



J. Huang, J. New, & the BioPilot Project Group

Preview: Data-Intensive, Data-Driven Computing for Complex Biological Systems

Exciting scientific breakthroughs from the BioPilot project, funded by the DOE Office of Advanced Scientific Computing, will be featured in an upcoming issue of *SciDAC Review*. BioPilot scientists are working towards novel capabilities for predictive understanding of complex biological systems through advanced data-intensive and data-driven computing. The researchers address science questions of critical importance to bioenergy and bioremediation. For example, what cellular mechanisms underlie the organismal tolerance to a variety of stresses that yeast is exposed to during its bioethanol production of thermochemically pretreated plant material in industrial production? How can this tolerance be enhanced? The images above depict the whole cellular machinery involved in stress-induced transcriptional reprogramming of the yeast cells, discovered by a graph-theoretical computational framework developed at ORNL. Advanced capabilities for large-scale visualization and browsing of biological networks are provided by Dr. Jian Huang and Joshua New from the SciDAC Ultrascale Visualization Institute.

Legend of Common Acronyms

SciDAC	Scientific Discovery through Advanced Computing
DOE	U.S. Department of Energy
NSF	National Science Foundation
NASA	National Aeronautics and Space Administration
PI	Principal Investigator
HPC	High-Performance Computing

National Laboratories

Argonne National Laboratory	ANL	http://www.anl.gov/
Brookhaven National Laboratory	BNL	http://www.bnl.gov/world/
Los Alamos National Laboratory	LANL	http://www.lanl.gov/
Lawrence Berkeley National Laboratory	LBNL	http://www.lbl.gov/
Lawrence Livermore National Laboratory	LLNL	http://www.llnl.gov/
Oak Ridge National Laboratory	ORNL	http://www.ornl.gov/
Pacific Northwest National Laboratory	PNNL	http://www.pnl.gov/
Sandia National Laboratories	SNL	http://www.sandia.gov/