



# Distinguished Lecture Series

LECTURE 1, MARCH 22, 2PM

Simularium, Room 180, Engineering 2 Building

## How Global-Scale Personal Lightwaves Are Transforming Scientific Research

### Larry Smarr

Director, California Institute for  
Telecommunications and Information Technology;  
Harry E. Gruber Professor, Department of Computer  
Science and Engineering, UC San Diego. Smarr  
is Principal Investigator on the NSF OptIPuter  
LambdaGrid project and is Co-PI on the NSF  
LOOKING ocean observatory prototype.

As founding director of the National Center for  
Supercomputing Applications (1985) and the  
National Computational Science Alliance (1997),  
Smarr has driven major contributions  
to the development of the national  
information infrastructure: the  
Internet, the Web, the emerging Grid,  
collaboratories, and scientific  
visualization. His views have been  
quoted in *Science*, *Nature*, the *New  
York Times*, *Wall Street Journal*, *Time*,  
*Newsweek*, *Fortune*, and *Business  
Week*, and he gives frequent keynote  
addresses at professional conferences  
and to popular audiences.



During the last few years, a radical restructuring of optical networks supporting e-Science projects is beginning to occur around the world. U.S. universities are beginning to acquire access to high-bandwidth lightwaves (termed “lambdas”) on fiber optics through the National LambdaRail and the Global Lambda Integrated Facility. These user-controlled 1- or 10- Gbps lambdas are providing direct access to global data repositories, scientific instruments, and computational resources from the researchers’ Linux clusters in their campus laboratories. These dedicated connections have a number of significant advantages over shared Internet connections, including high bandwidth, controlled performance (no jitter), lower cost-per-unit bandwidth, and security. These lambdas enable the Grid program to be completed, in that they add the network elements to the compute and storage elements which can be discovered, reserved, and integrated by the Grid middleware to form global LambdaGrids. I will describe how LambdaGrids enable new capabilities in medical imaging, Earth sciences, interactive ocean observatories, and marine microbial metagenomics.

**10**  
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years  
of innovation

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