

Taj Dyson

[Website](#) | tdyson@stanford.edu | github.com/1sadtrombone

EDUCATION

Stanford University <i>PhD, Physics</i>	Sep. 2021 – Jun. 2026
McGill University <i>Bachelor of Science, Honours Physics</i>	Aug. 2018 – May 2021
Dawson College <i>DCS, First Choice Sciences, Honours List</i>	Aug. 2016 – May 2018

SELECTED AWARDS

Robert H. Siemann Fellowship	2022 – 2025
NSERC PGS-D	2023 – 2026
NSERC Undergraduate Summer Research Award (USRA) & FRQNT Supplement	2020
BLUE Fellowship at McGill's Building 21	2020
McGill Physics Hackathon Winner – Arts & Science	2019

PUBLICATIONS

(Click to view)

- **T. Dyson**, *et al.*, “High-volume Tunable Resonator for Axion Searches Above 7 GHz,” *Phys. Rev. Applied*, Submitted 14 Feb. 2024, Published 23 Apr. 2024.
- **T. Dyson**, *et al.*, “Radio-Frequency Interference at the McGill Arctic Research Station,” *Journal of Astronomical Instrumentation*, Submitted 15 Dec. 2020, Published 12 May 2021.
- H. C. Chiang, **T. Dyson**, *et al.*, “The Array of Long Baseline Antennas for Taking Radio Observations from the Sub-Antarctic,” *Journal of Astronomical Instrumentation*, Submitted 27 Aug. 2020, Published 21 Dec. 2020.

PRESENTATIONS AND OUTREACH

(Click to view)

Demonstration of a High-Volume Tunable Haloscope Above 7 GHz <i>Patras 19, University of Rijeka</i>	Jul. 2023
Thin Shell Haloscope Development <i>Axion Dark Matter eXperiment Collaboration Meeting, University of Washington</i>	Feb. 2023
Radio Frequency Interference at the McGill Arctic Research Station <i>Soup and Science Public Talks, McGill University</i>	Sep. 2020
Emergent Computation <i>Project Presentation, Building 21</i>	Aug. 2020
Interviewed in “ALBATROS radio astronomy Product Showcase” <i>Article, The MagPi Magazine</i>	Sep. 2019

Graduate Research Assistant – Axion Haloscope

Sep. 2021 – Present

Stanford University, supervised by Prof. Chao-Lin Kuo

- Commissioning a pathfinder dark photon search.
- Designing a cryogenic dark photon search.
- Characterized the resonances of a novel prototype haloscope for axion dark matter detection.
- Developed a script for automatically aligning the haloscope based on measurements possible at cryogenic temperatures.

Graduate Research Assistant – Novel Cryogenic Detectors

May 2022 – Jul. 2023

Stanford University, supervised by Prof. Chao-Lin Kuo

- Took cryogenic measurements of the noise performance of a novel detector type, thermal kinetic inductance detectors (TKIDs).
- Collaborating with Bryan Steinbach, Lorenzo Minutolo, and Albert Wandui at Caltech to deploy a test tile of detectors to the south pole with BICEP.
- Helped design the cryogenic radio-frequency readout chain for a receiver in the BICEP array.

Graduate Research Assistant – Qubit-Based Sensors

Mar. 2022 – Jun. 2022

SLAC and Stanford University, supervised by Dr. Noah Kurinsky

- Characterized a cutting-edge superconducting travelling wave parametric amplifier (TWPA), finding optimal operating parameters and its noise temperature.
- Took measurements of a qubit at cryogenic temperatures, verifying its transition between states under an excitation, and the AC Stark shift of the transition frequency.
- Measured the critical temperature of superconducting samples for use in transition edge sensors.
- Learned firsthand to operate a dilution refrigerator.

Graduate Research Assistant – Atom Interferometry with MAGIS

Jan. 2022 – Mar. 2022

Stanford University, supervised by Prof. Jason Hogan

- Designed, built, & tested an optical assembly critical to the MAGIS experiment.
- Set up a magneto-optical trap for manipulating atoms in a vacuum using lasers.
- Locked many lasers' frequencies using PID feedback with a known frequency comb.
- Built & aligned a 922 nm (infrared) laser.

Undergraduate Research Assistant – Radio Cosmology Field Work

Sep. 2018 – Jul. 2021

McGill University, supervised by Prof. Cynthia Chiang

- Developed and deployed solar and wind power solutions for radio interferometer stations in remote locations such as Uapishka Station and the McGill Arctic Research Station.
- Designed & built electronic devices and wrote C++ Arduino firmware for power control & logging.
- Flagged radio-frequency interference in radio astronomy data using Python.

Undergraduate Research Assistant – Radio Interferometry Analysis

Sep. 2020 – May. 2021

McGill University, supervised by Prof. Jonathan Sievers

- Synchronized independent interferometer antenna clocks using the time delay of a known signal between them.
- Used the Niagara cluster of Compute Canada to run Python.
- Gave a summary talk to peers and faculty.

BLUE Fellow – Emergence and Complexity

May 2020 – Jul. 2020

Building 21

- Independently researched emergence and its relation to the computational capacity of a system.
- Led group discussions about several research topics.
- Wrote computer simulations of cellular automata using Python.

TEACHING EXPERIENCE

Teaching Assistant Jan. 2022 – Mar. 2022, Jan. 2023 – Mar. 2023, Sep. 2023 – Dec. 2023
Stanford University *Intro. Mechanics, Intro. E&M, Intro. Heat & Light*

- Taught in an active learning classroom and laboratory.
- Organized and led study sessions and office hours.
- Graded assignments and exams.

TEAM Undergraduate TA Jan. 2021 – May 2021
McGill University *Advanced Undergraduate – Data Science and Observational Astrophysics*

- Mentored students through coding labs in an online active learning environment.

Instructor Feb. 2017 – Sep. 2017
Kids Code Jeunesse

- Taught coding to kids of all ages in several workshops and events, including Scratch, HTML, and Python.

TECHNICAL SKILLS

Languages: Python, C, C++ (Arduino), Rust, Java, Lua

CAD: SOLIDWORKS, KiCAD

Manufacturing: machine shop, 3D printing, Hexagon metrology

GRADUATE-LEVEL COURSES

Quantum Field Theory I *Stanford University*

Cosmology *Stanford University*

Physics of Energy *Stanford University*

Quantum Theory *McGill University*

Electromagnetic Theory *McGill University*

General Relativity *McGill University*

Particle Physics *McGill University*

Advanced Statistical Mechanics *McGill University*

Biophysics *McGill University*