Department of Mathematics
Panjab University, Chandigarh

The Sixth Sarvadaman Chowla Memorial Lecture

Polymath 14: From word games to an analysis-definition of abelian groups.

by

Apoorva Khare

Indian Institute of Science, Bengaluru

on **December 20, 2023 at 5 pm**

in the Seminar Hall of Mathematics Department

Abstract: We will answer a basic question: "What are all the groups that have a norm?"

This project connects across algebra, analysis, geometry, probability, and combinatorics. It also provides a non-standard, modern model for mathematics collaboration in today's fast-evolving world, using both technology (in multiple crucial ways) and crowdsourcing. Research was conducted round-the-clock across multiple timezones and continents, by six colleagues (with contributions from several others), and progress was tabulated on the blog of Terence Tao (UCLA), including via help from a computer. This led to a novel discovery: a fundamental algebraic structure (abelian torsionfree) is precisely the same as a fundamental analysis structure (norm), for an arbitrary group.

(Joint as D.H.J. PolyMath with Tobias Fritz, Siddhartha Gadgil, Pace Nielsen, Lior Silberman, and Terence Tao.)

About the Speaker: *Apoorva Khare did his PhD from University of Chicago in 2006. He is presently working as Associate Professor at Indian Institute of Science, Bengaluru. He works in matrix positivity and analysis, combinatorics and discrete mathematics, and representation theory. He is a highly decorated mathematician. Besides being awarded the Shanti Swarup Bhatnagar Prize in 2022, Khare is also a recipient of the Swarnajayanti Fellowship and the Ramanujan Fellowship from SERB/DST, Govt. of India, and a Fellow of the Indian Academy of Sciences. In a publication by the Government of India celebrating 75 years of Indian independence, Khare was listed as one of the 75 scientists aged under 50 who are shaping today's India.*