

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

AWARDS

Robert H. Siemann Fellowship	2022
NSERC Undergraduate Summer Research Award (USRA) & FRQNT Supplement	2020
BLUE Fellowship at McGill's Building 21	2020
McGill Physics Hackathon Winner – Arts & Science	2019
Dawson College ScienceFest Hackathon Winner & Best Poster Winner	2018
Governor General's Academic Medal Bronze Level	2016

PUBLICATIONS

(Click to view)

- **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)

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

RESEARCH EXPERIENCE

Graduate Research Assistant – Axion Haloscope <i>Stanford University, supervised by Prof. Chao-Lin Kuo</i>	Sep. 2021 – Present
<ul style="list-style-type: none">• 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.• Verified the alignment by mapping electric field intensity.• Trained in modern high-precision metrology techniques for construction of the next haloscope model.	
Graduate Research Assistant – Novel Cryogenic Detectors <i>Stanford University, supervised by Prof. Chao-Lin Kuo</i>	May 2022 – Present
<ul style="list-style-type: none">• 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 may 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

Stanford University

Introductory Undergraduate – Mechanics

- Taught in an active learning classroom.
- 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

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*