

# Taj Dyson

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

## EDUCATION

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<b>Stanford University</b> <i>PhD, Physics</i>	Sep. 2021 – Jun. 2027
<b>McGill University</b> <i>Bachelor of Science, Honours Physics (GPA 3.76)</i>	Aug. 2018 – May 2021
<b>Dawson College</b> <i>DCS, First Choice Sciences, Honours List</i>	Aug. 2016 – May 2018

## SELECTED AWARDS

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

## SELECTED PUBLICATIONS

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(Click to view)

- **T. Dyson**, *et al.*, “High-volume Tunable Resonator for Axion Searches Above 7 GHz,” *Phys. Rev. Applied* (2024).
- **T. Dyson**, *et al.*, “Radio-Frequency Interference at the McGill Arctic Research Station,” *Journal of Astronomical Instrumentation* (2021).
- G. Bratrud, S. Lewis, K. Anyang, **T. Dyson**, *et. al.* “Measurement of Correlated Charge Noise in Superconducting Qubits at an Underground Facility,” *Nature Communications* (2025)
- H. Magoon, T. Aralis, **T. Dyson**, *et. al.* “A First Demonstration of the SQUAT Detector Architecture: Direct Measurement of Resonator-Free Charge-Sensitive Transmons,” *In submission for Physical Review Applied* (2026).

## SELECTED PRESENTATIONS AND OUTREACH

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(Click to view)

<b>Resonating with Dark Matter with ADMX-VERA</b> <i>Article, Stanford KIPAC Research Highlights</i>	Dec. 2024
<b>High-frequency Haloscopes for the ADMX-VERA Program</b> <i>Talk, APS Global Physics Summit</i>	Mar. 2025
<b>Developing ADMX-VERA, an Axion Haloscope Above 7 GHz</b> <i>Talk, Fermilab Superconducting Quantum Materials and Systems Seminar</i>	Mar. 2024
<b>Design and Characterization of SQUAT Detectors</b> <i>Talk, APS Global Physics Summit</i>	Mar. 2026
<b>Radio Frequency Interference at the McGill Arctic Research Station</b> <i>Talk, Soup and Science Public Talks, McGill University</i>	Sep. 2020
<b>Interviewed in “ALBATROS radio astronomy Product Showcase”</b> <i>Article, The MagPi Magazine</i>	Sep. 2019

**Graduate Research Assistant – Axion Haloscope**

Sep. 2021 – Present

*Stanford University, supervised by Prof. Chao-Lin Kuo*

- Characterized the resonances of a novel prototype haloscope for axion and dark photon dark matter detection.
- Developed an algorithm to automatically align the haloscope based on measurements possible at cryogenic temperatures.
- Performed precision metrology on haloscope parts in a custom-built LN<sub>2</sub> bath.
- Designed a cryogenic dark photon search, including a vacuum system extension, thermal sinking, and radiation shielding. I am now commissioning it.
- Performed a tabletop dark photon search using custom control software and a SQL database, with analysis using Python.
- Mentored three undergraduates for up to a year, with weekly meetings to set goals and assess challenges as well as collaborative work in the laboratory.

**Graduate Research Assistant – Qubit-Based Sensors**

Mar. 2022 – Present

*SLAC and Stanford University, supervised by Dr. Noah Kurinsky*

- Took continuous-wave and pulsed measurements to characterize Superconducting Quasiparticle-Amplifying Transmons, a novel low-energy rare event detector.
- Simulated SQUAT data to optimize the choice of integration time for given device properties.
- Designed and integrated a hardware system for actuating cryogenic radio frequency switches, and wrote a Python library to interface with it. These switches enable new types of cryogenic measurement and allow multiple devices to be tested in a single cooldown.
- Characterized a superconducting traveling wave parametric amplifier (TWPA), finding optimal operating parameters and its noise temperature.
- Learned firsthand to operate a dilution refrigerator.

**Graduate Research Assistant – Axion Dark Matter Experiment**

Feb. 2023 – Present

*Stanford University, supervised by Prof. Chao-Lin Kuo for the ADMX Collaboration*

- Sped up analysis of data taken in high-resolution mode by employing pre-compiled size- and type-aware functions rather than interpreted Python.
- Coordinated across the collaboration to gather past simulations and measurements done for the proposed ADMX Extended Frequency Range experiment, for publication of a detailed design study.
- Operated the ADMX main experiment during science data taking, including Josephson parametric amplifier pump optimization and rod actuation for re-scanning.

**Graduate Research Assistant – Cosmic Microwave Background Receivers**

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).
- Contributed to design the cryogenic radio-frequency readout chain for a receiver in the BICEP array.

**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 data using custom Python scripts.

**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 and analysed computer simulations of cellular automata using Python.

## TEACHING EXPERIENCE

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**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

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

**CAD:** SOLIDWORKS, KiCAD, COMSOL

**Manufacturing:** Manual mill, Lathe, Waterjet cutter, Laser cutter/engraver, 3D printer, CMM metrology

## GRADUATE-LEVEL COURSES

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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*