## **University of Florida Mathematics Department** SIXTH RAMANUJAN<sup>\*</sup> COLLOQUIUM

by

Professor Freeman Dyson \*\* The Institute for Advanced Study

## on PLAYING AROUND WITH PARTITIONS

Date and Time: 4:05 - 4:55pm, Monday, March 25, 2013 Room: LIT 109 **Refreshments:** After Colloquium in the Atrium (LIT 339)

> **OPENING REMARKS** bv Paul D'Anieri Dean, College of Liberal Arts and Sciences



Abstract: I have been playing around in two ways, first with equations and second with numbers. I equations, I discuss a well-known connection between pure mathematics and statistical physics. The canonical ensemble of statistical mechanics is applied to the counting of partitions. This picture bor from physics gives a simple way to find the leading term in the exact calculation of the partition fur Hardy and Ramanujan. Using numbers, I have been trying unsuccessfully to guess a simple formula spt-crank function defined in recent paper by Andrews, Garvan and Liang. Here spt stands for smal and the spt-crank was designed to help us understand the beautiful new congruence properties of pa smallest-parts discovered by Andrews. The Andrews congruences are like the famous Ramanujan congruences for the partition function modulo 5, 7, and 11, except that Andrews has 13 mysteriousl replacing 11. I found a simple formula for the spt-crank which exactly fits more than half the values fails miserably for the others. I challenge everyone in the audience to fix it so that it fits them all.

> NOTE: After the Ramanujan colloquium, Professor Dyson will give the following talks:

- Number Theory Seminar on New Strategies for Prisoner's Dilemma, Tue, Mar 26 at 1:55pm in The Atrium (LIT 339)
- Physics Colloquium entitled Are Gravitons in Principle Detectable?, Wed, Mar 27 at 4:05pm in NPB 1002.

\* ABOUT RAMANUJAN: Srinivasa Ramanujan (1887-1920), a self-taught genius from South Inc dazzled mathematicians at Cambridge University by communicating bewildering formulae in a seri letters. G. H. Hardy invited Ramanujan to work with him at Cambridge, convinced that Ramanujan "Newton of the East"! Ramanujan's work has had a profound and wide impact within and outside mathematics. He is considered one of the greatest mathematicians in history.

\*\* ABOUT THE SPEAKER: Freeman Dyson is Professor Emeritus at the Institute for Advanced S Princeton. He was born in England and worked as a civilian scientist for the Royal Air Force during World War. He graduated from Cambridge University in 1945 with a Bachelor of Arts degree in mathematics. He went on to Cornell University as a graduate student in 1947 and worked with Han and Richard Feynman. He is known for his work in quantum field theory, solid-state physics, astror nuclear physics, and his thoughts on science and society. Dyson has also done work in a variety of mathematics, such as topology, analysis, number theory and random matrices. He is winner of the I Medal, the Max Planck Medal, and the Templeton Prize, as well as a Fellow of the Royal Society a American Physical Society, and a member of the US National Academy of Science.

ABOUT THE SPONSOR: Evan Pugh Professor George Andrews of The Pennsylvania State Unive the world's premier authority in the theory of partitions and work of the Indian mathematical genius Srinivasa Ramanujan combined. He is a Member of the National Academy of Sciences. He has clos with the UF Mathematics Department which has one of the strongest programs on mathematics rela Ramanujan's work. He was a recipient of an Honorary Doctorate from UF in December 2002. Since he is a Distinguished Visiting Professor each year in the Spring term in the Mathematics Departmer has recently finished his term as President of the American Mathematical Society.

Ramanujan Colloquium \* University of Florida \* Mathematics \* Contact Info