Mathematics Department-University of Kansas

Smith Colloquium

Thursday, December 3, 2015
4:00 pm
306 Snow Hall
Aronszajn Seminar Room

Refreshments will be served at 3:30 pm in 406 Snow Hall.

Primes, Zeta and Asymptotic Formulas - Granville-Zagier's Multi Zeta Values

Yasuyuki Kachi

University of Kansas

The mystery of prime numbers prompts one to study Riemann's zeta function ("zeta"). I first motivate the audience why we study zeta, explain the key notion called "Euler product", then spotlight the multi-faceted personality of zeta, with a pit-stop at the Riemann Hypothesis, the most important open problem in pure math in the eyes of many (according to E. Bombieri). In the talk I specifically focus on the recent resurgence of the study of analytic continuation of zeta. My collaborators (P. Tzermias and C. Fang) and I are currently devising one of the competing theories in this field - it is very potent yet completely `exoteric' by nature. It generates myriad of problems which (apt) graduate students will likely find illuminating. I plan to share some snapshots: (1) Rejuvenation of the celebrated Granville-Zagier's theorem (1997) on multi-zeta values by embedding it into the (bigger) framework of generalized Bernoulli polynomials (Akiyama-Tanigawa Diagram). (2) The universal matrix and Laplace transform. (3) (One form of) full generalization of Stirling's formula. (4) Vexing phenomenon concerning `renormalization' of the infinite product (x+1) (x+2) (x+3) .. that has eluded investigation. (5) Does zeta have a "significant other" (does it have an Euler product)? The talk will be completely accessible to students with basic calculus and linear algebra background.