Distinguished Paper Awards for ISSAC 2002

Emil Volcheck, SIGSAM Chair
Manuel Bronstein, SIGSAM Vice-Chair

SIGSAM established the ISSAC Distinguished Paper awards to recognize excellent work presented at ISSAC and to reward the authors. We have written citations that describe the achievements of the authors in a way that we hope can be understood by non-specialists, and for this we have two goals in mind: first, to explain to a department chair or supervisor why the author received an award, and second, to communicate progress and excitement in the field of computer algebra to the greater scientific community. Each award, for both distinguished papers and student authors, carried a prize of USD 500. To read more about these awards, visit http://acm.org/sigsam/ISSAC_Awards/. Here we give the citations for 2002; for reasons of space, the citations for 2003 (Wayne Eberly, Zhonggang Zeng) will be published in the next issue of the Bulletin. The 2004 awards and citations will be published when available.

Multihomogeneous Resultant Matrices
Alicia Dickenstein and Ioannis Z. Emiris

Solving systems of polynomial equations is a significant challenge that lies at the heart of computer algebra and symbolic computation. Dickenstein and Emiris have made a substantial contribution towards the understanding of formulas, called resultants, that solve systems of polynomial equations efficiently. They have demonstrated how to explicitly compute such formulas in an important special case and have described conditions when such formulas are the best that can be attained. In this special case of multihomogeneous resultants, they have shown how a combinatorial construction can be made intrinsic.

For this contribution, ACM SIGSAM awards Professor Alicia Dickenstein and Professor Ioannis Z. Emiris the ISSAC 2002 Distinguished Paper Award.

High-Order Lifting
Arne Storjohann

Since the nineteenth century, mathematicians have studied matrices whose entries are numbers or polynomials in one variable. Both mathematicians and computer scientists are interested in solving equations involving matrices and in finding natural ways to discover the structure of matrices by converting them into certain “normal forms”. Storjohann has made a substantial contribution towards the development of symbolic matrix algorithms that efficiently solve equations and find normal forms of matrices of polynomials. His method of “High-Order Lifting” allows larger, complicated operations to be broken down into smaller steps that rely primarily on the simple yet efficient multiplication of matrices for the bulk of the work. His method improves theoretical estimates and practical performance of algorithms for these two problems as well as other applications.

For this contribution, ACM SIGSAM awards Professor Arne Storjohann the ISSAC 2002 Distinguished Paper Award.