

Sophia Rubens

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Education

McGill University

First-year physics doctoral student, GPA x.xx/x.xx

August 2024 – present

Montréal, QC, CA

Dartmouth College

AB Physics with high honors and minor in astronomy, GPA 3.95/4.00

September 2020 – June 2024

Hanover, NH, US

Exeter High School

High school diploma, GPA 4.14/4.33

August 2016 – June 2020

Exeter, NH, US

Work Experience

Teaching assistant

McGill University Physics Department

August 2024 – present

Montréal, QC, CA

- Plan and host guided problem-solving tutorials
- Mark assignments and written examinations
- Provide logistical course support: invigilate exams and correspond with students

Research Experience for Undergraduates and subsequent research

MIT Haystack Observatory

June 2023 – May 2024

Westford, MA, US

- Determine periodicity, time delay, and frequency-dependent lensing in light curve and VLBI data
- Gain familiarity with the VLBI software AIPS and difmap
- Analyze molecular absorption spectra

Undergraduate researcher

Mueller Heliosphere Research Group, Dartmouth College

August 2022 – May 2023

Hanover, NH, US

- Develop and optimize a suite of Fortran and MATLAB programs
- Calculate, visualize velocity distribution functions and trajectories for neutral helium in the heliosphere
- Communicate regularly with principal investigator to discuss results and theory

Teaching assistant

ENGS 20: Introduction to Scientific Computing, Dartmouth College

January 2023 – March 2023

Hanover, NH, US

- Grade short and long programming assignments and weekly tests
- Hold office hours for students to clarify course and assignment material
- Facilitate small group meetings to help students to troubleshoot long programming assignments

Undergraduate researcher

Zhang Research Group, Dartmouth College

March 2021 - December 2021

Hanover, NH, US

- Program density functional theory calculations for computational design of semiconducting polymers
- Communicate regularly with principal investigator to discuss results and theory
- Learn and apply MATLAB, Mathematica, GaussView, Slurm

Peer group tutor

Academic Skills Center, Dartmouth College

January 2022 – March 2022

Hanover, NH, US

- Prepare weekly outlines according to class pacing
- Conduct group tutoring sessions for multivariable calculus students
- Foster an inclusive academic environment with active participants

Volunteer Experience

Outreach volunteer

September 2024 – present

McGill University Physics Department

Montréal, QC, CA

- Communicate physics topics to non-specialist audiences in an engaging and accessible way

Peer tutor

September 2017 – June 2020

Exeter High School

Exeter, NH, US

- Advise math and Latin students on problem-solving and study skills
- Work with first-, second-, and third-year Latin students
- Work with algebra I and II, geometry, precalculus, and calculus students

Proofreader

September 2018 – June 2019

- Proofread manuscript and provided constructive feedback for *How to Free Your Inner Mathematician: Notes on Mathematics and Life* (Oxford University Press, 2020)

Research Presentations

"Density Functional Theory calculations on flexible polymer moieties to train a machine learning algorithm." Sophia Rubens and Wenlin Zhang. Wetterhahn Science Symposium. May 2021.

"Secondary Helium Neutrals in the Heliosphere." Hans-R. Mueller and Sophia Rubens. 20th Annual International Astrophysics conference. November 2022.

"Secondary neutral helium throughout the heliosphere." Hans-R. Mueller and Sophia Rubens. AGU Fall Meeting, Chicago, IL. December 2022.

"Primary neutral helium in the heliosphere: distributions and trajectories" Sophia Rubens and Hans-R. Mueller. Wetterhahn Science Symposium. May 2023.

"Multi-band and temporal analysis of lensed blazar PKS 1830-211" Sophia Rubens, Dongjin Kim, Kazunori Akiyama, and Vincent Fish. MIT Haystack Observatory REU Symposium. August 2023.

"Multi-band and temporal analysis of lensed blazar PKS 1830-211" Dongjin Kim, Sophia Rubens. 243rd Meeting of the American Astronomical Society. January 2024.

"Understanding the gravitationally lensed blazar PKS 1830-211" Sophia Rubens, Dongjin Kim, John Thorstensen, Kazunori Akiyama, Burçin Mutlu-Pakdil, Vincent Fish, Miles Blencowe. Honor Thesis Showcase (14 May) AND Wetterhahn Symposium (22 May) at Dartmouth College. May 2024.

Publications

"Understanding the gravitationally lensed blazar PKS 1830-211" Dartmouth College honors thesis, defended with high honors, June 2024

Technical Skills

Programming languages: C, MATLAB, Python, Mathematica, Fortran

Software: AIPS, difmap, Linux, Slurm, ArcGIS, SQL

Awards & Honors

The Physics and Astronomy Chair's Prize

Department of Physics and Astronomy at Dartmouth College

June 2024

First Honor Group (Rufus Choate Scholar; top 5%)

Dartmouth College

2023-24 academic year

Second Honor Group (top 15%)

Dartmouth College

2021-22 and 2022-23 academic years

Presidential Scholar

Dartmouth College

August 2022 - November 2022

Barbara E. Crute Memorial Scholarship

Dartmouth College

June 2021 - November 2021

Third Honor Group (top 35%)

Dartmouth College

2020-21 academic year

Advanced Placement Scholar Award with Distinction

College Board

July 2020

Top 10 student

Exeter High School

May 2020

Award with High Honors

Society of Women Engineers

June 2020

Latin Achievement Award

Exeter High School

June 2020

New Hampshire Scholar with STEM and arts emphasis

Exeter High School

June 2020

Harvard Book Award

Harvard Club of Boston

May 2019

Social studies writing award

Exeter High School

May 2019

Math achievement award

New Hampshire Teachers of Mathematics

May 2019

Gold medal on the National Latin Exam (I,II,III,III/IV Prose, III/IV Poetry)

American Classical League / National Junior Classical League

2016, 2017, 2018, 2019, 2020

Extracurriculars

Trottier Space Institute outreach: volunteer; 2024-present

Trottier Space Institute Stitching Club: member; 2024-present

Hillel Montréal: member; 2024-present

Dartmouth Chamber Orchestra: manager, social chair, flute, oboe; 2020 – 2023

Women In Science Project: peer mentor, intern; 2020 – 2024

Dartmouth Physics and Astronomy Society: member; 2024

Spilled Ink: A Poetry Club: vice president; March 2023 – June 2024

Humans of Dartmouth: interviewer, interviewee; September 2020 – February 2021