



California NanoSystems Institute offers High Performance Computing with the Center for Scientific Computing facility

The demand for high performance computing research has been significantly increasing over the past few years. Various centers have been created in an attempt to address an aspect of this increasing demand, with a select few truly making an impact. The Center for Scientific Computing (CSC) at UCSB is one of these select few. The CSC, located in the California NanoSystems Institute (CNSI), was formed to promote the effective use of High Performance Computing in the research environment. In addition to providing resources, the CSC has incorporated training into their mission as well by sponsoring classes, tutorials, and individual training.

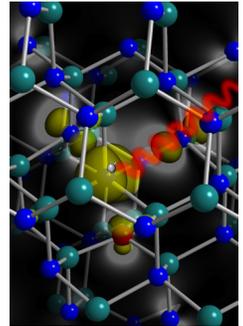
According to Chris Van de Walle, professor of materials, the CSC facility has enabled cutting-edge computations material research, "Having a high-performance computing environment available right here on campus has allowed us to directly impact a number of research projects." One such area of investigation is the effect of impurities on the electronic properties of semiconductors. Using "first-principles calculations", Van de Walle's group found that hydrogen impurities significantly affect the electrical conductivity of semiconducting oxides. "The ability offered by the CSC facility to run large-scale calculations on a number of candidate qubit centers has significantly contributed to our success in this field", concluded Van de Walle.

Eckart Meiburg, professor of mechanical engineering, also recognizes the importance of the CSC, "The CSC provides an excellent test bed facility for developing, validating and executing massively parallel computer codes for flow simulations. In particular, it allows for fine-tuning and optimizing the performance of these codes on many



Eckart Meiburg
Professor, ME

processors. For fluid flows exhibiting a large range of temporal and spatial scales, along with complex nonlinear dynamics, the CSC allows us to perform high-resolution simulations based on first principles, with a minimum of empirical modeling assumptions."



In 2009, 3.5 million hours of computer time were accrued. These figures have already been surpassed in 2010, and are expected to grow dramatically in 2011. Since CNSI started sponsoring campus High Performance Computing, the program has grown to 300 users, with 50% being graduate students, 25% postdocs, and the remaining 25% split between faculty, visiting researchers, and undergrads.

Industry involvement with CSC and CNSI is still growing, with plenty of opportunities still available for partnerships. The partnership between CNSI and Hewlett-Packard is a perfect example of industry collaboration furthering the mission of CNSI. Stan Williams, Senior HP Fellow and Director of the Quantum Research Group, partnered with UCLA's CNSI to provide funding for High Performance Computing, as well as for graduate student research. This partnership allowed for the creation of HP Labs, which generates a tremendous amount of research opportunities for the company, and provided a significant source of funding for CNSI. This collaboration with industry has allowed CNSI to advance their program and accomplish much of what they've done so far.

To learn more about how your company can work with UC Santa Barbara, contact Leslie Edwards (805-893-3944/edwards@engineering.ucsb.edu) or Chris Russo (805.893.5544/crusso@engineering.ucsb.edu) in the Corporate Affiliates Programs Office.