Connes Receives 2001 Crafoord Prize

Alain Connes

The Royal Swedish Academy of Sciences will award the 2001 Crafoord Prize in mathematics to ALAIN CONNES of the Institut des Hautes Études Scientifiques and the Collège de France, Paris, for his penetrating work on the theory of operator algebras and for having been a founder of noncommutative geometry.

Alain Connes is counted among the world's foremost mathematicians. For his work in operator algebras, Connes received the Fields Medal in 1983. Noncommutative geometry is a new field of mathematics, and Connes played a decisive role in its creation. His work has also provided powerful new methods for treating renormalization theory and the standard model of quantum and particle physics. He has demonstrated that these new mathematical tools can be used for understanding and attacking the Riemann Hypothesis.

Alain Connes was born in Draguignan, France, on April 1, 1947. He attended the École Normale Supérieure in Paris during 1966–70. Since 1979 he has held the Léon Motchane Professorship at the Institut des Hautes Études Scientifiques in Bures-sur-Yvette, outside Paris, and since 1984 he has also held a professorship in analysis and geometry at the Collège de France in Paris. He is a member of many scientific academies, including the Académie des Sciences de Paris and the National Academy of Sciences of the U.S.

The 2001 Crafoord Prize will be presented by the King of Sweden on September 26, 2001, at a ceremony at the Royal Swedish Academy of Sciences in Stockholm. The prize consists of a gold medal and US$500,000.

The Anna-Greta and Holger Crafoord Foundation was established in 1980 for promoting basic research in mathematics, astronomy, the biosciences (particularly ecology), the geosciences, and polyarthritis (joint rheumatism). Previous laureates in mathematics are Vladimir I. Arnold and Louis Nirenberg (1982), Pierre Deligne and Alexandre Grothendieck (1988) (Grothendieck declined the prize), and Simon Donaldson and Shing-Tung Yau (1994).

—From a Royal Swedish Academy news release

Arnold and Shelah Receive 2001 Wolf Prize

The 2001 Wolf Prize in Mathematics has been awarded to VLADIMIR I. ARNOLD of the Steklov Mathematical Institute, Moscow, and the Université de Paris-Dauphine, and to SAHARON SHELAH of the Hebrew University of Jerusalem. Arnold is honored "for his deep and influential work in a multitude of areas of mathematics, including dynamical systems, differential equations, and singularity theory." Shelah is honored "for his many fundamental contributions to mathematical logic and set theory and their applications within other parts of mathematics." The two share the $100,000 prize.

Vladimir I. Arnold

Saharon Shelah

Vladimir I. Arnold

Vladimir I. Arnold has made significant contributions to a large number of different mathematical disciplines. His many research papers, books, and lectures, plus his enormous erudition and enthusiasm, have had a profound influence on an entire generation of mathematicians. Arnold's Ph.D. thesis contained a solution to Hilbert's 13th problem. His work on Hamiltonian dynamics, which includes cocreation of KAM (Kolmogorov-Arnold-Moser) theory and the discovery of "Arnold diffusion", made him world famous at an early age. Arnold's contributions to the theory of singularities complement Thom's catastrophe theory and have transformed this field. Arnold has also made innumerable and fundamental contributions to the theory of differential equations, symplectic geometry, real algebraic geometry, the calculus of variations, hydrodynamics, and magneto-hydrodynamics. He has often discovered links between problems in diverse areas.

Arnold was born in 1937 in Odessa, Russia. He received his B.Sc. (1954), his M.Sc. (1959), his Ph.D. (1961), and his D.Sc. (1963) all from Moscow State University. He held positions at that institution until 1986, when he became a professor at the Steklov Mathematical Institute, a position he currently holds. In 1993 he also assumed his other current position as professor at the Université de Paris-Dauphine. His previous honors include the Prize for Young Mathematicians of the Moscow Mathematical Society (1958), the Lenin Prize (1965, shared with A. N. Kolmogorov), the Crafoord Prize of the Royal Swedish Academy of Sciences (1982, shared with Louis Nirenberg), the Lobachevski Prize of the Russian Academy of Sciences (1992), and the Harvey Prize (1994). He is a member of the Russian Academy of Sciences, the Russian Academy of Natural Sciences, the U.S. National Academy of Sciences, the American Academy of Arts and Sciences, the American Philosophical Society, the

Académie des Sciences de Paris, the Royal Society of London, the Accademia dei Lincei, and the Academia Europaea. He is also an honorary member of the London Mathematical Society.

Saharon Shelah

Saharon Shelah has for many years been the leading mathematician in the foundations of mathematics and mathematical logic. His staggering output of 700 papers and half a dozen monographs includes the creation of several entirely new theories that changed the course of model theory and modern set theory and also provided the tools to settle old problems from many other branches of mathematics, including group theory, topology, measure theory, Banach spaces, and combinatorics. Shelah created a number of subfields of set theory, most notably the theory of proper forcing and the theory of possible cofinalities, which is a remarkable refinement of the notion of cardinality and which led to proofs of definite statements in areas previously considered far beyond the limits of undecidability. His work on set theoretic algebra and its applications showed that many parts of algebra involve phenomena that are not controlled by universally recognized axioms of set theory. In model theory he carried through a monumental program of deep structural analysis known as "stability theory", which now dominates a large part of the field.

Shelah was born in 1945 in Jerusalem, Israel. He received his B.Sc. (1964) from Tel Aviv University and his M.Sc. (1967) and Ph.D. (1969) from the Hebrew University of Jerusalem. He held positions at Princeton University (1969–70) and the University of California, Los Angeles (1970–71), before returning to the Hebrew University of Jerusalem, where he is currently a professor. Since 1986 he has also been a Distinguished Visiting Professor at Rutgers University. His previous honors include the Erdős Prize (1977), the Rothschild Prize (1982), the C. Karp Prize of the Association for Symbolic Logic (1983), the George Pólya Prize of the Society for Industrial and Applied Mathematics (1992), the Israel Prize for Mathematical Research (1998), the Japanese Association of Mathematical Sciences Prize (1999), and the János Bolyai Prize of the Hungarian Academy of Sciences (2000). He is a member of the Israel Academy of Sciences and Humanities and is an honorary member of the American Academy of Arts and Sciences.

About the Wolf Prize

The Wolf Foundation was established by the late German-born inventor, diplomat, and philanthropist Ricardo Wolf (1887–1981). A resident of Cuba for many years, he became Fidel Castro's ambassador to Israel and held this position until 1973, when Cuba severed diplomatic ties. Wolf decided then to stay on in Israel, where he lived until his death in 1981.

Five annual Wolf Prizes have been awarded since 1978 to outstanding scientists and artists "for achievements in the interest of mankind and friendly relations among peoples, irrespective of nationality, race, color, religion, sex, or political view." The prizes of $100,000 apiece are given every year in four out of five scientific fields in rotation: agriculture, chemistry, mathematics, medicine, and physics. The arts prize rotates among architecture, music, painting, and sculpture. The prize jury in each field is formed by three members: one from the United States, one from Europe, and one from Israel. New juries are appointed each year. The Wolf Foundation does not disclose the names of the jury members in order to allow them to make their decisions exclusively on the basis of the candidates' achievements.

—*Allyn Jackson*

2001 JPBM
Communications Award

The Joint Policy Board for Mathematics (JPBM) Communications Award was established in 1988 to reward and encourage journalists and other communicators who, on a sustained basis, bring accurate mathematical information to nonmathematical audiences. The 2001 award was presented to KEITH J. DEVLIN at the Joint Mathematics Meetings in New Orleans in January 2001. What follows is the citation for the award, a biographical sketch, and a response from Devlin upon receiving the award.

Citation

The Joint Policy Board for Mathematics presents its 2001 Communications Award to Dr. Keith Devlin for his many contributions to public understanding of mathematics through great numbers of radio and television appearances; public talks; books; and articles in magazines, newsletters, newspapers, journals, and online. For more than seventeen years, Dr. Devlin's expository powers have furthered an appreciation for the mathematical enterprise. Dr. Devlin generates excitement for mathematical ideas without sacrificing accuracy. He is a regular correspondent on Scott Simon's *Weekend Edition* on National Public Radio, and he regularly appears on radio and television in the United Kingdom. It is most extraordinary for any newspaper, especially a major newspaper, to have a regular column on mathematics. Yet Dr. Devlin's column is a regular feature of the *Manchester Guardian* (England). Of twenty-two books he has written, eleven are devoted to the popular exposition of mathematics. He even wrote a mathematically inspired radio play. Keith can be provocative; he is well known for writing such pieces as editor of *Focus*, the newsletter of the Mathemat-

ical Association of America. We recognize Keith for a preponderance of highly public and very popular work that covers a broad spectrum of topics and has been delivered through a variety of media to a worldwide audience.

Keith J. Devlin

Biographical Sketch

Keith Devlin is dean of the School of Science at Saint Mary's College in Moraga, California, and a senior researcher at the Center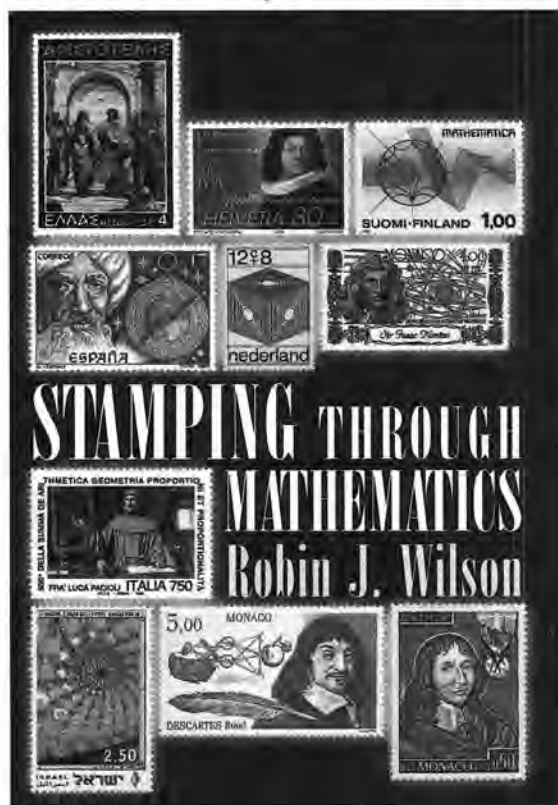 for the Study of Language and Information at Stanford University. His current research work is centered on the application of mathematical techniques to issues of language and information and the design of information systems. He is a member of the Mathematical Sciences Education Board of the National Academy of Sciences and a fellow of the American Association for the Advancement of Science. He is the author of twenty-two books, ranging from research monographs to textbooks to books aimed at a general audience. He has also written over sixty-five published research articles.

Devlin writes a monthly column, "Devlin's Angle", on the Web journal *MAA Online* and is a regular contributor to the National Public Radio program *Weekend Edition*. He also contributes to various other local and national radio programs in the U.S. and Britain, commenting on advances in mathematics and computing. In addition, he has worked on and appeared in a number of

television programs, including *Life by the Numbers*, a six-part series broadcast on the Public Broadcasting System (PBS) in 1998, and *GED Connections*, a 13-part series aimed at the adult mathematics learner, to be broadcast by PBS in 2001. His most recent book for a general audience is *The Math Gene: How Mathematical Thinking Evolved and Why Numbers Are Like Gossip* (Basic Books, 2000; reviewed in the *Notices*, February 2001).

Response

How did I get into this situation? In late March 1983, on the spur of the moment, I dashed off a spoof mathematics article for publication as an April Fool's joke in the British newspaper *The Guardian*. (The spoof was that the mathematics described was correct, although hardly anyone would believe it and would assume it was a fake April 1 spoof!) *The Guardian* didn't publish it, but the editor called to say he liked my style and invited me to send in other pieces. I did, readers liked them, and by the end of the year I had a regular, 750-word math column that ran every two weeks. Unplanned, I found myself a "math popularizer". Being a sucker for flattery, when people said they liked my popular writing, I kept on doing it after I moved to the United States in 1987. The following year my first "popular math book" was published by Penguin Books: *Mathematics: The New Golden Age*.

Despite its accidental beginnings, my side-career as a communicator of mathematics has developed into something I now take great pride in and like to think has value. Certainly, I devote a great deal of time and effort to it. Thus, being awarded the JPBM Communications Award means a great deal to me. My sincere thanks to all concerned, not just to my colleagues at JPBM and in the mathematics profession in general, but to Tim Radford, my editor at *The Guardian*, who encouraged me in the early days and has become a good, lifelong friend; to the other newspaper, magazine, and book editors who have taught me—and continue to teach me—how to reach a wider audience; and to Scott Simon, host of NPR's *Weekend Edition*, and the program's senior producer, Ken Hom, for having the courage to allow me onto their show at regular intervals, where Scott and I can use mathematics to warm up the audience for *Car Talk*.

—From a JPBM announcement

MAA Awards Presented in New Orleans

At the Joint Mathematics Meetings in New Orleans in January 2001, the Mathematical Association of America (MAA) presented several prizes and awards.

Haimo Awards for Distinguished Teaching

The Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics honor teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions. Deborah Tepper Haimo was president of the MAA during 1991–92.

The 2001 Haimo Awards were presented to EDWARD B. BURGER of Williams College, EVELYN SILVIA of the University of California, Davis, and LEONARD F. KLOSINSKI of Santa Clara University.

"Edward Burger possesses two great talents: he is a marvelous teacher and an exceptional lecturer and speaker," the citation says. "He inspires students with his enthusiasm for mathematics and his ability to make it interesting, even fun." Known as an engaging speaker, Burger has given conference talks, presented popular lectures, and appeared on television and radio. The citation calls him "an inspiring teacher" and "an ambassador of mathematics."

"Evelyn Silvia is the consummate teacher, whose hallmarks are complete dedication to the education of her students; the ability to make difficult concepts comprehensible; great energy; and personal qualities of integrity, helpfulness, and caring," the citation says. Silvia has taught all levels of mathematics, from grade school to graduate school, and has served as a role model for teachers at the high school and university levels. The citation speaks of her "remarkable dedication to teaching and great success in all of its aspects."

"Leonard Klosinski is well known for his invaluable contribution to mathematics teaching through his capable administration of the William Lowell Putnam Mathematical Competition during the last twenty-two years," the citation says. Under his leadership the number of contestants in the Putnam Competition has remained constant, or even increased slightly, despite a drop in the number of mathematics majors. He is also an enormously popular teacher known for challenging courses that have inspired a loyal following of students.

Chauvenet Prize

The Chauvenet Prize for expository writing, first awarded in 1925 to Gilbert Bliss of the University of Chicago, is given for an outstanding expository article on a mathematical topic by a member of the MAA. The prize is named for William Chauvenet, professor of mathematics at the U.S. Naval Academy, and was established through a gift in 1925 from J. L. Coolidge, then MAA president.

The 2001 Chauvenet Prize was awarded to CAROLYN S. GORDON and DAVID L. WEBB for their article "You can't hear the shape of a drum" (*American Scientist*, January–February 1996, pages 46–55). The article describes work that answered a famous question raised by Mark Kac in a 1966 *American Mathematical Monthly* article entitled "Can one hear the shape of a drum?", which won him the Chauvenet Prize in 1968. The citation says that the Gordon-Webb article is "exciting, its mathematical

content understandable by anyone with a minimal knowledge of differential equations, group theory, and linear algebra; and it contains a great deal of historical information concerning what can be inferred about vibrating systems from their frequencies."

Gung and Hu Award for Distinguished Service

The Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics is the most prestigious award made by the MAA. The 2001 award was presented to MANUEL P. BERRIOZÁBAL of the University of Texas at San Antonio.

"Berriozábal is a mathematician, a college professor, and a visionary with the unusual talent to turn his visions into reality," the citation says. "The best example—and the one for which he has become most widely known—is the incredibly successful Prefreshman Engineering Program (PREP)." Formed in 1979 in San Antonio, PREP aims to identify and encourage high-achieving students in grades six through eleven who are potential engineers and scientists. The PREP program has expanded to other cities in Texas and has reached over 18,000 students, 81 percent of them minorities and 54 percent of them women. A 1999 study showed that 92 percent of these students entered college, and of those, 90 percent completed college and 53 percent majored in science or engineering. In 1997 Berriozábal's achievements were recognized by the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. The citation for the Gung and Hu Award concludes by recognizing "his extraordinary contributions to the mathematical community and...the vision that has benefited thousands of youth with potential to excel in mathematics, science, and engineering."

Certificates of Meritorious Service

Each year the MAA presents Certificates of Meritorious Service to recognize service to the MAA at the national level or service to an MAA section. Honored with certificates for 2001 were: CARL LEINBACH of Gettysburg College, BERNARD SOHMER of City College of the City University of New York, RALPH W. CARR of St. Cloud University, KENNETH A. ROSS of the University of Oregon, and JOANNE PEEPLES of El Paso Community College.

—From MAA announcements

AWM Awards Presented in New Orleans

At the Joint Mathematics Meetings in New Orleans in January 2001, the Association for Women in Mathematics (AWM) awarded the Alice T. Schafer Prize and the Louise Hay Award.

Schafer Prize

The annual Alice T. Schafer Prize recognizes excellent achievement in mathematics by an undergraduate woman. The prize is named for former AWM president and one of its founding members, Alice T. Schafer, professor emerita of Wellesley College, who has contributed a great deal to women in mathematics throughout her career.

The AWM awarded the 2001 Schafer Prize to JACLYN (KOHLES) ANDERSON, a senior mathematics major at the University of Nebraska at Lincoln. Anderson has written two research papers that grew out of her participation in summer programs for undergraduates in mathematics. She has also taken many graduate-level courses and served as a teaching assistant for honors calculus courses. Last year she received an honorable mention for the Schafer Prize. The citation includes the following quotations from her professors: her work "far surpassed that of the rest of the students," including graduate students; she is "the most talented undergraduate I have encountered in my 33 years of college teaching"; and she is "a bona fide star" with "impressive talent, drive, and enthusiasm for mathematics."

Hay Award

The annual Louise Hay Award for Contributions to Mathematics Education recognizes outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The award honors the memory of Louise Hay of the University of Illinois at Chicago.

The AWM presented the 2001 Hay Award to PATRICIA D. SHURE of the University of Michigan in Ann Arbor. Each fall term at Michigan there are over 120 sections of the mainstream precalculus and calculus courses, requiring about 115 instructors (graduate students, new assistant professors, and visitors). Because around half of the instructors are unfamiliar with Michigan's mathematics program, Shure developed a successful training program called the Professional Development Program. The material she developed for the program has been published and has been used to train instructors elsewhere in the U.S. and in Canada. In addition, she ran a program to support underrepresented minority students in mathematics, and she has worked throughout her career to attract young women into mathematics. Since the early 1960s Shure has been involved in curriculum reform. At Michigan she worked on a project to design and evaluate ways to incorporate graphing calculators, writing, cooperative learning, and systematic testing of symbolic skills into first-year undergraduate mathematics courses. The citation for Shure concludes by noting Shure's "tireless commitment to improving mathematics education for countless students. Her professional contributions along with her personal commitment to improving mathematics education are noteworthy."

—From AWM announcements