Executive Summary

On January 16, 2011, the Graduate School of Texas Tech University established a four-person committee composed of three internal reviewers (Dr. Sam Dragga, College of Arts & Sciences; Dr. Siva Parameswaran, College of Engineering, and Dr. Surya Yadav, College of Business) and one external reviewer (Dr. Gurdip Singh, Head of the Department of Computing and Information Sciences at Kansas State University) to conduct an assessment of the graduate program of the Department of Computer Science. On February 14, the committee members met with the interim chair, Dr. William Marcy, as well as with graduate faculty and graduate students in order to discuss a variety of issues. In addition, the committee gathered privately both before and after these meetings in order to exchange observations. On February 15, the committee met again to arrive at a consensus regarding conclusions and recommendations. Subsequent discussions were conducted through exchange of e-mail messages and resulted in the completion of this report.

While the program enjoys vigorous leadership and appropriate facilities and is effectively recruiting non-resident students, it could do better in

- recruiting resident students
- supporting its students with scholarships and stipends
- offering its students a wider variety of courses each semester
- mentoring assistant professors
- energizing associate professors
- supporting and integrating software engineering studies
- cultivating a higher profile in publication and funded research

The committee’s impression is that in recent years the department has drifted into being more faculty-centered than student-centered and more faculty-centered than research centered, creating a program that often meets the needs and interests of the faculty instead of the students and in a manner that does not result in greater research productivity for the faculty.

Program Overview and Vision

Overall, the reviewers agreed that the Department of Computer Science’s graduate program is functioning at a “good” level. The Department is divided into theoretical and applied studies. Non-resident students are more likely to choose the theoretical focus, at the PhD level or at the MA level in preparation for the PhD. Resident students are more likely to choose the applied focus as preparation for jobs in industry. The committee’s impression is that theoretical studies are given extraordinary privilege and that applied studies are given insufficient attention by the faculty—a condition that would likely have to change if the program is to recruit and retain a greater proportion of resident students.

The joint administration of the MS. in Software Engineering by the Department of
Computer Science and the Department of Industrial Engineering is a constructive effort to remediate its impoverished condition and offers a noteworthy opportunity for it to grow in size and reputation. It is nonetheless essential that faculty in Computer Science give their unqualified support to students in applied studies.

**Faculty Productivity**

Faculty productivity is satisfactory. In 2006, following the last graduate program review, the teaching load for faculty was adjusted from a standard 2-2 to 2-1 and 1-1 on the expectation that this change would lead to greater productivity in publications and funded research. In some cases, the reduced teaching has generated more publications and funded research; in other cases, little or no change in productivity has resulted.

The reviewers believe that the department has made good hires in the last several years but that assistant professors benefit from mentoring and support. Full professors could assist new faculty in setting a research agenda, in obtaining research funding, in forming research groups, in coordinating research efforts, and in exchanging ideas for both research and teaching. Full professors could also serve as exemplars for those associate professors who are not making adequate progress toward promotion to full.

To solve these problems, the committee recommends

- the reduced teaching load (of 2-1 or 1-1) be continued, at the discretion of the chair, only for those faculty who have satisfied the expectation of increased productivity in publication and funded research.
- the department’s next two hires be at the level of full professor in order to provide leadership in department administration and in the organization of research initiatives.

**Quality and Quantity of Graduate Students and Graduates**

The review committee was impressed with the quality and quantity of graduate students in the program as well as by the quality of the jobs, both in academic and corporate settings, that graduates have accepted. GPAs and GRE scores are at expected levels. Students report excellent working relationships with their major professors. This area merits a rating of “very good.” Nevertheless, three significant problems are apparent.

First, the great majority of students admitted to the program are non-residents. The program thus doesn’t have the level of diversity considered ideal for the learning environment and for the future of the discipline and the profession. Greater efforts in recruiting resident students are necessary.

Second, the majority of students admitted to the program are admitted without financial support. The department has few ongoing GPTI/GA/RA positions, and many students enter the program hoping to be appointed as GAs/RAs by faculty with funded research projects. This situation makes it difficult for students without external sources of support to complete the program, especially the PhD program. Many students admitted to the PhD program without support will switch to the MS program after the first year if they fail to obtain a GA/RA position. Students typically graduate with considerable debt, which deters their ability as alumni to make generous donations to department scholarships.

Third, students report feeling isolated from each other, a situation potentially exacerbated by the competition for GA/RA positions. They regularly interact with few other students in the program.
To solve these problems, the committee recommends

- the department cultivate greater scholarship funding with which to target resident students for recruitment and retention.
- the department be given greater funding for a stable corp of GA/RA/GPTI positions, admitting no student to the PhD program without three or more years of guaranteed funding (assuming adequate degree progress).
- the department offer students more opportunities to socialize, support each other, and collaborate on assignments and activities.

**Curriculum and Programs of Study**

The review committee was impressed with the offerings and areas of specialization within the department and found the offerings compatible with departments of similar size. This area merits an overall rating of “good.”

The course inventory includes courses infrequently or never offered, and few organized courses are offered in any given semester. Students have a diminished ability, as a consequence, to take the courses they are especially interested in (or came to TTU with the expectation of taking). Those courses that are offered are often overenrolled. Nevertheless, PhD students are expected to take 16 organized courses and 4 independent studies (7000s), whereas other degrees in the College of Engineering require 14 organized courses and 6 independent studies (7000s).

To solve these problems, the committee recommends

- the course inventory be pruned of those courses rarely/never offered.
- the department offer more graduate course each semester.
- the department consider changing its requirements from 16 to 14 organized courses in order to give students greater opportunity to study in their area of interest.

**Facilities and Resources**

The department’s facilities, both its space and available technology (including access to high-performance computing), appear to be very good and meet the needs of faculty and students.

The Engineering Job Fair, however, does not meet the needs of graduate students in the Computer Science program. Few, if any, potential employers of its MS or PhD graduates participate.

The committee recommends that the organizers of the Engineering Job Fair make a concerted effort to secure the participation of potential employers in computer science.

**Conclusion**

The Department of Computer Science is to be commended for the many things it is doing to produce excellent graduate students and to advance the academic reputation of Texas Tech University. The issues of concern identified in this report should be addressed as soon as possible in order to assure the graduate program’s continued success.