Distinguished Lecture Series on
Network Science and Research

In light of the growing interest and importance of network science and network research to the Penn State Research community, the Office of the Senior Vice President for Research is sponsoring this series. Prominent national experts are scheduled to present talks on campus throughout the academic year. The goal is to clarify the underlying principles in this intrinsically interdisciplinary research area and to bring the diverse community of Penn State researchers together around common themes to explore how their research might benefit from intellectual cross-fertilization.

"A Web of Short Stories Concerning SARS, Fishing, and Growing"

Luis Amaral, Northwestern University

Wednesday, November 19, 2008
4:00 p.m. – 5:00 p.m.
Cybertorium, 113 IST Building

Abstract:

The network vision of the natural, biological, and social worlds is now pervasive. Indeed, its promise is so great that one may fear a backlash. In his talk, Professor Amaral will briefly discuss three major research areas where the network approach enables us to uncover striking insights about the behavior of complex systems. The first example concerns the role of the air transportation network on the spread of SARS. The second example concerns the organization of trophic interactions in natural ecosystems. The third example concerns the set of chemical reactions occurring inside each of the cells in our bodies.

Biography:

Dr. Amaral received his BS (1990) and MS (1992) in Physics from the University of Lisbon. He went on to obtain a PhD from the Department of Physics at Boston University under the guidance of Gene Stanley. From 1995-1996, Amaral was a postdoctoral fellow at Forschungszentrum Juelich in Germany. He successively spent two years as a Postdoctoral Fellow at the Massachusetts Institute of Technology. In 1999, Amaral became a Visiting Scholar at both the Center for Polymer Studies and at the Margret and H.A. Rey Laboratory for Nonlinear Dynamics in Medicine, and from 2000 to 2002 he held joint Research Associate appointments at these institutions. Since August of 2002, Amaral has served as an Associate Professor of Chemical and Biological Engineering at Northwestern University. Since 2002 he has mentored 27 trainees, ranging from high school students to postdoctoral fellows.

Amaral's research centers on the field of complex systems. He has published more than 100 peer-reviewed papers in major scientific journals, including *Nature, Science, The Proceedings of the National Academy of Science of the U.S.A.* (PNAS) and *Physical Review Letters* (PRL). Amaral has received a K-25 CAREER award from the National Institutes of Health and has been named a Distinguished Young Scholar in Medical Research by the Keck Foundation. Amaral has recently proposed the development of cartographic methods for the representation of complex biological networks. These methods will enable researchers to accomplish something similar to what travelers now can easily accomplish with, for example, Google Maps, that is, to glean the important information on a given system at the scale of interest to the researcher. These tools hold the promise to enable biomedical researcher to design or re-engineer biological systems for therapeutic purposes.

Sponsored by the Department of Physics and the Office of the Senior Vice President for Research