Levi L. Conant
LECTURE SERIES

Bryna Kra

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Bryna Kra earned her undergraduate degree from Harvard University in 1988 and her PhD from Stanford in 1995. Before her appointment to Northwestern University in 2004, she held postdoctoral positions at the Hebrew University of Jerusalem, the University of Michigan, the Institut des Hautes Études Scientifiques, and Ohio State University, and was an assistant professor at Pennsylvania State University. Kra works in dynamical systems and ergodic theory, with a focus on problems related to combinatorics and number theory. She was an invited speaker at the 2006 International Congress of Mathematicians, was awarded a Centennial Fellowship in 2006, and was awarded the Conant Prize in 2010. Kra organizes a mentoring program for women in mathematics at Northwestern, runs a math enrichment program for children at a local elementary school, and is currently chair of the Northwestern University math department.

Patterns in the Primes

Thursday, 11:00 a.m.
November 4, 2010
Campus Center, Odeum C

In 2004, Ben Green and Terence Tao made a stunning breakthrough, showing that the primes contain arbitrarily long arithmetic progressions. Perhaps even more impressive is the fusion of methods and results from number theory, ergodic theory, harmonic analysis, and combinatorics used in its proof. The starting point for their proof is the celebrated theorem of Endre Szemerédi from the 1970s: a set of integers with positive upper density contains arbitrarily long arithmetic progressions. Shortly thereafter, Hillel Furstenberg gave a new proof of this theorem, uncovering beautiful connections between dynamics and additive combinatorics. More recently, Timothy Gowers gave a new proof of Szemerédi's Theorem vastly improving quantitative bounds in the finite version. Although the various proofs, Szemerédi's, Furstenberg's, and Gowers's, seem to use very different methods, they have several features in common: in each, a key idea is the dichotomy in the underlying space between randomness and structure. Green and Tao's proof draws on all of these proofs and exploits such a dichotomy. The talk will be an overview of the connections between these topics, with a focus on recent developments.

Levi Leonard Conant, 1857–1916

Levi Conant was a mathematician and educator who spent most of his career as a faculty member at Worcester Polytechnic Institute; he served as head of the Mathematics Department and as acting president from 1911 to 1913. Conant was noted as an outstanding teacher, and an active scholar. He published a number of articles in scientific journals and wrote four textbooks: *The Number Concept: Its Origins and Development* (1896), *Original Exercises in Plane and Solid Geometry* (1905), *Five-Place Logarithmic and Trigonometric Tables* (1909), and *Plane and Spherical Trigonometry* (1909). Upon his premature death in 1916 he made a large bequest to The American Mathematical Society, which established the Levi L. Conant Prize, awarded annually to recognize the best expository paper published in either *Notices of the AMS* or *Bulletin of the AMS* in the previous five years.

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Students and faculty are invited to meet the speaker at a reception following the lecture

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