P. Haxell, Krieger-Nelson Prize

The Krieger-Nelson Prize recognizes outstanding research by a female mathematician.

Dr. Penny E. Haxell works in Combinatorics and Graph Theory, focussing on combinatorial, probabilistic and, more recently, topological tools in a very fascinating manner. In all her work she exhibits impressive capability, originality and technical ability, and her pioneering work is well known internationally.

Her work in 1995 with Kohayakawa and Luczak, led to a profound study of Szemeredi's lemma in a sparse setting, and their methods are still being developed fruitfully by others.

Shortly thereafter, she gave an ingenious proof of a conjecture of Aharoni. This led to a collaboration that culminated in a beautiful and celebrated paper applying topological ideas to give a simple sufficient condition for a system of distinct representatives in a hypergraph family. The work has already found manifold applications.

The Haxell-Ro"dl Theorem, published in 2001, asserts that an optimal fractional packing of one graph into another can be converted into an actual packing that is more or less as good. It can facilitate the proof of a stability, or structural, result without the need for a pre-existing extremal theorem, from which it may then be possible to recover the extremal theorem itself. This line of research is very new, with great potential and prospects.

One of her latest papers gives a proof that the strong chromatic number of a graph is at most three times the maximum degree. This is a direction of research in which Alon's ten-year-old result was the previous best but, whereas Alon's approach was probabilistic, Haxell's is a lovely demonstration of traditional graph theory.

Dr. Haxell received a B. Math.Honours from the University of Waterloo in 1988 and was awarded the University of Waterloo Alumni Association Gold Medal for highest academic achievement in the Faculty of Mathematics. She received her Ph.D., supervised by Bela Bollobas, from the University of Cambridge in 1993. She has been a member of the Department of Combinatorics and Optimization, University of Waterloo, since 1993, rising to rank of Full Professor in 2004. In 2002, she was a Visiting Professor at Bell Laboratories, Lucent Technologies, New Jersey.

She received an NSERC Women's Award from 1993 to 1998, and an Ontario Premier's Research Excellence Award from 2001 to 2006. Dr. Haxell is a managing editor of the Journal of Combinatorial Theory (Series B), widely regarded as the best in the subject. She has been active in the organization of international conferences and seminars. From 1997 to 2001, she served on the Board of Directors of the Canadian Mathematical Society.

Dr. Penny Haxell will present the 2006 Krieger-Nelson Prize Lecture at the CMS 2006 Summer Meeting hosted by the University of Calgary in June 2006.