

Levin Receives 2005 Kyoto Prize

On June 10, 2005, the Inamori Foundation announced the names of the recipients of the 2005 Kyoto Prizes. The prize in Basic Science will be awarded to SIMON A. LEVIN of Princeton University for “fundamental contributions to environmental science”.

On the Work of Simon Levin

The *Notices* asked Rick Durrett of Cornell University to comment on the work of Simon Levin. Durrett responded:

“It is a great pleasure for me to write a few words to describe the work that led to Simon Levin’s Kyoto Prize. In 1987, soon after I came to Cornell, I was introduced to Simon by his postdoc, Carlos Castillo-Chavez. It took several years of meeting with Simon two or three times a month before I began to gain an appreciation of the questions and answers of interest to ecologists. In the long run, we wrote ten papers on the use of stochastic spatial models in ecology, which are a small part of the work for which Levin was honored.

“In contrast to many mathematicians, myself included, who prove theorems inspired by biology that are primarily of interest to other mathematicians, Simon has crossed the line to become an ecologist who uses mathematics to obtain insights into important questions in that field. To see some of the substance of Simon’s work, the reader should travel to <http://www.eeb.princeton.edu/~slevin/> or Google “Simon Levin”. His publication list, with 350 entries and roughly as many coauthors as Paul Erdős, will overwhelm you, so you should start with the 23 greatest hits on his CV.

“That list begins with his work with Bob Paine on how disturbance and local competition shape patterns found in the intertidal region and work with Lee Segal using reaction-diffusion equations to study pattern formation, for example in plankton. In the mid-1980s Simon became interested in spatially explicit models in connection with a study of

the Jasper Ridge serpentine grassland, an experimental plot near Stanford run by Hal Mooney.

“After moving to Princeton in 1992, he collaborated with Steve Pacala on his spatially explicit forest model, developed detailed models of marine ecosystems with Glen Flierl and Danny Grunbaum, modeled the emergence of biodiversity in plant communities in joint work with Helene Muller-Landau, and studied the evolution of influenza sequences with Joshua Plotkin

and Jonathan Dushoff. These research topics are a small sample of the work in the Levin lab, which occupies one-half of the second floor of Eno Hall. Many talented postdocs and graduate students work in small offices around a central space with two blackboards and a large conference table where informal presentations are made at lab teas.

“Simon’s selections from his work leave out some of my personal favorites, probably because these are on the more mathematical end of the spectrum: his early work on Gause’s principle, which shows that the number of coexisting species is limited by the number of underlying resources; his 1987 paper with Stewart Kauffman on what is now known as the NK model; a project with Shay Gueron on self-organization of front patterns in large wildebeest herds; work with Amar Ghandi and Stephen Orzsag bringing methods of physics to bear on evolutionary games played by spatially distributed competitors; and recent work with Mercedes Pascual on competitive coexistence in dynamic landscapes.

“For those of you who want to understand some of the many ecological issues addressed in Simon’s



Simon Levin

work, I highly recommend his 1999 book *Fragile Dominion*. To quote the review in *Nature*: ‘Simon Levin’s book takes the reader on an intellectual journey through the natural world, exploring the evolution of biodiversity, and explaining what its loss may mean for humanity.’ This entertaining book uses references to the Passover seder and to the contents of his desk drawer to make its points, but in contrast to the two books on networks that I have reviewed in these pages (*Linked* by L. Barabási and *Six Degrees* by D. Watts, *Notices*, February 2004), it is a book about real and important science. For more on Simon’s book see the review by David Krakauer and Martin Nowak in the May 2000 *Notices*.

“The Kyoto Prize recognizes not only Simon’s many contributions to mathematical ecology but also his great impact on the field. He participates actively in the editorial boards of a dozen journals and several book series. He has edited a number of conference proceedings and collections of papers, including a five-volume set on biodiversity. He has written definitive survey articles that have appeared in high-profile journals and participated in writing several reports for government and scientific agencies.

“However, most important of all, he has educated and inspired a large number of people. Many graduate students and postdocs were trained in his lab. He has had long-term collaborations with many mathematicians and ecologists. For all of us who have worked with him and many others who have only read his work, he has been an important role model, showing that mathematics can have an important impact on our understanding of the world around us. A Kyoto Prize for his work is a well deserved honor.”

Biographical Sketch

Simon A. Levin received his B.S. in mathematics from Johns Hopkins University in 1961 and his Ph.D. in mathematics from the University of Maryland in 1964 under the direction of Monroe Martin. He was on the faculty of Cornell University from 1965 until 1992, when he moved to Princeton University, where he is the George M. Moffett Professor of Biology and director of the Center for Biocomplexity. His visiting positions include a Miller Research Professorship at the University of California, Berkeley (2003), and membership at the Institute for Advanced Study (spring 1999). His prizes include the Heineken Prize for Environmental Sciences of the Royal Netherlands Academy of Arts and Sciences (2004) and the MacArthur Award of the Ecological Society of America (1988). He is a member of the U.S. National Academy of Sciences and a fellow of both the American Academy of Arts and Sciences and of the American Association for the Advancement of Science.

About the Kyoto Prize

The Kyoto Prize is presented annually for extraordinary lifelong achievements in the areas of Advanced Technology, Basic Science, and Arts and Philosophy. It is one of the highest international awards for services to science and culture. The prize, which comes with a monetary award of 50 million Japanese yen (about US\$500,000) for each category, is one of the world’s highest honors. It was founded in 1984 by Kazuo Inamori, the founder of the Japanese technology group Kyocera. The award ceremony will be held on November 10, 2005, in Kyoto, Japan.

Previous recipients of the Kyoto Prize include Rudolf E. Kalman (1985), Claude E. Shannon (1985), John McCarthy (1988), I. M. Gelfand (1989), André Weil (1994), Donald E. Knuth (1996), Kyosi Itô (1998), and Mikhael Gromov (2002).

—Allyn Jackson