Christoph Koutschan, Manuel Kauers, and Doron Zeilberger to Receive 2016 AMS Robbins Prize

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Providence, RI---**Christoph Koutschan** (Austrian Academy of Sciences), **Manuel Kauers** (Johannes Kepler University, Linz, Austria), and **Doron Zeilberger** (Rutgers University) will receive the 2016 AMS David P. Robbins Prize. The three are honored for their paper, "Proof of George Andrews's and David Robbins's q-TSPP conjecture," *Proceedings of the National Academy of Sciences (USA)* (2011). (Photos, left to right: Koutschan, Kauers, Zeilberger.)

This work concerns plane partitions, which are standard objects in the branch of mathematics known as combinatorics. A plane partition can be visualized as a stack of blocks fitted into one corner of a rectangular solid to form a shape like a mountain face: Every step away from the highest block in the corner is a step at the same level or a step down (see figure). One can perform various transformations on the plane partition, such as exchanging the axes, which gives another plane partition. One can also obtain a new plane partition by looking at the portion of the rectangular solid not filled in by the original plane partition. (For more on plane partitions, see "How the Alternating Sign Matrix Conjecture was Solved", by David Bressoud and James Propp, *Notices of the AMS*, June/July 1999.)

A "symmetry class" is a set of plane partitions that is left unchanged under certain such transformations. The study of symmetry classes of plane partitions has proven very rich, revealing unexpected connections between several areas, including statistical mechanics, the representation theory of quantum groups, alternating sign matrices, and lozenge tilings.

By 1995, mathematicians had proven formulas enumerating all symmetry classes of plane partitions---all, that is, except for one, known as q-TSPP. A formula for q-TSPP had been conjectured in the early 1980s by two mathematicians, George Andrews and David Robbins himself. The paper by Koutschan, Kauers, and Zeilberger, along with supporting computer files on Koutschan's website, finally established the correctness of this remaining conjectured formula.

The paper "is a tour de force of experimental mathematics," the prize citation says, calling it "a shining example" of the kind of work the Robbins Prize is meant to honor. "The conjecture itself was born from experimental observations, and the proof involved the development of new experimental mathematical techniques that are sure to solve many problems."

The prize-winning paper is available on Koutschan's website.

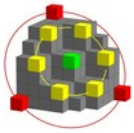

Image: A three-dimensional picture of a plane partition, courtesy of Christoph Koutschan.

Presented every three years, the Robbins Prize recognizes a paper published within the past six years that presents novel research in algebra, combinatorics, or discrete mathematics and that has a significant experimental component. The prize will be presented on Thursday, January 7, 2016, at the Joint Mathematics Meetings in Seattle.

Find out more about AMS prizes and awards.

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