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CCT Colloquium Series

The Architecture, Performance and Applications of Montage, An Astronomical Image Mosaic Engine

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Infrared Processing and Analysis Center (IPAC)

Johnston Hall 338
April 13, 2007 - 03:00 pm

Abstract:

Modern wide-area imaging surveys in astronomy have created the need for a high performance image mosaic engine. The scientific requirements on such an engine are stringent: it must preserve the positional and calibration fidelity of the images that it is compositing, it must rectify ground-based images for radiation from the atmosphere, and it must support the many processing environments used by astronomers. The Montage engine is the response to these requirements. It is a toolkit, written in ANSI C, that contains independent modules for performing the tasks needed to produce a mosaic; these modules are controlled through simple executives. Generating mosaics of scientific quality is computationally and I/O expensive. I will describe how Montage has exploited two types of parallelization, MPI and Pegasus ("Planning for Execution on Grids") to improve performance. Montage is a driver application for generating more efficient grid planning and execution tools, and I will describe some results in this area. Finally, I will describe the applications of Montage in astronomy, such as in product generation by NASA's Spitzer Space Telescope, and the design of an on-request image portal that we intend to deploy presently.

Speaker's Bio:

Bruce Berriman obtained his Ph.D in Astronomy in 1983 at the California Institute of Technology. After a postdoctoral position at the Institute of Astronomy, Cambridge, U. K., he spent many years at NASA's Goddard Space Flight Center in Maryland, where he was a Support Scientist for the Cosmic Background Explorer. In 1996, he became the manager of the calibration pipeline team for the Moderate Resolution Imaging Spectroradiometer (MODIS) aboard the Earth Observing System (EOS) platform Terra, and developed his interest in high performance computing. In 2000, he returned to Caltech as the Head of NASA's Infrared Science Archive, the archive node for NASA's infrared astronomy missions. His current scientific interest is in discovery of faint brown dwarfs from infrared and visible sky surveys.

Refreshments will be served.
This lecture has a reception.