AIST - National Institute of Advanced Industrial Science and Technology
Booth Number 104

The Grid Technology Research Center (GTRC) of AIST is a research center fully engaged in emerging grid technologies in Japan. Presently, research is undertaken on advanced grid programming tools, high-speed networking and clusters as compute resources on the grid, international demonstration and verification experiments, the demonstration of applications using grid technology, and on issues that are crucial to the actual deployment of grid technology, such as security and reliability. At SC2004, GTRC/AIST will demonstrate the latest research results including: programming middleware "Ninf-G" based on Grid RPC (remote procedure calls), various applications with Ninf-G running on the Asia Pacific Grid Testbed, "Grid MPI" on emulated global grid environment, "Grid Datafarm" system with its applications, scientific applications and portal services on the Grid. You might find every single layer of Grid technology here at the GTRC booth.

Aggregate.Org - University of Kentucky
Booth Number 853

Aggregate.Org refers to a collection of researchers, led by the KAOS group at the University of Kentucky, and the technologies that they use to make the components of a parallel computer work better together. Since before we built the first Linux PC cluster supercomputer, we have been considering all aspects of Compilers, Hardware Architectures, and Operating Systems (KAOS) together, optimizing system performance rather than performance of the individual parts. This year, Aggregate.Org will again present a variety of new research results and free software leveraging these new technologies. Work to be presented includes: major improvements to the Cluster/Beowulf Design Rules (CDR/BDR) software tool new bonding drivers efficiently supporting conventional channel bonding and various types of Flat Neighborhood Networks (FNNs) system software.

AFRL - Air Force Research Laboratory
Booth Number 2736

The Department of Defense established the Software Protection Initiative (SPI) to prevent the unauthorized distribution, alteration, and exploitation of application software critical to national security. The Software Protection Initiative is executed under the cognizance of the Deputy Under Secretary of Defense (Science and Technology) (DUSD (S&T)) with the Air Force Research Laboratory (AFRL) as the Office of Primary Responsibility. The SPI display describes new technologies and ongoing research opportunities focused on protecting critical national security application software.

Critical applications represent a significant investment for the DoD and are instrumental to maintaining our technological advantage.

Ames Laboratory - Scalable Computing Laboratory
Booth Number 314

The Scalable Computing Laboratory in the DoE's Ames laboratory will be showcasing work on assessing and improving the overall performance of real-world HPC applications on large cluster computer systems. In addition to the performance evaluation of multiple high-speed interconnects, a new efficient threaded message passing benchmark will be presented. The new benchmark will be used to aid in the optimization of clustered SMP machines. The improvement in performance comes at all levels beginning with low level improvements to communications performance through the use of OS-bypass techniques and the use of the MP Lite or GPSHMEM communications libraries. Middleware improvements include a generic IO library providing tunable data compression allowing applications to trade latency performance for bandwidth. At the application layer improvements come in the form of new algorithms for computing highly correlated wave functions tuned for scalable parallel performance. Finally, from a total system perspective we will demonstrate the benefits of a new resource management system that has been developed as part of the Scalable Systems Software Enabling Technology Center.

ARSC - Arctic Region Supercomputing Center
Booth Number 951

The Arctic Region Supercomputing Center (ARSC) supports the computational needs of researchers within the Department of Defense, the University of Alaska, other academic and research institutions, and other government agencies. The center provides high performance computing, visualization, storage, and networking resources, programming and technical expertise and training. Areas of specialty supported by ARSC include bioinformatics, global climate forecasts, distributed data archival and retrieval, coupled ocean modeling, tsunami research and community code portal, ionospheric modeling, and art. ARSC operates a Cray X1, an IBM Regatta, and an integrated IBM system consisting of p655+ and p690+ technology. The ARSC Discovery Lab hosts a Mechdyne MD Flying Flex system. Various other resources, including an HP Cluster, an IBM Image Generator, and SGI and Macintosh workstations are distributed through five access labs on the University of Alaska Fairbanks campus. ARSC hosts a National Science Foundation Research Experience for Undergraduates intern program each summer, which attracts students from all over the country. The center is part of and located on the campus of the University of Alaska Fairbanks.

ANL - Argonne National Laboratory
Booth Number 339

Researchers at Argonne National Laboratory are developing powerful collaborative tools and technologies that will advance the state of the art in large-scale computing and will make scientists more productive. The exhibit showcases work in the following areas: numerical libraries for large-scale computational applications parallel programming tools collaborative tools scalable superclusters advanced visualization environments software infrastructure for the national computational Grid servers enabling problem solving over the Internet and associated scientific computing applications in such areas as computational biology, computational chemistry, computational astrophysics, and climate modeling. Closely tied with these projects is an emphasis on collaborations, including the National Leadership Computing Facility, the ASCI program, TeraGrid, and SciDAC.

AHPCRC - Army High Performance Computing Research Center
Booth Number 1947

The Army High Performance Computing Research Center (AHPCRC) is a partnership committed to helping uphold and expand the Army and U.S. led in the application of HPC in academe, defense and industry to solve complex real-world problems of interest to the Army. Our exhibit will demonstrate the results of AHPCRC projects that utilize the Cray X1, CRAY T3E, CRAY SV1ex, and IBM SP systems for large simulations. Highlighted will be basic research projects, along with collaborative projects involving both AHPCRC and Army researchers, and educational programs. The AHPCRC exhibit will utilize high-performance workstations for visualization demos, a DVD and monitor for showing narrated videotapes of AHPCRC project results, and posters of selected project graphics mounted in the exhibit. Information regarding the AHPCRC can be found at: http://www.ahpcrc.org.

ATIP - Asian Technology Information Program
Booth Number 303

The Asian Technology Information Program (ATIP) is the premiere source of science and technology information and analyses on Japan and the Asian Region. ATIP has been covering Asian trends & developments in the Asia Pacific region for the past ten years. It has become the premiere source of science and technology related information and analysis in English on Japan and the entire Asian region. ATIP's information gathering

and assessments of the Asian HPC landscape have helped bridge the gap between the Asian and Western research communities. ATIP has also provided timely information on Asian HPC initiatives and accomplishments through a ten-year series of reports, news feeds, and briefings. It has published nearly 300 reports on HPC in Asia. Over the past few years, ATIP has released nearly 1,300 reports and information documents covering all aspects of technology in Asia. ATIP maintains an extensive network of contacts in technical communities throughout Asia. Visitors to ATIP's booth will have the opportunity to browse information, speak with analysts, and learn about upcoming projects, activities, and events.

Boston University
Booth Number 852

Boston University's research exhibit will feature information on and demonstrations of current university research and education projects that have been developed through the University's Center for Computational Science and the Scientific Computing and Visualization Group, as well as information on current and future facilities and infrastructure. The booth will feature demonstrations of scientific visualization using a stereoscopic, tiled-display wall being driven by a Linux cluster.

BNL - Brookhaven National Laboratory
Booth Number 2427

The Center for Data Intensive Computing (CDIC) pursues research in advanced scientific computing and its application to high-energy and nuclear physics, biological and environmental studies, and materials science. We will highlight recent work in the Terascale Simulation Tools and Technology Center, and a new initiative in nanoscience computing.

Experiments at the Relativistic Heavy Ion Collider and the Large Hadron Collider require the coherent use of massive world wide distributed computing facilities to collect, process, distribute and analyze the petabytes of data they produce. BNL operates the primary computing facility for all of the RHIC experiments with several petabytes of tape storage capacity and one of the largest Linux clusters in the world. The US ATLAS Tier 1 facility is under development at BNL. We will present the current status of work to integrate these facilities into an increasingly complex and capable worldwide Grid in the context of the SciDAC Particle Physics Data Grid and the International Virtual Data Grid Laboratory.

BNL is a "DOE topical computing site" with the QCDSP 600 Gflop supercomputer. Its successor is QCDOC, a 10-30 Teraflop supercomputer that is an integral part of the RIKEN-BNL Research Center and SciDAC's effort for a National Computational Infrastructure for Lattice Gauge Theory. The QCDOC architecture and hardware will be on display and running physics.

C-DAC - Centre for Development of Advanced Computing
Booth Number 2652

C-DAC's HPCC initiatives include the development of the PARAMNet II System Area Network, which finds a place in India's celebrated supercomputer PARAM Padma. The initiative is being furthered with ongoing research to evolve more efficient architectures for System Area Networks, link and host interface technologies and protocols, communication co-processor and switching fabric designs, and software interfaces such as Direct Access Protocol Library (DAPL) and Socket Direct Protocol (SDP) for scientific and business applications. C-DAC is also working on Re-configurable Computing Systems and has already developed FPGA based hardware accelerators and application solvers for computational structural mechanics, linear algebra and signal processing.

C-DAC's HPCC software addresses the smooth functioning and usability of programming clusters through a high performance flexible software environment and is available on Solaris, AIX and Linux clusters. A key feature is the exploitation of hardware features for communication providing a low latency and high bandwidth communication substrate.

C-DAC's Scientific and Engineering activities are focused on developing codes from the algorithmic level, porting and optimizing third party codes and problem solving around the codes on its PARAM series of supercomputers for scientific and engineering applications. The PARAM Padma has also been deployed to extend the Bioinformatics research Application Facility (BRAF) to promote industrial usage.

C3.ca
Booth Number 2734

C3.ca Association Inc. is a not-for-profit "collaboratory" created in 1997 by Canadian individuals and organizations to help ensure widespread availability of technologies, applications and skills in High Performance Computing. In encouraging the establishment and continual enhancement of this ever-improving technology and knowledge infrastructure, C3 is helping provide advanced computational and

communications tools to meet the needs for research and innovation in the sciences, health, engineering, the arts and the social sciences.

Recognizing the broad geography of Canada, several member organizations within C3.ca have determined the mutual benefits of shared and complementary facilities and services in more localized groupings. We call these Major Resource Providers. Six of these are now active across the country and will participate within the Canada booths: Westgrid, covering Western Canada, SHARCnet, covering the western side of the Province of Ontario, HPCVL, covering the eastern side of Ontario, RQCHP and CLUMEQ in the Province of Quebec, and ACEnet, covering the Atlantic Provinces. There are also individual member organizations providing resources to user members.

More information about C3.ca and these Providers can be found at www.c3.ca and at www.c3.ca/ce/rp.php

CAPSL - University of Delaware
Booth Number 128

Emulation for large-scale multiprocessor systems itself is a challenging task. In this booth we present DIMES - a new FPGA-based logic emulator for large multiprocessor systems such as cellular architectures. It aims to provide both logic design verification and early software development environments with dramatically improved cost-performance, as well as to be used as a platform for cellular multiprocessor architecture research. On DIMES the targeted architecture is folded up to fit within an FPGA by using our innovative iterative emulation scheme. We will demonstrate multi-chip iterative emulation of IBM Blue Gene/Cyclops. In the exhibit, visual demonstrations of some Cyclops application programs will also be shown on the working hardware and software. DIMES has been developed at University of Delaware in cooperation with ET International Inc. with advice from IBM T.J. Watson Research Center.

CCLRC Daresbury Laboratory
Booth Number 2447

The Computational Science and Engineering Department at CCLRC acts as a UK focus for the development, application and support of research in computational science and engineering. We are also the host site for, and one of the partners in, HPCx - a 1600-processor IBM POWER4+ system with a Federation switch and the UK's leading high-performance resource for academic computational research. Areas of research include advanced research computing, band theory, computational engineering, computational

materials, distributed computing, mathematical software, molecular simulation, numerical analysis, scientific databases and quantum chemistry.

Capability computing is a major focus of much of the computational science activity within CCLRC – developing the next generation of applications that need to scale to thousands of processors to meet their computing needs. We will overview our work with the UK academic community, focusing in particular on scientific highlights from the collaborative computational projects and our high-performance computing activities on HPCx . Please visit the department's web site at http://www.cse.clrc.ac.uk/. You can find additional information about HPCx at http://www.hpcx.ac.uk/.

CACR – Center for Advanced Computing Research, Caltech
Booth Number 349

In 1995, the Center for Advanced Computing Research (CACR) was established to ensure that Caltech and its Jet Propulsion Laboratory would be at the forefront of computational science and engineering (CS&E). CS&E is the practice of computer-based modeling for the study of scientific phenomena and engineering designs, and typically involves a multidisciplinary investigation of interactions among the application, solution algorithms, computer architecture, and system software.

Computer-based modeling and simulation are indispensable for gaining a better understanding of many scientific phenomena and engineering designs. Computer simulation makes it possible to investigate regimes that are beyond current experimental capabilities, and to study phenomena that cannot be replicated in laboratories, such as the evolution of the universe. In the realm of science, computer simulations are guided by theory as well as experimental results, while the computational results often suggest new experiments and theoretical models. In engineering, many more design options can be explored through computer models than by building physical ones, usually at a small fraction of the cost and elapsed time.

CACR simultaneously provides leading-edge capabilities for CS&E research and experiments with new technologies that help define the technical computing environment of the future.

Hungarian Grid Competence Center
Booth Number 2634

P-GRADE provides a complete, integrated, graphical solution for development and execution of parallel applications on clusters, Grid systems and supercomputers. P-GRADE significantly accelerates the reengineering procedure of sequential and legacy programs including hierarchical design, debugging, testing, on-line monitoring, performance analysis, and visualization phases. P-GRADE's run-time environment provides dynamic load balancing for long-running parallel applications based on fully automatic checkpointing and migration mechanisms. Some successful application areas of P-GRADE environment: ultra short-range forecasting of dangerous weather situations, simulations of urban traffic and astronomic events, analysis
of smog alarm plans.

P-GRADE portal provides P-GRADE compatible workflow construction and execution mechanism for Globus and Condor Grids including execution and performance visualization. P-GRADE portal has already been connected to LCG-2, Hungarian SuperGrid, EU GridLab testbed and UK OGSA testbed. P-GRADE portal is integrated with the GEMLCA Grid legacy code architecture enabling the usage of any legacy code as services in OGSA based Grids without any modification or wrapping of the legacy code.

The Mercury Grid monitor serves the monitoring requirements of both P-GRADE and P-GRADE portal and can be used in any Globus Grid as was demonstrated in the EU GridLab testbed.

The Hungarian ClusterGrid initiative provides 500 Gflops production desktop-PC Grid-service being operational since September,2002. It introduces many innovative features distinguishing it from traditionally built Grids: use of private computer networking, intelligent resource brokering (WSRL), and dynamically-mapped runtime execution environment.

CiSE - Computing in Science & Engineering
Lobby

Computing in Science & Engineering (CiSE) is a bimonthly magazine designed to help scientists apply high-end software in their research. CiSE provides specific tips for scientists from scientists--not programmers--in many different disciplines. There will be subscription specials during SC2004—so come by for discounts and free stuff!

CTC - Cornell Theory Center
Booth Number 2235

CTC will highlight projects from its data-intensive computing initiative, a project launched with Cornell CS, and including Web Services access to databases housing data from the Arecibo radio telescope, physically accurate rendering in computer graphics, and the structure and evolution of the World Wide Web. We will feature ongoing work in our Computational Biology Service Unit, whose goal is to make high-performance computing more accessible to life scientists, and will feature work in computational finance and materials. We will also demonstrate K-20 science outreach through SciCentr, our 3-D virtual science museum. As Microsoft's premier center for Windows-based HPC, we provide case studies and insights for organizations interested in moving to a Windows-based environment.

CMC - Cybermedia Center, Osaka University
Booth Number 2245

Cybermedia Center, Osaka University (CMC) currently promotes Japanese national research projects to develop next-generation research infrastructure for advanced life science. One of our research challenges is to bridge multi-scale life science related databases and services, for genome-based drug discovery, based on Globus Toolkit 3 (GT3) / OGSA-DAI. Another challenge is to integrate multi-scale biological simulations, from molecular models at atomic resolution to whole body models based on anatomical reconstructions, by "BioPfuga" and gbmsMLh. We have also been tackling research that supports life science research using Grid technologies. For instance, we have been trying to provide a computational environment of protein structure prediction, and useful infrastructure for life sciences research focusing on user convenience and grid security. Furthermore, we attempt to realize data integration of multi-scale outputs from heterogeneous device and simulation results such as cell-structure data. At SC2004, we will demonstrate and exhibit our latest Grid research results from two of our national projects: BioGrid and Japan Gigabit Network 2 (JGN2). The exhibit research results include: seamless federation of bio-related databases and services for drug discovery, hybrid QM/MM molecular dynamics simulation by "BioPfuga", and user conveniently workflow engine which supports in-silico drug design.

DSSC - Data Storage Systems Center, Carnegie Mellon University
Booth Number 2718

The field of Information Technology comprises the transmission, processing, and storage of information. The Data Storage Systems Center (DSSC) is an interdisciplinary research and educational organization within Carnegie Mellon University whose mission is to advance information storage technologies. Faculty and students from a wide range of academic disciplines and colleges within CMU are developing the fundamental understanding of the science and advanced engineering methods required for future

generations of information storage systems. DSSC takes a system based approach in its efforts and works closely with industrial and government partners to define projects that will advance information storage technology beyond the current frontiers of magnetic disk and tape recording, optical data storage, probe based systems, holographic, and solid state memory. The research in information storage conducted within the DSSC places this center, by necessity, at the forefront of nanotechnology and its application. As a consequence of the research and educational efforts, the DSSC produces uniquely skilled and knowledgeable students who are well positioned to play key roles in information storage systems development in their future careers.

Department of Homeland Security
Booth Number 1855

The Advanced Scientific Computing (ASC) R&D program is part of the Science and Technology Directorate within the U.S. Department of Homeland Security. This program funds R&D for the development of enabling computational technologies that will be deployed in the next generation of operational tools designed to simulate and understand physical and biological phenomena for homeland security applications. The ASC program also funds R&D in the area of large-scale data management and integration. These capabilities will be used to improve scenario planning and emergency response, to design better radiation and biological detectors for border protection, to enable vulnerability assessments and consequence analyses for infrastructure protection, and to accelerate information extraction and data assimilation for threat analysis and attribution.

Doshisha University
Booth Number 2327

Doshisha University, that is located in Kyoto Japan and has more than 25000 students, is one of Japanese old private universities. In this research exhibition, we introduce our activities for HPC. Now, in Doshisha University, we have developed mid-sized PC clusters aggressively. In 2003, we have introduced 256 nodes of AMD Opteron Cluster whose Linpack Benchmark is more than 1 Tflops. In 2004, we have developed 128 nodes of IBM Blade cluster that is also has more than 1 Tflops of Linpack Benchmark. We also have more than 2000 PCs for educational matter. We are trying to build a system for effective use. As parallel applications, we are solving structural optimization problems, protein tertiary problems, diesel engine design problems, powder simulations, and so on. We are also engaged in Grid computing. We have 10 Gbps-class high-speed wide area networks, Super-SINET. Based on this network, we are attending Naregi MPLs, AP Grid and OBI Grid. On these Grid test beds, we are examining our applications.

Dutch Research Consortium
Booth Number 2150

This is a combined 'The Netherlands' exhibit. It is a cooperative and combined show of major research institutes and not-for-profit research network infrastructure and supercomputing organizations and funding agencies. Participating organizations include: Astron (Netherland Foundation for Research in Astronomy), CWI (Centre for Mathematics and Computer Science), Decis (Delft Cooperation on Intelligent Systems) DEISA (Distributes European Infrastructure for Supercomputer Applications) Gigaport (Organization to establish the new generation of the research communication network), NCF (Netherlands National Computing Facilities Foundation), Nikhef (Institute for Nuclear and High energy Physics), NWO (Netherlands Organization for Scientific Research), SARA (Computing and Networking Services), SURF (ICT Cooperative body of the universities and vocational high schools), SURFnet (Organization for the Dutch research communication network). The exhibit will provide information on the collective infrastructure elements that support ICT research in the Netherlands (network, supercomputers,VR, Data storage), IT-related and IT-enabled research at the contributing institutes, and Supercomputing, VR and GRID/E-science projects and activities.

EPCC - The University Of Edinburgh
Booth Number 2443

Edinburgh Parallel Computing Centre (EPCC) has been a leading European HPC Centre since its foundation in 1990. With around 60 full-time staff, EPCC is the focus for the University of Edinburgh's HPC facilities, training, and research support for academic users and European industry. The University of Edinburgh leads a consortium that provides the UK leading HPC service, HPCx. HPCx sustains more than 6TF on 1600 IBM POWER4+ processors, and will grow to 12TF by 2006. The system is funded by the UK government and with our partners CCLRC (Daresbury) and IBM, we will provide UK HPC support for the next 4 years. At SC2004, we will demonstrate various projects in HPC and Grid computing, including: innovative applications in materials science, engineering and environmental science results from HPC research activities and highlights from projects undertaken by our Masters students and EU -funded visitors.

Ehime University
Booth Number 2651

We will demonstrate the gVirtual Earth Magnetosphere System h, which works on PVR (Portable Virtual Reality system). You may feel as if you were flying in the vicinity of the Earth onboard REAL satellites since all of the data are real.

Kyushu University Computing & Communications Center and Partners
Booth Number 2727

The Computing & Communications Center of Kyushu University has been contributing to Japanese HPC for more than 30 years, and has been recently working on two big national collaborative research projects on future HPC: NAREGI and EHPC.

NAREGI: We have been developing application-specific middleware components to Grid-enable large-scale nano-science applications including those that require coupling of multiple applications on the Grid. In order to proceed multi-scale applications, we are developing a new middleware system, called "Mediator", that provides high-level transparency in data communication between different discretization methods associated with model specific spatial and temporal scale based on physical requirements.

EHPC: The primary goal of EHPC (Embedded High Performance Computing) project is to develop a platform architecture that can be customized easily to provide semi-special purpose computers for many scientific applications. High cost-performance will be achieved by using the system LSI technologies, FPGA (Field Programmable Gate Array), and other embedded system technologies. The Booth will show the first prototype of the EHPC platform and some scientific applications, including molecular-orbital calculation, and the density functional calculation.

European Center for Parallelism of Barcelona
Booth Number 512

The booth presents the main research and development activities the center is currently undertaking, both in the scope of the European union funded projects and in the framework of the CEPBA-IBM Research Institute agreement. The booth has demonstrators of our performance visualization and analysis tools (Paraver), performance prediction tools (Dimemas) for parallel and GRID architectures, OpenMP compilation and runtime platform (Nanos) for SMP and DSM architectures, and the GridSuperscalar programming model for GRID. The booth also opens a door to the recently created

Spanish National Supercomputing Center in the premises of the Technical University of Catalunya (UPC) in Barcelona. The center hosts the Marenostrum supercomputer based on IBM BladeCenters. For additional information, please step by our booth or visit our web site at www.cepba.upc.es.

Fermilab/SLAC - Fermi National Accelerator Laboratory and Stanford Linear Accelerator Center
Booth Number 2418

Recently, the Dept Of Energy, the National Science Foundation, and the High Energy Physics Advisory Panel released a report entitled "The Quantum Universe", outlining the future of HEP research. The report poses nine questions that will guide the path toward understanding the origins and the nature of the universe through the study of dark matter, dark energy, and elementary particles. Traversing this path will make extensive use of quantum physics, which governs the behavior of the microscopic, subatomic world. Obviously, modern computing technology will play an enormous role in the next generation of HEP research. State-of-the-art data management, processing, networking, and interactivity will assist the physicists in their quest for the understanding of the universe. Our exhibit demonstrates current standards in the use of modern tools for management of enormous amounts of data, sharing of resources worldwide, and interaction and visualization. We preview the technology that will play a key role in the exploration of the universe.

Florida State University
Booth Number 2453

This research booth provides an overview of technical capabilities and ongoing research at Florida State University in Computational Science. This work is primarily undertaken in the new School of Computational Science, but also occurs in the departments of Computer Science, Mathematics, Statistics, Physics, Biology, Chemistry and the FAMU-FSU School of Engineering.

Forschungszentrum Karlsruhe
Booth Number 2641

At Forschungszentrum Karlsruhe, the German Tier 1 center, GridKa, for the LCG project at CERN is build up. As part of an international network of Grid Computing Centers, GridKa takes its share in the provision of enormous compute and storage capacities needed by the high-energy physics community. Already serving experiments at CERN, Fermilab and SLAC today, the GridKa compute cluster grows to over 2000 nodes and more than three PByte of data storage (online, tape) in the coming years. A very efficient and cost-saving solution of the cooling problem will be presented. The Global Grid User Support is supplying the first entry point for all user problems within the LCG/EGEE environment and building a knowledge database. In order to offer 24/7 support a partner institution in the USA is needed. CampusGrid a second grid project started in 2003 aims at the virtualization of a heterogeneous HPC environment. Systems with Intel, AMD, IBM and vector processors will be included. Storage from different vendors must be integrated in a global file space. As a first step a common file system will be selected First results of a PCI-Express Infiniband connection between Xeon “Nocona” processors will be presented.

CEA - French Atomic Energy Commission
Booth Number 2744

The CEA is a global leader in research, development and innovation. It intervenes in three main fields: energy, information and health technologies and defense. Face the diversity of its programs the CEA takes advantages of exceptional installations (super-computer, large physics instruments, etc.)

In the energy area the objective of the CEA is to contribute to competitive, safe and clean sources of energy, which in particular do not emit greenhouse gases. Supporting industrialists, the CEA seeks to optimize the current nuclear reactor installations and develop solutions for the management of radioactive waste. It participates in international programs on the nuclear reactors of the future. Upstream it carries out programs in the climatic and environmental sciences, sciences of matter, etc.

In the health and information technologies domain the CEA has high-level research in the field of micro- and nano-technologies. Deeply involved in biotechnologies and nuclear technologies for health, the CEA is also a major player in medical research.

The CEA develops the necessary programs to guarantee the continuation of the French nuclear deterrent. Following the cessation of nuclear testing, it is implementing the Simulation program. Most of these activities carried out by the CEA rely on extensive computing resources and computational science.

GRAPE Projects (RIKEN/University of Tokyo)
Booth Number 2619

This is a joint exhibition by two Japanese research groups, RIKEN and the University of Tokyo that are involved in the development of GRAPEs. GRAPEs (GRAvity PipE) are special-purpose computers for particle-based calculations such as astrophysical N-body simulations and molecular dynamics simulations. Calculations using GRAPEs won the Gordon-Bell Prizes for years 1995,1996,1999-2001,and 2003. The 78-Tflops MDM in RIKEN and the 64-Tflops GRAPE-6 in U. Tokyo still stand first and second in the top nominal peak performance of the world. The University of Tokyo group will demonstrate the 64-Tflops GRAPE-6 completed in 2002. A small, single-unit will be displayed and will show some real-time calculations. Also, the overview of GRAPE-DR project, started in July 2004, will be presented. Its goal is to achieve the peak speed of 2 Petaflops by 2008, for several important scientific applications including particle-based simulations, large-scale dense linear matrix computations and quantum chemistry calculations. The RIKEN group will explain the ongoing MDGRAPE-3 project, the petaflops special-purpose computer system for molecular dynamics simulations, which will be finished in e2arly 2006. We will also demonstrate real-time molecular dynamics simulations.

Gelato Federation
Booth Number 746

The Gelato Federation is the global research community dedicated to advancing the Linux Itanium platform through collaborative relationships targeting real-world problems and solutions. Much of Gelato's work is conducted through our portal, www.gelato.org, which features content from organizations and experts, including a technical discussion forum downloadable software and representative research problems in high-performance computing, database systems, and software engineering. Gelato.org is a collaborative international working environment, open to all contributors and those seeking computing solutions.

Georgia Tech
Booth Number 118

The Georgia Institute of Technology (Georgia Tech) has a long history of hosting high performance computing systems and of cultivating students and faculty skilled in their use. Over the years we have supported most supercomputing platforms and cluster systems. Faculty will be on hand to discuss research topics taking advantage of our high performance computing resources. We will highlight various research areas through posters on topics such as aircraft and engine design thermodynamics high-energy physics biomedical engineering molecular dynamics climate and ecosystem prediction

mechanics, reliability, and wear of materials network and processor simulations algorithm design geographic information systems (GIS) earth science modeling, materials science hydropower systems sensor and control systems. We will also be prepared to discuss efforts taking place toward the formation of a campus-wide center for high end computing. This center will promote diversity of parallel machines along with the diverse skills required in the effective use of those machines. Drawing from experts across campus, our purpose is to position Georgia Tech, at an institutional level, for leadership and collaboration in high performance computing on regional, national, and international scales.

GGF - Global Grid Forum
Booth Number 2633

Global Grid Forum (GGF www.ggf.org) is a globally distributed community of product developers, researchers, technologists, and end-users of Grid technologies, working together to develop best practices and technical standards to create a foundation for Grid computing applications, products and services. Established in 1999, the GGF community is comprised of thousands of participants from 50 countries and over 500 organizations. GGF is supported by over 50 sponsor member companies and over 25 sponsoring research laboratories, programs, and universities.

HLRS – High Performance Computing Center Stuttgart
Booth Number 140

The High Performance Computing Center Stuttgart (HLRS) is a federal HPC Center in Germany. In addition, together with T-Systems and Porsche, it has formed a company to provide access to supercomputers for research and industry. HLRS has established a distributed working environment for its users to see and use all resources (Cray Opteron Cluster, NEC SX-6, several Linux Clusters) in a seamless way. At SC2004 HLRS will demonstrate its activities in the field of High Performance and Grid Computing. We will also show the tools developed at HLRS to support the users like PACX-MPI and MARMOT. Examples from industry include the car and aerospace sector. Scientific research is demonstrated in medicine, biology, chemistry and physics. The results are visualized by our own collaborative visualization tool COVISE. More information can be found at http://www.hlrs.de/news-events/2004/sc2004

HPCMPO - High Performance Computing Modernization Program
Booth Number 315

The High Performance Computing Modernization Program Office (HPCMPO) will demonstrate its support to the DoD and the warfighter via hard copy posters, interactive demonstrations on a powerwall, and presentations. We will emphasize how the technology employed by the HPCMP is used to directly support the warfighter. We will show the Computational Technology Areas supported by the program, where these areas are supported, and highlight some of the Challenge Projects for the past year. We will also describe the Defense Research and Engineering Network, our software, and our Programming Environment and Training (PET) program.

CAHPC - Center for Applied High Performance Computing, Howard University
Booth Number 2720

The Center for Applied High Performance Computing's (CAHPC) mission is to advance the state of the art in real applications of High Performance Computing by fostering Ethnically Diverse, Multi-disciplinary collaborations between Research, Education, and Industry.

ICT - Institute of Computing Technology, Chinese Academy of Sciences
Booth Number 455

The Institute of Computing Technology (ICT), Chinese Academy of Sciences, is a leading research institute of high-performance computing, networking, and storage systems in China. ICT has spun off many high-tech companies; such as China's largest PC company Lenovo and the largest HPC server company Dawning. ICT also has close contacts with the user community, serving users in education, research, telecommunication, finance, government, petroleum, electricity, water resources railways, and manufacturing.

- Dawning 4000A: An 11 Tflop/s system with massive cluster computing and grid enabling features. This Linux system uses 2560 AMD Opteron processors and is manufactured by the Dawning Company. It is installed at Shanghai Supercomputing Center to serve research, education, drug discovery, manufacturing, and traffic control needs.

- BlueWhale 1000: A high-performance, low-cost storage system scalable to 512 TB and 10 GB/s. It features dynamic provisioning, on-demand deployment, and low overhead Products started shipping in early 2004.

- Vega GOS: A grid operating system for web services and grid services. Version 1.1 has been deployed and used in China National Grid over six cities.

INRIA
Booth Number 2345

The booth will present the INRIA activities in High Performance Computing and Networking. The INRIA is leading many HPC projects in France, including large scale ones, particularly in cluster and Grid, such as Grid'5000 and the French ACI GRID research initiative. INRIA ensure also the leadership in one of the largest Grid Initiative in Europe: the CoreGrid Network of Excellence.

INRIA pursues research in all layer of the software stack between low-level system support and coupled codes assembling complex applications. Several demonstrations of INRIA research projects and technologies will be presented: DIET, MPICH-V, OAR, Padico, Proactive-PDC, XtremWeb, etc. Several papers have been presented in the past SC conference about these technologies. This year, we will demonstrate a new project: Grid5000. Grid5000 is a nation wide experimental Grid harnessing 8 sites geographically distributed across France. Each of these sites features from 256 CPUs to 800 CPUs. They are connected by the French academic network. OS, middleware, runtimes and applications. They can test network, processors and algorithms. They can measure performance and fault tolerance. By participating to SC2004, INRIA will continue its tradition of SC conference series participation.

ITBL Project
Booth Number 2748

The objective of the ITBL (Information Technology Based Laboratory) project is to construct powerful and versatile virtual research laboratory environments for various disciplines utilizing grid and other emerging information technologies. ITBL connects supercomputers and research and development facilities at various geographical locations in Japan.

Currently, six research organizations are working together on the ITBL Project: RIKEN, JAERI, JST, JAXA, NIMS and NIED. Future plans call for participation by other institutions, universities and industries.

The ITBL project has four main objectives: procurement of high performance computer resources required for the ITBL virtual environment, development of common software to provide the base of the ITBL virtual environment, development of application software for the ITBL environment, and the promotion of extensive utilization of the ITBL and comprehensive advancement of computational science and technology and education of human resources in this area.

ITBL runs physically on the high-speed academic research network, Supersinet. Researchers at arbitrary locations can log into the ITBL and establish their own VPN. Researchers can then combine appropriate software and hardware resources to solve their problem. In this exhibit the latest activities and achievements of the ITBL project will be demonstrated. For additional information about ITBL please see: http://www.itbl.jp/.

INL - Idaho National Laboratory
Booth Number 2735

INL is leveraging HPC computing capabilities to develop a mature security-focused high-performance computing concept that enhances scientific collaboration on a very large, and dynamic, scale. With the addition of a cluster computing system of Sun Microsystems servers, INL computational scientists are working to create a collaborative environment for modern, geographically distributed science teams. The initial focus for this effort will be several Generation IV nuclear reactor designs and bioinformatics for extremophile research. Principal concept elements on collaboration at this high level will be used for exploration in a variety of areas, including hydrogen energy, subsurface science, and other keys areas of INL's multi-program mission. Collaboration on this scale has never before been attempted at the INL and presents significant issues, especially in creating secure environments within the same computing systems for a variety of teams and efforts.

Indiana University
Booth Number 1052

The State of Indiana has long been known as the "Crossroads of America," and Indiana University is fast becoming a key player in the nation's cyberinfrastructure - America's "Crossroads of Information." Indiana University operates the GlobalNOC, responsible for operations of some of the highest-speed networks in existence. Indiana University operates two supercomputers and several advanced visualization system. Most recently Indiana University has joined the TeraGrid. Researchers at Indiana University are among the nation's leaders in computer and computational science, and application of advanced information technology in the sciences - especially the life sciences. Efforts such as the Pervasive Technology Laboratories and the Indiana Genomics Initiative are key drivers of Indiana University's innovations. The Indiana University display features new innovations in advanced information technology and computer science and applications of these innovations in the sciences. Perhaps most importantly the Indiana University display will

IFS - Institute of Fluid Science, Tohoku University
Booth Number 2748a

The Institute of Fluid Science (IFS), Tohoku University, has joined the ITBL project from academia in addition to the original government institutions. ITBL stands for "the Information Technology Based Laboratory." The project's objective is to construct powerful and versatile virtual research laboratory environments for various fields of disciplines utilizing the grid technology and other emerging information technologies. The mission of the Institute of Fluid Science is: to conduct research on flow science as fundamental scientific and engineering disciplines that protect the global environment and maintain the continued progress of human society and to contribute toward the improved safety and welfare of the citizens. To this end, this Institute is aggressively pursuing research activities that solve various issues form the viewpoint of the flow phenomena and meet the demands of society. Examples of these activities are: control of substances causing global warming, development of low-intrusive medical treatments with shock waves, creation of advanced technology for better utilization of natural energy sources, development of manufacturing processes of new materials, development of high-functionality material/fluid systems, and advancement of high-efficiency supersonic flight and space propulsion technology. Many research activities are strongly related to ITBL project.

IHPC - Institute of High Performance Computing, Singapore
Booth Number 301

Established in Singapore in 1998 and supported by Singapore's Agency for Science, Technology and Research (A*STAR), the Institute of High Performance Computing (IHPC) is committed to enhancing Singapore's global competitiveness. Its research thrust is in computational science and engineering (CSE). The Institute places great emphasis on furthering CSE through the development of human capital, intellectual capital and industrial capital. It also aims to help Singapore-based companies gain competitiveness through the promotion, development and application of CSE technologies. With a staff strength of 165 research scientists and engineers, IHPC is well-placed to spearhead research and development in CSE across a broad range of disciplines, such as manufacturing, electronics, chemical applications, precision engineering, virtual reality and advanced product design.

This exhibit will showcase IHPC's capabilities and some of its principle projects such as web-based problem solving environment for solving computational and data intensive problems in CSE and immersive virtual technology for interactive and real time display

of dynamic visualization content. More information about the Institute can be found at: http://www.ihpc.a-star.edu.sg

IIS - Institute of Industrial Science, University of Tokyo
Booth Number 2728

The FSIS project, "Frontier Simulation Software for Industrial Science (FSIS)", directed by Professor Chisachi Kato, began at the Institute of Industrial Science (IIS), the University of Tokyo, as a research project of the IT-program under Research Revolution 2002 organized by the Ministry of Education, Culture, Sport, Science and Technology. This project investigates the five research topics of computational science that lead a new generation of industries. Software systems for terascale computation of these scientific and engineering simulations are developed for promoting practical developments of original fundamental research in each field: 1) Quantum chemical simulation for direct analysis of proteins, 2) Quantum molecular interaction analysis for receptor-ligand docking, 3) nano-scale device simulation for new generation LSI design, 4) Fluid dynamics simulation for turbulence, combustion and multiphase flows in energy problems, 5) Structural analysis for supporting complex and multi-scale structure design. 6) Platform for Problem Solving Environment and 7) High Performance Computing Middleware are also developed for supporting the above simulation software on the new generation computer and network. This research project will be interconnected with various science and engineering fields and open to the industrial world, educational institutions and research organizations.

Internet2
Booth Number 2241

Led by more than 200 U.S. universities, working with industry and government, Internet2 is developing and deploying advanced network applications and technologies for research and higher education, accelerating the creation of tomorrow's Internet. Internet2 recreates the partnerships among academia, industry, and government that helped foster today's Internet in its infancy.

JAERI - Japan Atomic Energy Research Institute
Booth Number 2341

The Japan Atomic Energy Research Institute (JAERI) has been conducting R&D activities in parallel computing technologies at its Center for promotion of Computational Science and Engineering (CCSE) since 1995. In 2000, CCSE launched a new project

named ITBL (Information Technology Based Laboratory), which aims to establish a virtual research environment by connecting various supercomputers located in different research organizations all over Japan using a high-speed network. Today, 21 supercomputers in 9 organizations have been connected successfully using the ITBL infrastructure software, equipped with a single sign on certification mechanism, workflow management functions on distributed computers, visualization and data sharing tools. Using this environment, many researchers are sharing not only hardware resources, but also their personal applications and research experience. At SC2004, we will present the recent status of the ITBL project and demonstrate its key technologies.

JAMSTEC - Japan Marine Science and Technology Center / Earth Simulator Center
Booth Number 148

The Earth Simulator is the world's fastest supercomputer and a well-balanced system consisting of 640 processor nodes each node has 8 vector processors with shared memory, and connected to the interconnection network with full crossbar switches. The average efficiency of all users' programs is amazing high that it reaches more than 30% of peak performance. The Earth Simulator project has entered into the third year. We have obtained lots of remarkable results in various fields such as atmospheric and oceanic simulations, solid earth simulation, computer science and epoch-making simulations. 34 national collaborative projects are selected this year, and 9 international collaboration projects are in progress under the MOU agreement.

JAXA - Japan Aerospace Exploration Agency
Booth Number 2748b

The IT Center of the Institute of Space Technology and Aeronautics, Japan Aerospace Exploration Agency (JAXA) operates the Numerical Simulator System III. NS III consists of CeNSS (Central Supercomputing System), CeVIS (Central Visualization System) and Mass Storage System. CeNSS is a large-scale SMP cluster of 14 Computing nodes (1792 SPARC64V CPUs) connected by a Crossbar Network: peak performance is 9.3 TFLOPS and total memory size is 3.6 Tera Bytes. NS III achieved Linpack speed of 5.406 GFLOPS using 64CPU/n x 36 nodes (peak 11.98TFLOPS) with an efficiency of 45%. In CFD codes, substantial performance of 11-13% efficiency is obtained.

CeVIS consists of a Visualization server SGI Onyx3400, Graphic terminals and "Aerovision", a large flat wall display (4.6m x 1.5m, 3320 x 1024 dots). Using the new system JAXA is conducting extensive research in aerospace engineering, especially practical and complicated CFD simulation with multidisciplinary analysis and design linked to structure, thermo-structure, aero acoustics and combustion. Recently CFD

simulation contributed to the investigation of Solid Booster Rocket Nozzle throat failure of H2A6 accident. Fundamental applications include combustion process using DNS and LES, and large-scale separation flow by DES. A Network connection demonstration on ITBL using Virtual Personal Network will also be shown at the Exhibit.

NAREGI - Japanese National Research Grid Initiative
Booth Number 2721

The goals of the Japanese National Research Grid Initiative (NAREGI) project are: to conduct R&D on Grid middleware as a prototype for future national-scale research Grids, to Grid-enable a specific target application area (nano-science), and to perform experimental deployment and demonstration of large-scale Grids based on middleware and Grid-enabled applications. The National Institute of Informatics and the Institute for Molecular Sciences are the main R&D centers and several major national universities and labs, as well as IT vendors, actively participate in this project. During the first year, we defined the NAREGI software stack and started developing prototypes, which are built upon the de facto standard Grid middleware such as UNICORE, Globus and Condor. We have also established the phase-one NAREGI Test Beds, consisting of the PC clusters and Unix SMP servers with various architectures and operating systems. The aggregate performance is ~15 Tflop/s with over 3000 CPUs, which are distributed at multiple sites. These systems are connected with SuperSINET, the 10Gbps optical national backbone network for academic research, which we utilize as the NAREGI networking infrastructure. We could successfully run the coupled simulation codes for quantum mechanical computations of protein molecules in solvent over the NAREGI Test Beds. For additional information please see: http://www.naregi.org.

NIC - John von Neumann Institute for Computing
Booth Number 2441

The John von Neumann Institute for Computing (NIC), which is mainly supported by the Research Center Juelich's Central Institute for Applied Mathematics (ZAM), is one of three national HPC Centers in Germany (http://www.fz-juelich.de/nic). Its task is to support and further develop scientific computing in Germany in cooperation with other centers, universities and research institutes by providing supercomputer resources nationwide, developing computational methods, and conducting interdisciplinary research.

At the SC2004 Research Exhibit NIC will present itself as one of the leading European supercomputer centers (http://www.fz-juelich.de/nic/Exhibitions/sc2004.html). We will introduce Juelich's new supercomputer system - an IBM p690 e-server Cluster 1600 with 1312 POWER4+ processors (1.7 GHz), 8.9 Tflops peak performance and 5.6 Tflops LINPACK performance, 5 Tbytes main memory and 50 Tbytes disk capacity - and the new building housing the system. Furthermore, ongoing research in the field of supercomputing, focusing on Grid computing in the life sciences and Grid-based steering and visualization of applications on the new supercomputer will be presented. Recent R&D work on the performance analysis of parallel programs will be introduced and demonstrated. On posters the architecture and software environment of the special purpose QCD supercomputer APEmille and its successor apeNEXT operated at DESY-Zeuthen will be explained.

KISTI Supercomputing Center
Booth Number 2739

KISTI (Korea Institute of Science and Technology Information) Supercomputing Center is a national center for high performance computing and networking. It provides leading edge, high performance computing and networking resources and technologies to researchers in academia, government, and industry throughout the country. Our SC2004 exhibit will showcase the features of the following areas: successful research results of supercomputing applications in astrophysics, CFD, chemistry, climate modeling, biosciences, structural mechanics, scientific visualization, the latest research outcomes of the K*Grid and its applications, and the development of Grid middleware. The KISTI Supercomputing Center will also feature the current connections of KREONET/KREONet2 and research in networking technologies.

Krell Institute
Booth Number 310

The Krell Institute booth will showcase research conducted by the next generation of scientists and technologists in two fellowships that Krell administers- the Department of Energy Computational Science Graduate Fellowship (DOE-CSGF) and the High-Performance Computer Science Fellowship (HPCS) sponsored by Los Alamos National Laboratory, Lawrence Livermore National Laboratory and Sandia National Laboratories. DOE-CSGF fellows carry out research in a wide variety of resource intensive computational science areas including turbulent combustion, aero elastic system simulation, bioinformatics and transport theory. HPCS fellows concentrate their research in the high-performance computing areas of scalable operating/run-time systems,

hierarchical program systems, compiler design, networking research, performance modeling, and component architectures.

LA Seminar
Booth Number 2748c

The LA seminar is organized for researchers who are interested in Numerical Linear Algebra and its application. Since 1997, a lot of lectures (at least once bimonthly on Saturday) and additional special lectures have been arranged for the LA seminar. The purpose of the LA seminar is to encourage young researchers and engineers in companies and universities. All the lectures are open to public freely, and the lecturers are absolutely volunteers!

At SC2004 the LA seminar shows four research results about a parallel eigensolver, a hybrid iterative method, the Parallel Computing Platform, and a system to find the best iterative algorithm. A parallel eigensolver works in any parallel environments with high scalability. A hybrid iterative method combining the Generalized Conjugate Residual method with the Successive Over Relaxation method is robust and has a good convergence for realistic problems. The Parallel Computing Platform (PCP) is a perfect solution for parallelization of FEM/FDM/FVM code, free from headaches on matrix handling, MPI commands and memory allocations. The system called "Test for Iterative Solvers" is open to public via ITBL portal (http://itbl.riken.jp/). The TIS system helps people to choose the best algorithm for their problems without writing any code.
For additional information, please see http://phase.hpcc.jp/la/.

LBNL - Lawrence Berkeley National Laboratory
Booth Number 139

Lawrence Berkeley National Laboratory (LBNL), home to the Department of Energy's National Research Scientific Computing Center (NERSC) and the Energy Sciences Network (ESnet), is a global leader in scientific computing and networking. Berkeley Lab's HPC and networking capabilities and facilities are advancing DOE research programs by providing Milestones achieved by Berkeley Lab's leadership of six projects in DOE's Scientific Discovery through Advanced Computing (SciDAC) and participation in another six SciDAC projects. Scientific results obtained using NERSC's 6,656-processor IBM SP supercomputer Grid capabilities Technical presentations by Berkeley Lab staff and NERSC users and Demonstrations of HPC tools developed at LBNL.

LANL - Los Alamos National Laboratory
Booth Number 220

Los Alamos National Laboratory is a world leader in national security science and technology. Established in 1943, the Laboratory attracts world-class scientists and provides them the environment, facilities, and tools to direct their creativity and energy toward solving the nation's most challenging problems. The Laboratory's vision is to be the trusted, competitive scientific solution for today and tomorrow's national security challenges. The Laboratory applies science and technology to ensure the safety, reliability, and performance of the nation's nuclear stockpile while enabling new and encompassing applications for homeland security, defense, and intelligence.

MHPCC - Maui High Performance Computing Center
Booth Number 751

The Maui High Performance Computing Center (MHPCC) is an Air Force Research Laboratory (AFRL) Center managed by the University of Hawaii. MHPCC is an Allocated Distributed Center of the Department of Defense (DoD) High Performance Computing Modernization Program (HPCMP), providing more than 9,000,000 hours of computing time per year to the research, science, and warfighter communities. MHPCC's terascale, High Performance Computing resources showcase a range of technologies, from IBM Power4 configurations to large Linux clusters. MHPCC is a national resource chartered to support a diverse base of DoD and other government users, facilitating the collaborations needed to solve today's complex computational problems.

MHPCC's booth will highlight research being performed on its terascale computing platforms in support of AFRL, HPCMP, DoD and other government programs.

Mississippi State University
Booth Number 2229

The ERC at Mississippi State University is a coalition of member centers and groups that share a common core objective in advancing the state-of-the-art in computational science and engineering using high performance computing. The ERC's focus areas include automotive research, computational physics, computational fluid dynamics, geosciences,

and collaborative assistance and training to DoD users as part of the DoD HPCMP PET program.

The Mississippi Center for Supercomputing Research at the University of Mississippi provides high performance computing resources and support to all Mississippi Institutions for Higher Learning, enhancing their instructional and research climates. Access to the MCSR has helped many smaller universities in the state attract research projects that would have been unavailable to them otherwise.

NASA - National Aeronautics and Space Administration
Booth Number 540

NASA's research exhibit focuses on the science and engineering results obtained using NASA's newest supercomputer "Columbia." Project Columbia, a collaboration with Intel and SGI, is part of the larger Space Exploration Simulator Project. It integrates 10,240 of Intel's most advanced processors embedded in 20 of SGI's Single System Image (SSI) Altix 512-processor supercomputers to build one of the world's largest and most capable supercomputers. A variety of real-time and interactive exhibits will feature computational applications serving Aeronautics Research, Exploration Systems, and Science missions. Demonstrations in the booth will include the results of high performance applications, atmospheric modeling, ocean modeling, and aerodynamics performance benchmarking of high performance machines tools for porting and performance tuning of applications scientific visualization tools and environments to analyze the results advances in high-speed networking a Grid-enabled service to store and retrieve the results of remote observations and analytical results the Earth System Modeling Framework (ESMF) Mars exploration rover analysis, simulation of microgravity environments and star formation, modeling black holes and neutron stars, and calculating our origin.

NASA Ames Research Center -
http://www.arc.nasa.gov/>http://www.arc.nasa.gov/

NASA Glenn Research Center -
http://www.grc.nasa.gov/>http://www.grc.nasa.gov/

NASA Goddard Space Flight Center -
http://www.gsfc.nasa.gov/>http://www.gsfc.nasa.gov/

NASA Jet Propulsion Laboratory -
http://www.jpl.nasa.gov/>http://www.jpl.nasa.gov/

NASA Langley Research Center -
http://www.larc.nasa.gov/>http://www.larc.nasa.gov/

NCAR – National Center for Atmospheric Research, Scientific Computing Division
Booth Number 131

NCAR's Scientific Computing Division will showcase recent developments in large-scale efforts and the emerging technologies and tools that will help develop a better understanding of our planet. For SC2004, we will demonstrate new tools and environments for scientific knowledge development including Grid-based computing, data and knowledge management systems, and data analysis and visualization thrusts. Several specific projects will be showcased including the DOE-Earth System Grid (ESG) project, two NASA-sponsored efforts: the Earth System Modeling Framework (ESMF) and GridBGC (Grid Biogeochemical Modeling and Analysis Environment), NCAR's Community Data Portal (CDP), and a new NSF/ITR-sponsored research project for visualizing very-large-time-varying scientific data.

NCSA – National Center for Supercomputing Applications
Booth Number 548

Since 1986, NCSA (National Center for Supercomputing Applications) has been a leader in developing and deploying the computing, networking and information technologies that enable scientific discovery. NCSA has led or played a lead role in several major National Science Foundation efforts to build and deploy the nation's cyberinfrastructure for science and engineering, including the National Computational Science Alliance and the TeraGrid project, an effort involving nine sites that will give the U.S. research community the most comprehensive cyberinfrastructure ever deployed for science and engineering. At SC2004, NCSA and its partners will demonstrate how cutting-edge cyberinfrastructure developed through NCSA's leadership is helping researchers analyze and discover new knowledge in massive datasets, collaborate on large multidisciplinary research projects, visualize real-time and stored data, and push the boundaries of computing capabilities. Demonstrations will illustrate the power of Linux cluster computers, including the TeraGrid's Itanium 2 Linux cluster machines and Tungsten, currently the fourth most powerful computer in the world. Other demonstrations will show how powerful networks and computers, innovative software applications, and advanced visualization capabilities are making it possible to analyze and extract information from data in real time.

NNSA/ASC – National Nuclear Security Administration/Advanced Simulation and Computing Program
Booth Number 403

The National Nuclear Security Administration's (NNSA) Advanced Simulation and Computing Program (ASC, formerly ASCI) is an integral and vital element of our nation's Stockpile Stewardship Program. ASC provides the integrating simulation and modeling capabilities and technologies needed to combine new and old experimental data, past nuclear test data, and past design and engineering experience into a powerful tool for future design assessment and certification of nuclear weapons and their components. The ASC program has assembled powerful partnerships with DOE's three national security laboratories (Sandia, Los Alamos, and Lawrence Livermore National Laboratories), some of the world's leading computer manufacturers and several of America's great universities. This research exhibit will feature relevant ASC research through PowerWall presentations, videos and live computer demonstrations.

National Biomedical Computation Resource - UC San Diego
Booth Number 2353

The National Center for Research Resources (NCRR) of the National Institutes of Health supports centers to develop tools and infrastructure for the biomedical community. Researchers from several NCRR centers will present projects and demonstrate software tools to address problems in biomedical computing visualization, imaging, informatics, and grid services. See http://nbcr.net/SC04. The National Biomedical Computation Resource coordinates this activity.

NCDM - National Center for Data Mining
Booth Number 653

The National Center for Data Mining provides high performance web services for data exploration and integration and develops algorithms for mining high volume data streams. The infrastructure developed scales from the commodity Internet to emerging lambda grids, such as the OptIPuter, from single PCs to high performance compute and data clusters, and from off-line computations to real time, interactive ones. We will run a series of interactive demonstrations from bioinformatics, astronomy and web mining on 3 screens, as well as demonstrations of the underlying services and protocols. The demonstrations will use the Teraflow Testbed, the OptIPuter and StarLight. The URL for our Institution is: www.ncdm.uic.edu. A related URL is: www.optiputer.net.

NCHC - National Center for High-Performance Computing, Taiwan
Booth Number 103

The National Center for High Performance Computing (NCHC) is one of Taiwan's national laboratories funded by the National Science Council (NSC). In addition to providing our world-class supercomputing facilities to international high-performance computing societies, NCHC plays a key role in the R&D of various local high-performance computing applications. The services provided by NCHC include large-scale computational science and engineering, cluster and network computing, middleware development, computer visualization, virtual reality, and TANet2 (next-generation National Research Network) operation. At SC2004, we will showcase our new national program, the island-wide circuited gigabit network and Grid-based Knowledge Innovation system. We will demonstrate various practical applications including, among others, a national medical information exchange, long-term ecology research, and hazard mitigation. We will also showcase various 3D visualization techniques.

NCO - National Coordination Office for Information Technology Research and Development
Lobby

The National Coordination Office (NCO) for Information Technology Research and Development (IT R&D) carries out planning, budget, and assessment activities for the Federal Networking and Information Technology R&D (NITRD) Program. The NCO reports to the White House Office of Science and Technology Policy (OSTP) and the National Science and Technology Council (NSTC). The NCO works with the participating Federal agencies through the NSTC's Interagency Working Group (IWG) on IT R&D and six IWG Coordinating Groups to prepare and implement the NITRD budget crosscut, totaling $2.1 billion in FY 2004.

By Executive Order, the NCO supports the President's Information Technology Advisory Committee (PITAC), a private-sector panel of leading IT executives and researchers that provides expert independent guidance to the President on IT R&D issues. The NCO also supports the High End Computing Revitalization Task Force (HECRTF), a multi-agency group charged by OSTP with developing a coordinated plan to reinvigorate Federal HEC R&D.

The NCO publishes budget documents in cooperation with the IT R&D agencies, including the supplement to the President's budget, and special reports, such as PITAC and HECRTF reports. For additional information: about the NCO, see http://www.nitrd.gov about PITAC, see http://www.nitrd.gov/pitac and about HECRTF, see http://www.nitrd.gov/hecrtf-outreach.

NLR - National LambdaRail
Booth Number 747

The National LambdaRail (NLR) is a major initiative of U.S. research universities and private sector technology companies that have banded together to provide a national scale infrastructure for research and experimentation in networking technologies and applications. NLR aims to catalyze innovative research and development into next generation network technologies, protocols, services and applications. Owning the dark fiber and lighting it themselves allows NLR to enable researchers with capabilities that were never before possible let alone economically feasible. To date, more than 50% of the national footprint has been deployed and is entering into operational stages.

NorduGrid Collaboration
Booth Number 2722

NorduGrid is a Grid Research and Development collaboration aiming at development, maintenance and support of the Advanced Resource Connector (ARC), the NorduGrid middleware. ARC is an open source software solution enabling production quality computational and data Grids. Since the first release (May 2002) the middleware is deployed and being used in production environments. A growing number of grid deployments chose ARC as their middleware thus creating one of the largest production Grids of the world. ARC provides a reliable implementation of the fundamental grid services, such as information services, resource discovery and monitoring, job submission and management, brokering and data management. The middleware builds upon standard open source solutions like OpenLDAP, OpenSSL, SASL and Globus Toolkit 2 (GT2) libraries. NorduGrid provides innovative solutions essential for a production quality middleware: Grid Manager, ARC GridFTP server, information model and providers (NorduGrid schema), User Interface and broker (a "personal" broker integrated into the UI), extended Resource Specification Language (xRSL), and the monitoring system. ARC solutions are replacements and extensions of the original GT2 services.

ORNL - Oak Ridge National Laboratory
Booth Number 331

ORNL has the nation's most modern computer facility for unclassified scientific computing. The National Center for Computational Sciences will house the National Leadership Computing Facility. The NLCF engages a world-class team from national laboratories, research institutions, computing centers, universities, and vendors to take a dramatic step forward to field a new capability for high-end science. The NLCF will provide the nation's most powerful open resource for capability computing, with a sustainable path that will maintain and extend national leadership for the Department of Energy's Office of Science.

OSC - Ohio Supercomputer Center
Booth Number 132

MATLAB, a scripting language, is widely used in engineering and science. Recently, several researchers have developed methods of using MATLAB with HPCs. OSC will host a Mini-Symposium on Parallel MATLAB and Applications with short presentations and demonstrations by leading researchers in this area.

The OSC Springfield Center, its partner facility, will focus on data intensive computing issues, such as bioinformatics, computational biology, data warehouse applications, earth science modeling, and materials modeling

Cluster Ohio, a statewide grid of commodity clusters running Linux. OSC furnishes the hardware, software, training, and maintenance to provide faculty with local computing resources and an easy migration path to larger clusters centrally located at OSC.

Third Frontier Network, the nation's most advanced high-speed, fiber-optic network used to enhance connectivity for all colleges, universities, and research centers throughout Ohio.

Research by Ohio faculty using OSC's HPC, networking, and storage resources will be highlighted.

More information about OSC is at www.osc.edu.

Pennsylvania Advanced Networking
Lobby

The Commonwealth of Pennsylvania contains a number of groups in the forefront of Information Technology. The Pennsylvania Advanced Networking booth will highlight the activities of two such groups, specifically, the MAGPI GigaPoP and the Three Rivers Optical Exchange. Both groups provide high performance, leading edge networking services, infrastructure and applications to a broad set of entities with in the state. Both groups offer a full range of services helping to enable regional infrastructure in a cost-effective manner and promote applications for the region's research and education communities through high performance network technology. The Pennsylvania Advanced Networking booth will highlight innovative applications and infrastructure, such as optical networking infrastructure, distance learning and education, digital video and advanced networking services.

PNNL - Pacific Northwest National Laboratory
Booth Number 2027

Using innovations in scalable tools, methods and applications, Pacific Northwest National Laboratory will highlight research that drives answers for today's energy and environmental issues. With one of the world's largest Linux-based, massively parallel supercomputers, Laboratory researchers and other sites can utilize PNNL's high-end computing and distributed resources to solve problems in chemistry, biology, energy and the environment. PNNL will demonstrate how to fuel the future with its breakthrough computational science solutions in alternative fuels, climate, transportation and environmental cleanup.

Paradyn
Booth Number 2227

The Paradyn project is a joint effort of the University of Wisconsin and the University of Maryland. It develops several pioneering technologies used in tools for real-world application analysis. The main focus of the project is on automated diagnosis of performance problems, security analysis, and scalability of tools to support large parallel and distributed applications. Two enabling technologies provided by the Paradyn project are Dynamic Instrumentation with Dyninst API and Scalable Multicast/Reduction communication with MRNet. Dyninst API allows modification of applications during execution, enabling a wide range of automated analysis tools used in the research and industrial communities. Multicast/Reduction capabilities allow tools to support large-scale applications with thousands of nodes. The research exhibit will show automated performance problem diagnosis capabilities of our Paradyn Parallel Performance Tool applied to large-scale MPI and multi-threaded applications. We will also demonstrate a variety of other tools using dynamic instrumentation for application and OS kernel analysis. Refer to our Web site at http://www.paradyn.org/ for further information about the project.

PSC - Pittsburgh Supercomputing Center
Booth Number 110

This year's research exhibit will demonstrate the capabilities of PSC's resources, which include the Terascale Computing System, two GS1280 HP Alphaservers and other HPC platforms. PSC will feature a variety of demonstrations designed to showcase research done at the center. Particular areas of focus include computational biomedical research, such as bioinformatics, high-energy physics, weather modeling, computational pathology, and materials science. The Pittsburgh Supercomputing Center (PSC) is an NSF national supercomputing center established in 1986. PSC also receives funding from The Department of Energy, the National Institutes of Health and the Commonwealth of

Pennsylvania. PSC provides government, academic and industrial users with access to state-of-the-art high performance computing and communication resources. PSC strives to provide a flexible environment conducive to solving today's largest and most challenging computational science problems.

Purdue University
Booth Number 2251

Purdue University and High Performance Computing have been intertwined for many years. Over the last five years, Purdue and Notre Dame have joined together with Indiana University in the “Research in Indiana” booth presenting some of the current research efforts in the SC Exhibit Hall. The “Powering Research” booth reflects the expanding boundaries in research powered by high performance computing, networking, storage, and visualization. The booth will feature multiple presentations by Purdue and Notre Dame faculty and staff spanning a wide range of application research topics, including quantum chemistry, homeland security, stereo presentation of GIS applications, and nanotechnology. There will be opportunities for discussion with the various researchers regarding their projects and the impact to science, technology and everyday life.

RIKEN - The Institute of Physical and Chemical Research
Booth Number 2748d

We will introduce RIKEN Super Combined Cluster (RSCC) that has been operating since this March. The RSCC consists of 2048 CPUs (Pentium Xeon 3.06 GHz) on 1024 nodes (2 CPU/board) that have a peak performance of 12 TFLOPS and LINPACK benchmark performance of 8.728 TFLOPS (It was ranked No. 7 in the Top 500 in June 2004). These 1024 nodes are divided into 5 sub-clusters and connected by using of InfiniBand or Myrinet. The latter sub-cluster is connected to 20 MDGRAPE-2 accelerator boards optimized for molecular dynamics. These work at 64 GFLOPS per board or 1.2 TFLOPS total. The RSCC is also including a NEC SX-7/32 with a peak performance of 283 GFLOPS and a memory capacity of 256 GB for large-memory jobs. With the use of Grid and Web Portal technologies, the system is accessible by researchers at affiliated institutions of RIKEN. Furthermore, it is expected that institutions participating in the ITBL project will share the system resources. Research areas that will benefit from the RSCC will include simulation for fluid dynamics analysis, for astrophysics, and for computational chemistry, homology analysis in Bioinformatics, and data analysis of spin physics experiments.

RIST - Research Organization for Information Science and Technology
Booth Number 1153

Research Organization for Information Science & Technology (RIST) has been taking up challenging cutting-edge missions ranging from HPC application and software technology development to HEC large-scale simulations for innovation and discovery. We showcase recent simulation results focusing on large-scale simulations of nanotechnology for synthesizing nanostructure materials such as carbon nanotubes, fullerene, diamonds, and for designing nanodevices such as the Nanoscale Electronic Mechanical System, NEMS, using the Earth Simulator. This demonstration shows novel physical behaviors and features occurring in the nanoscale world, and some results show excellent and useful thermal, electrical and mechanical properties for nanotechnology industries. We exhibit also the latest results of HPC-Middleware (HPC-MW) development, a HPC software technology for shortening the time-to-solutions using an assembly of tools, kernels and libraries and maximizing parallel efficiency. The latest results of other ongoing research projects are also shown such as the bottom-up meso-scale climate simulation.

Rice University
Booth Number 2643

Rice University is consistently ranked one of America's best teaching and research universities and is considered one of the best values in higher education in the country. The Computer and Information Technology Institute (CITI) is one of five research institutes at Rice. CITI's goals are to support, foster, and develop research and education across a wide area of computing technologies, computational science and engineering, and information processing and theory. The six centers associated with CITI span a broad range of research in computational science and engineering, such as high performance software, computational geophysics, complex financial systems, and digital signal processing. Research at Rice is focused on four primary areas: information technology, nanoscience and technology, bioengineering and biosciences, and environmental technology and systems. At SC04 we will demonstrate advances in telescoping languages and grid computing developed by the Center for High Performance Software Research (HiPerSoft, www.hipersoft.rice.edu). We will feature demonstrations of the Grid Application Development Software (GrADS), key industrial partnerships, and research initiatives such as technology in education at Rice.

SDSC – San Diego Supercomputer Center
Booth Number 149

The theme of the San Diego Supercomputer Center's 2004 exhibit is 'Discovering Cyberinfrastructure.' The exhibit focuses on SDSC's effort to help build a national cyberinfrastructure: an organized aggregate of technologies that enable the Center to access and integrate today's information technology resources to facilitate science and engineering goals. SDSC will showcase its efforts to provide a comprehensive scalable environment for data-oriented community efforts by focusing on pillars of cyberinfrastructure: applications, visualization, software and services, databases and database technology, networking and grids, storage and high performance computing. SDSC's exhibit includes a presentation area for demonstrations, a collaboration area with refreshments and a dedicated Cyberinfrastructure Forum section for strategic partners. In-booth demonstrations will feature high performance computing, data transfer, and data management and data storage. The exhibit will also highlight SDSC's leadership in the recently concluded National Partnership for Advanced Computational Infrastructure (NPACI) and the Center's participation in the NSF-funded TeraGrid.

SIAM - Society for Industrial and Applied Mathematics
Lobby

Siam seeks to advance the application of mathematics to science and industry, promote mathematical research that could lead to effective new methods and techniques for science and industry, and provide media for the exchange of information and ideas among mathematicians, engineers, and scientists. Visit the SIAM booth to check out our new publications. Recently published books and information about our newest book series will be on hand. You will see sample journal issues of SIAM's renowned journals, plus information about Locus – SIAM's online journal archive available in January 2005. Membership information and applications will be available for those individuals interested in becoming a SIAM member. Don't forget to pick up a copy of SIAM News for the road. For additional information see: www.siam.org.

Saitama Institute of Technology
Booth Number 2726

The Saitama Institute of Technology initiated its intensive efforts in the education of information technology in the last few years. The computational resources are Origin, ONYX300 with CAVE and PCs placed in the lecture rooms and exercise rooms. These resources are used for the education of UNIX, visualization, CG and computational methods and simulations. The software of AVS is used as one of the platform of visualization environment. It is actually used widely in CAVE, the stereographic screen, the wide screen with cooperating three projectors and the usual display of PCs and X terminals. Other visualization software is being examined in our CAVE system. The three dimensional CG tools are also used in the exercises and project studies. Based on the enhancement of CG environment, the first CG competition will be organized in

September, gathering the wide interest of the undergraduate students of SIT and middle/high school students. The contents developed in the fields of scientific visualization and CG can be shared with other universities that have CAVE or similar VR. The cooperative study is expected in these fields with the counterpart universities in Japan and outside of Japan. Some teleconference system is equipped and used for remote education.

Saitama University
Booth Number 2627

Computational studies have been developed in the last ten years by using the supercomputers of Hitachi SR-8000 and SGI ONYX3400 with the VR environment such as CAVE in the fields of science and engineering including the new features such as digital database to preserve the traditional techniques of fabrication with 3-dimensional models and time-dependent procedures. Visualization has been developed for these studies and their application for education. Scientific conferences using CAVE have been carried out more than 13 times in the last two years to show the success of its application and to examine the feasibility for education. The educational materials using 3D visualization and movies have been developed and published in DVD format for the fields of Electromagnetism, Fluid Dynamics and Material Science based on the success of VR. The collaboration with universities and research organization in Saitama has been developed through the activities of visualization, CG and their applications in the field of education. The experiences of remote lectures have been developed with the counterpart of other Japanese universities, and others such as a Polish school. The teleconference system is used in the lectures and also in the discussions and demonstration of VR visualization in scientific meetings.

(SC)^2 - SuperComputing Science Consortium
Booth Number 119

Under a Memorandum of Agreement signed on August 31, 1999, NETL partnered with PSC, CMU, WVU, and the West Virginia Governor's Office of Technology to create (SC)^2. Since its creation, this regional partnership of research and education institutions in Pennsylvania and West Virginia has been expanded to include the University of Pittsburgh, Duquesne University, the Pennsylvania State University, Waynesburg College, the Institute for Scientific Research, and the National Aeronautics and Space Administration's (NASA's) Independent Verification and Validation (IV&V).
(SC)^2 improves the ability of the partners to advance energy and environment technologies through the application of HPCC. Through the (SC)^2 framework, the partners maintain open cooperative channels with the objective of enhancing research in the Pennsylvania-West Virginia region. (SC)^2 also facilitates collaboration among these regional partners on the application of HPCC to simulations of energy and environmental

processes and on the development and implementation of HPCC technologies for such simulations. Participation in (SC)^2 also provides NETL with the ability to permit the faculty and staff affiliated with academic and research institutions whose work is relevant to the U.S. Department of Energy's energy and environmental mission to apply for a grant of supercomputing time.

TACC - Texas Advanced Computing Center
Booth Number 120

The Texas Advanced Computing Center (TACC) at The University of Texas at Austin (UT Austin) has become one of the leading academic advanced computing centers in the United States. TACC enables computational researchers to conduct leading-edge simulations using comprehensive terascale resources: a multi-teraflops Cray-Dell Linux cluster and a teraflops IBM Power4 system a world-class immersive visualization laboratory with a first-of-its-kind Sun terascale visualization system and a massive data storage environment with a 50 terabyte SAN and a 2+ petabyte capacity archival system. TACC research & development activities in HPC, scientific visualization, data & information systems, and distributed & grid computing are designed to augments users' capabilities with these terascale resources. TACC's exhibit will showcase results from several of these innovative R&D activities using TACC resources: performance optimization of parallel linear algebra routines computational fluid dynamics analysis of flexible off-shore structures a reliable MPI computing environment large-scale feature detection and extraction photorealistic visualization methods for time-varying computational simulations remote and collaborative visualization technologies grid-hosted geosciences data collections the new version of GridPort including the Grid Portal Information Repository (GPIR) the GridShell software for orchestrating grid jobs, data, and workflows and the operation of the largest single-campus cyberinfrastructure, UT Grid.

Temple University
Booth Number 2653

This booth shows a preliminary Stateless Parallel Processing Architecture (SPPA) implementation and its Parallel Markup Language (PML) compiler. SPPA promises to deliver high performance and high availability at the same time. Comparisons with direct message passing system will be made during demonstration.

Texas A&M University Supercomputing Facility
Booth Number 2743

Our exhibit will highlight research carried out at the Texas A&M University Supercomputing Facility through the direct use of its computational resources. The research areas supported include computational chemistry, bioinformatics and finite element engineering applications. In addition, we will showcase PROPHESY, an infrastructure for analyzing and modeling the performance of parallel and distributed applications.

TTU - Texas Tech University
Booth Number 2416

Texas Tech University is using high performance computing, visualization, and grids to support research in computational chemistry, dispersion processes in the atmosphere, weather prediction, high-energy physics, and business intelligence. Researchers at TTU use both highly coupled computational clusters in addition to grids of workstations and PC's. Various middleware solutions are used to create these grids including Avaki, NMI R5, SAS/Connect and SORCER. SORCER is a service-oriented technology being developed at Texas Tech University. Texas Tech University is working in collaboration with other institutions of higher education in Texas (HiPCAT) to deliver Grid computing through the Texas Internet Grid for Research and Education (TIGRE) project. Using Beowulf clusters and Internet2 connectivity between institutions, this collaborative effort is developing a grid to deliver both large computational resources and visualization capabilities.

UK e-Science Programme
Booth Number 2140

At the UK e-Science booth project leaders will present and demonstrate projects funded by the UK e-Science programme. Applications will include Engineering, Medicine, Physics, Astronomy and Bioinformatics. Demonstrations of Web Service middleware will cover job submission, Grid markets, data integration and visualisation. The projects will include GridPP, DAME, AstroGrid, EGSO, OMII, RAVE, BRIDGES and others. Programme resources include:
- A National Grid Service with a Grid Operations and Support Centre
- A network of 20 e-Science Centres
- Industrial collaborations with 80 companies contributed $50M-

- Grid Web Services maintained by the Open Middleware Infrastructure Institute
- Research visitors and events at the e-Science Institute
- A national Digital Duration Centre

The UK e-Science projects DiscoveryNet and RealityGrid are winners of HPC challenges at SC2002 and SC2003. OGSA-DAI is nominated for the HPC Software Challenge at SC2004. See www.nesc.ac.uk (the National e-Science Centre) for more information on UK e-Science, including events, projects, people, previous presentations and links to the centres and institutes. Visit the UK e-Science at Booth 2140!

UPC – Unified Parallel C, George Washington University
Booth Number 2740

UPC (Unified Parallel C) is a parallel extension of ISO C aimed at striking a balance between ease-of-use and high-performance. UPC exploits the ease of programming of the shared memory programming model by providing a global address space, while exploiting data locality as in the message passing model. Therefore, UPC is developed around the partitioned global address space (PGAS) model and among its features are constructs that facilitate the explicit control of data and work distribution among the threads such that remote memory accesses are minimized. Among the other advanced features offered by UPC are pointers into the shared and private address spaces and support for different memory consistency models. UPC is gaining rising attention and compilers are now available for many platforms including clusters as well as high-end systems from leading vendors. The UPC exhibit this year will highlight the specifications developments, especially in the areas of parallel I/O and collective operations as well the newly available compiler implementations. New applications and performance measurements will be presented. Posters, Demos, Presentations and UPC programming tournaments will be featured. Information on getting started with UPC, getting help with UPC as well as on how to join the UPC consortium will be furnished.

Universidade de Sao Paulo
Booth Number 647

University of Sao Paulo will present R&D activities related to High Performance Computing and networking. This year the focus will be scientific and engineering applications using Cluster and GRID Computing Systems. It will also cover scientific visualization and multimedia applications over Internet2.

University at Buffalo
Booth Number 2623

The University at Buffalo's Center for Computational Research will display leading-edge research in a wide range of disciplines including GRID Computing, Bioinformatics, Computational Chemistry, Medical Visualization, Urban Simulation & Groundwater Modeling. Also included, will be a presentation of CCR's High School program in Computational Science/Bioinformatics.

University of Houston
Booth Number 2329

Faculty, research scientists, and graduate students will showcase their efforts in high performance computing at the University of Houston SC2004 booth. Demonstrations of digital imaging and visualization, medical applications, and high performance computing will highlight ongoing research in the areas of high-energy physics, adaptive software, computational chemistry, and biomedical imaging. The University of Houston continues to work in partnership with our grid-computing colleagues in the state of Texas through HiPCAT (High Performance Computing Across Texas). The Texas Learning and Computation Center provides computation, visualization, and educational facilities to the University's scientific and engineering community. An Itanium2 Cluster and high-speed distributed storage network (running San Diego's Storage Resource Broker software) join an existing High Performance Computing Center and Sun Microsystems Center of Excellence. Access to these resources has allowed UH develop new technologies that they will demonstrate at the booth.

University of Iowa Research Services
Booth Number 2731

ITS Academic Technologies Research Services (ATRS) is the central facility for research computing, especially high performance computing, at the University of Iowa. ATRS is working to provide an environment for research and education in advanced high-performance computing for interdisciplinary applications of science and technology on the UI campus. Our booth will showcase research projects from laboratories throughout the University that use high performance computing. Featured projects include: the National Driving Simulator System (NADS), parallel computing in CFD from the Iowa

Institute of Hydroscience and Engineering (IIHE) and Center for Global and Regional Environmental Research (CGRER), applications from the Center for Bioinformatics and Computational Biology, and imaging projects from the College of Medicine. We will also demonstrate several projects using grid computing from our Grid computing in research and education group @Iowa (GROW), including applications in Geography, high-energy physics, and thermal-science. We will demonstrate a P2P Java-enhanced distributed computing system. For additional information, please see: www.uiowa.edu.

University of Manchester
Booth Number 2053

The University of Manchester is one of the biggest and most prestigious universities in the UK. The University has provided HPC services to the national research community since the early 1970s. The world's first stored program computer was developed at Manchester in 1948.

Manchester runs the UK national HPC service "CSAR", providing capability supercomputing resources and support to researchers. CSAR supercomputers include a 512 processor Altix and a 512 processor Origin. Manchester HPC experts have extensive experience in applying parallel programming and optimisation techniques to scientific research. Additionally, research including scalable finite elements and linear algebra is undertaken. Manchester also operates local HPC services including Origins, Intel and AMD Beowulf clusters, IBM SP's and more.

The University has a leading reputation in visualization research and services, including a VR research facility development of a Multi-Pipe Edition of AVS and a Parallel Support Toolkit for AVS.

Manchester is an international leader in e-Science middleware and services and develops Grid middleware through national and international projects in Resource Brokering, Description and Discovery, OGSI, Computational Steering, Metacomputing and Access Grid. Other key work includes Grid-enabling scientific applications, maintenance and support of national production Grids, international testbeds, and involvement in standardisation efforts.

University of Melbourne
Booth Number 2637

The SC2004 "Bridging Communities" theme reflects the High Performance Computing research direction at the University of Melbourne, which not only bridges the divide between disparate disciplines such as computational sciences and fine arts, but also

facilitates local researchers becoming part pf global collaborations, such as Grid Middleware (GridBus, NorduGrid), Physics (Belle, Atlas), Chemistry (DNA damage caused by radicals, free-radical damage to paints), Mathematics & Statistics, and Earth Sciences. We will showcase our current activities, our global collaborations, and hopefully we will engender enough interest from delegates for them to be interested in following up and becoming involved in further collaborations with researchers at the University of Melbourne.

University of New Mexico - Center for HPC
Booth Number 327

USC - University of Southern California
Booth Number 2649

USC's first Supercomputing booth will demonstrate a sampling of the depth and breadth of the exciting research activities being done on the University Park Campus in Downtown Los Angeles, as well as it's Information Sciences Institute in Marina Del Rey. Our exhibit will feature demonstrations, cgi animated shorts, and conversations on topics including: University campus supercomputing techniques and algorithms for multiscale atomistic simulation and visualization of very large nano-bio materials visualizing Southern California's faults and earthquakes GRID computing middleware infrastructure immersive technologies such as 3D face modeling and animation, immersivision panoramic video technology, immersive audio, and haptics and a PIM chip representing the first smart-memory device designed to support virtual addressing and capable of executing multiple threads of control. Participating USC organizations include the University's Center for High Performance Computing and Communications (HPCC), Information Sciences Institute, Collaboratory for Advanced Computing and Simulation, Integrate Media Systems Center, and the Southern California Earthquake Center.

University of Tokyo
Booth Number 510

In the booth, we show (1) Data Reservoir Project and (2) GRAPE-DR Project. Data Reservoir is a file system and operating system transparent data sharing system that shares data in low level layer of storage using very high bandwidth high-latency Long Fat pipe Network. At Bandwidth Challenge at SC2003, Data Reservoir received distance bandwidth product award and network technology award by 7.5Gbps disk-to-disk data transmission on 15,000-mile network. The GRAPE-DR Project is a newly started project. The goal of GRAPE-DR is to build PFLOPS level computing engine combined with data-sharing infrastructure that utilize 100Gbps level Internet connections. The main

features of GRAPE-DR are highly integrated processor design, high-performance on actual scientific programs and tight integration of computing engine, file system and high-speed network infrastructure. At the booth, you can see latest results from above two projects and hardware developed in Data Reservoir Project.

Center for Computational Sciences, University of Tsukuba
Booth Number 643

The Center for Computational Sciences, University of Tsukuba is dedicated to research in computational science and high performance parallel processing. In this exhibition, the Center and its partner organizations present HPC activities ranging from hardware and software systems to various computational science applications. Our presentations in computational science cover state-of-the-art results over wide areas of research in particle physics, astrophysics, condensed matter physics, and biophysics. The results include the largest class of QCD calculations in the world, epoch-making astrophysical simulations, and novel attempts toward first-principle materials simulations. Through the exhibition, we provide a new approach to the next generation of computational sciences. For next generation platforms for HPC, we present an on-going project (supported by JST-CREST) to develop an ultra low power, high-density, cluster system in which 16 CPUs are packed in just 1U unit. A new project for developing the Heterogeneous Multi-Computer System as a hybrid computational resource for multi-physical simulation is also presented. We are also developing various software systems: OmniRPC Grid-RPC system, Omni OpenMP compiler for distributed shared memory environment, very high-speed FFT library, a large scale database management system, a large scale cluster management system, and a new paradigm of large scale parallel processing programming schemes.

University of Utah
Booth Number 2335

The research exhibit for the University of Utah will be comprised of three entities. The Center for High Performance Computing (CHPC) provides large-scale computer resources to the campus. CHPC's projects come from a variety of disciplines requiring large capacity computing resources and advanced networking. The Scientific Computing and Imaging (SCI) Institute is a leader in scientific computing, scientific visualization, and imaging research. Among SCI's long-term scientific computing goals are technical research of computational and numerical methods, and exploration of integrated problem solving environments. The Center for the Simulation of Accidental Fires and Explosions (C-SAFE) was created by the University of Utah and DOE's Accelerated Strategic Computing Initiative (ASCI). The objective of C-SAFE is to provide a system comprising a problem-solving environment in which fundamental chemistry and engineering physics are fully coupled with non-linear solvers, optimization,

computational steering, visualization and experimentation data verification, focusing on accidental fires and explosions.

University of Vienna, Institute for Software Science and Vienna University of Technology, Institute for Software Technology and Interactive Systems
Booth Number 2437

Researchers at our organizations are developing two novel infrastructures: GridMiner for knowledge discovery in Grid databases and the Vienna Grid Environment (VGE).

The GridMiner project addresses all aspects of the knowledge discovery process. The kernel parts of GridMiner include services for data mediation, data preprocessing, data mining, OLAP, visualization, and workflow management of Grid services. A Graphical User Interface and a knowledge base support data exploration tasks. The results of data mining and OLAP are represented by the Predictive Model Markup Language, and the OLAP Model Markup Language. GridMiner is implemented on top of Globus Toolkit 3 and OGSA-DAI database services. The exhibit showcases the architecture and functionality of a running GridMiner prototype operating on several medical databases.

The VGE presentation will provide an overview of VGE architecture and infrastructure, and live demonstrations with Grid services for advanced medical image reconstruction. VGE is a secure, service-oriented Grid infrastructure based on standard Web Services technologies that automate the provision of HPC applications as Grid services and simplifies the construction of client-side applications. As a key feature, VGE supports a flexible QoS negotiation model that enables clients to dynamically negotiate QoS guarantees on execution time and price with potential service providers.

VPAC - Victorian Partnership for Advanced Computing
Booth Number 449

The Victorian Partnership for Advanced Computing Limited (VPAC) is a high performance computing organization formed in 2000 by a consortium of six universities in the state of Victoria, Australia: La Trobe University, Monash University, RMIT University, Swinburne University of Technology, The University of Ballarat and The University of Melbourne. VPAC's mission is to act as "an advanced computational research bridge to link academic Members' expertise with growing opportunities in industry". With several research interests, including Bioinformatics and Life Sciences, Environmental and Geoinformatics, Geodynamics and Computational Engineering, VPAC is focused on providing cutting-edge and sustainable solutions to real world problems solvable by advanced computing. VPAC achieves this by associating with the best people and organisations nationally and internationally, and by pursuing the establishment of development environments that allow for innovation.

Virginia Tech
Booth Number 2435

Virginia Tech's research exhibit will feature information on current research projects that have been developed through the University's initiative in Computational Science and Engineering:
http://www.research.vt.edu/researchinitiatives/abstract_computational_sciences.html

The Terascale Computing Facility TCF (http://www.tcf.vt.edu) and System X will be highlighted. Information on current research projects at Virginia Tech will include the development of the next generation of large space systems (joint with DARPA and NASA LaRC), the Virginia Bioinformatics Institute (VBI http://www.vbi.vt.edu), and others. Information on Virginia Tech's academic programs will also be available at the booth.

WestGrid - Western Canada Research Grid
Booth Number 2732

WestGrid provides high performance computing, networking, and collaboration tools to over 250 researchers at seven institutions in western Canada. Resources available at participating institutions include:

1. University of Alberta - SGI Origin 256 processor system for shared-memory parallel computing, plus a 5 Terabyte disk storage system and 10Terabytes of tape storage.

2. University of Calgary - HP SC45 144 processors for message passing parallel computing, plus a 5 Terabyte disk storage system, and the "Genematcher2" genome sequence analyzer.

3. University of British Columbia/TRIUMF - 1008-processor IBM blade cluster for naturally parallel computing jobs, plus a 10 Terabyte disk and 70 Terabyte tape storage facility.

4. Simon Fraser University - A scalable network storage facility consisting initially of 24 Terabytes of disk and 135 Terabytes of tape silo capacity and a 20-processor, 8 graphics pipe Onyx UltimateVision system for remote visualization and collaboration.

5. Collaboration and Visualization facilities include video conferencing and document sharing capabilities, built on the Access Grid technology, enhanced with real-time

distributed visualization capabilities, virtual reality and other advanced collaborative facilities.

Funding has been provided by the Canada Foundation for Innovation, Alberta Innovation and Science, British Columbia Knowledge Development Fund, the collaborating institutions, and private sector partners.