

# MATHIS BOUFFARD

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## EDUCATION

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<b>UNIVERSITÉ DE MONTRÉAL</b> Master's (M.Sc.) in Physics	Sep. 2024 -
<b>MCGILL UNIVERSITY</b> Bachelor of Science (B.Sc.) - Major Physics	Sep. 2021 - Apr. 2024
<b>COLLÈGE ANDRÉ-GRASSET</b> Diploma of College Studies (DCS) in Arts and Sciences	Aug. 2019 - May 2021

## RESEARCH EXPERIENCE

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<b>MASTER'S IN PHYSICS</b> Atmospheric Characterization of the TRAPPIST-1 Planets through High-Dispersion Infrared Spectroscopy Supervisors: Prof. René Doyon & Prof. Nicolas Cowan I am conducting an analysis of multiple SPIRou, NIRPS and IRD spectroscopic datasets of the exoplanets in the TRAPPIST-1 system. I aim to constrain the abundance of greenhouse gases such as H <sub>2</sub> O, CO <sub>2</sub> and CH <sub>4</sub> in their atmospheres.	Sep. 2024 - Université de Montréal
<b>TROTTIER INSTITUTE FOR RESEARCH ON EXOPLANETS (IREX) SUMMER INTERNSHIP</b> High Resolution Transmission Spectroscopy of the TRAPPIST-1 Planets Supervisors: Prof. Nicolas Cowan & Dr. Vigneshwaran Krishnamurthy I analyzed SPIRou spectroscopic observations of the transiting exoplanet TRAPPIST-1 b to characterize its atmosphere. I performed a statistical assessment of the results, concluding with a non-detection of CO <sub>2</sub> .	May 2024 - Aug. 2024 McGill University
<b>HONOURS RESEARCH THESIS</b> High Resolution Transmission Spectroscopy of TRAPPIST-1 b Supervisors: Prof. Nicolas Cowan & Dr. Vigneshwaran Krishnamurthy I adapted the STARSHIPS data reduction pipeline to work with Earth-sized exoplanets and implemented a telluric correction package tailored for observations from the IRD spectrograph.	Sep. 2023 - Apr. 2024 McGill University
<b>TROTTIER INSTITUTE FOR RESEARCH ON EXOPLANETS (IREX) SUMMER INTERNSHIP</b> High Resolution Spectroscopy of Transiting Hot Jupiters Supervisor: Prof. Björn Benneke I performed data reductions of observations from the NIRPS & HARPS spectrographs as well as cross-correlation with atmosphere models to characterize the atmospheric compositions of the exoplanets WASP-178 b and WASP-189 b. I helped the NIRPS scientific team in Montréal to optimize their data reduction pipeline and adapted it to the HARPS instrument.	May 2023 - Aug. 2023 Université de Montréal

## AWARDS

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<b>HUBERT-REEVES SCHOLARSHIP</b> 3000\$	Nov. 2025 Université de Montréal Department of Physics
<b>TROTTIER RESEARCH EXCELLENCE GRANT</b> 9000\$	May 2024 - Aug. 2024 Trottier Institute for Research on Exoplanets
<b>J.W. MCCONNELL SCHOLARSHIP</b> 3000\$	Sep. 2021 - Apr. 2022 McGill University
<b>D'ARCHIMÈDE À ZOLA SCHOLARSHIP</b> ~11000\$	Aug. 2019 - May 2021 Collège André-Grasset

## PRESENTATIONS

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<b>CENTER FOR RESEARCH IN ASTROPHYSICS OF QUEBEC ANNUAL MEETING</b> Contraintes sur l'atmosphère de TRAPPIST-1 b et e à haute résolution spectrale	May 2025 Saint-Alexis-des-Monts, Canada
<b>ASTROPIZZA</b> A CO <sub>2</sub> exosphere on Ganymede	Oct. 2024 Université de Montréal, Canada
<b>TROTTIER SPACE INSTITUTE SUMMER UNDERGRADUATE RESEARCH SHOWCASE</b> Hiking Through the Spectral Forest: The TRAPPIST-1 System at High Resolution Honourable Mention.	Aug. 2024 McGill University, Canada
<b>IREX SUMMER INTERNS FINAL PRESENTATIONS</b> Hiking Through the Spectral Forest: The TRAPPIST-1 System at High Resolution	Aug. 2024 Université de Montréal, Canada
<b>9<sup>TH</sup> EMERGING RESEARCHERS IN EXOPLANET SCIENCE SYMPOSIUM</b> Hiking Through the Spectral Forest: The TRAPPIST-1 System at High Resolution	July 2024 Cornell University, USA
<b>HONOURS RESEARCH THESIS DEFENSE</b> High Resolution Transmission Spectroscopy of TRAPPIST-1 b, e & f	Apr. 2024 McGill University, Canada
<b>IREX SUMMER INTERNS FINAL PRESENTATIONS</b> High Resolution Spectroscopy of Transiting Hot Jupiters	Aug. 2023 Université de Montréal, Canada

## SKILLS

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<b>SCIENTIFIC PROGRAMMING LIBRARIES</b>	Python   Git (version control)   High-performance computing on Linux clusters
<b>EXOPLANET DATA ANALYSIS</b>	NumPy   Matplotlib   SciPy   Astropy   emcee
<b>OTHER TOOLS</b>	High resolution spectroscopy   Atmospheric retrievals
<b>LANGUAGES</b>	LaTeX   Microsoft Office Suite French (native)   English (bilingual)

## TEACHING EXPERIENCE

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<b>TEACHING ASSISTANT</b> PHY 1234 - Introduction to Numerical Methods in Physics Assisting students in completing their programming labs, grading.	Sep. 2024 - Dec. 2024 Université de Montréal
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## COMMITTEES

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<b>EQUITY, DIVERSITY AND INCLUSION (EDI) COMMITTEE</b> Trottier Institute for Research on Exoplanets (IREx) I lead initiatives to promote EDI within IREx. I am currently preparing a presentation on persistence in physics majors, with a focus on gender and ethnic diversity.	Feb. 2025 - Université de Montréal
<b>MISSION &amp; VISION COMMITTEE</b> Emerging Researchers in Exoplanet Science (ERES) Symposium By leading and participating in focus groups, I contribute to the development of mission and vision statements that will serve as guidelines for future ERES symposiums.	June 2024 - Online
<b>STARSHIPS COLLABORATION</b> Developer I contribute to the development and maintenance of STARSHIPS, a data analysis pipeline for high resolution spectroscopic observations of exoplanet atmospheres. We presented a workshop on high resolution data analysis at the 2025 ExoSLAM summer school.	May 2024 - Université de Montréal

## TRAINING

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### EXOSLAM SUMMER SCHOOL

From light to knowledge: data reduction and analysis techniques for exoplanet atmosphere characterization

July 2025

Université de Montréal, Canada

### OBSERVING MISSION AT THE MONT-MÉGANTIC OBSERVATORY

Training over two nights with the observation assistant.

July 2024

Mont-Mégantic National Park, Canada

### CENTRE FOR RESEARCH IN ASTROPHYSICS OF QUEBEC SUMMER SCHOOL

Scientific Machine Learning Applied to Astrophysical Data

June 2024

Université de Montréal, Canada

### ECLIPSE AMBASSADORS TRAINING PROGRAM

Ambassador

June 2023

Université de Montréal, Canada

Science communication training provided by the Trottier Institute for Research on Exoplanets in preparation for the April 2024 total solar eclipse.

## SCIENCE COMMUNICATION

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### À LA DÉCOUVERTE DES EXOPLANÈTES

Public lecture

Oct. 2025

Vaudreuil-Dorion library, Vaudreuil-Dorion, Canada

Introduction to exoplanets in the context of my research project on TRAPPIST-1 b.

### AGENCE DE VOYAGES INTERSTELLAIRES

Public lectures (2)

July 2025

École de français, Université de Montréal, Montréal, Canada

Workshops introducing the diversity of exoplanets to groups of French-language learners.

### ASTRAGORA

Member of the astrophysicists' team

May 2025 -

Online

I manage and moderate a Discord server where young people across the French-speaking world engage with astrophysicists. We also give presentations in high school classrooms.

### SPRINTS DE SCIENCE

I lead workshops guiding high school students through astrophysics research projects.

Feb. 2025 -

Online

### RESEARCHERS' NIGHT

Trottier Institute for Research on Exoplanets booth

Nov. 2024

Espace pour la vie, Montréal, Canada

I presented my research to members of the general public through an interactive demonstration on spectroscopy.

### INITIASCIENCES

I prepare and lead workshops on the scientific method for high school and cégep students.

Sep. 2024 -

Montréal, Canada

### UNE ÉCLIPSE TOTALE À MONTRÉAL

Public lecture

Mar. 2024

Sylvain-Garneau library, Laval, Canada

Introduction to eclipses and tips for safe observation in preparation for the April 2024 total solar eclipse.

## WORK EXPERIENCE

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### LAVAL PUBLIC LIBRARIES

Library assistant

Dec. 2022 -

Laval, Canada

I sort and shelve books and facilitate loans and returns. I inform users of services the library offers and help them find specific titles.

### ARCHAMBAULT

Service clerk / Bookseller

June 2019 - Oct. 2022

Laval, Canada

I guided clients to the products they were looking for and made recommendations for books, board games and toys. I also created product displays (on shelves, on tables).

## **VOLUNTEERING & INVOLVEMENT**

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### **EXOCLIMES VII**

Volunteer

I supported conference operations by preparing catering areas and accompanying attendees during the excursions.

**July 2025**

**Montréal, Canada**

### **OPEN DOOR BOOKS**

Volunteer

I helped sending boxes of donated books to prison libraries throughout Canada, facilitating the prisoners' access to reading material.

**June 2022 - Apr. 2023**

**Montréal, Canada**