Monday
May
27

FACULTY OF MATHEMATIC'S INTERNATIONAL WOMEN IN MATHEMATICS DAY COLLOQUIUM

The Ramanujan conjecture: from theory to applications

Originally predicted by Ramanujan in 1916 for the discriminant function, the Ramanujan conjecture is a very deep statement concerning the size of the Fourier coefficients of cusp forms. The generalized Ramanujan conjecture expects that a generic unitary cuspidal representation of a reductive group over a global field should be locally tempered. While this conjecture is largely open to date, it is established for certain cases.

In this survey talk we explain some novel applications of the proven cases to explicit constructions of pseudorandom objects. These include (a) Ramanujan graphs and Ramanujan complexes, (b) points uniformly distributed on spheres, and (c) Golden Gate sets in quantum computing. The Ramanujan conjecture is closely tied to the Riemann Hypothesis, and the Ramanujan graphs/complexes can be characterized by their associated zeta functions satisfying the Riemann Hypothesis. This reveals a very interesting connection between number theory and combinatorics.

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Sloan Fellow
Inaugural Fellow of the American Mathematical Society

Professor Wen-Ching (Winnie) Li joined Penn State University in 1979 and has been a Distinguished Professor of Mathematics since 2012. She is a renowned Number Theorist specializing in automorphic forms with applications to coding theory and spectral graph theory. She has supervised 17 Ph.D. graduates and served the Mathematical Society internationally. She was the Director of the National Center for Theoretical Sciences in Taiwan 2009-2014. She was a Sloan Fellow in 1981, was awarded the 2010 Chern Prize in Mathematics, and is an Inaugural Fellow of the American Mathematical Society.

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May 27, 2024
10:30-11:30 AM

WHERE
DC 1302

UNIVERSITY OF WATERLOO
WOMEN IN MATHEMATICS

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