

Mathematics People

Mathematics Student Wins Siemens Competition

For the second straight year, a high school mathematician has won the grand prize in the Siemens Competition in Math, Science, and Technology. The top honors for the 2006–2007 competition went to DMITRY VAINTROB, a senior at South Eugene High School in Eugene, Oregon. He won a US\$100,000 scholarship in the individual category.

Vaintrob's project, "The String Topology BV Algebra, Hochschild Cohomology, and the Goldman Bracket on Surfaces", involves the new mathematical field of string topology. Focusing on mathematical shapes, his work offers insights that are universal and applicable in any field. His research could provide knowledge that mathematicians and physicists might apply to help understand the

fundamental forces of nature: electricity, magnetism, and gravity.

"Mr. Vaintrob found a very beautiful formula for describing the way shapes combine in string theory," said competition judge Michael Hopkins of Harvard University. "His work is at the Ph.D. level, publishable and already attracting the attention of researchers."

Vaintrob was introduced to this topic of research by his mentor, Pavel Etingof of the Massachusetts Institute of Technology, who proposed a problem that came out of his own recent work. "It was an insanely difficult problem, which he solved within weeks and then came up with an important additional development," said Hopkins. "This brilliant young mathematician showed amazing maturity and perspective which would be surprising in a graduate student, let alone a high school senior."

Vaintrob is a volunteer in his high school library and in the mathematics library at the University of Oregon. He also organized the math club in his high school. He is a pianist and enjoys reading classical literature and memorizing poetry, a Russian tradition. He is fluent in Russian, French, and English. He plans a career teaching mathematics on the college level.

The Siemens Competition, a program of the Siemens Foundation, is administered by the College Board. The awards were presented by U.S. Secretary of Education Margaret Spellings.

—From a Siemens Competition announcement



Left to right: Bettina von Siemens; Dmitry Vaintrob; Secretary of Education Margaret Spellings; and George Nolen, president and CEO of Siemens Corporation. Photo courtesy of Siemens Corporation.

Lebowitz Receives Max Planck Medal

JOEL LEBOWITZ of the Center for Mathematical Sciences Research at Rutgers University has been awarded the Max Planck Medal of the German Physical Society (DPG).

Lebowitz is being honored for his life's work in statistical physics.

Lebowitz's work focuses on heat transport, magnetism, and hydrodynamics, among many other areas. He has also studied the "time's arrow" phenomenon, the question of why time always continues unstopably and why physical processes always take place in a single direction.

According to the award citation, Lebowitz was honored for "promoting new streams of physics and for his great enthusiasm in bringing several generations of scientists to the field," as well as for his important contributions to the statistical physics of equilibrium and nonequilibrium systems, especially his contributions to the theory of phase transitions, the dynamics of infinite systems, and stationary states in nonequilibrium.

The Max Planck Medal is awarded for outstanding achievements in the field of theoretical physics. Previous award winners include Max Planck, Albert Einstein, and Carl Friedrich von Weizsäcker.

—From a German Physical Society announcement

Prizes of the Mathematical Society of Japan

The Mathematical Society of Japan (MSJ) awarded a number of prizes in autumn 2006.

HIROSHI ISOZAKI of Tsukuba University was awarded the Autumn Prize for his contributions to the study of scattering theory and inverse problems, especially for his proof of the eigenfunction expansion theorem for 3-particle Schrödinger equations and for his approach to the inverse boundary value problems in Euclidean space based on hyperbolic geometry. The Autumn Prize is awarded to a mathematician who has made outstanding contributions within the preceding five years to mathematics in the highest and broadest sense.

TOSHIKI MABUCHI of Osaka University and TAKASHI SHIOYA of Tohoku University were awarded the Geometry Prizes. Mabuchi was recognized for his fundamental research work on the existence problem for Kähler-Einstein metrics, in particular his study of the so-called Mabuchi functional defined on the space of admissible Kähler metrics. Shioya was honored for his research work on the geometry of Alexandrov spaces, in particular his study of the singular set of these spaces when the curvature is bounded below, and for initiating a new direction in the theory of the Laplacian on these singular spaces.

The Analysis Prizes were awarded to NARUTAKA OZAWA and NAKAHIRO YOSHIDA, both of the University of Tokyo, and JUN KIGAMI of Kyoto University in recognition of their outstanding contributions in analysis. Ozawa was honored for a series of results on operator algebras arising from discrete groups and related topics, particularly his work on hyperbolic group von Neumann algebras and its applications. Yoshida was honored for his work on a theory of asymptotic expansion and statistical inference for stochastic processes and its applications. Kigami was honored for his

fundamental theory of analysis on fractals and for recent developments in resistance forms and local Nash inequalities.

The Takebe Senior Prize was awarded to MAKOTO NAKAMURA of Tohoku University for his study of initial boundary value problems for nonlinear hyperbolic equations. Takebe Junior Prizes were awarded to the following five mathematicians. TAKESHI KATSURA of Hokkaido University was honored for his study of topological dynamical systems and C^* -algebras. KENTARO SAJI of Hokkaido University received an award for his studies on geometry of fronts and their singularities. EIGE FUJIKAWA of Sophia University was honored for her study of dynamics of quasiconformal mapping class groups acting on infinite-dimensional Teichmüller spaces. TARO YOSHINO of Kyoto University was selected for his solution of the Lipsman conjecture and his study of discontinuous transformation groups on non-Riemannian homogeneous spaces. TERUYUKI YORIOKA of Shizuoka University was honored for his combinatorial investigation of the continuum. The Takebe Prizes were established to encourage young mathematicians in their research and are awarded to recipients chosen from nominations by members of the Mathematical Society of Japan.

—From a Mathematical Society of Japan announcement

Sofya Kovalevskaya Award Recipients Announced

Two mathematical scientists are among the twelve recipients of the Sofya Kovalevskaya Award of the Alexander von Humboldt Foundation of Germany for 2006.

OLGA HOLTZ of the University of California, Berkeley, works in numerical analysis, using both pure and applied mathematics to develop a method of matrix multiplication that, in the words of the prize citation, "should provide the solution to a multitude of computational calculations in science and engineering." She received her doctorate from the University of Wisconsin, Madison. Her primary research areas are numerical analysis and scientific computing, matrix and operator theory, approximation theory, orthogonal polynomials, wavelets, and splines. Her host institution for the Kovalevskaya Prize is Berlin Technical University.

BENJAMIN SCHLEIN of the University of California, Davis, received his doctoral degree from the Swiss Federal Institute of Technology (ETH). His work involves developing mathematical methods that will make it possible to derive simpler equations to describe the dynamics of macroscopic systems and creating a mathematical basis for assessing and developing further applications in quantum mechanics. His host institution for the Kovalevskaya Prize is the University of Munich.

The Kovalevskaya Prize is funded by the Federal Ministry of Education and Research of Germany. Recipients receive awards of up to €1.2 million (approximately US\$1,500,000), which allow them to concentrate on high-level, innovative research work in Germany, virtually

without administrative constraints, and which give them the ability to finance their own work groups at German universities and research institutes of their choice for up to four years.

—From a Humboldt Foundation announcement

Rhodes Scholarships Awarded

Two students in the mathematical sciences are among the thirty-two American men and women who have been selected as Rhodes Scholars by the Rhodes Scholarship Trust. The Rhodes Scholars were chosen from among 896 applicants who were endorsed by 340 different colleges and universities in a nationwide competition. The names and brief biographies of the mathematics scholars follow.

MICHELLE M. SIKES of Lakewood, Ohio, is a senior at Wake Forest University, where she majors in mathematical economics. She is captain of the Wake Forest track and cross-country teams and is an NCAA All-American. Michelle has done comparative research in organ donation systems. She plans to study for an M.Sc. in global health science at Oxford University.

AVI FELLER of Scottsdale, Arizona, is a senior at Yale University majoring in political science and applied mathematics. He has interned at the State Department in international environmental policy and has done research on comparative welfare and health care policies. Avi has also sung leading roles in four operas, is the president of the Yale Alley Cats, an a capella group, and is a soloist in the Yale Collegium Musicum. At Oxford he plans to study for an M.Sc. in applied statistics.

Rhodes Scholarships provide two or three years of study at the University of Oxford in England. The value of the Rhodes Scholarship varies depending on the academic field, the degree (bachelor's, master's, doctoral), and the Oxford college chosen. The Rhodes Trust pays all college and university fees and provides a stipend to cover students' necessary expenses while they are in residence in Oxford, as well as during vacations, and transportation to and from England. The total value averages approximately US\$40,000 per year.

—From a Rhodes Scholarship Trust announcement

AAAS Fellows Chosen

Four mathematicians have been elected as new fellows to the Section on Mathematics of the American Association for the Advancement of Science (AAAS). The new fellows are: **AMY COHEN**, Rutgers University; **EVANS M. HARRELL II**, Georgia Institute of Technology; **WARREN PAGE**, Yeshiva University; and **ALAN S. PERELSON**, Los Alamos National Laboratory.

—From an AAAS announcement



**IMA INSTITUTE FOR MATHEMATICS
AND ITS APPLICATIONS**

New Directions Short Course

**Compressive Sampling and Frontiers in Signal Processing
June 4 -15, 2007**

Instructors: **Emmanuel J. Candes** (Caltech),
Ronald DeVore (U. South Carolina),
Richard Baraniuk (Rice University)

From June 4-15, 2007 the IMA will host an intensive short course on the emerging field of Compressive Sampling which overturns conventional wisdom to enable recovery of signals and images from what appears to be highly incomplete data. The course will efficiently provide researchers in math and related disciplines the basic knowledge prerequisite to undertake research in this exciting new area, which has many beautiful connections to diverse branches of mathematics including probability, optimization, Banach spaces, information theory, coding and statistics. The course will be limited to 25 participants, typically mathematics faculty, selected by application. All successful applicants will be funded for travel and local expenses.

For more information and to apply:
www.ima.umn.edu/2006-2007/ND6.4-15.07

Application deadline: April 1, 2007



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