The University of California
High-Performance AstroComputing Center
A consortium of nine UC campuses and three DOE laboratories

Deep field image of the Andromeda Galaxy created by co-adding 423 images.

At the National Energy Research Scientific Computing Center (NERSC), Peter Nugent (LBNL) and his colleagues combine Astrocomputing with observation to study dark energy in the Universe.

News/Announcements

Welcome to the new UC High-Performance AstroComputing Center (HIPACC) website!

Announcing the 2011 International AstroComputing Summer School on Computational Explosive Astrophysics. Now accepting applications! [more]

View UC HIPACC's Annual Report for 2010 here.

Quick Links

The 2010 International Summer School on AstroComputing focused on Galaxy Formation [more]

The Future of AstroComputing conference was held on Dec 16 & 17 at the San Diego Supercomputer Center. View the conference website [here]

place the cursor over the image to pause the slideshow

http://hipacc.ucsc.edu/
As computing and observational power continue to increase rapidly, the most difficult problems in astrophysics are now coming within reach of simulations based on solid physics, including the formation and evolution of stars and supermassive black holes, and their interactions with their galactic environments.

The purpose of HIPACC is to realize the full potential of the University of California’s worldleading computational astrophysicists, including those at the affiliated national laboratories. HIPACC will do this by fostering their interaction with each other and with the rapidly increasing observational data, and by empowering them to utilize efficiently the new supercomputers with hundreds of thousands of processors both to understand astrophysical processes through simulation and to analyze the petabytes and soon exabytes of data that will flow from the new telescopes and supercomputers. This multidisciplinary effort links theoretical and observational astrophysicists, physicists, earth and planetary scientists, applied mathematicians, and computer scientists on all nine UC academic campuses and three national labs, and exploits California’s leadership in computers and related fields.

HIPACC’s outreach activities will include developing educational materials, publicity, and websites, and distribution of simulation outputs including visualizations that are beautiful as well as educational.
UC-HIPACC Leadership

Executive Committee
Director: Joel Primack (UCSC) <joel@ucsc.edu>
Coordinator from Northern California: Peter Nugent (LBNL)
Coordinator from Southern California: Michael Norman (UCSD)

Council

UC Berkeley: Christopher McKee
UC Davis: TBA
UC Irvine: James Bullock
UC Los Angeles: Steve Furlanetto
UC Merced: TBA
UC Riverside: Gillian Wilson
UC San Diego: Michael Norman
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UC Santa Cruz: Sandra Faber
Los Alamos National Lab: Salman Habib
Lawrence Berkeley National Lab: Peter Nugent
Lawrence Livermore National Lab: Peter Anninos

UC-HIPACC Staff

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Visualization and Outreach Specialist: Nina McCurdy <nmccurdy@ucsc.edu>
Senior Writer - Publicity and Proposals: Trudy Bell <t.e.bell@ieee.org>
Annual Conferences in Northern and Southern California

HIPACC will sponsor two large meetings each year especially (but not exclusively) for scientists working on computational astrophysics and related topics at the UC campuses and labs. Unlike the more specialized meetings of working groups, we expect that these larger meetings will be broad, with the purpose of bringing theoretical astrophysicists together with computer science specialists, computer hardware experts, and observational astronomers. One meeting will be in northern California and the other in southern California to promote maximum participation. In addition to sharing new information, these meetings will highlight problems needing attention to advance the state-of-the-art and introduce participants to potential colleagues and begin collaborations.

Annual International AstroComputing Summer Schools

HIPACC will support an annual school aimed at graduate students and postdocs who are currently working in, or actively interested in doing research in, AstroComputing. Topics and locations of the annual school will rotate, and Caltech and Stanford are also welcome to participate.

The 2010 school was at UCSC, on the topic of Hydrodynamic Galaxy Simulations. Lectures were presented by experts on the leading codes (AMR codes ART, Enzo, and RAMSES, and SPH codes Arepo, GADGET, and Gasoline) and the Sunrise code for making realistic visualizations including stellar SED evolution and dust reprocessing. There were 60 students, including 20 from outside the USA. Lecture slides and videos, codes, inputs and outputs are on the UC-HIPACC website http://hipacc.ucsc.edu. Funding from NSF helped to support non-UC participant expenses.

The 2011 school is July 11-23 at UC Berkeley/LBNL/NERSC, on the topic of Computational Explosive Astrophysics: novae, SNe, GRB, and binary mergers. The scientific organizers are Daniel Kasen (LBNL/UCB) and Peter Nugent (LBNL).

The 2012 school will be at UC San Diego/SDSC, on Astrophysical Data Mining and AstrolNformatics. The scientific director is Alex Szalay (Johns Hopkins) and the host is Michael Norman, director, SDSC.
The 2010 school was at UCSC, on the topic of Hydrodynamic Galaxy Simulations
The Future of AstroComputing
UC-HIPACC Conference December 2010 at SDSC
Announcing the 2011 UC-HIPACC International AstroComputing Summer School on Computational Explosive Astrophysics

**Topics Include:** supernovae, gamma-ray bursts, compact object mergers, energetic transients

**Location:** University of California, Berkeley/ Lawrence Berkeley National Lab/ National Energy Research Scientific Computing Center

**Dates:** July 18 – July 29, 2011

**Organizers:** Daniel Kasen & Peter Nugent (UCB/LBNL)

**Description:** The University of California High-Performance AstroComputing Center (UC-HIPACC) is pleased to announce the continuation of its international summer school, to be held this year by UC Berkeley and LBNL from July 18-29, 2011. This year’s summer school will focus on computational explosive astrophysics, including the modeling of core collapse and thermonuclear supernovae, gamma-ray bursts, neutron star mergers, and other energetic transients. Lectures will include instruction in the physics and numerical modeling of multi-dimensional hydrodynamics, general relativity, radiation transport, nuclear reaction networks, neutrino physics, and equations of state. Workshops will guide students in running and visualizing simulations on supercomputers using codes such as FLASH, CASTRO, GR1D and modules for equations of state, nuclear burning, and radiation transport.

For more information and to apply, visit the web:
http://hipacc.ucsc.edu/ISSAC2011.html
Funding Opportunities

Calls for proposals scheduled twice annually for Fall/Winter & Spring/Summer funding Cycles.

UC-HIPACC will support focused working groups of UC scientists from multiple campuses to pursue joint projects in computational astrophysics and related areas by providing funds for travel and lodging. At the heart of UC-HIPACC are working groups.

1. **Small travel grants** enable scientists, graduate students, and post-doctoral students to travel easily and spontaneously between Center nodes. UC-HIPACC will fund travel grant proposals submitted by faculty members, senior scientists, postdocs or graduate students up to $1000 on a first-come-first-served basis with a simple application describing the plan and purpose of the travel.

2. **Grants ranging between $1000 - $5,000** to support larger working groups or participation in scientific meetings.

3. **Mini Conference grants of up to $5,000** to support collaborations of multiple UC campuses and DOE labs.

4. **Grants to faculty to support astrocomputing summer research projects** by undergraduates.

5. **Matching grants of up to $10,000** for astrocomputing equipment.

6. **Innovative initiative proposals** for other purposes that are consistent with the goals of UC-HIPACC. Such purposes could include meetings or workshops, software development, or education and outreach.
HIPACC is working with the Morrison Planetarium at the California Academy of Sciences (pictured here) to show how dark matter shapes the universe. We are helping prepare their planetarium show opening fall 2010, and also working on a major planetarium show to premiere at the Adler Planetarium in spring 2011.
Astronomical observations represent snapshots of particular moments in time; it is effectively the role of astrophysical simulations to produce movies that link these snapshots together into a coherent physical theory.

Showing Galaxy Merger simulations in 3D will provide a deeper, more complete picture to the public and scientists alike.

Galaxy Merger Simulation

Finally, I’d like to show you two visualizations:

1. Merging spiral galaxies, with stellar evolution and dust scattering, absorption, and re-emission of light included.

2. The Constrained Local Universe Simulation: evolution of a 64 Mpc/h region of the universe including the Milky Way and Virgo Supercluster.
CONSTRAINED LOCAL UNIVERSE SIMULATION
Virgo Cluster

MWy & M31

Fornax Cluster