

STRATEGIC PLAN FOR 2003
(Preliminary ideas presented to Dean)

Department of Computer Science
Louisiana State University

VISION

To gain enhanced visibility and national prominence, the Department of Computer Science at LSU will focus its emphasis on three core research areas that are contemporary, still maturing and also complement the skills of existing department faculty. Research in *networking* has garnered national attention due to the immense potential of computer, sensor and optical networks for exploiting information technology and providing users the ability to control and understand the natural environment. High-end *scientific computing and visualization* with implementation in Grid environment has taken on an increased significance to understanding of large-scale scientific issues including those related to nanobiosystems, DNA computing. Due to the enhanced national security environment, research in the area of *cyber-security/information assurance* is in high demand and will continue to intensify over the next several years. Achieving critical mass through new hires in these areas will have an immediate impact on the Department's competitiveness for federal funding and for ability to gain national recognition.

MISSON

In recent years, we have established strong research groups in sensor networking – networking laboratory, high-performance computing – Biological Computation and Visualization Center (BCVC), and cyber-security. We have received approximately \$1 million/year from AFOSR, NASA, DARPA, DOE and other federal agencies. The department has recently received about \$2.5 million from NSF in the areas of sensor networking and security. The research conducted by the faculty has been featured in news articles and popular journals including Science and Computers in Physics. Awards and honors received include the IEEE Harry Goode, Allen Newell, and distinguished alumnus awards, IEEE Fellow, the Editor-in-Chief of the IEEE Computer Magazine, and editors of several highly reputed journals.

The department has been increasingly stronger in its educational program by having a large number of graduate and undergraduate students including women and minorities. The department has 51 PhD, 85 M.S. and 250 undergraduate students. It also offers a wide spectrum courses in information technology for both science and non-science majors. We have developed new courses in the areas of computer and sensor networking, scientific visualization and software engineering. Our students gain highly practical training in software development. Strong background in information technology and high-quality dissertation research make our students highly competitive in job searches. Our dual-degree program in physical and computer sciences has been highly successful. Our graduates have taken research positions at Silicon Graphics, Microsoft, AT&T Bell Laboratories, Oak Ridge National Laboratory, and faculty positions across the United States and the world such as the University of Pittsburgh, University of Georgia, University of Alabama, and Drexel University. Undergraduates are also being exposed early to research through NSF-REU grants.

GOALS

Over the last several years, the department has significantly contributed to the areas of sensor networking, cyber security and high-performance scientific computing. It will continue to lead this effort by providing:

Information technologies such as networked intelligent systems, metacomputing framework for scientific simulations including nano-bio-systems, virtual reality, different application softwares;

Education in networking, cyber-security, high-performance scientific computing, visualization, grid computing for both technical and non-technical students.

PLANNING PROGRESS REPORT (2002-2003)

Strategic Direction 1: To strength research in the three focused areas, networking, scientific computing and visualization, and cyber-security:

1. *Seek Funding:* We have been successful in getting grants from NSF, MURI and a few other funding agencies through intelligent system, sensor networking and high-performance computing groups of the department. Some of these grants will start from July 1, 2003. We will seek more funding from NSF's KID, NASA' Information Power Grid, DOE's ASCI, DARPA's MURI, NSF's ITR, NSF's NES, NIH-BECON.
2. *Parallel and Grid Computing:* Dr. Iyengar, Dr. Acharya and Dr. Karki's groups have been using parallel computing facilities provided by BCVC and LSU-CAPITAL to enhance high-end computational research and are working towards extending them to a Tera-Grid computing framework.
3. *Visualization:* Establish a visualization laboratory that will be used to develop/apply various techniques for different scientific needs including immersive and interactive visualization. Several visualization and imaging projects have already been started.
4. *Faculty Hiring:* We have recently hired new faculty in the areas of networking (Drs. Duresi and Wilson), scientific computing and visualization (Drs. Allen, Karki and Siedel). Some of these are joint positions with LSU-CAPITAL. We plan to hire more faculty in the focused areas on the recommendation of recent departmental review plan.

Strategic Direction 2: To strength education in the three focused areas: Dr. Iyengar and others were able to get a half-million dollars from NSF for IT training.

1. We have introduced new courses in sensor networking and scientific visualization. We will revise the existing courses and develop new courses towards strengthening the focused areas at undergraduate level.
2. We will extend our current dual degree program in which a student get a PhD in physics and an MSc in computer science to biol-IT interdisciplinary education
3. We will further enhance our current web-based courses through the use of the recently established Access-Grid facility to expose our faculty and students to the outside world.
4. We have been improving graduate student fellowships (Teaching or Research Assistantships) in quality and quantity to attract outstanding students to the department
5. We will continue the computational workshop for underrepresented group that was conducted in January 7-11, 2003 to motivate undergraduate students to graduate program and research in computer science as well as to recruit more underrepresented students

Strategic Direction 3: To act as the IT engine for distributed, multidisciplinary collaborations in research and teaching at LSU and around the world

1. *Tutorials:* Provide tutorials on parallel computing.
2. *Visualization:* Provide scientific visualization needs through the establishment of a modern visualization laboratory. We have already initiated some visualization projects.
3. *Multiscopic computing:* Synthesis of currently fragmented subareas of computational sciences by seamless software engineering of, for example, engineering and first-principles physics approaches.
4. *Outreach to nonmajors:* We have been providing web-collaboration software tools for both technical and nontechnical students to be able to participate actively and interactively in web-based courses.

ASSESSMENT BY REVIEW PANEL

An external advisory committee consisting of seven distinguished scientists from universities and government laboratories has recently reviewed the department of computer science and made a very satisfactory assessment of our graduate and undergraduate programs. The panel has made several recommendations that we will implement in 2003. The committee will convene once a year to assess and advise on the following issues: i) student recruitment and retention, with special emphasis on minorities; ii) students' progress in course work, multidisciplinary research, and internship programs; iii) graduation time and job placement of dual-degree students, and iv) faculty's contribution in research and education.