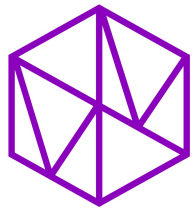
BAMO
Bay Area Mathematical Olympiad

25th Annual BAMO Awards

Santa Clara University
March 17, 2024



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Program

- 2:30 Introduction
- 2:45 Local-global problems in orbits

  Alex Kontorovich, Rutgers University

  Problems in numerical integration and pseudorandom sequences motivated a 50+ year old conjecture that could have been stated 2000+ years ago; Zaremba's conjecture is a simple question about whole numbers and continued fractions. Another problem involves fractal configurations of tangent circles and their radii. As often happens, devilishly simple statements in number theory belie some very deep mathematics underneath, from harmonic analysis and dynamics on orbits in highly symmetric spaces with non-Euclidean geometries, to local-global principles in groups, to "expander properties" of families of graphs. We will survey these developments and others, assuming no prior knowledge of these topics.
- 3:45 Presentation of awards

About BAMO

- **The Bay Area Mathematical Olympiad** (BAMO) is an annual contest for middle and high school students. The first high school contest was held on February 23, 1999. The 25th annual BAMO took place on March 6, 2024, with over 600 participants from grades 3 to 12, mostly in the Bay Area, but including students from Seattle to San Diego. The BAMO competition tests students' problem-solving skill, stamina, and creativity.
- **BAMO is made possible** by generous gifts from Tom Davis and Ellyn Bush, Peggy and Tom Rike, the support of the Simons Laufer Mathematical Sciences Institute, and numerous donations from private individuals.
- **BAMO Organizing Committee**: Zvezdelina Stankova, UC Berkeley; Paul Zeitz, University of San Francisco; Austin Shapiro, Proof School.
- **BAMO Problems Committee**: Austin Shapiro, Zvezdelina Stankova, Eugene Veklerov, Paul Zeitz.

About BAMO

- **BAMO Grading Team**: Aaron Agulnick, Aaron Cho, Aaron Zaks, Aathreya Kadambi, Andrew Huang, Arun Sharma, Ashmita Reddy, Atticus Cull, Borislav Mladenov, Cody Strouse , Colby Brown, Ellen Kulinsky, Elysée Wilson-Egolf, Erik Herrera, Eugene Veklerov, Felicia Lim, Isabella Arcoleo, Jonathan Sy, Joshua Zucker, Justin Wu, Liliana Mironova , Matthew Liu, Mátyás Sustik, Orlando Munoz, Paul Zeitz, Peter Koroteev, Rune De Anda, Theodore Alper, Zvezdelina Stankova.
- We thank:
  - Austin Shapiro, Espen Slettnes, Eugene Veklerov, and R. S. Luthar (*American Mathematical Monthly*, 1969) for problem contributions;
  - The UC Berkeley mathematics department for providing meeting space for the construction and grading of BAMO;
  - Professors Frank Farris and Shamil Asgarli of the Santa Clara University mathematics department, and Brian Conrey of the American Institute of Mathematics for generously hosting both a satellite site for the BAMO exam and especially, this awards ceremony;
  - Tom Davis, as always, for the T-shirt design!

Our speaker

Alex Kontorovich received his BA from Princeton and PhD from Columbia. He is currently a Distinguished Professor of Mathematics at Rutgers, after previously teaching at Brown, Stony Brook, and Yale. He is the recipient of numerous prestigious awards. He currently serves on the Scientific Advisory Board of *Quanta* and is Dean of Academic Content at the National Museum of Mathematics (MoMath). Besides his service to MoMath, Alex is a prolific creator of math videos, some technical, some for general audiences, and a few that are approaching cult status. Unsurprisingly, he is also a professional musician, and has performed "Afro-Klezmer" sax in Europe and North America.

Alex joins a very distinguished list of speakers, which includes Arthur Benjamin, Melanie Wood, and the late John Conway and Ronald Graham. See `https://www.bamo.org/archives/speakers/` for more information.