

# Shihan Kanungo

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## EDUCATION

**Henry M Gunn High School** GPA 3.96/4.46W | **San José State University (SJSU)** GPA 4.0 ..... 2022–2026

## MATHEMATICS RESEARCH (PUBLICATIONS/PREPRINTS)

**MIT PRIMES-USA** (2024 Representation Theory; 2023 Commutative Algebra) ..... Cambridge, MA · 2023–25

- **Mixed Tensor Products, Capelli Berezinians, and Newton's Formula for  $\mathrm{gl}(m|n)$**  (with S. Erat, A. Kannan) [arXiv] (2024)  
Transform. Groups., Submitted. Won USA Bronze medal in Mathematics at S.-T. Yau HS Science Award. Presented at JMM25 PME Contributed Session for Research by Undergraduates. Reference: Dr. Arun Kannan (MIT)
- **A weaker notion of the finite factorization property.** (with H. Jiang, H. Kim) [arXiv] (2023)  
Commun. Korean Math. Soc. **39** (2024), no. 2, 313–329. Presented at JMM24 AMS-PME, MAA MathFest. Reference: Dr. Felix Gotti (MIT)

**San José State University (SJSU)** (Number Theory, 2024) ..... San José, CA · 2024

- **On Product Formulas of Guillera and Sondow** (with J. Schettler) [arXiv] (2024)  
American Mathematical Monthly. Submitted. Reference: Dr. J. Schettler (SJSU)

## EXPOSITORY PAPERS

- **David Gale's Subset Takeaway Game**, Combinatorial Game Theory ('24)
- **Space-Filling Curves**, Real Analysis ('24)
- **Chromatic Polynomials**, Graph Theory ('24)
- **Lagrangian and Hamiltonian Mechanics**, Dynamical Systems ('24).
- **Large Gaps Between Primes**, Analytic Number Theory ('24)
- **Dynamical Billiards**, Ergodic Theory ('24)
- **Arithmetic Dynamics**, Number Theory ('23)
- **Minimal surfaces**, Differential Geometry ('22)
- **Herbert Wilf's snake-oil method**, Generating Functions ('21)
- **Mixing-time estimates for riffle shuffle**, Markov chains ('20)
- **Classifying groups of certain orders**, Algebra ('20)

## HONORS & AWARDS

- S.-T. Yau Science Award. USA Bronze medal in Mathematics ('24)
- USAPhO Gold Medal & US Physics Team (top 20) ('24)
- WSS, World Science Scholar ('24)
- Spirit of Ramanujan \$2k Fellowship ('23)
- USAMTS Gold Medal ('23)
- USAMO (USA Math Olympiad) ('22, '25)
- AIME, 6-time qualifier. 13/15 ('25); 11/15 ('22, '24)
- Math Kangaroo (Level 12) USA rank 4 ('22)

## CAMPS & PROGRAMS

- USAPhO Team Training Camp, Univ. of Maryland. (Jun '24)
- JMM25 PME Contributed Session. Presenter (Jan '25)
- MAA MathFest '24 *Research in Motion*. Presenter (Aug '24)
- JMM24 AMS-PME Poster Session. Presenter (Jan '24)
- SWIM23, MIT. Presenter. (Aug '23)
- The Special Lectures. Kharkiv-Vienna International Science School. Invitee. (Aug 2023)

**Technical Skills:** Python, Java, MATLAB,  $\LaTeX$ , spreadsheets.

**Languages:** English (native) & French (beginner).

## MATH COURSES

**San José State University** (Graduate courses shown in color)

- A+ **MATH 231A Real Analysis** Slobodan Simic ..... '24 F
- **MATH 231B Functional Analysis** Slobodan Simic ..... '25 Sp
- **MATH 233A Applied Mathematics I** Daniel Brinkmann ..... '25 Sp
- A+ **MATH 234 Advanced Dynamical Systems** Liam Stanton ..... '24 Sp
- **MATH 285A Stochastic Methods** Liam Stanton ..... '25 Sp
- A+ **MATH 229 Advanced Matrix Theory** Wasin So ..... '24 F
- **MATH 285M Nonnegative Matrices** Wasin So ..... '25 Sp
- A+ **MATH 279A Graph Theory** Yan Zhang ..... '24 F
- A+ **MATH 226 Theory of Numbers** Jordan Schettler ..... '24 Sp
- A **MATH 39 Linear Algebra I** Dashiell Fryer ..... '23 F
- A+ **MATH 129B Linear Algebra II** Wasin So ..... '24 Sp
- A+ **MATH 131A Introduction to Analysis** Tim Hsu ..... '24 Sp
- A+ **MATH 131B Introduction to Real Variables** Tim Hsu ..... '24 F
- A+ **MATH 138 Complex Variables** Liam Stanton ..... '23 F
- **MATH 142 Introduction to Combinatorics** Jesse Geneson .... '25 Sp
- A+ **MATH 179 Introduction to Graph Theory** Sogol Jahanbekam . . '24 F

**Euler Circle** (Grades not assigned)

Combinatorial Game Theory ..... 2024–'25  
Analytic Number Theory, Ergodic Theory, Number Theory .2023–'24  
Differential Geometry, Generating Functions ..... 2021–'22  
Markov Chains, Abstract Algebra, Real Analysis ..... 2020–'21

**Art of Problem Solving (AoPS)**

Group Theory (A+), Calculus (A+) ..... 2020–23

## MUSIC

- **Stanford Jazz Workshop** (2024)  
Duke Ellington award; Outstanding Musicianship award
- **Northern California Young Talents Competition** (2023)  
First place, solo violin classical performance
- **Golden State Youth Orchestra** (GSYO)
  - Assistant concertmaster. Camilla Kolchinsky Orchestra (2023)
  - Concertmaster. Camerata & Chamber Players Orch. ('20–'22)