For Your Information

AMS President Arthur Jaffe, Congressman George Brown Jr., and AMS President-elect Felix Browder at the Capitol Hill briefing.

Capitol Hill Briefing Draws a Crowd

Encouraged by the success of a pilot event held last year, the AMS Washington Office organized its second annual lunch briefing for members of Congress and staff on March 4, 1998, in the Rayburn Building on Capitol Hill.

A crowd even larger than last year's showed up to hear Carl Pomerance of the University of Georgia speak on "Eavesdropping on the Internet: Mathematics and Policy". Fields Medalist Efim Zelmanov of Yale University introduced the talk by Pomerance, and AMS President Arthur Jaffe acted as master of ceremonies.

Because this topic is related to some important policy issues facing Congress, the event attracted almost ninety attendees. Most were congressional staffers with responsibility for handling science/technology issues, but also in attendance were three champions of science on Capitol Hill: Congressmen James Sensenbrenner (chair of the House Science Committee), Vernon Ehlers (head of the House Science Policy Study), and George Brown Jr. (ranking Democrat on the House Science Committee). The three congressmen each spoke briefly and thanked the AMS for sponsoring the briefing.

Pomerance presented a lively talk, suited to the audience of nonmathematicians. He started out by describing the problem of secure communications and the need for cryptography. Pointing to important advances during World War II, he discussed how cryptography has become a part of mathematics. He mentioned a number of current problems in cryptography and explained how some of these might be attacked using elliptic curves. One of the strongest points he made was that number theory, which was first developed because of its beauty, has now been shown to have extremely important applications.

"It was a very interesting experience," says Pomerance. "Once I got started talking, it was just like any talk, and I felt I could connect with the audience." Afterwards there were a number of questions, ranging from the very simple ("What is a 'bit'?") to ones that got into the controversial territory of export restrictions on products with strong cryptography.

According to AMS executive director John H. Ewing, "This was the most successful event of this type that the AMS has ever organized. Everything went perfectly—there was a good turnout, Zelmanov gave a wonderful introduction, and Pomerance did a great job with the talk."

Arthur Jaffe agreed. "This was a significant event that shows that the mathematical community can connect with the general public to demonstrate the impact that our field has on important issues facing the country. We showed that mathematics has a contribution to make, and I believe we left the audience with a very positive impression of the field."

—Allyn Jackson

AMS Adds New Reviews to MathSciNet

The AMS has announced that over 175,000 reviews that appeared in *Mathematical Reviews* during 1975–79 have recently been added to the MR database. Previously, only reviews going back to 1980 were available in electronic form.

The addition of these reviews marks a milestone in the Society's multiyear project to make available electronically full reviews from the early years of MR. When completed, the project will add over 500,000 reviews to the 800,000 that were in the MR database prior to the start of the project. All reviews in MR, going back to its first issue in 1940, will be accessible online by the summer of 1999.

Newly added reviews are now accessible to subscribers of MathSciNet, the Web delivery version of MR (`http://www.ams.org/mathscinet/`).

—from AMS News Release

New IAS Program in Theoretical Biology

The Institute for Advanced Study has announced that it will begin a new program in theoretical biology, to be headed by Martin Nowak, one of the world's leading researchers in this area. Nowak, presently professor of mathematical biology at Oxford University, will come to the Institute this fall to lead the research initiative. The program is made possible in part by a new initiatives fund at the Institute, established by Institute trustee Leon Levy, to provide greater flexibility in exploring promising new areas not already represented within the Institute.

The use of mathematical ideas, models, and techniques in the biosciences has been growing rapidly and becoming increasingly important. Applied mathematicians have traditionally used mathematical methods to address a wide range of problems in the physical sciences, especially physics and engineering, in the belief that the underlying laws of physics are of a precise nature and therefore capable of being described mathematically. Although mathematical biology actually began in the 1920s with the work of Fischer, Haldane and Wright in genetics, Lotka and Volterra in ecology, and Kermack and McKendrick in epidemiology, biology does not have the same mathematical/theoretical tradition as the physical sciences and instead has been more focused on laboratory work. However, several areas of biology have gradually developed an understanding of the important role that mathematical approaches can play. Such approaches are often in the hands of people who collaborate with experimentalists but do not themselves work in the laboratory.

"The Institute's new initiative is a tremendous opportunity for theoretical biology and an important recognition of the whole field," Nowak commented. "The main objective of the new program will be to undertake world-class research in diverse areas of mathematical biology, ranging from evolutionary biology and ecology to infectious diseases of humans. The emphasis will be on maintaining research collaborations with leading experimental groups, as mathematical theory in biology is usually at its best when in close conjunction with experimental data. Furthermore," Nowak continued, "there is the definitive chance to introduce bright young physicists and mathematicians to a scientific field which is full of open questions and unexplored areas."

The research goals of the new initiative will include work on the evolution and dynamics of infectious disease. The human immunodeficiency virus (HIV) will be an area of focus, because more quantitative data are available for HIV than for any other infectious disease. The research will include topics such as anti-viral treatment, viral population genetics, and the complex interaction between the virus and the immune system. A quantitative understanding of anti-HIV immune responses should greatly strengthen the research efforts for an HIV vaccine. Along similar lines, mathematical models will be developed to illuminate the dynamics of prion infections.

Other important research goals in the area of evolutionary biology will focus on the mathematical analysis of complex biological systems, such as the evolution of cooperation, development, and genetic systems. Evolution of cooperation based on direct and indirect reciprocity is crucial for understanding problems ranging from the interaction among genes and cells to the origin and integration of human societies. Of similar importance are mathematical models for the evolution of human language.

Among the IAS faculty who played important roles in developing the initiative are Frank Wilczek and Stephen Adler of the School of Natural Sciences and Thomas Spencer of the School of Mathematics. Four people have been invited to the Institute to work in the initiative: biologists David Krakauer and Dominik Wodarz, engineer Linda Wahl, and mathematician Alun Llyod.

Martin Nowak, who holds degrees in biochemistry and mathematics, was born in Austria and educated at the University of Vienna, where he received his Ph.D. with highest honors in 1989. He subsequently went to Oxford University, where he has worked closely for the past nine years with Professor Sir Robert May, now England's chief scientific advisor and head of the Office of Science and Technology, developing a wide variety of mathematical models to address a broad range of problems in evolutionary biology and infectious diseases. Since 1992 Nowak has been a Wellcome Trust Senior Research Fellow in Biomedical Sciences and a Fellow of Keble College, Oxford, becoming head of the Mathematical Biology Group in 1995 and professor of mathematical biology in 1997. He serves as an editor of a number of scientific journals and is the author or coauthor of over one hundred papers.

—from IAS News Release

Graduate Enrollments in Science and Engineering Continue Downward Move

Following fifteen years of consistent gains, graduate enrollments in science and engineering for 1996 declined for a third straight year, according to a newly published National Science Foundation (NSF) Data Brief.

NSF figures show that enrollment of women in graduate science and engineering (S&E) programs, which has been rising consistently since 1980, went up again by about 1 percent over the 12-month period ending in the fall of 1996. Meanwhile, graduate S&E enrollments for men, which started downward in 1992, continued its slide, down 3.3 percent from 1995 to 1996.

Another telling figure in the data brief is that for the 1995–96 period there was a drop of nearly 7,000 graduate enrollments in S&E among white men.

Overall there were more than 20,000 fewer S&E graduate enrollments from 1993 to 1996. Enrollments have declined consistently in the physical sciences (3 percent) and in engineering (4 percent).

The data brief is produced by NSF's Division of Science Resources Studies. For more information see `http://www.nsf.gov/sbe/srs/stats.htm`.

—NSF News Release

Science Board Approves Utah Graphics/Visualization Center

The National Science Board, the governing body of the National Science Foundation (NSF), has approved a 48-month grant worth almost $13 million for the Center for Graphics and Visualization at the University of Utah, an NSF Science and Technology Center.

The center is distributed among five universities: the Utah site, Brown, Cornell, CalTech, and the University of North Carolina at Chapel Hill. The center was established in 1991 and has received continued funding totalling nearly $28 million overall—nearly $21 million of that from NSF. The center has four core missions in computer graphics and scientific visualization: modeling, rendering, interaction, and performance.

Research in the four core areas is centered on two applications: telecollaboration and visualization. The center's telecollaboration research is directed at the pacing problem of remote design and manufacturing. This focus spans the entire center and includes the four core research areas as well as scene acquisition and reconstruction, and design of display devices.

—NSF