

Sai Sivakumar

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University of Texas at Austin

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Research Interests

Representation theory, mathematical physics

Education

- 2024– **Ph.D., Mathematics**, *University of Texas at Austin*
- 2020–2024 **B.Sc. Summa Cum Laude, Mathematics**, *University of Florida*
- 2020–2024 **Minors in Physics, Computer Science**, *University of Florida*

Works

Publications

- [1] **On virtual resolutions of points in a product of projective spaces**
I. Bailly-Hall, C. Berkesch, K. Dovgodko, S. Guan, S. Sivakumar, J. Sun (2024). (arXiv, Journal of Pure and Applied Algebra)
- [2] **Ideals preserved by linear changes of coordinates in positive characteristic**
B. Cattell-Ravdal, E. Delargy, A. Ganguly, S. Guan, T. Karn, M. Perlman, S. Sivakumar (2024). To appear in Communications in Algebra. (arXiv)

Miscellaneous

- [3] **Strong multiplicity one for classical modular forms**
S. Sivakumar (2024). Senior thesis. (PDF)

Talks and Presentations

- Sep. 2025 Introduction to TQFTs
UT Austin Junior Geometry and Quantum Field Theory Seminar
- Sep. 2025 Introduction to Koszul duality: S-Lambda duality, (two talks)
UT Austin GRANT (Geometry, Representation theory, Algebra, and Number Theory) Seminar
- Apr. 2025 Schur functors and the representation theory of the general linear group
UT Austin Junior Geometry Seminar
- Apr. 2025 D-modules and chiral algebras
UT Austin Junior Geometry and Quantum Field Theory Seminar
- Feb. 2025 The cobordism hypothesis in one dimension
UT Austin Junior Geometry and Quantum Field Theory Seminar
- Oct. 2024 Local systems, monodromy, elliptic curves, and the Picard-Fuchs equation
UT Austin GRANT (Geometry, Representation theory, Algebra, and Number Theory) Seminar
- Jan. 2024 On virtual resolutions of points in a product of projective spaces
Joint Mathematics Meetings 2024, in the AMS Contributed Paper Session on Commutative Algebra and Related Topics
- Jan. 2024 Ideals preserved by linear changes of coordinates in positive characteristic
Joint Mathematics Meetings 2024, in the AMS Contributed Paper Session on Commutative Algebra and Related Topics
- Oct. 2023 Virtual resolutions of points in $\mathbb{P}^n \times \mathbb{P}^m$
UF Algebra Seminar

- Apr., Jul. 2023 Fourier analysis on LCA groups and Pontryagin duality
For Dr. Sin's Introduction to Representation Theory class; for the Student Summer Representation Theory Seminar at the University of Minnesota, Twin Cities.
- Feb. 2022 Combinatorial proof of existence of Sylow subgroups
UF Algebra seminar
- Falls 2021–2023 Annual L^AT_EX seminar
Joint with the UF Graduate Mathematics Association (GMA) and the UF Association for Women in Mathematics (AWM) chapter.

Conferences and Workshops

- Mar. 2025 Texas Algebraic Geometry Symposium, *Texas A&M University*
- Jan. 2024 Joint Mathematics Meetings, *San Francisco*

Teaching

- Fall 2025 **Teaching Assistant**, *M 427J*: Differential Equations with Linear Algebra
- Spring 2025 **Teaching Assistant**, *M 427L*: Advanced Calculus for Applications II
- Fall 2024 **Teaching Assistant**, *M 408N*: Differential Calculus for Science
- 2021, 22 AY **Teaching Assistant**, *MAP2302*: Elementary Differential Equations

Outreach and Service

- Aug. 2024– Member of the Austin Civic Wind Ensemble
Part of the clarinet section.
- Oct. 2024– Volunteer at the Sunday Morning Math Group at UT Austin
Exposes local junior high and high school students to fun and engaging topics in mathematics not typically appearing in the curricula; this group also hosts the AMC 8, 10, and 12 exams.
- 2024– Member of the Graduate Representative Committee at UT Austin
We interface with UT Austin's graduate students by representing the interests of the graduate students in the department, and we organize events and tea.
- 2024 AY Organizer of the Sophex seminar at UT Austin
This seminar gives first-year graduate students a low-pressure environment to practice giving talks.
- 2021, 22, 23 AY Officer of the University Math Society at UF
President, formerly Academic Director. Managed the club, collaborated with the AWM chapter and the GMA, ran its seminar, and encouraged an inclusive environment.
- Mar. 2021– Moderator for a large online mathematics community
Exceeding 270,000 members globally, it seeks to stimulate mathematical discussion and interest, as well as to provide assistance with math.

Honors and Awards

- 2023 The Kermit Sigmon Scholarship.
\$200, awarded every spring to promising undergraduate mathematics majors.

Skills

- L^AT_EX 6+ years
- Macaulay2 Used in both REUs I attended
- Java, C++ In my undergraduate studies