

Three year joint research program in nonlinear dynamics established between scientists from Gorky State and UCSD

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JOINT RESEARCH PROGRAM IN NONLINEAR DYNAMICS ESTABLISHED BETWEEN RESEARCHERS FROM GORKY STATE UNIVERSITY AND UCSD

A three-year joint research program in nonlinear dynamics has been established between scientists from the Soviet Union and the Institute for Nonlinear Science (INLS) at the University of California, San Diego.

As part of the program, two Soviet scientists from Gorky State University are now at UCSD delivering a series of graduate-level lectures in math and physics.

The lectures, which began late February and are expected to end in April, are believed to be the first offered by Soviet scientists at UCSD, according to Henry Abarbanel, the institute's director.

During the exchange program, a member of the UCSD faculty is expected to visit Gorky for three months later this fall. Several other visits by scientists from both nations are being planned.

"Maybe 10 years ago, nonlinear science was not supported in the Soviet Union, but that is not true today," said Misha Rabinovich, a physics professor at Gorky State and the Institute of Applied Physics in Gorky.

Rabinovich is delivering the first series of lectures with Afraimovich Valentine, a mathematics professor at Gorky State.

"It is understood that nonlinear dynamics is very important for science and our collaboration with the United States is fully supported," he added.

By studying nonlinear dynamics, researchers attempt to seek order in seemingly chaotic situations in the lab and in nature. Although it crosses a widely divergent field of disciplines, from chemistry and engineering to cardiology and psychiatry, those who study nonlinear dynamics share a common language in mathematics.

In their lecture series, the Soviet scientists will discuss "Nonlinear Dynamics in Dissipative Media," or systems relating to friction that develops when the boundaries of two fluids meet.

"What these scientists are interested in is the formation of patterns and structures of things like the centers of chemical reaction in power plants, or the fronts of weather systems in the atmosphere and the ocean, or even the organization of slime mold colonies," said Abarbanel.

Topics relating to friction and boundary layers are of particular interest to several UCSD scientists as well, he added. Nonlinear processes under investigation at UCSD include turbulence in the oceans, noise reduction

in complex signals, dynamics of climate models, transport of pollutants in the atmosphere and ground water, in addition to pattern formation in dissipative media.

"They're (the Soviet scientists) not here in a vacuum," Abarbanel said. "They're here because a lot of people at UCSD are interested in the things they are talking about."

Rabinovich said he hoped the exchange program, funded through the U.S. Office of Naval Research and the Soviet Academy of Science, would be a "long-term affair" and continue beyond its three-year contract. Plans already are underway for another Soviet scientist to be at UCSD during the entire calendar year of 1992.

The Soviet scientists said they will conduct their lectures in English, without an interpreter.

"During the first days I must relax and overcome my fear of the English language," he said. "Two weeks later, my English is better and usually I do not make as many mistakes."

Added Valentine: "I am mathematician. Just numbers and equations. That's all I need."

The INLS was established in 1986 by the University of California Board of Regents. Members of the institute represent an interdisciplinary group that includes faculty and researchers from psychiatry and cardiology, physics, chemistry, engineering, oceanography and mathematics.

Abarbanel said that he hoped the INLS program would encourage similar exchanges among UCSD researchers from other departments and their Soviet colleagues in Gorky.

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