

# Desmond Coles

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## SUMMARY

Mathematician and recent PhD graduate from the University of Texas at Austin. Through my dedicated teamwork mentality and passion for solving mathematical problems I help organizations tackle difficult and opened ended problems.

## EDUCATION

The University of Texas at Austin, PhD in Mathematics	3.94 GPA	2025
The Ohio State University, BS in Mathematics	3.98 GPA	2019

## SKILLS & CERTIFICATIONS

- Expert in linear algebra, graph theory, discrete mathematics, mathematical statistics, machine learning, topology, category theory, abstract algebra, algebraic & tropical geometry, group theory, and number theory.
- Programming languages and tools: Python, Rust, Lean, Bash, Git, and Linux.
- Data Science Boot Camp Certification, The Erdős Institute. [2025 Certificate](#).
- Soft skills: Public speaking, technical writing, mentorship, and meeting facilitation.
- Other: Microsoft office, graphic design and video editing using Adobe CC, Adobe Premier, LaTeX.

## WORK EXPERIENCE

Assistant Professor of Instruction - **The University of Texas at Austin** - Austin, TX 2025-Present

- Course design, lecturing, and mentoring students. Teaching advanced calculus and number theory to 300+ students per semester.

Graduate Researcher & Teaching Assistant - **The University of Texas at Austin** - Austin, TX 2019-2025

- Conducted independent research in algebraic geometry. Planned and executed a multi-part, five-year research program. Travelled (inter)nationally to meet collaborators and present research on 12+ occasions. Organized 3 seminars over 10 semesters as well as a summer long multi-university program for 100+ PhD students, postdocs, and professors to learn novel techniques in their field. Designed syllabi, gave lectures, mentored seminar participants, organized course schedules, and maintained websites. [CV](#).
- Designed and taught classes with 100+ students for 12 semesters on material including topology, statistics, calculus, analysis, and group theory. Mentored advanced undergraduate students through 1-on-1 reading courses.

Teaching Assistant & Tutor - **The Ohio State University** - Columbus, OH 2015-2019

- Designed and taught classes of 30+ undergraduate students for 6 semesters.
- Individually tutored students for over a dozen mathematics courses including linear algebra, differential equations, and statistics.

## SELECTED PROJECTS

Dissertation Research in Algebraic Geometry - **The University of Texas at Austin** - Austin, TX 2019-2025

- Conducted novel research in algebraic geometry that was presented at 6 international conferences and 5 invited talks at university seminars. Research results were disseminated in 5 [articles](#); two publications and three articles in review.
- Developed techniques in tropical geometry to simplify geometric objects arising from polynomials for the purpose of computations. Generalized central theorems in the field by developing a modular framework for the proofs. Research made use of tools from topology, algebraic geometry, representation theory, and combinatorics. Resolved four unsolved open problems.

Contributions to open-source software libraries - **The Ethereum Foundation** - Remote 2025

- Contributed to [Arklib](#), an open-source library written in Lean, maintained by the Ethereum Foundation for formally verifying the security of cryptographic protocols implemented in Rust for the Ethereum blockchain. Resolved 5 open issues. [Sample PR](#).

Windpower Forecasting in Quebec - **The Erdős Institute** - Remote 2025

- Collected four years of wind power generation data from Hydro-Québec as well as weather data and designed machine learning models in Python to forecast power generation using weather, succeeding with over 80% accuracy. Results available [here](#).

## LEADERSHIP

Graduate Representative Committee - **The University of Texas at Austin** - Austin, TX 2020-2022

- Founded the Graduate Representative Committee for UT Austin math department. Advocated for 100+ PhD students regarding university policy. Designed administrative processes and met regularly with university administration.

COVID-19 Outreach - **The University of Texas at Austin** - Austin, TX 2020-2022

- Organized an outreach program with UTeach to support 100+ students in public schools during the COVID-19 pandemic. Designed educational materials, coordinated volunteers, coordinated with school administration, and acquired funding.

## SELECTED PUBLICATIONS

- Desmond Coles and Netanel Friedenberg. *Locally finite completions of polyhedral complexes*. Disc. Comput. Geom., 2024.
- Desmond Coles. *Spherical tropicalization and Berkovich analytification*. Math. Z., 303(4):Paper No. 86, 23, 2023.
- Desmond Coles, Peter Huston, David Penneys, and Srivatsa Srinivas. *The module embedding theorem via towers of algebras*. J. Funct. Anal., 280(11):Paper No. 108965, 52, 2021.