Four UCSD researchers awarded Sloan Research Fellowships

March 10, 1994

Media Contact: Warren Froelich, (619) 534-8564

FOUR UCSD RESEARCHERS AWARDED SLOAN RESEARCH FELLOWSHIPS

Four researchers at the University of California, San Diego are among 100 outstanding scientists and economists to receive Sloan Research Fellowships this year.

This year's awards, granted by the Alfred P. Sloan Foundation, went to the following UCSD faculty members: Kim Griest, assistant professor of physics; Michael Sailor, assistant professor of chemistry; Russell Impagliazzo, assistant professor of computer science and engineering; and Valerie Ramey, assistant professor of economics.

The fellows were selected from among hundreds of highly qualified scientists in the early stages of their careers based on their potential to contribute to the advancement of knowledge in their fields. Candidates for the fellowship are nominated by department chairmen or other senior scholars familiar with their talents, and selected by a committee of distinguished scholars.

Griest is studying dark matter to answer questions about the mass of the universe. While dark matter is considered the most common substance in the universe, no one knows its composition.

Griest's research covers particle dark matter and, more recently, dark matter in the form of black holes and brown dwarf stars. Griest and a team of 15 scientists in California and Australia perform a computer analysis of images and data for ten million stars a night to determine the effects of a star's appearance when dark matter is present.

Griest joined the UCSD faculty in July 1992 after completing post-doctoral work at the University of Chicago and the University of California, San Diego. He received his Ph.D. in physics from the University of California, Santa Cruz.

Sailor, who is finishing his fourth year at UCSD after earning his Ph.D. from Northwestern, has played an important role in the studies of luminescent porous silicon, conducting polymers and semi-conductor thin films. Among other things, he is interested in understanding the chemistry of the materials and their relevance to the electronics industry.

Much of his work is based on the discovery about four years ago that silicon, when sculpted into a forest of very thin pillars, emits an intense orange-yellow glow when stimulated by a laser. In his studies Sailor has explored ways to use porous silicon for long-term storage of holographic images on tiny chips by reflecting a rainbow of colors in white light and as an "inorganic tongue," capable of sensing or "tasting" a large array of molecules in gas, liquid, or biological systems. The chips also hold promise for even faster computers by using light to transmit through fiber optic cables, a process 10 times faster than electricity can move through wires.

Cryptography--a mathematical system that designs and deciphers codes--is a focus of Impagliazzo's research. The system is essential to control the flow of private information from one person or group to another, and is the

backbone for the security of complex computer systems. In essence, security relies on computationally intractable problems that cannot be solved with current technology. An example of such a problem is factoring numbers that are hundreds of decimals in length. Impagliazzo joined UCSD in 1991 after finishing his post-doctoral work in the computer science department of the University of Toronto.

Ramey's research revolves around the nature of business cycles. In her doctoral studies at Stanford University, she suggested that companies produce excess amounts of goods when the economy is booming, and then cut back dramatically during recessions. This "production-bunching" behavior, she wrote, can help explain why gross national product (GNP) widely fluctuates. In her work into the causes of business cycles, Ramey has studied how monetary policy impacts GNP. She uses statistical techniques to determine if monetary policy works by reducing the money supply or by reducing the supply of credit from banks. Finally, in joint work with George Borjas, an economics professor at UCSD, she presents a theoretical model and corroborating evidence linking the recent increase in wage inequality to U.S. imports of durable goods, such as automobiles and steel.

The Sloan Research Fellowship program was established in 1955 to encourage research young scholars at a critical time in their careers when other support is difficult to obtain. Since its creation, the Sloan Foundation has granted $66 million to more than 2,900 researchers, including 17 of whom went on to win Nobel prizes. This year, computer science researchers also were eligible for the award.

Fellows use their $30,000 over a two-year period to pursue lines of inquiry of most interest to them and to use the funds in a variety of ways to further their research aims. This flexibility is often of great value to young scientists who are at a pivotal stage in establishing their own independent research projects.

This year's fellows were selected from more than 400 candidates. Awards were granted to faculty members at 53 colleges and universities in the United States and Canada.

This article was written by Liz Pizza.

(March 10, 1994)