

## **Education**

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**University of Cambridge** **Cambridge, United Kingdom**  
**Ph. D. in Astronomy** **Sept. 2023 – ongoing**

- Thesis: Machine Learning and Stellar Tidal Stream: Constraining Dark Matter
- Supervisor: Prof. Vasily Belokurov

**University of Montreal** **Montreal, Canada**  
**M. Sc. in Physics & Astrophysics (GPA: 4.3/4.3)** **Sept. 2021 – Aug. 2023**

- Thesis: A novel machine learning approach to measuring supermassive black hole masses at higher distances using comic lenses
- Supervisors: Dr Julie Hlavacek-Larrondo & Dr Yashar Hezaveh

**University of Montreal** **Montreal, Canada**  
**Honors in Physics (GPA: 4.2/4.3)** **Sept. 2018 – April 2021**

- Specialisation in Astrophysics

**Jean-de-Brébeuf College** **Montreal, Canada**  
**DEC Health sciences** **Aug. 2016 – May 2018**

- R score: 35.8 (99<sup>th</sup> percentile)

**Jean-de-Brébeuf College** **Montreal, Canada**  
**High School diploma** **Aug. 2011 – June 2016**

- Scientific specialisation
- Sports affiliation

## **Awards, Scholarships and Distinctions**

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- **Harding Distinguished Postgraduate Scholarship 2023-2026 – 70,000£/year**  
Private Scholarship for research in quantitative science
- **Doctoral Training Partnership 2023-2026 – 60,000£/year**  
Excellence Scholarship from United Kingdom Research and Innovation (UKRI)
- **J-A deSève scholarship 2022 – 5000\$**  
University of Montreal Academic Excellence Scholarship
- **Big Data graduate scholarship 2022, IVADO – 40,000\$/year**  
Private M. Sc. Excellence Scholarship
- **International scholarship of LOJIQ – 500\$**  
Quebec International Internship Award

- **Scholarship in machine learning awarded by the Faculty of Arts and Sciences – 6,500\$**  
University of Montreal M. Sc. Excellence Scholarship for AI
- **International internship of the Center for research in astrophysics of Quebec, CRAQ – 7,500\$**  
Provincial International Internship for Excellence Award
- **Quebec Research funds in Nature and Technologies 2021-2023, FRQNT – 35,000\$/year**  
Provincial M. Sc. Research Scholarship
- **Canada graduate scholarships 2021, NSERC – 17,500\$**  
Federal M. Sc. Excellence Scholarship
- **Undergraduate Student Research Awards 2020, CRSNG – 4,500\$ (Declined)**  
Federal Undergraduate Student Research Award
- **Undergraduate introduction to research scholarships 2020, IVADO – 5,000\$**  
Private Undergraduate Research Scholarship for Big Data Science
- University of Montreal Faculty of Arts and Sciences **Dean’s List** (2019 – 2021)
- **Honorary Mention** from Jean-de-Brébeuf College awarded for my academic standing in CEGEP (2016 – 2018)
- Jean-de-Brébeuf’s *Grand Distinction* awarded for my academic success, quality of French, mastery of technology, surpassing oneself and community service throughout the entirety of high school from 2011 to 2016 (awarded to only the best 10 students).
- **Honours** from the *Waterloo Mathematics and Computer Science Education Center* for attaining in the 90<sup>th</sup> percentile in several mathematical competitions

## Research Expertise

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University of Cambridge

Cambridge, England

**Measuring the mass of Supermassive Black Holes through gravitational lensing using machine learning**

**Aug. 2022 – Nov. 2022**

**Supervisor:** Prof. Roberto Maiolino & Prof. Vasily Belokurov

**But:** A 3-month internship working on my master’s project with a team of galaxy-black hole coevolution experts at the Kavli Institute for Cosmology and Institute of Astronomy.

University of Montreal

Montreal, Canada

**Model the origins of life using Astrobiology**

**Jan. 2021 – April 2021**

**Supervisor:** Prof. Paul Charbonneau

**But:** In 4 months, I coded from scratch a model allowing to simulate the origin of life and then carried out a numerical, physical and biological study of it. The results obtained and the interesting phenomena observed were the subject of a final report (15 pages).

University of Montreal

**Extragalactic and high-energy astrophysics (X-tra)**

Montreal, Canada

April. 2020 – April 2021

**Supervisor:** Prof. Julie Hlavacek-Larrondo, Canada Research Chair

**Goal:** I obtained the very first high-resolution radio image of the Coma galaxy cluster with the Jansky Very large Array telescope (JVLA) that will lead to a first author scientific publication to MNRAS.

California Institute of Technology

**Assistant observer**

California, USA

10 – 12 July 2020

**Supervisor:** Prof. Julie Hlavacek-Larrondo, Canada Research Chair

**Goal:** Assisted for 3 nights of observations using the W.M. Keck an internationally renowned and competitive telescope. Very few students, even graduates, get to assist in observations using such a tool.

Jean-de-Brébeuf College

**Chemistry Research Group**

Montreal, Canada

May 2017 – May 2018

**Supervisor:** Éric Martineau, PhD

**Goal:** I researched the main medicinal active ingredients in pharmaceutically branded “natural” products to perform safety testing and compare them to drugs licensed by *Santé Canada*. This position was offered to me for my academic excellence in my Health Science cohort (top 10).

Jean-de-Brébeuf College

**Organic Chemistry Research**

Montreal, Canada

Jan 2018 – May 2018

**Supervisor:** François Raymond, PhD

**Goal:** I synthesis Luminol from 3-Nitrophthalic acid and wrote a manuscript (20 pages) explaining my method and needed materials. This experience was later presented in a pan-Canadian conference workshop at the University of Ottawa.

## Research Presentations

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CASCA 2023

Virtual Symposium

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master’s thesis presentation

19 May 2023

Principal Public: Professors and graduate students (150 participants)

Oral presentation with poster

CRAQ 2023

Montreal, Canada

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master’s thesis presentation

8 May 2023

Principal Public: Professors and graduate students (75 participants)

Oral presentation with visual support

SAPHARI 2023

Montreal, Canada

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master's thesis presentation

5 March 2023

Principal Public: Professors and students of the department (100 participants)

Oral presentation with poster

University of Oxford

Oxford, United Kingdom

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master's thesis presentation

14 November 2022

Principal Public: Professors and graduate students (20 participants)

Oral presentation with visual support

University of Cambridge

Cambridge, United Kingdom

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master's thesis presentation

12 October 2022

Principal Public: Professors and graduate students (80 participants)

Oral presentation with visual support

University of Cambridge

Cambridge, United Kingdom

**Machine Learning approach to Measure the Mass of Supermassive Black Holes at High Redshifts**

Master's thesis presentation

3 September 2022

Principal Public: Research group ExGal (15 participants)

Oral presentation with visual support

Montreal Summer School 2022

Montreal, Canada

**The mystery behind supermassive black holes**

Popular science

16 August 2022

Principal Public: High school and undergraduate students (10 participants)

Oral presentation with visual support

Montreal Summer School 2022

Montreal, Canada

**Astronomy & Astrophysics**

Introductory crash course

15 August 2022

Principal Public: High school and undergraduate students (10 participants)

Oral presentation with visual support

CASCA 2022

Virtual Symposium

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master's thesis presentation

18 May 2022

Principal Public: Professors and graduate students (150 participants)

Oral presentation with poster

CRAQ 2022

Montreal, Canada

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master's thesis presentation

12 May 2022

Principal Public: Professors and graduate students (60 participants)

Oral presentation with visual support

PoSTER 2022

Virtual Symposium

**Heavy lifting: leveraging machine learning to measure the mass of supermassive black holes**

Master's thesis presentation

5 mai 2022

Principal Public: graduate students (50 participants)

Oral presentation with poster

Calix Lavallée High school

Montreal, Canada

**Le mystère des trous noirs**

Popular science

30 March 2022

Principal Public: high school students (75 participants)

Oral presentation with visual support

SAPHARI 2022

Montreal, Canada

**Using AI to measure the mass of supermassive blackhole through cosmic lensing**

Master's thesis presentation

4 March 2022

Principal Public: Professors and students of the department (100 participants)

Oral presentation with poster

University of Montréal

Montreal, Canada

**A novel machine learning approach to measuring supermassive blackhole masses**

Master's thesis presentation

20 October 2021

Principal Public: Professors and students of the department (100 participants)

Oral presentation with poster

University of Montréal

Montreal, Canada

**First high-resolution radio JVLA image of the cluster of galaxies Coma**

Summer internship with Prof. Julie Hlavacek-Larrondo

4 May to 28 August 2020

Principal Public: Research groupe X-Tra (6 participants)

Weekly oral presentation on the progress of the project

Jean-de-Brébeuf College

Montreal, Canada

**Bioluminescence and synthesis of Luminol from 3-Nitrophthalic acid**

Integration project for the chemistry of biomolecules applied to domains

23 April 2018

Principal Public: Professors and students of the department (100 participants)

Oral presentation in kiosk format

Jean-de-Brébeuf College

Montreal, Canada

**A vaccine against cancer!**

Research presentation

22 March 2018

Principal Public: Professors and students of the chemistry research group (25 participants)

Oral presentation with poster

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## Scientific publications

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**First-author**

**Machine Learning approach to Measure the Mass of Supermassive Black Holes at High Redshifts**

D. Chemaly, J. Hlavacek-Larrondo, Y. Hezaveh, R. Maiolino, V. Belokurov, A. Weiss, D. Anglés-Alcázar, M. Pasquato, L. Perrault-Levasseur

The Astrophysical Journal (ApJ).

In preparation

**Co-author**

**Effets des habitudes de vie d'une mère enceinte ainsi que d'environnements extrêmes sur le développement du cerveau de l'enfant et conséquences comportementales à long terme**

D. Chemaly & C. Chahfé

Le Perceptum, 1<sup>er</sup> édition (2018)

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## Summer schools & Workshops

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- Simulation Based Inference – Royal Astronomical Society  
2024

- James Webb Space Telescope (JWST) data reduction workshop – University of Cambridge 2022
- Center for research in astrophysics of Quebec Summer School 2022 & 2023
- Dunlap Institute Virtual Summer School – University of Toronto 2021
- AstroComm Virtual Meeting 2021
- Annual General Meeting of the *Canadian Astronomical Society* (CASCA) 2020 & 2021 & 2022 & 2023
- *European Astronomical Society* (EAS) Virtual Meeting 2020 & 2021
- ngVLA Summer Short Talk Series 2020

## Work Experience

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### University of Cambridge

Cambridge, United Kingdom

#### Supervisor

- *Statistical Physics* Jan. 2024 – March 2024
- *Stellar Dynamics and Structure of Galaxies* Oct. 2023 – Dec. 2023

### University of Montreal

Montreal, Canada

#### Teacher Assistant

- *Classical Mechanics* (PHY 1651) – 90 hours Jan. 2022 – April 2022
- *Theoretical tools of physics* (PHY 2345) – 90 hours Sep. 2021 – Dec. 2021
- *Waves and Vibrations* (PHY 1620) – 30 hours Jan. 2021 – April 2021
- *Classical Mechanics* (PHY 1651) – 30 hours Sep. 2020 – Dec. 2020
- *Mechanics and modern physics* (PHY1901) – 60 hours Jan. 2020 – April 2020
- *Electromagnetism* (PHY 1441) – 30 hours Sept. 2019 – Dec. 2019

### Town of Mount-Royal

Montreal, Canada

#### Coordinator/Manager of the TMR Day Camp

Feb. 2019 – Aug. 2019

- Responsible for hiring and managing 70 councillors and 5 supervisors
- Organising and administrating camp events
- Mediating and performing conflict resolution between clients, employees and administration
- Overseeing safety precautions and overall wellbeing of campers, camp staff, and Town of Mount-Royal community members.

**Counsellor – Camp Counsellor Training Program** **June 2018 – Aug. 2018**

- Oscillating between learning intensive activities and entertainment
- Leading and managing large groups

**Counsellor** **June 2016-17 – Aug. 2016-17**

- Develop leadership skills and a strong sense of initiative
- Provide friendly and effective customer service

**Jean-de-Brébeuf College** **Montreal, Canada**

**High-school and College level tutor for Physics, Biology, Chemistry and Mathematics (over 1000h)**

- Academic Excellency **Sep 2018 – April 2021**
- Scholarly Success **May 2018 – Aug. 2018**
- Science Support and Development Center **Jan 2017 – May 2018**

**Jean-de-Brébeuf College** **Montreal, Canada**

**Student Supervisor** **Jan 2018 – May 2018**

- Developed interpersonal skills when dealing with kids of all ages
- Maintained a courteous and respectful demeanor when dealing with students

## **Leadership & Public Outreach**

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### **Community Service**

- Volunteer for the Institute of Astronomy Open Day
- Volunteer for various activities and events organised by the *PYHSUM* (50h total)
- Volunteer for the collective student cafe of the *PHYSUM* (200h total)
- Volunteer at the center of neonatology and urgency of the Sainte-Justine Hospital (150h total)
- Volunteer at the food drive of Montreal organised by the *Centraide* foundation (100h total)
- Volunteer for Jean-de-Brébeuf College's Annual Open House (30h total)

### **Extracurricular activities**

- Member of the Queens' College Boathouse Club (2023-2024)
- Organiser of a weeklong Summer School for high school students (2022)
- Elected Treasury and Co-Organiser of the *SAPHARI 2022* event (2021- 2022)
- Elected Vice president and General director of the *PHYSUM* student café (2020 - 2021)
- Member of the sports and healthy lifestyle comity (2020 - 2021)
- Elected Vice president's adjoint of sports and healthy lifestyle of the *PHYSUM* (2019 – 2020)
- Private pilot licence (2019 - ongoing)
- Member of the University of Montreal Chess Club (2018 – 2020)
- Founder and president of the Jean-de-Brébeuf College *Pangée* club (2017 – 2018)
- Member of the Jean-de-Brébeuf College mathematics club (2016 – 2018)



- Employed as part of the “Jeunes Entreprises du Québec” (2015 – 2016)
- Member of the Jean-de-Brébeuf College elite volleyball team (2011 - 2016)

\*References available upon request