

New Challenges in Petascale Scientific Databases (Keynote Talk)

Alexander Szalay

Department of Physics and Astronomy
The Johns Hopkins University
3701 San Martin Drive
Baltimore, MD 21218
szalay@jhu.edu

Abstract. Scientific data is doubling every year. Virtual Observatories are established over every scale of the physical world: from elementary particles to materials, biological systems, environmental observatories, remote sensing, and the universe. These collaborations collect increasing amounts of data, often close to a rate of petabytes per year. Many scientists will soon obtain most of their data from large scientific repositories of data, often stored in the form of databases. The talk will discuss the different requirements for such databases, and discuss user behavior in a few concrete examples taken from astronomy, in particular from the 6 year usage of the Sloan Digital Sky Survey database. Interesting query patterns are emerging, where users create custom “crawlers” to break large queries into many repetitive ones. The trial-and-error behavior of many exploratory projects will be also discussed. The talk will also present various scalable alternatives to large scientific analysis facilities.

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. In 1990 he has been elected to the Hungarian Academy of Sciences as a Corresponding Member. He is the architect for the Science Archive of the Sloan Digital Sky Survey. He is Project Director of the NSF-funded National Virtual Observatory. He has written over 340 papers in various scientific journals, covering areas from theoretical cosmology to observational astronomy, spatial statistics and computer science. In 2003 he was elected as a Fellow of the American Academy of Arts and Sciences. In 2004 he received an Alexander Von Humboldt Prize in Physical Sciences, in 2008 a Microsoft Award for Technical Computing.