

UC-HiPACC 2013 Annual Report – 12/10/2013

In 2013, UC-HiPACC supported or co-sponsored activities in computational astronomy to further collaborations across UC campuses and three affiliated DOE national laboratories, both in fundamental research, and in education and public outreach to raise public awareness of computational astronomy and the pioneering research in the field throughout the UC system.

Small grants, research conferences and workshops

For the fourth year, UC-HiPACC sponsored two funding cycles for small grants in support of computational astrophysics research that includes collaborations among two or more UC campuses and the affiliated DOE labs. This year, the Center funded three **collaborative research efforts** at three campuses, and **co-funded equipment** with matching funds at a fourth campus. In 2013 UC-HiPACC also supported use of the **SeeVogh** scientific web conference platform for computational astrophysics research on the UC campuses and affiliated DOE laboratories.

Also for the fourth year, UC-HiPACC provided support for the annual **Galaxy Workshop** at UC Santa Cruz on August 12-16, organized by Joel Primack and Avishai Dekel. The five-day conference attracted 90 participants, including from four UC campuses. As usual, slides and video recordings of all the talks were posted on the UC-HiPACC website <http://hipacc.ucsc.edu>.

For the second year, on August 16-18, UC-HiPACC sponsored the Assembling Galaxies of Resolved Anatomy (**AGORA**) project to run high-resolution galaxy simulations with (as much as possible) the same astrophysics and compare them with each other, with fundamental theory, and with observations. Over those three days, 50 leading cosmologists and computational astrophysicists from over 20 leading institutions worldwide participated. Participants continued to work on the project remotely, with web meetings using the SeeVogh web conference platform supported by UC-HiPACC. UC-HiPACC also supported a development workshop for the **yt** astrophysics analysis and visualization code that AGORA will use. Much was accomplished, and in November 2013 the massive AGORA flagship paper was accepted for publication in *Astrophysical Journal Supplement*. Several more papers are in preparation. The AGORA project is also supported by the new UCSC Hyades astrophysics computer system (<http://hipacc.ucsc.edu/Hyades/>) purchased with a NSF MRI grant and including a PetaByte AstroData system donated by the Huawei company as a result of UC-HiPACC director Joel Primack's efforts.

Education and outreach

For the fourth year, UC-HiPACC organized a three-week, advanced **International Summer School on AstroComputing** (ISSAC 2013) for graduate students and post-doctoral fellows, this time on Star and Planet Formation at UC Santa Cruz, July 22–August 9. The goal of ISSAC 2013 was to train the next generation of researchers in the use of large-scale simulations in star and planet formation. There were 16 lecturers and 48 student participants. UC HiPACC funds covered lodging and refreshments.

Supercomputing accounts on UCSC's new 3,000 core supercomputer Hyades were provided for all the lecturers and participants, with all relevant codes with sample inputs and outputs. As usual, all lecture slides and videos of the lectures are posted at the HiPACC website.

UC-HiPACC also provided staff support for a three-week **Institute for the Philosophy of Cosmology** at UCSC, with funding from a Templeton Foundation grant to Rutgers University. Participants included 28 advanced graduate students and postdocs (about 20 whose backgrounds are mainly in philosophy of science and 10 mainly in physics/astrophysics) and 20 faculty lecturers. Lecture slides and videos are posted at <http://hipacc.ucsc.edu/IPC2013.html>.

The **UC-HiPACC website** <http://hipacc.ucsc.edu/> continues to act as a resource for astrophysicists. **AstroShorts** are free monthly articles on research in computational astronomy in the UC system,

designed to be reprinted in amateur astronomy newsletters. The **Press Room** column offers a bi-monthly roundup of press releases on computational astronomy throughout the UC-HiPACC consortium. Two press releases were prepared by UC-HiPACC senior writer Trudy Bell in 2013, one about the measurement of the cosmic gamma ray horizon, a project led by Alberto Dominguez at UC Riverside, and the other about the AGORA project. Significant for both research and outreach, the UC-HiPACC **AstroViz Gallery** continues to make astrocomputing simulations visualizations accessible to both the scientific community and the general public. At UCSC, the **3D Visualization Laboratory**, created by Prof. Enrico Ramirez-Ruiz and UC-HiPACC director Joel Primack with partial support from UC-HiPACC, has made exciting advances in developing scientific visualizations. This includes new software using the “holographic” 3D visualization hardware donated by the zSpace company, and new software to allow very rapid production of images and videos from the yt astronomical volumetric analysis and visualization platform using Nvidia GPUs. This will enhance the usability of the powerful, general-purpose yt toolkit, which will be a boon for computational astronomers.

Plans for 2014

UC-HiPACC plans for 2014 include again co-sponsoring with the UC Center for Galaxy Evolution a conference at the Beckman Center at UC Irvine, this time entitled **The Near-Field, Deep-Field Connection**, February 12-14, 2014; a two-day conference on the Future of UC-HiPACC, March 21-22 at Lawrence Berkeley Laboratory; the **2014 UC-HiPACC summer school** on nuclear astrophysics at UCSD July 21–August 1 (George Fuller, director); the **2014 Galaxy Workshop** at UCSC August 11-15; and the third international workshop of the **AGORA** project on high-resolution galaxy simulations, August 15-18. As in previous years, UC-HiPACC also will have two funding cycles of small grants to encourage collaborations among UC campuses and affiliated DOE labs. Among the UC-HiPACC outreach activities for 2014 are two **popular magazine articles**, one about CANDELS, the largest-ever Hubble Space Telescope program, for *Sky & Telescope* magazine, and the other about measuring all the light in the universe for *Scientific American*.