

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

<u>Assistant Professor of Instruction - The University of Texas at Austin</u> - Austin, TX	2025-Present
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- Course design, lecturing, and mentoring students. Teaching advanced calculus and number theory to 300+ students per semester.

<u>Graduate Researcher & Teaching Assistant - The University of Texas at Austin</u> - Austin, TX	2019-2025
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- 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.

<u>Teaching Assistant & Tutor - The Ohio State University</u> - Columbus, OH	2015-2019
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- 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

<u>Dissertation Research in Algebraic Geometry - The University of Texas at Austin</u> - Austin, TX	2019-2025
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- 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.

<u>Contributions to open-source software libraries - The Ethereum Foundation</u> - Remote	2025
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- 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](#).

<u>Windpower Forecasting in Quebec - The Erdős Institute</u> - Remote	2025
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- 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

<u>Graduate Representative Committee - The University of Texas at Austin</u> - Austin, TX	2020-2022
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- 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.

<u>COVID-19 Outreach - The University of Texas at Austin</u> - Austin, TX	2020-2022
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- 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.