Texas A&M University Commerce
Department of Computer Science
Graduate Program
Visiting Committee Report

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Submitted by:

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I. OVERVIEW

OVERVIEW

The Department of Computer science has a long and proud record of excellence at both the undergraduate and graduate levels. In addition, it boasts of being one of the earliest computer science programs in the state of Texas. Overall the graduate program consists of a qualified faculty, an enthusiastic and well-prepared student body, and a strong and varied curriculum.

The Department has a comprehensive Mission Statement for the department as a whole. However, the Purpose Statement and subsequent Goals presented in the Graduate Program Review primarily referred to the undergraduate program, not the graduate program.

The 2 significant changes cited during the past 6 years were the upgrading of the faculty credentials to Ph.D. level and the development of a comprehensive assessment plan. The department hopes to increase the number of faculty this year by filling 2 new positions and will continue with the current assessment plan.

STRENGTHS

The department is to be commended for having a comprehensive and well written Mission Statement. It addresses the broad range of careers and employment locations that the department prepares their graduates to work in.

The assessment program is well developed and thorough, perhaps overly so.

The faculty demonstrates excellence in grant writing and has active publication record. They have built good relationships with community industry. They have involved students as active members in their research programs. The graduate students in the program were positive about their experiences in the program.

WEAKNESSES

In the report there is significant blurring of the lines between the graduate and undergraduate programs. It was often difficult to determine whether the discussion applied to the graduate or undergraduate program. In several cases, the discussion clearly referred to the undergraduate program. For example, there are no separate mission statements or statements of purpose for the graduate program. Clear guiding statements may help the faculty and department administration as they move forward with plans. In Section IV more than 10 pages of the report were exclusively dedicated to undergraduate course objectives.

Significant concerns were expressed by administration and faculty concerning the student/faculty ratio in some graduate classes. There is a proposal to add additional graduate programs, but no clear statement of where resources to meet the increasing need are to be found.
There appeared to be a tense atmosphere among faculty. It is unclear what the source of such perceived discord might be. However, there is clearly a great deal of stress related to the student/faculty ratio and the large class sizes. This might be a goal for all faculty members to work towards a stronger level of collegiality.

RECOMMENDATIONS

Construct a separate Mission Statement and Statement of Purpose for the graduate and undergraduate programs. Establish specific, independent goals for the graduate program.

Consider the faculty/student ratio when admitting graduate students and in both short-term and long-term planning. A reduction in the number of students admitted should be considered.

Budgets should be analyzed with the administration to determine the support needs of faculty and students and how these can be met.

Make building stronger collegial relationships among the faculty a priority.

The committee recommends that the graduate program faculty look toward the future of the graduate program, and additions to it, with careful, constructive planning.
II. CURRICULUM & PROGRAM PROFILE

OVERVIEW

Graduate students are admitted to the program based on an evaluation of undergraduate transcripts and general GRE or GMAT scores. In addition, international students must submit TOEFL scores and financial statements. A bachelor's degree in computer science or a related discipline is preferred. However, students not having the degree but with programming skills may be considered. The faculty estimated that 35% – 40% of the students admitted have a background in a discipline other than computer science. Approximately 10% of the applicants are not admitted.

Upon admission and arrival, students attend an orientation at which they receive degree information, are assigned an advisor, and are provided other pertinent program information. New students also take a competency exam to determine if leveling work is necessary. A significant percentage of the students take the leveling courses.

The graduate program has 2 options – Thesis (24 + 6 hours) and Non-Thesis (36 hours). All students complete a 5 course core and complete one of 5 available specialties consisting of 2 or 3 courses. Computer science electives are taken to complete the required number of hours. According to the chair, approximately 10% – 15% of the courses are offered online. Faculty are considering the possible addition of new specialties.

The number of graduate student applications and acceptances has continually increased over the past few years. The graduate report indicates 224 graduate students in fall 2009. According to the Department Chair, the current (spring 2011) number of graduate students is approximately 350. Unfortunately, few of these students come from the department’s undergraduate program.

The number of graduate degrees awarded has remained reasonably consistent over the past several years with a range of 54 to 84 per academic year. The departments states that approximately 95% of the students admitted successfully complete the degree in just over 2 years.

Class sizes for graduate courses for the past 2 semesters range from relatively small (10 – 12) to excessively large (45 – 90). In some cases there is a significant imbalance in 2 sections of the same course. Overall, most classes are quite large. In the current semester (spring 2011), 8 courses have enrollments greater than 45 students.

STRENGTHS

The department admits a large and academically strong student body. Most students admitted have an undergraduate background in computer science making for stronger courses at the graduate level. The faculty expressed the advantage of a large student population being that they can be very selective about the students they choose to work with in research. They also
indicated that they believe that the top 20% of graduate students are truly exceptional academically.

The students are satisfied with the advising process and speak very highly of the faculty. They expressed enthusiasm and satisfaction with the program overall.

The graduation rate of 95% is exceptional.

The choice of thesis or non-thesis program and the option of 5 specialties is good for the students, allowing them to focus on their particular interests. The department offers a wide variety of course topics including offerings in summer and the mini-semesters. The offering of some online courses is advantageous to some students. Overall, the department offers a strong curriculum which prepares students for industry.

WEAKNESSES

Classes are too large for faculty to be able to reasonably manage all that is necessary to teach, grade, and assist students effectively. In addition, the time required to manage the large classes takes away from research time for faculty and from faculty-student interaction time.

The evaluation of credentials of applying graduate students, particularly those from non-U.S. schools, is very difficult. As a result, although the students admitted “look good on paper,” interviews with the faculty indicate that some do not have the programming skills necessary to be successful.

The students had several comments regarding the curriculum. There was concern that the core included a great deal of material repeated from their undergraduate backgrounds and would like a smaller core or options in the core. They also expressed a desire for a larger variety of course topics.

RECOMMENDATIONS

In discussions with all groups, large class size seemed to be the matter of primary concern. The committee agrees that the excessively large class sizes are a major problem for all parties concerned. With this in mind, the committee has compiled the following list of suggestions as possible short-term and long-term solutions to this situation. The committee is also quite concerned that the department cannot reasonably handle current program, yet they are proposing a new Ph.D. program and a new professional MS degree with internships

Excessive Class Sizes

1. Reduce graduate admissions to bring number of graduate students to a size that can be managed in a reasonable manner:
   a. Faculty will have class sizes that are reasonable (30 to 40 as beginning target)
   b. Faculty will be able to provide support (office time, etc.) to students
   c. Faculty will have more time for theses, research projects, etc.
   d. Students will be able to get classes on schedule without waiting lists
2. Establish and enforce course caps and to balance course sections
   a. There are numerous examples of very unbalanced sections of some courses
      i. Fall 2010 CSCI 527: Suh – 54 students, Deignan – 24 students
      ii. Spring 2011 CSCI 520: Creider 12, Arslan 37
3. Hire more graduate assistants
   a. To support faculty course administration & grading
   b. To provide assistance/tutoring to students in courses
4. Hire more adjunct faculty for short-term relief
5. Add full-time faculty positions
   a. Add lecturer positions that ONLY teach with no research requirements (teach 5 courses per term)
6. Teach more summer courses & mini-mester courses to help reduce demand in long term
7. Allow students to test out of core courses (then take an additional elective)
8. Use a cohort system for first year students (first year students take same required classes together) – allows planning of sections to allow adequate seats
9. Both students and faculty exhibited a negative attitude related to the large class sections.
10. If university wants department to maintain current graduate student levels, the department needs more support in terms of faculty, graduate assistants and other resources.

Curriculum

While students expressed a desire for additional topic offerings, more options in core, and new specializations, it is the recommendation of the committee that no major change in the curriculum be made under the existing student-faculty ratio.
III. STUDENT PROFILE

OVERVIEW

The department has a large, well-qualified group of graduate students, who are enrolled in the program. Approximately one-half are enrolled as full-time students (at least 9 hours) and on-half are enrolled part-time (less than 9 hours). Students complete their degree in an average of 2.05 years. The annual graduation rate is 50% which is consistent with the 2.05 year completion time. Approximately 95% of students admitted complete the graduate degree in computer science. Plans are underway to establish a doctoral program with a focus on computational sciences and a second master’s program with an internship component.

In interviews with students, they indicated their concern with the lack of support for job placement and lack of support for internships during their course of study. They also seemed to have minimal knowledge of support and social services on campuses such as the career center and the department’s ACM organization. However, the students voiced strong support for their faculty, the advising process and an overall satisfaction with the graduate program. The list below provides an overview of the comments made by the students to the committee.

Students expressed concerns regarding the following issues:

1. Large course sizes (does not allow time with professors for help)
2. Too few seats available; students unable to get courses they want/need
3. Lack of scholarships and other financial assistance
4. Lack of graduate assistants to provide assistance for courses (tutoring)
5. Lack of assistance for internships
6. Lack of new course topics
7. Screening Exam (no prior information on content)
8. Lack of content consistency between different sections of same course taught by different faculty members
9. Would like a smaller core or options within the core
10. No department identity on campus (in Journalism Building)

Students expressed satisfaction with the following:

1. Advising process
2. Quality and efforts of faculty

STRENGTHS

Students have a high overall satisfaction with the program.

The pool of graduate students enrolled in the graduate program is diverse in terms of background. In fact, this is one of the department strengths that were explicitly mentioned by the graduate students who met with the review committee.
As many as 95% of the students who enroll in the program complete the degree, which is an indicator that the department has a very good retention program. The average time to completion is 2.05 years.

WEAKNESSES

The number of graduate assistantships offered to students, in the form of teaching or research assistantships is extremely small. This has a dual negative effect. First, the students enrolled in the program have no options for financial support during their graduate studies. Second, the lack of teaching assistants places an additional burden on the faculty teaching the large graduate classes, and consequently limits the amount of assistance that students can receive for a given class.

There is no or very little continuity between the undergraduate and graduate program, as very few of the undergraduates choose to pursue a masters degree in the department. This has also the effect that students who are involved in research projects with the faculty end up spending very little time in the projects they work on because the graduate program only lasts for two years.

The department does not seem to keep track of its alumni and job placement. In the Graduate Program Review provided to the review committee, information on their current working place was provided for only a handful out of hundreds of graduates. The connection with alumni is very important, as the success of its alumni can reflect back on the department.

Students are not well-informed of campus resources.

Few students from the master’s program continue their education into a Ph.D. program.

RECOMMENDATIONS

It is recommended that a sustained effort be made to significantly increase the number of graduate assistantships. Assistants are needed to support the faculty as both teaching assistants and as research assistants. The computer science program is one of the largest on campus, and yet it seems to receive only a very small number of such assistantships. At a minimum, all classes with an enrollment of at least 10 graduate students should have a graduate assistant to assist the faculty with the class preparation and grading. One graduate assistant could probably handle 2-3 such classes in a semester (depending on the size of the classes).

The department should also consider applying for federal funding as a means to provide fellowships and tuition support for its graduate students. See for instance the following list of funding opportunities for graduate students provided by the National Science Foundation http://www.nsf.gov/funding/education.jsp?fund_type=2. It would also be helpful if the department will make an effort to maintain and publicize a list of scholarship options for its graduate students. As an example, the following is the scholarship page provided in the Computer Science Department at UNT http://www.cse.unt.edu/site/node/73
A possible suggestion for retaining some of the undergraduate students is to have them involved in research. The National Science Foundation offers very good programs to attract undergraduates to research, such as the REU sites or REU proposals.

The department should make a stronger effort to keep track of its alumni. One idea is to ask each graduate to complete an exit survey to provide, in addition to the name and location of the organization they plan to join upon graduation, the name and email address of at least two (female) relatives who are likely to be able to provide contact information on the graduate at all times. Ideas for connecting with the alumni include a regular newsletter on the department to be sent to alumni, the possibility to highlight the alumni achievements on the department webpage (or in the department newsletters), etc.

Inform incoming students of all campus support resources during orientation.
IV. STUDENT LEARNING & ASSESSMENT

OVERVIEW

The graduate program uses 2 in-house exams for evaluation of graduate students. The first is taken by all students prior to enrolling for their first semester in the program. This exam serves as a placement exam to determine if the incoming student requires leveling courses. (The leveling courses – CSCI 515 and CSCI 520 – do not count toward the required credit hours for the MS degree.)

The second exam is a comprehensive written exam at the end of the program which is administered 3 times a year. A committee develops and administers the exam and established the criteria for passing. The exam questions are based on a set of the most important course objectives as determined by the committee. The committee assesses both the pass/fail rate of each objective on the exam and the overall pass/fail results.

The Department of Computer Science has developed a list of 6 program objectives for the graduate program.

- **PO1**: Students will be able to demonstrate a broad knowledge of Computer Science which includes data structures, operating systems, computer programming skills, computer organization, algorithm design, and automata theory.
- **PO2**: Students will gain a substantial knowledge of one of the following Computer Science specialties: Database, Networking, Artificial Intelligence, Information Security, and Computer Engineering.
- **PO3**: Students will demonstrate the ability to recognize, design, and implement efficient software solutions to problems.
- **PO4**: Students will demonstrate knowledge and understanding of professional ethics and responsible behavior.
- **PO5**: Students will demonstrate the ability to communicate effectively and to work as a team.
- **PO6**: Students will become successful professionals able to gain employment and/or to be accepted into a Computer Science Ph.D. program.

In addition, the department has developed course objectives for every course in the curriculum. The assessment process ties course objectives to the appropriate program objective. This is very comprehensive assessment plan which quantitatively *assesses every objective every semester* utilizing the process described in the report.

The program report states that the development of the assessment plan has caused faculty to be more aware of various issues/problems within the department. However, no concrete use of the assessment was provided. Nor were any significant changes during the past 6 years provided.
STRENGTHS

The 2 in-house written exams are very good ways to assess both entering and graduating students on a continual basis. This should be able to provide the department with a great deal of data on which to assess the program.

One faculty member serves as the department's graduate advisor. He is also responsible for reviewing all applications for admission to the program.

Six comprehensive program objectives for the graduate program have been developed. Learning objectives for each of the graduate courses have also been developed.

The assessment plan which ties course objectives directly to program objective is very comprehensive and thorough. It provides a clear and well-developed mechanism for assessment of the program.

WEAKNESSES

There is no evidence provided to demonstrate how the results of the 2 in-house written exams are used to assess and/or improve the graduate program. In fact, no results were provided in the report or during the visit. That is, the question of how many students pass/fail each exam was not provided. Nor do we know what happens if a student fails the comprehensive exam at the end of his/her program. Can they take it again? If so, how many times?

Students expressed concern that the written entry exam did not fairly represent their skill due to the "surprise" at its content, thus placing student in unnecessary leveling courses.

The immense number of course objectives assessed every semester is extremely burdensome for the faculty. Although a significant amount of quantitative results for the past several semesters have been compiled, there is no evidence the results have been used to improve/change the program.

RECOMMENDATIONS

Develop a plan for use of the results 2 written in-house exams and maintain records of changes made in response to the results. That is, complete the assessment cycle.

Consider providing a "study guide" for students upon admission so that they can prepare for the in-house placement exam administered during orientation.

The assessment plan for student learning objectives is to be greatly commended. However, it is unreasonable to continue to assess every objective every semester. Now that a comprehensive baseline has been obtained, it is recommended that the department select a modest number of objectives (perhaps, 3 to 8) that have consistently fallen below the 75% goal established by the department and focus on these for 2 – 4 years, in hopes of improving the results. Once this has
been accomplished, move on to another small set of objectives and repeat the process. The assessment process has established that students are currently excelling in many of the objectives. Thus, it seems reasonable to refrain from the assessment of those components at this time.

Recent experience with the SACS assessment processes compels the committee to comment on the stated objectives established by the department. A student learning objective should contain precisely one objective, not multiple, and it should be measurable, preferably in a quantifiable manner. For example, consider Program Objective 5: Students will demonstrate the ability to communicate effectively and to work as a team. The stated objective contains not one, but 2 clearly stated objectives: (1) to communicate effectively and (2) to work as a team, each of which is measured differently. SACS experience dictates that these should be separated into 2 separate objective statements. It is recommended that the other program objectives be reviewed so that each numbered program and course objective represents only one student learning objective.

Consider the eighteen “Characteristics of Texas Doctoral Programs” in anticipation of the assessment measures that will be required if the proposed doctoral program in computer science is approved. These measures could be applied to the current master’s program as part of the overall graduate assessment program.
V. FACULTY PROFILE

OVERVIEW
According to the Graduate Program Review, the department currently has 7 full-time faculty members with doctoral degrees. One of those is a half-time appointment shared with the Department of Mathematics. The rank of faculty is well balanced with members at all levels, professor to instructor. Salaries are very competitive when compared to the 3 selected peer universities.

The faculty have an impressive publication record. In addition they have received $1.5 million in grants over the past 6 years. The teaching load for graduate faculty is 3 courses per term. Occasionally, some faculty teach 4 courses if it is necessary for them to also teach undergraduate classes.

Faculty are evaluated in 2 ways each year. At the end of each semester, students evaluate their courses and faculty via the course evaluation form. In addition, each faculty member completes an annual report summarizing his/her accomplishments for the past year. The results of the student evaluations and the annual report are discussed in a meeting between the department chair and the faculty member. The promotion and tenure process was not discussed in either the program review or interviews.

STRENGTHS

The Texas A&M Commerce Department of Computer Science has a strong and productive faculty. They have been very productive in publications. Members of the faculty have been awarded an impressive number of grants and they demonstrate impressive effort in grant submissions.

Students report they are pleased with the quality of instruction and the efforts of the faculty in terms of teaching and advising.

The faculty has built strong relationships with their industry and business partners in the community.

WEAKNESSES

A recurring concern is the student/faculty ratio in some courses and the availability of seats for students. Faculty feel large course size impacts their ability to meet the needs of their students and to provide the amount of feedback needed by their students. Students state that it is difficult to see faculty and to obtain academic support when they have problems in class. Some courses have very uneven numbers in different sections.
There is a level of perceived tension among the faculty. It seems an important goal is to actively improve communication and positive relationships. This change could improve the overall working atmosphere for the faculty as a whole.

At one level, the faculty is diverse. They have an admirable mix of persons from many cultures. On the other hand, more women in the faculty would provide mentors and role models for female students.

Faculty receive limited financial support to attend conferences which is vital in maintaining a sound research and publishing effort.

RECOMMENDATIONS

Reducing the size of some courses may take time, but a first step would be to establish a projected need for each class and establish the required number of seats. A goal of 30 to 40 students per section is recommended. (See additional details in Section II of this report.)

Reevaluate course offerings and rotations. Some small classes might be offered only once a year or every other year.

Establishing a tutoring office, manned by graduate assistants, will increase the individual help a student can receive while not further burdening busy faculty members. Graduate assistants should also be used to help with large class sections.

Use adjunct faculty to reduce the teaching load. The program appears to have a solid group of well-qualified of adjunct faculty members at this time. Perhaps qualified persons from more distant areas could be used to teach on-line courses when appropriate.
VI. PLANNING & EVALUATION PROCESSES

OVERVIEW

The Planning and Evaluation Processes conducted by the Department of Computer Science are not well discussed in the Graduate Report. In fact, the Report provides no indication of how the department meets to plan and evaluate the program, other than through the compilation of data on the course objectives. During the committee visit, the department chair indicated that the department faculty meet only when needs warrant a meeting. It appears that there is no established process for long-range planning.

Although not included in the Graduate Program Review, the department chair stated that there exists a Graduate Curriculum Committee to consider changes in the curriculum and that most graduate faculty are involved with the committee. However, due to teaching work load, committee has proposed few changes. He also stated that a great deal of planning took place in developing the proposed doctoral degree, including working with 7 other departments, however, this was not included in the report.

STRENGTHS

The assessment plan and results of the assessments demonstrates that a great deal of planning has been done in the past by some member(s) of the faculty.

WEAKNESSES

The Graduate Program Review provides virtually no information related to the planning process within the department. Interviews with the chair and others indicate that there is at least some formal planning in place. The absence of this information from the report is troublesome as it did not allow the committee to comment on this very important aspect of a department.

There appears to be no process in place for short-term or long-range planning in the department. In addition, there is no plan in place for the use of the results obtained from the assessment of the program and course objectives, nor for the results of the written in-house exams.

RECOMMENDATIONS

The department should develop a process to be used for both short-term and long-term planning, including the use of assessment results for improvement of the graduate program. Perhaps, regular meetings in the short term to establish a process for planning and assessment would be helpful. A good starting place might be to discuss and answer in detail the 3 questions posed in Section VI of the Graduate Review, but which were not adequately answered.

- Summarize the results of the departmental planning and evaluation.
- Summarize how the evaluations of the department plans (for the past 5 years) have led to greater effectiveness.
• Summarize how your planning process has allowed the department to envision developments in curriculum, students, student learning, instruction, faculty, fiscal resources and mission/purpose of the program for the next 6 years.

Begin to plan for evaluation of the eighteen “Characteristics of Texas Doctoral Programs” in anticipation of the approval of the proposed doctoral program in computer science. These 18 measures could provide a starting point for long-range planning within the department.
DEPARTMENT FACILITIES

OVERVIEW

The current home of the Department of Computer Science consists of a widely distributed set of independent rooms spread over 2 floors of the Journalism Building. At this time, it appears that the facilities are marginally adequate in terms of office and lab space for faculty and lab space for students. Both faculty and students indicated problems with the lack of space for expansion, particularly with new faculty being hired, lack of space for graduate assistants, and the lack of a space identity for the department.

Interviews indicated that each faculty member has an office and some space for research. In addition there is a large open lab maintained by the department for student use. The recently acquired cluster computer resides in the Science Building.

STRENGTHS

Currently the faculty seems to be functioning adequately in the available space. The large computer lab appears to be adequate at the current time.

The new cluster computer is a great resource that provides a host of opportunities for interdisciplinary research. Hopefully, it will also provide an opportunity for the graduate students to obtain experience in the rapidly growing area of high-performance computing.

WEAKNESSES

There is no office suite or other area identified as the Department of Computer Science. The faculty are significantly separated physically. This seems to be contributing to a lack of collegiality among the faculty and within the graduate student body.

Although the students can utilize the new cluster remotely, it is unfortunate it is not physically located within the department. Having such leading-edge equipment nearby and visible would be a morale and enthusiasm builder.

There is a need for an “office” space for graduate assistants so that they can work within the department, near their supervising faculty members.

RECOMMENDATIONS

The Department and the Administration should begin long-range planning to address the space issues, particularly in anticipation new faculty and 2 new degree programs and the demands that these will add to an already significant space problem.
VII. ACTION PLAN

To be completed by the Department of Computer Science upon receipt of this document.
VIII. SUMMARY OF PROGRAM REVIEW

The committee has identified a number of strengths and weaknesses within the Department of Computer Science Graduate Program. These are discussed in the previous sections of this report. In general, the program has a solid base on which to build, including:

- A strong and knowledgeable faculty,
- A large and well-qualified and enthusiastic student body,
- Minimally adequate facilities.

However, the primary weakness — significant understaffing — casts a very negative shadow over the entire program. Both faculty and students seem to be heavily burdened by the current faculty/student ratio which has lead to unreasonably sized classes and a lack of support for both faculty and students. The committee agrees that this is the first issue that should be addressed by the department and the administration.

The second issue of concern to the committee is lack of general planning by the program faculty. There are probably several reasons for this, including the understaffing, but it also appears that it is at least somewhat related to a lack collegiality and interaction among the faculty. A good starting place could be to reconsider the 2 questions posed in this section of the Graduate Program Review.

- Describe internal strengths and weaknesses of the program that impact it effectiveness.
- Provide recommendations for the improvement of the program. Include rationale for each recommendation.

The department is proceeding with plans for a Ph.D. program and a new master’s program. The committee recommends proceeding with caution as resources seem quite limited at this time.

During the visit, the Department Chair, Dr. Sang Suh, commented that he believed that the department was doing all that it could at the moment with the limited resources. In some respects that is probably true. However, the committee recommends that he work with the department faculty in an attempt to think creatively to address the problem areas in the department as a cooperative team, to stretch the current resources, and to work with the administration on long-range planning for the program.