
University of Florida, Mathematics
Department
FOURTH RAMANUJAN* COLLOQUIUM

by
Professor Kannan Soundararajan**
Stanford University

on
Quantum Unique Ergodicity and Number Theory

Date and Time: 4:00 - 5:00pm, Wednesday, March 24, 2010

Room: FAB 103

Refreshments: At 3:30pm in the Atrium (LIT 339)



Abstract: A fundamental problem in the area of quantum chaos is to understand the distribution of high eigenvalue eigenfunctions of the Laplacian on certain Riemannian manifolds. A particular case which is of interest to number theorists concerns hyperbolic manifolds arising as a quotient of the upper half-plane by a discrete "arithmetic" subgroup of $SL_2(\mathbb{R})$ (for example, $SL_2(\mathbb{Z})$), and in this case the corresponding eigenfunctions are called Maass cusp forms). In this case, Rudnick and Samak have conjectured that the high energy eigenfunctions become equi-distributed. I will discuss some recent progress which has led to a resolution of this conjecture, and also on a holomorphic analog for classical modular forms. I will not assume any familiarity with these topics, and the talk should be accessible to graduate students.

NOTE: After the Ramanujan colloquium, Professor Soundararajan will give two [Number Theory Seminars](#) on related topics at 10:40am, Thursday March 25 and Friday March 26 in LIT 339 (The Atrium).

* ABOUT RAMANUJAN: Srinivasa Ramanujan (1887-1920), a self-taught genius from South India, dazzled mathematicians at Cambridge University by communicating bewildering formulae in a series of letters. G. H. Hardy invited Ramanujan to work with him at Cambridge, convinced that Ramanujan was a "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:

Professor Kannan Soundararajan is perhaps the top analytic number theorist in the world under the age of 40. He has made outstanding contributions to multiplicative number theory, the theory of the Riemann zeta function, Dirichlet L-functions, and the theory of automorphic forms. Even as an undergraduate at the University of Michigan, he did very fundamental research and was recognized with the Morgan Prize of the American Mathematical Society for Undergraduate Research the very first year that prize was instituted. After completing his PhD at Princeton, he was awarded the prestigious American Institute of Mathematics Fellowship, the very first year that was instituted. Then in 2005, he was the recipient of the First SASTRA Ramanujan Prize given to mathematicians not exceeding the age of 32 for pathbreaking contributions to areas influenced by Srinivasa Ramanujan. In addition, he is a winner of the Salem Prize in analysis. He is currently Professor at Stanford University. Very recently, in collaboration with Roman Holowinsky, he solved an important case of the Quantum Unique Ergodicity Conjecture of Rudnick and Samak and his talks will report on this work among other things.

ABOUT THE SPONSOR: Evan Pugh Professor George Andrews of The Pennsylvania State University is 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 close ties with the UF Mathematics Department which has one of the strongest programs on mathematics related to Ramanujan's work. He was a recipient of an Honorary Doctorate from UF in December 2002. Since 2005, he is a Distinguished Visiting Professor each year in the Spring term in the Mathematics Department. He is currently President of the American Mathematical Society.

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