Abstract

The amount of scientific information is doubling every year. This exponential growth is fundamentally
changing every aspect of the scientific process – the collection, analysis and dissemination of scientific
information. Our traditional paradigm for scientific publishing assumes a linear world, where the number
of journals and articles remains approximately constant. The talk presents the challenges of this new
paradigm and shows examples of how some disciplines are trying to cope with the data avalanche. In
astronomy, the Virtual Observatory is emerging as a way to do astronomy in the 21st century. Other
disciplines are also in the process of creating their own Virtual Observatories, on every imaginable scale
of the physical world. We will discuss how long this exponential growth can continue.

About the speaker

Alexander Szalay is the Alumni Centennial Professor of Astronomy
at the Johns Hopkins University. He is also Professor in the
Department of Computer Science. He is a cosmologist, working on
the statistical measures of the spatial distribution of galaxies and
galaxy formation. He was born and educated in Hungary. After
graduation he spent postdoctoral periods at UC Berkeley and the
University of Chicago, before accepting a faculty position at Johns
Hopkins. He is the architect for the Science Archive of the Sloan
Digital Sky Survey. He has been collaborating with Jim Gray of
Microsoft to design an efficient system to perform data mining on the
SDSS Terabyte sized archive, based on innovative spatial indexing
techniques. He is leading a grass-roots standardization effort to bring
the next generation Terabyte-sized databases in astronomy to a
common basis, so that they will be interoperable – the Virtual
Observatory. He is Project Director of the NSF-funded National Virtual Observatory. He is involved in
creating testbed applications for the Computational Grid. He has written over 340 papers in various
scientific journals, covering areas from theoretical cosmology to observational astronomy, spatial
statistics and computer science. In 1990 he has been elected to the Hungarian Academy of Sciences as a
Corresponding Member. In 2003 he was elected as a Fellow of the American Academy of Arts and
Sciences. In 2004 he received one of the Alexander Von Humboldt Prizes in Physical Sciences.