Computer Science Department – NC State University

Summary
1-July-2005 to 30-Jun-2006

General. The Department of Computer Science at North Carolina State University will be celebrating its 40th anniversary in 2007, and as such it is one of the oldest CS departments in the nation. The mission of the department is to: (1) create and disseminate knowledge by constituting a scholarly community focused on research and education in the area of Computer Science, (2) better the state and nation through research in the science and technology of computing, and (3) through our educational programs, equip our students to be competitive, to succeed in their profession, and to contribute to society. We offer the degrees of Bachelor of Science, Master of Science, Master of Computer Science, Master of Science in Computer Networking, and Doctorate in Computer Science.

Students. In 2005-2006 the department had an average of about 640 (S06=610, F05=667) undergraduate students, and over 360 (F05=376, S06=353) graduate students, about 135 of which are PhD students. In 2005-2006 we awarded 129 Bachelor’s, 100 masters (about 40 are with thesis), and 12 PhD degrees. The number of graduated PhDs is a high for the department second year running. This rate is comparable to that in top 13 to 24 computer science departments in the nation1. In fact, we are among the top 20 or better in the number of awarded Bachelor's and Master's degrees in Computer Science and in the sponsored research expenditures2. Our current student-credit hours per faculty are still the highest in the college. While the number of undergraduate students has declined over the last several years (a national trend), our graduate program has grown considerably in the same time-period. Indications are that the undergraduate enrollments are beginning to stabilize. In the mean-time, we are taking advantage of this by re-structuring our introductory undergraduate courses to better fit the needs of our majors (smaller classes, more personalized and hands-on teaching models), to increase the attractiveness of our program, and to increase retention of students already in our program. We are also re-structuring our junior and senior-level course suite to reflect globalization and changing trends in employer expectations to produce the so called “T-shaped” students, i.e., students who have both the needed domain knowledge and skills depth, and an appropriate breadth (e.g., communications, business, process, practice, and interdisciplinary knowledge and skills). At the graduate level, we have (jointly with ECE and College of Management) introduced a Service Sciences initiative that will provide an additional set of highly sought-after skills to our masters level graduates. Our goal is to stabilize our PhD production at about 0.5 to 0.8 PhDs per year per tenure/tenure-track faculty member, and to stabilize our undergraduate and graduate student to faculty ratios at the level commensurate with that of our peers in other research intensive universities.

Faculty and Staff. During the 2005/06, we had 41 tenured and tenure-track faculty, three (3) emeritus faculty (one in phased retirement), 6 lecturers, 5 adjuncts, 18 associate faculty, one affiliate professor, and one research professor. We have three named professorships, one of our faculty is a member of the National Academy of Engineering, and several are Fellows in prestigious professional societies. During the 2005/06 we had about 16 staff supporting general departmental administrative, operations, and information technology activities, and another 12

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1 CRA/Taulbee 2004/05 data from March 2006.
2 Among CS departments in Schools of Engineering, ASEE data – estimated.
staff on specially-funded projects.

Two new faculty and several research and administrative staff joined the department this past year, one faculty member started phased retirement, and nine faculty successfully went through the promotion, tenure and reappointment process (3 were promoted to Associate Professor rank and six were re-appointed to second term in the Assistant Professor rank). Several faculty were on scholarly leave of absence during the year. Dr. Mladen Vouk was appointed as the Head of the Department starting with July 1, 2006.

In the 2005-2006 academic year, faculty as a group published over 40 refereed journal papers, over 170 refereed conference and workshop papers, 2 books and about 20 book chapters and other edited works. They also produced over 60 other publications, tutorials, editorials, news articles, or media appearances. Over the academic year, faculty gave over 180 professional talks related to their research and educational activities. A number of our faculty (10+) serve as editors and on editorial boards of leading professional publications, and as members and officers in most prestigious professional societies and organizations in their areas of specialty. Of course, Computer Science faculty continued the tradition of being both organizers and participants in a number of prestigious professional events, such as flagship computer science conferences, as well as delivering services and functions to the university, the state, professional societies, and the nation.

**Facilities.** During the academic year 2005/2006 the department has done well. We moved into the Engineering Building II in the Fall05/Spring06 time-frame. We are now housed in three locations on campus. The new building brings a majority of the department’s academic and research units into one consolidated space. This relocation is already enhancing faculty-student interaction and, with its new teaching and research labs, it is significantly strengthening the student learning experience as well as providing essential physical resources for faculty research.

**Accolades.** In 2005/2006 faculty and students received a number of awards and accolades. Among them is a new CAREER award (Dr. Ma) for a total of 16 in the department, the prestigious DOE Early Career Primary Investigator Award (Dr. Ma), a “Woman of Influence Award” (Dr. Anton), two IBM Ph.D. Fellowships (Ms. Smith and Mr. Breaux), one Cisco Fellowship (Mr. Breaux), inaugural Kelly/ISSA Student Fellowship (Mr. Beers), and a Junior Ethics Research Fellow award (Mr. Wright). Dr. Bitzer was inducted into the Consumer Electronics Association Hall of Fame, Dr. Williams received an NC State University Academy of Outstanding Teachers award, and Dr. Antón was named to the CRA Board of Directors and to the NSF CISE Advisory Committee. It is also very satisfying that NC State was named as “One of Nation's 25 'Most Connected' Campuses” in 2005/6 by the Princeton Review, in part based on the strength and the breadth of our computer science program. To top everything off, one of our senior design project teams (mentored by Dr. Fornaro and Ms. Heil) has for the second time in that many years won the first place at the IEEE CSIDC competition, a place that none of the US universities have ever held in the 7 year history of the competition before NC State University’s first win last year.

**Budget and Funding.** In the fiscal year 2005-2006, the departmental budget was about $6 million in state funds. In the same period, we received about $3+ million in new external research funding (active research grants amount to about $19.2 million), and we generated about $130k in release time. We estimate that in the fiscal year 2005-06 our overall research expenditures (all sources) were well over $6 million. The Department also received about
$500k in gift funds, and over $4 million in in-kind donations. We expect that in the future non-state appropriated funding, i.e., research funding and gift-based scholarships and other activities will play an increasing role in the development and growth of the department. The goal is to, in a reasonable time period, double our research funding per faculty member as well as our gift-based activities.

**Research and Expertise.** Our key areas of expertise are in *Theory* (Algorithms, Theory of Computation), *Systems* (Computer Architectures and Operating Systems, Embedded and Real-Time Systems, Parallel and Distributed Systems, Scientific and High Performance Computing), *Artificial Intelligence* (Intelligent Agents; Data-Mining, Information and Knowledge Discovery, Engineering and Management; eCommerce Technologies; Information Visualization, Graphics and Human-Computer Interaction), *Networks* (Networking and Performance Evaluation), *Security* (Software and Network Systems Security, Information Assurance, Privacy), *Software Engineering* (Requirements, Formal Methods, Reliability Engineering, Process and Methods, Programming Languages), and *Computer-Based Education*. The department has a number of teaching and research laboratories, centers and other facilities that support its educational and research mission. The Department is in the process of creating several new and self-funded research centers which we view as a major stabilizing and catalyzing force in advancing our research activities and recognition.

**Multidisciplinary Efforts.** We foster strong multidisciplinary and collaborative interactions and long-term ties with a number of other North Carolina State (NC State) departments, programs, centers and divisions, and with other universities, industry, government agencies and laboratories, and with partners on campus and beyond. This includes joint appointments and/or faculty affiliation in the NC State Bioinformatics Program, Biomedical Engineering Department, Electrical and Computer Engineering Department, Genomics Program, Information Technology Division, Operations Research Program, Mathematics Department, Statistics Department, as well as with Duke University, the University of North Carolina at Chapel Hill, Oakridge National Laboratory, and several national centers of excellence. Especially noteworthy is the interaction of our new Center for Visualization and Analytics with the UNC Renaissance Institute (RENCI) that has resulted in installation of the state-of-the-art visualization facilities in our new building and in the construction of the RENCI Engagement center on the Centennial campus. We expect that in the future a number of CSC activities will be interdisciplinary, especially in the context of emerging fields such as Genomics, Bioinformatics and Biometrics.

**Development and External Relations.** We have a very strong corporate and industry related program that interacts with leading information and other technology companies in the country. But the department has especially strong ties with companies in the Research Triangle area and in North Carolina. The department has a number of undergraduate and graduate teaching and research laboratories that leverage NC State’s leading-edge networking and computational infrastructure as part of our external relationships. Our faculty and students reap a special benefit from the outstanding infrastructure and research facilities located on NC State’s Centennial Campus. A particularly important part of our external activities is our e-Partners program and the endowment-based support for our Senior Design Center. Our external relations program has last year created several new endowments including the new building related “Pathway to the Future” endowment, and the Hatch scholarship and Martin scholarship endowments. We view interactions with industry and alumni as an increasing source of funding for departmental activities. Our development and external relations program will play an especially important role in the context of our department's forthcoming 40th anniversary.