy & Physics Specialist, Minors in Mathematics and French Language*

2018 – 2023

- 88% average in astronomy courses (3.80 GPA on 4 point scale)
- 84% average in upper level courses (3.64 GPA on 4 point scale)

### Bishop Allen Academy Catholic Secondary School

*OSSD*

2014 – 2018

- Ontario Scholar with 92% average in top six grade 12 courses
- Completed 12 courses and 4 examinations in the Advanced Placement program

## Research Experience

### Undergraduate Thesis

#### Mapping the Mass-Light Evolution of Galaxies in the Hubble eXtreme Deep Field (XDF) and SIMBA Simulations

University of Toronto

Fall 2021 & Winter 2022

*Advisors: Dr. Kartheik Iyer & Dr. Lamiya Mowla*

*Super-advisor: Dr. Yanqin Wu*

- Measures morphological parameters of galaxies in the XDF and SIMBA suite of simulations
- Applied and optimized previously developed pipeline to yield the mass-light relationship of observed and simulated galaxies
- Participated in 3 interim talks and a final report delivered to Super-advisor

### Summer Research

#### Measuring Galaxy Morphology in Simulations and Observations

University of Toronto

*Supervisors: Dr. Kartheik Iyer & Dr. Lamiya Mowla*

Summer 2021

- Measured morphological parameters of galaxies in the SIMBA suite of simulations
- Developed a pipeline to measure morphological characteristics of simulated and observed galaxies
- Participated in midterm and final presentations, created an academic poster and a research summary delivered to Faculty and interested public

#### Behavioural and Pathological Characterization of Prodromal Alzheimer's Disease in TgF344-AD Rat Model

Sunnybrook Research Institute

*Supervisor: Dr. JoAnne McLaurin*

Summer 2019

- Performed experiments and data analysis in a laboratory setting
- Characterized behaviour and pathology of prodromal Alzheimer's Disease in a rat model
- Participated in a final presentation, created an academic poster and a research summary

## Scholarships, Awards & Honours

### Walter John Helm Scholarship in Astronomy and Astrophysics

*University of Toronto, \$1,763.43*

2021

### Summer Undergraduate Research Program (SURP) Fellowship

*Dunlap Institute for Astronomy & Astrophysics, \$9,595*

2021

### **SURP Student Spotlight**

*Dunlap Institute for Astronomy & Astrophysics* 2021

### **Sunnybrook Research Institute (SRI) Summer Student Research Program**

*Sunnybrook Research Institute, \$6,978* 2019

### **Ontario Scholar**

*Toronto Catholic District School Board* 2018

- Distinction for graduating students with an average of 80% or greater in top six grade 12 courses

### **Advanced Placement with Honor Award**

*Advanced Placement College Board* 2018

- Recognition for attaining an average score of at least 3.25 (on a 4 point scale) on all AP Exams taken and scores of 3.0 or higher on four or more exams

### **Subject Award in Grade 12 Religious Education**

*Bishop Allen Academy Catholic Secondary School* 2018

### **Extended French Certificate with Specialization**

*Toronto Catholic District School Board* 2018

- Distinction for graduating students having taken a minimum of seven Extended French credits, of which four are French Language credits and three are other credits in French

### **Instrumental Music Certificate with High Distinction**

*Bishop Allen Academy Catholic Secondary School* 2018

- Completed four years of Instrumental Music Courses with Distinction

## **Presentations**

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### **Invited & Public Talks**

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

*Decoding galaxy evolution through the lens of galaxy morphology.*

**Johns Hopkins University/Online**

*August 2021*

#### **SURP Midterm Presentation**

*What does morphology tell us? Understanding galaxy evolution through the lens of galaxy shapes and sizes.*

**University of Toronto/Online**

*July 2021*

#### **Vitrine de savoirs 2021 - Sprint-présentations de la relève en recherche**

*Que nous dit la morphologie des galaxies? Procédure pour identifier les lacunes dans nos simulations actuelles.*

**L'Acfas/Online**

*June 2021*

### **Conference Posters**

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#### **SURP Poster Presentation**

*What does morphology tell us? Employing galaxy morphology to decode galaxy evolution.*

**University of Toronto/Online**

*August 2021*

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

*What does morphology tell us? Employing galaxy morphology to decode galaxy evolution.*

**Johns Hopkins University/Online**

*August 2021*

#### **407 ETR Summer Student Poster Competition**

*Behavioural and Pathological Characterization of Prodromal Alzheimer's Disease in TgF344-AD Model.*

**Sunnybrook Research Institute**

*August 2019*

## **Teaching Experience**

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#### **Teaching Assistant**

*AST201: Stars and Galaxies*

**University of Toronto**

*Winter 2022*

#### **Teaching Assistant**

*AST101: The Sun and Its Neighbours*

**University of Toronto**

*Fall 2021*

## Other Relevant Work & Volunteer Experience

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<b>AstroTours</b> <i>Volunteer</i> <ul style="list-style-type: none"><li>– Gave a virtual tour of New Horizons Space Probe</li><li>– Discussed the science motivation and different instruments of the probe</li></ul>	<b>University of Toronto</b> <i>December 2021</i>
<b>St. Mike's Grad Week</b> <i>Panel Moderator</i> <ul style="list-style-type: none"><li>– Graduate program panels and alumni panels regarding life after graduation</li><li>– Moderated the Math &amp; Physical Sciences Alumni Panel</li></ul>	<b>University of Toronto</b> <i>October 2021</i>
<b>USMC Student Union Mental Health &amp; Accessibility Committee</b> <i>Committee Member</i> <ul style="list-style-type: none"><li>– Work alongside the St. Michael's College (USMC) Student Union VP Mental Health &amp; Accessibility</li><li>– Promote and develop mental health &amp; accessibility initiative; plan events, socials and workshops</li><li>– Collaborate with other students groups to increase the visibility of mental health &amp; accessibility resources</li></ul>	<b>University of Toronto</b> <i>Fall 2021 &amp; Winter 2022</i>
<b>USMC Mentorship Program</b> <i>Mentor, Academic Representative</i> <ul style="list-style-type: none"><li>– Help mentees in a similar program/faculty/study-area regarding program-specific concerns</li><li>– Help to organize Professional Development Seminars in the Program</li><li>– Leaders in a Registered Study Group &amp; Learning communities project within the program</li></ul>	<b>University of Toronto</b> <i>Fall 2021 &amp; Winter 2022</i>
<b>USMC Orientation</b> <i>Leader</i> <ul style="list-style-type: none"><li>– Orient first years into university life, run and moderate events online and in-person</li><li>– In 2021, moderated an academic panel (online) and lead a campus tour (in-person)</li></ul>	<b>University of Toronto</b> <i>Summer 2019, 2020, 2021</i>
<b>USMC Student Union Formal Committee</b> <i>Member</i> <ul style="list-style-type: none"><li>– Work alongside the VP of Community Life on the USMC Student to plan and execute the USMC Formal event</li><li>– Worked specifically on promotional aspects of planning the event</li></ul>	<b>University of Toronto</b> <i>Winter 2020</i>

## Mentorship

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### Mentor.....

<b>Ruchira Ray Verma – Mentee</b> <i>USMC Mentorship Program</i>	<b>University of Toronto</b> <i>Fall 2021 &amp; Winter 2022</i>
<b>Erica Rose – Mentee</b> <i>USMC Mentorship Program</i>	<b>University of Toronto</b> <i>Summer 2021 - Winter 2022</i>
<b>Jing-Zu Tate Li – Mentee</b> <i>USMC Mentorship Program</i>	<b>University of Toronto</b> <i>Summer 2021 - Winter 2022</i>
<b>Joshua Thoppil – Mentee</b> <i>USMC Mentorship Program</i>	<b>University of Toronto</b> <i>Summer 2021 - Winter 2022</i>
<b>Jou Glasheen – Mentee</b> <i>USMC Mentorship Program</i>	<b>University of Toronto</b> <i>Summer 2021 - Winter 2022</i>
<b>Megh Agarwal – Mentee</b> <i>USMC Mentorship Program</i>	<b>University of Toronto</b> <i>Summer 2021</i>

### Mentee.....

<b>Simran Nerval – Mentor</b> <i>Astronomy &amp; Astrophysics Undergraduate Mentorship Program</i>	<b>University of Toronto</b> <i>Fall 2021 &amp; Winter 2022</i>
<b>Jacob Taylor – Mentor</b> <i>Astronomy &amp; Astrophysics Undergraduate Mentorship Program</i>	<b>University of Toronto</b> <i>Fall 2020 &amp; Winter 2021</i>

## Workshops, Training, & Professional Development

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### Teaching Assistants' Training Program

University of Toronto

*Trainee - Teaching Assistant*

*September 2021*

- Completed modules in Grading, Quercus Training, Policies & Procedures
- Topics covered include instructional techniques, general online/remote teaching strategies, time management, communicating with students, effective student support.

### SURP Astro 101 Lecture Series

University of Toronto

*Attendee - Summer Research Student*

*Summer 2021*

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

### SURP Professional Development Series

University of Toronto

*Attendee - Summer Research Student*

*Summer 2021*

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

### Call it out: racism, racial discrimination & human rights

Ontario Human Rights Commission

*Trainee - Orientation Leader, Mentor*

*July 2021*

- Foundation for learning about race, racial discrimination and human rights protections under Ontario's Human Rights Code.
- Historical overview of racism and racial discrimination, explains what "race," "racism" and "racial discrimination" mean, and provides approaches to preventing and addressing racial discrimination.

### LivingWorks Start

LivingWorks

*Trainee - Orientation Leader, Mentor*

*July 2020, 2021*

- Teaches how to recognize suicidal behaviours and refer others to help and support.
- Series of real life scenarios and interactive modules.

### Identify, Assist, Refer Education Module

University of Toronto

*Trainee - Orientation Leader, Mentor*

*July 2020, 2021*

- Addresses identification of mental illnesses and methods of assisting and referring to resources.

### Shutdown STEM

University of Toronto

*Attendee*

*July 2021*

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

### Introduction to Computational Astrophysics

University of Toronto

*Student*

*May 2021*

- 2-week intensive introductory course to coding and data analysis with Python, instructed by Dr. Norman Murray.
- Covered topics such as advanced plotting, statistical analysis, and machine learning.

### Equity & Diversity Training

University of Toronto

*Trainee - Orientation Leader*

*July 2020*

- Learned how to create virtual and physical spaces that are inclusive and equitable for all.
- Explored ways to become advocates for one another in seeking equity.

## Relevant Coursework

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- **Astronomy:** Astronomy Research, Computational Astrophysics, Introduction to Astrophysics
- **Physics:** Classical & Quantum Mechanics, Electricity & Magnetism, Thermal Physics
- **Mathematics:** Ordinary & Partial Differential Equations, Complex Variables, Multivariable Calculus
- **Computer Programming:** Introduction to Computational Astrophysics

## Technical & Personal Skills

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- **Programming Languages:** Python, HTML
- **Software:** L<sup>A</sup>T<sub>E</sub>X, Git
- **Operating Systems:** macOS, Windows
- **Spoken Languages:** English (Native or bilingual proficiency), French (Working proficiency)

## Extracurricular Activities

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### **Pair-A-Dice Board Game Club**

*General Member*

**University of Toronto**

*Fall 2019 & Winter 2020*

### **Vocal & Instrumental Jazz Bands**

*1<sup>st</sup> & 2<sup>nd</sup> Trumpet*

**Bishop Allen Academy**

*Winter 2014 - Winter 2018*

### **Concert Band**

*1<sup>st</sup> & 2<sup>nd</sup> Trumpet*

**Bishop Allen Academy**

*Winter 2014 - Winter 2018*

## Media Appearances

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### **SURP Project Showcase**

*Poster & Research Summary*

2021

### **SURP Student Spotlight**

*Student of the Week interview*

2021

### **Meet the SMC Mentorship Team 2021-2022**

*Facebook & Instagram*

2021

### **Abstract for *Vitrine des savoirs* 2021**

*Event program*

2021