

Mathematics People

Kohn Receives 2004 Bergman Prize

JOSEPH J. KOHN of Princeton University has been awarded the 2004 Stefan Bergman Prize. Established in 1988, the prize recognizes mathematical accomplishments in the areas of research in which Stefan Bergman worked. Kohn will receive one year's income from the prize fund, approximately \$22,000.

The previous Bergman Prize winners are: David W. Catlin (1989), Steven R. Bell and Ewa Ligocka (1991), Charles Fefferman (1992), Yum Tong Siu (1993), John Erik Fornæss (1994), Harold P. Boas and Emil J. Straube (1995), David E. Barrett and Michael Christ (1997), John P. D'Angelo (1999), Masatake Kuranishi (2000), László Lempert and Sidney Webster (2001), and M. Salah Baouendi and Linda Preiss Rothschild (2003). On the selection committee for the 2003 prize were John P. D'Angelo, John Erik Fornæss, and Yum Tong Siu (chair).

Citation

Joseph J. Kohn's work in partial differential equations (PDE) and several complex variables (SCV) has influenced countless researchers and has fostered an intense interaction between these subjects. Kohn is best known for his solution of the $\bar{\partial}$ -Neumann problem and the many subsequent developments for PDE and SCV. The $\bar{\partial}$ -Neumann problem was proposed by D. C. Spencer in the 1950s as a way of extending Hodge theory to open domains in complex manifolds. Although the system of partial differential equations (the Cauchy-Riemann equations) is elliptic, the boundary conditions are not; Kohn's solution for strongly pseudoconvex domains, given in 1962, introduced new and deep methods, including the so-called $\frac{1}{2}$ estimate.

Kohn's work soon led to the Kohn-Nirenberg theory of pseudodifferential operators and also to the study of the tangential Cauchy-Riemann equations initiated by Kohn and Rossi. Kohn also proved a global regularity result for the solution of the Cauchy-Riemann equations. In the early 1970s Kohn introduced subelliptic estimates for $\bar{\partial}$; the search for the right geometric conditions for these estimates led to the study of finite-type conditions for weakly pseudoconvex domains and eventually to deep connections between partial differential equations and the algebraic method of multiplier ideals.



Joseph J. Kohn

Kohn's paper in 1979 motivated Nadel's work on the application of multiplier ideal sheaves to the existence problem of Kähler-Einstein metrics on Fano manifolds, which led to the application of multiplier ideal sheaves to many problems in algebraic geometry, such as the Fujita conjecture, the invariance of the plurigenera, and the effective Nullstellensatz.

Kohn's work has provided an impetus to the study of the Bergman projection P and its many applications in regularity

for biholomorphic and proper mappings. Kohn's formula $P = I - \bar{\partial}^* N \bar{\partial}$ links the Bergman projection and the Neumann operator N , and this link has been instrumental in the work of several previous winners of the Bergman Prize.

Kohn has also made important contributions to microlocal analysis, to the complex Monge-Ampère equation, and to the study of hypoellipticity for second order operators.

Biographical Sketch

Joseph J. Kohn was born on May 18, 1932, in Prague. He received his B.A. from the Massachusetts Institute of Technology (1953) and his M.A. (1954) and Ph.D. (1956) from Princeton University. His thesis advisor was Donald C. Spencer.

Kohn was an instructor at Princeton University in 1956-57 before moving to Brandeis University, where he was on the faculty for ten years. In 1968 he assumed his present position as a professor at Princeton University. He has held visiting positions at the Courant Institute of Mathematical Sciences of New York University, the Institute for Advanced Study in Princeton, Harvard University, the Institut des Hautes Études Scientifiques, Charles University of Prague, the University of Florence, the University of Buenos Aires, and the University of Mexico. His many professional activities include serving on the AMS Board of Trustees (1972-82) and on the U.S. National Committee for Mathematics (2000-04).

Kohn is the recipient of a Sloan Fellowship and a Guggenheim Fellowship. He was elected a fellow of the American Academy of Arts and Sciences and a member of the U. S. National Academy of Sciences. In 1966 he was an invited speaker at the International Congress of Mathematicians. He was awarded the 1979 AMS Steele Prize for a Seminal Contribution to Research. He received an honorary doctorate from the University of Bologna and the Bolzano Medal of the Czechoslovak Mathematics and Physics Society in 1990. In 1993 he was awarded the First Order Prize of the Union of Czech Mathematicians and Physicists.

About the Prize

The Bergman Prize honors the memory of Stefan Bergman, best known for his research in several complex variables, as well as the Bergman projection and the Bergman kernel function that bear his name. A native of Poland, he taught at Stanford University for many years and died in 1977 at the age of eighty-two. He was an AMS member for thirty-five years. When his wife died, the terms of her will stipulated that funds should go toward a special prize in her husband's honor.

The AMS was asked by Wells Fargo Bank of California, the managers of the Bergman Trust, to assemble a committee to select recipients of the prize. In addition, the Society assisted Wells Fargo in interpreting the terms of the will to assure sufficient breadth in the mathematical areas in which the prize may be given. Awards are made every one or two years in the following areas: (1) the theory of the kernel function and its applications in real and complex analysis, and (2) function-theoretic methods in the theory of partial differential equations of elliptic type with attention to Bergman's operator method.

—Allyn Jackson

Nemirovski and Todd Awarded von Neumann Prize

The 2003 John von Neumann Theory Prize, the highest prize given in the field of operations research and management science, has been awarded to ARKADI NEMIROVSKI of the Technion-Israel Institute of Technology and MICHAEL J. TODD of Cornell University for their "seminal and profound" contributions to continuous optimization. The award, presented by the Institute for Operations Research and the Management Sciences (INFORMS), carries a cash award of \$5,000.

The citation for Nemirovski reads in part, "Arkadi Nemirovski has made fundamental contributions in continuous optimization in the last thirty years that have significantly shaped the field. He developed (with D. Yudin) the theory of information-based complexity for convex optimization underlying the majority of modern results on efficient solvability of well-structured convex problems." He has also done "groundbreaking work in the theory and algorithmic implementation of interior-point polynomial-time methods for convex optimization."

The citation for Todd states that he "has made fundamental contributions in a variety of different theoretical domains in continuous optimization" and "developed new triangulations for fixed-point algorithms and developed the critical measure of efficiency of triangulations (average directional density); in addition he made important contributions to combinatorial and pivot theory for fixed-point methods and related mathematical structures." It further states that his work "defined new and critical ways of thinking about the underlying theory of optimization, established the important issues in the field, and explored a variety of mathematical themes and algorithmic concepts."

—From an INFORMS announcement

Prizes and Elections of the French Academy of Sciences

The French Academy of Sciences has announced the awarding of several prizes in mathematics for 2003. CLAIRE VOISIN, Université Pierre et Marie Curie, has been awarded the Prix Sophie Germain. LOUIS BOUTET DE MONVEL, Université Pierre et Marie Curie, received the Prix Fondé par l'État. The Prix Jacques Herbrand was awarded to WENDELIN WERNER, Université Paris-Sud. CLAUDE BARDOS, Université Paris VII, was awarded the Prix Marcel Dassault. GILLES LEBEAU, Université de Nice Sophia-Antipolis, received the Prix Ampère de l'Électricité de France. The Prix Gabrielle Sand et M. Guido Triossi was awarded to DAMIEN GABORIAU, Centre National de la Recherche Scientifique. JEAN-MARC DELORT, Université Paris Nord, received the Prix Langevin.

Three mathematicians were elected to the French Academy of Sciences in 2003. They are THIERRY AUBIN, Université de Paris 6; LAURENT LAFFORGUE, Institut des Hautes Études Scientifiques; and MARC YOR, Université de Paris 6.

—From French Academy of Sciences announcements

Rhodes Scholarships Awarded

Six students of mathematics are among the thirty-two American men and women chosen as Rhodes Scholars by the Rhodes Scholarship Trust. The Rhodes Scholars were chosen from 963 applicants who were endorsed by 366 colleges and universities in a nationwide competition. The names and brief biographies of the mathematics scholars follow.

OLIVIA RISSLAND of Belmont, Massachusetts, is a senior at Brown University majoring in biology, mathematics, and Latin. She is the editor of the Brown classics journal and has gained distinction in the classics, as well as in mathematics and science. She is a radio disc jockey, coxswain in a boat club, and a black belt in karate. She plans a career in medicine and will work on a doctorate in biology at Oxford.

DELAVANE DIAZ of Tampa, Florida, is a senior astronomical engineering major at the United States Air Force Academy with a minor in Spanish. She is wing commander with responsibility for 4,000 cadets, the second woman ever to hold this top position at the academy. She was named the most valuable player for two years on the academy's varsity volleyball team. She plans to work on an M.Sc. in mathematical modeling and scientific computing at Oxford.

ROBIN M. ROTMAN of Lake Bluff, Illinois, is a senior at the University of the South, where she majors in geology with minors in environmental studies and mathematics. She has won research internships at both the National Science Foundation and the Environmental Protection Agency. She is also treasurer of the Sewanee student body. At Oxford she plans to work toward an M.Sc. in geology.

ALLISON GILMORE of Eagan, Minnesota, is a senior at Washington University in St. Louis, where she will receive both her B.A. and M.A. in mathematics. A Byrd Scholar and a Compton Scholar, she has particular interest in algebraic topology. Allison is also president of Washington University Students for a Sensible Drug Policy and is a leader of her campus Stop-the-War coalition. She plans to work toward an M.Phil. in sociology at Oxford.

DECKER WALKER of Lafayette, Indiana, is a senior at St. Olaf College, where he majors in mathematics and economics. As a Goldwater Scholar, he worked in Zambia on African development, and his work is to be published. Decker plays varsity football and indoor and outdoor track and field. He spent his junior year at Oxford University, where he won blues in both track and field and basketball. He plans to work on a doctorate in economics at Oxford.

LARA B. ANDERSON of North Logan, Utah, was a double major in physics and mathematics at Utah State University. She graduated first in her class and is currently working on a master's degree. She is a violinist and a black belt in aikido. Lara will work on a doctorate in mathematical physics at Oxford.

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 (B.A., 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 \$30,000 per year.

—From a Rhodes Scholarship Trust announcement

Young Mathematicians Honored in Siemens Westinghouse Competition

Four young mathematics scholars have been awarded prizes in the 2003–2004 Siemens Westinghouse Competition in Math, Science, and Technology. LINDA WESTRICK of Maggie Walker Governor's School in Richmond, Virginia,

won a \$40,000 scholarship for her project "Investigations of the Number Derivative". The number derivative is closely linked with the prime numbers and calculus. Westrick discovered many "surprising and beautiful" patterns produced by the derivative.

The team of ARACELI FERNANDEZ of Harlandale Senior High School, San Antonio, Texas; YIDUO "DAVID" WANG of Lincoln High School, Portland, Oregon; and HANNAH CHUNG of Lyndon B. Johnson High School, Austin, Texas, were honored for their joint project, titled "Eccentric Graphs of Block Graphs and Trees". The project consists of mathematical proofs that explore the structure and properties of eccentric graphs that can be constructed from block graphs and trees. The prize carries a \$10,000 scholarship award.

The annual competition, administered by the College Board and funded by the Siemens Foundation, recognizes outstanding talent among high school students in science, mathematics, and technology.

—From a Siemens Foundation announcement

European Mathematical Society Article Competition 2003

The European Mathematical Society (EMS), through its Committee for Raising Public Awareness of Mathematics (RPA), has announced the winners of its first competition for articles published in the general press that seek to present mathematics in interesting ways for the general public. The articles were published in the authors' home countries. They could be in any language that could be read by more than one member of the committee.

First prize was awarded to NUNO CRATO, Universidade Técnica de Lisboa, Portugal, for a three-part article, "Cibersegredos invioláveis" ("Unbreakable cybersecrets"), published in the Portuguese weekly newspaper *Expresso*, September 8, 22, and 29, 2001.

Second prize was given to F. THOMAS BRUSS, Université Libre de Bruxelles, Belgium, for his article "Der Ungewissheit ein Schnippchen schlagen" ("Playing a Trick on Uncertainty"), published in the magazine *Spektrum der Wissenschaft*, June 6, 2000, and for a similar article in the daily German newspaper *Die Welt*, May 17, 2001.

Third prize went to SAVA GROZDEV, IVAN DERZHANSKI, and EVGENIA SENDOVA, Union of Bulgarian Mathematicians, for the article titled "For Those Who Think Mathematics Dreary", published in the Bulgarian daily newspaper *Dnevnik*, December 27, 2001.

The RPA committee which awarded the prizes consisted of Chris J. Budd, Mireille Chaleyat-Maurel, Michele Emmer, Andreas Frommer, Vagn Lundsgaard Hansen (chair), Osmo Pekonen, José Francisco Rodrigues, and Marta Sanz-Solé. For further information, including links to the prizewinning articles, see the website <http://www.mat.dtu.dk/people/V.L.Hansen/rpa/resultartcomp.html>.

—From an EMS announcement