Trends, Discovery, & Innovation at NUG User Day 2013

UC Berkeley graduate student Edgar Solomonik receives the inaugural Early Career NERSC Award for Innovative use of HPC from Richard Gerber (right) and NERSC Director Sudip Dosanjh.

The day's attendance of 130 was split almost evenly between local and remote participants.

The second day of the NERSC User Group (NUG) 2013 meeting was focused on community engagement and celebrating scientific achievement.

Featured Presentations

- *The Future of HPC*, Kathy Yelick, Berkeley Lab CS AD
- *The Future of NERSC*, Sudip Dosanjh, NERSC Director
- *Discovery of the Higgs and the role of Berkeley Lab HPC*, Ian Hinchliffe, head of Berkeley Lab ATLAS effort, former ATLAS physics coordinator
- *Discovery of the θ_{13} Weak Mixing Angle using ESnet & NERSC*, Craig Tull, U.S. Manager for Software and Computing for the Daya Bay Experiment
- Planck Satellite Data Analysis at NERSC, *Julian Borrill*, Berkeley Lab

Six contributed talks described novel uses of High Performance Computing and Data facilities.

NERSC Award for High Impact Scientific Achievement 2013

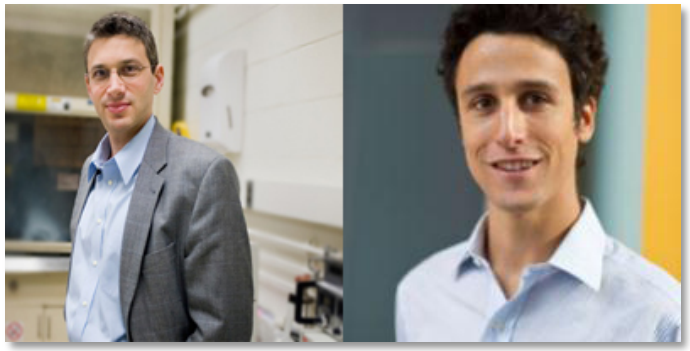
A New Approach to Water Desalination

Jeff Grossman and David Cohen-Tanugi, MIT

New material's water permeability is several orders of magnitude greater than conventional membranes.

Using supercomputers at NERSC, Grossman and Cohen-Tanugi came up with a new approach for desalinating seawater using sheets of graphene, a one-atom-thick form of the element carbon. This method holds the promise of being far more efficient and less expensive than existing desalination systems.

Grossman's project "Quantum Simulations of Nanoscale Energy Conversion" has used 5.6 Million hours at NERSC since 2010.



Jeff Grossman (left) and David Cohen-Tanugi are the recipients of the inaugural NERSC award.

One of Smithsonian Magazine's Top Ten "Surprising Scientific Milestones of 2012"

Early Career Award

Tanmoy Das, Las Alamos National Laboratory

Das completed groundbreaking computational work to understand fundamental properties of novel superconductors and spin-orbit ordering effects in two-dimensional electron gases. A postdoctoral researcher at LANL, Das was the first author on three 2012 articles published in the highly regarded journal Physical Review Letters.

NERSC Award for Innovative Use of High Performance Computing

Data Pipeline Transfers, Analyzes, Stores, & Disseminates Astronomical Observations

Peter Nugent and the PTF Team, Berkeley Lab & UC Berkeley, California Institute of Technology

Innovative workflow enables earliest supernova discovery, first direct observations of progenitor systems.

Every night observations from the Palomar Observatory in Southern California are sent to NERSC where computers running machine learning algorithms scour the data for transients. Once an interesting event is discovered, an automated system sends its coordinates to ground-based telescopes around the world for follow-up observations. NERSC also archives this data and allows collaborators to access it over the Internet through a web-based science gateway.

Peter Nugent, the PTF's Realtime Transient Detection Lead, is interviewed on the PBS News Hour following the discovery of supernova PTF 11kly within hours of its appearance.

Early Career Award

Edgar Solomonik, UC Berkeley

Solomonik, a graduate student at UC Berkeley, has developed novel algorithms for massively parallel tensor contractions and applied them to quantum chemistry problems. Solomonik's algorithmic developments are instantiated in the Cyclops Tensor Framework (CTF), which has been used on some of the largest supercomputers in the world, including the NERSC Hopper system, and the IBM Blue Gene/Q systems at the Lawrence Livermore National Laboratory and Argonne Leadership Computing Facility.

National Energy Research Scientific Computing Center