Desmond Coles

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https://desmondcoles1.github.io/

Research interests

I am interested in applying tools from combinatorics, tropical geometry, Berkovich non-Archimedean analytic geometry, and log geometry to study spherical varieties and other algebro-geometric objects related to representation theory.

Positions

2025–Present	Assistant Professor of Instruction, Department of Mathematics, The University of Texas at Austin, USA.

Education

2019–2025	PhD in Mathematics, The University of Texas at Austin, USA.
2014–2019	BSc in Mathematics, The Ohio State University, USA.

Preprints

Desmond Coles. Spherical tropical curves are balanced, 2025. arXiv:2505.04839

Desmond Coles and Martin Ulirsch. Towards the tropicalization of reductive groups, 2025. arXiv:2503.21654

Desmond Coles and Netanel Friedenberg. A construction of algebraizable formal models, 2023. arXiv:2303.13646

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, Neelav Dutta, Sifan Jiang, Ralph Morrison, and Andrew Scharf. The moduli space of tropical curves with fixed Newton polygon. *Adv. Geom.*, 22(1):49–68, 2022

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

Desmond Coles, Neelav Dutta, Sifan Jiang, Ralph Morrison, and Andrew Scharf. Tropically planar graphs. *Collectanea Mathematica*, 2021

Teaching at The University of Texas at Austin

Fall 2025	Professor, Multivariable calculus, two sections. Teaching assistant for one section of honors vector calculus.
Summer 2025	Teaching Assistant Multivariable calculus, M408D.
Fall 2024	Grader, Actuarial Statistical Estimates, M349P.
Spring 2023	Grader, Real Analysis I, M365C.
Fall 2022	Teaching Assistant, Discrete Mathematics, M325K.
Spring 2022	Grader, Real Analysis II, M365D.
Fall 2021	Teaching Assistant, Calculus for Business, M408Q.
Fall 2020	Teaching Assistant, Algebraic Structures, M373K.
Spring 2020	Teaching Assistant, Multivariable Calculus, M408D.
Fall 2019	Teaching Assistant, Multivariable Calculus, M408D.

Teaching at The Ohio State University

2016 - 2019	Teaching Assistant, Precalculus, Math 1150.
2014 - 2016	Tutor for Mathematics and Statistics Learning Center.

Service

Summer 2022	Organizer for University of Texas at Austin Department of Mathematics Summer Mini-courses.
2021 - 2022	Graduate Student Representative for Mathemtatics Department.
Summer 2021	Instructor for summer mini-course on algebraic geometry.
Spring 2021	Outreach coordinator for University of Texas at Austin Department of Mathematics outreach in Title I schools.
Fall 2020	Outreach organizer specializing in teaching support for public schools during COVID-19.
2020 - 2022	Seminar organizer for the UT Austin Beginning Algebraic Geometry Seminar.
Fall 2020	Seminar Organizer for University of Texas at Austin Junior Geometry Seminar.
Summer 2020	Organizer for University of Texas at Austin Department of Mathematics Summer Mini-courses.

Invited talks

October 2025	Gary-Fest: Enumerative Geometry, Intersection Theory & Beyond
February 2025	The University of Illinois Chicago Algebraic Geometry Seminar
Sep. 2024	"Spherical Tropicalization" at The Ohio State University Algebraic Geometry Seminar.
Oct. 2023	"Spherical Tropicalization and Berkovich Analytic Groups" at the GAUS-seminar at Goethe-Universität Frankfurt am Main.
Jan. 2023	"Spherical tropicalization and Berkovich analytification" at Tulane University Algebraic Geometry and Geometric Topology seminar.
Sep. 2022	"Spherical tropicalization and Berkovich analytification" at Duke University algebraic geometry Seminar.

Conference presentations

Sep. 2024	"Spherical Tropicalization" at the AMS sectional meeting Special Session on Non-Archimedean, Algebraic, Tropical Geometry and applications, hosted at the University of Texas at San Antonio.
Oct. 2023	"Spherical Tropicalization" at Vector bundles and combinatorial algebraic geometry, hosted at Goethe-Universität Frankfurt am Main.
Oct. 2022	"Tropicalization and Berkovich analytification of spherical varieties" at Texas Algebraic Geometry Symposium poster session, hosted at Texas A& M.
May 2022	"Spherical tropicalization" at the International School on Tropical Geometry, hosted at The University of Valladolid.
Apr. 2022	"Tropicalization of Spherical Varieties and the Connections with Berkovich Geometry" at the Graduate Student Topology and Geometry Conference poster session, hosted at Georgia Tech.