

Webinar: Andrews' approach to conjecture the Rogers-Ramanujan identities by Dr. Gaurav Bhatnagar (Ashoka University)

by Manjil Saikia - Monday, August 10, 2020

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Gonit Sora is organizing a webinar on number theory to be delivered by [Dr. Gaurav Bhatnagar](#) of Ashoka University. The details are given below.

Date: 16 August 2020 (Sunday)

Time: 2.30 pm IST

Title: Andrews' approach to conjecture the Rogers--Ramanujan identities

Abstract: The two Rogers--Ramanujan identities were sent by [Ramanujan](#) to Hardy in a letter in 1913. As an example, here is the first Rogers-Ramanujan Identity:

$$1 + \frac{q}{(1-q)} + \frac{q^4}{(1-q)(1-q^2)} + \frac{q^9}{(1-q)(1-q^2)(1-q^3)} + \cdots \\ = \frac{1}{(1-q)(1-q^6)(1-q^{11})(1-q^{16})\cdots} \times \\ \frac{1}{(1-q^4)(1-q^9)(1-q^{14})\cdots}.$$

They look less forbidding when interpreted in terms of partitions, which is how MacMahon considered them. A partition of a number is a way of writing it as an unordered sum of other numbers. Unordered means that $2+3$ and $3+2$ are considered the same. For example, $5 = 4+1 = 3+2 = 3+1+1 = 2+1+1+1$ are partitions of 5 . (Two partitions of 5 are missing in this list; can you find them?)

The theory of partitions is an attractive area of mathematics, where many complicated formulas are rendered completely obvious by making the 'right picture'. However, while each side of the Rogers-Ramanujan identities are represented naturally in terms of partitions, they are still far from obvious.

In this talk, we will introduce partitions, explain how to enumerate them systematically, represent them graphically, and write their generating functions. We present an experimental approach to discover the Rogers-Ramanujan identities. This approach is due to Professor George Andrews of Penn State University.

About the speaker: *Dr. Gaurav Bhatnagar is a Visiting Associate Professor at Ashoka University. He obtained his Ph.D. in Mathematics from The Ohio State University in 1995 under the direction of Stephen C. Milne. After his Ph.D, he spent one year each at Ohio State and the Indian Statistical Institute, Delhi. Subsequently, he joined the industry, where he made a significant contribution to the teaching and learning processes of Indian schools. Since September 2015 he has held visiting positions in Indian Statistical Institute, Delhi, University of Vienna and the School of Physical Sciences (SPS), JNU.*

The talk will be suitable for a general audience (high school and college students are specially welcome), and will be held online via Zoom. It will also be livestreamed on our [Facebook page](#).

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