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"Promoting Discovery Thinking"

**COLLEGE ACADEMIC PLAN
2011-2016**

June 2010

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Introduction

The College of Science & Engineering (CS&E) at Texas Christian University includes eight Departments and the new School of Geology, Energy, and the Environment. It is also the home of the Pre-Health Professions Program, the Institute of Child Development, and the Center for Applied Psychology.

The College provides a unique environment for the study and scholarship in mathematics, the sciences, and engineering, all in a liberal arts setting characterized by the teacher-scholar model. CS&E has been cultivating a culture that appreciates and capitalizes on the natural synergy between undergraduate and graduate education. The College encourages and cultivates critical thinking and promotes interdisciplinary and cross-disciplinary learning and discovery.

During the 2011-2016 period, the growth of the College will be characterized by **two major thrusts**, one in the areas of **Energy, Water Resources, Environment, and Sustainability**, and the other in the **Bio-inspired Sciences & Engineering**. The choice of these thrusts is based upon existing CS&E strengths, local/regional resources, national priorities, and most importantly the educational needs and professional aspirations of our students. These thrusts will be accompanied by an effort to strengthen our expertise in **Simulation-Based Engineering & Science**.

The CS&E Academic Plan is organized in terms of four motifs, which have their basis in the Vision in Action (VIA) Objectives. These motifs are **Distinction, Access, Excellence, and Leadership**. Each one of them is linked to a goal and specific action items.

The office of the CS&E Dean carries the primary responsibility for implementing the Academic Plan. During the 2010-11 academic year, the Dean will work closely with the CS&E Chairs to ensure that this Plan is finalized into a document that is well communicated, well understood, and reflective of the views and opinions of the College faculty. A timeline that underlines priorities will become part of the document.

Assessment is a critical aspect of all planning activities. The Dean and the Chairs will develop meaningful assessment mechanisms that will be followed for the duration of the 2011-16 period. Progress towards achievement of the stated CS&E goals and action items will be monitored annually. CS&E will identify “peer colleges” in other institutions and develop appropriate measures for comparison purposes, to the extent possible.

The annual reports compiled by the departments and the college will attest to the progress made relative to the plan goals and will provide opportunities for changes in annual priorities, as needed.

CS&E is looking forward to a very promising future. It has an enthusiastic student body, outstanding faculty, and dedicated staff. It has an excellent reputation for providing a high-value, “personal” education to a growing number of students. It continues to enhance its role as a valuable “citizen” of the City of Fort Worth, the region, and the Nation.

COLLEGE OF SCIENCE AND ENGINEERING

OFFICE OF THE DEAN

Demitris Kouris, Dean

Magnus Rittby, Associate Dean
Administration & Graduate Programs

Dick Rinewalt, Associate Dean
Undergraduate Programs

Valerie DeSantis Hancock
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DEPARTMENTS & SCHOOLS

DEPT. OF BIOLOGY
Ray Drenner, Chair

DEPT. OF CHEMISTRY
Robert Neilson, Chair

DEPT. OF COMPUTER SCIENCE
James Comer, Chair

DEPT. OF ENGINEERING
Walt Williamson, Chair

SCHOOL OF GEOLOGY, ENERGY,
AND THE ENVIRONMENT
Ken Morgan, Director

DEPT. OF MATHEMATICS
Robert Doran, Chair

DEPT. OF NUTRITIONAL SCIENCES
Anne Vanbeber, Chair

DEPT. OF PHYSICS AND ASTRONOMY
Waldek Zerda, Chair

DEPT. OF PSYCHOLOGY
Tim Barth, Chair

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Phil Hartman, Director

INSTITUTE OF CHILD DEVELOPMENT
Karyn Purvis, Director

CENTER FOR APPLIED PSYCHOLOGY
Don Dansereau, Director

INSTITUTE FOR ENVIRONMENTAL STUDIES
Mike Slattery, Director

ENERGY INSTITUTE
Ken Morgan, Director



COLLEGE OF
SCIENCE & ENGINEERING

TCU

JUNE 1, 2010

College of Science and Engineering

Summary of the College's Academic Plan, 2011-16

Mission

The mission of the College of Science and Engineering is to support the mission of the University; to provide a quality and rigorous education in the sciences, mathematics, and engineering; to conduct an active program of research and discovery while integrating the teaching and research missions; and to provide for all students experiences that will facilitate their becoming and continuing to be scientifically and mathematically literate citizens.

VIA Objectives

1. Recruit and retain students, faculty and staff who can achieve their full potential at TCU.
2. Design a vibrant learning community characterized by distinctive curricular, co-curricular and residential programs.
3. Sustain an environment in which rich personal interaction is enhanced by outstanding facilities and appropriate technology.
4. Accelerate our connection with the greater community: Fort Worth, Texas, the nation and the world.
5. Couple wise financial stewardship with a well-planned entrepreneurial approach to academic opportunities.

Distinction

Goal: While pursuing all aspects of the College's Mission, strengthen areas of particular importance where TCU has the potential to achieve national and international distinction.

Access

Goal: Provide access to a "personal" educational experience that is characterized by rigor, critical thinking, opportunities for growth, and teamwork, in a community of scholars that cherishes the teacher-scholar model.

Excellence

Goal: In an environment of continuous improvement, promote a climate where excellence is expected in every aspect of our mission, so that CS&E programs, research, and services are the best they can be.

Leadership

Goal: Cultivate and inspire an entrepreneurial spirit that will yield the leaders of tomorrow among our students and faculty.

Action Items

- D-1:** Enhance the CS&E educational experience.
- D-2:** Strengthen the undergraduate research experience.
- D-3:** Enhance interdisciplinary collaboration in education and research.
- D-4:** Invest in critical areas of science and engineering.
- D-5:** Strengthen the College's external reputation.

Action Items

- A-1:** Recruit a talented and diverse undergraduate student population.
- A-2:** Increase the number of graduate students in the CS&E.
- A-3:** Engage the College, its faculty, staff, and students productively with other TCU colleges and units, and with external constituencies.
- A-4:** Recognize and enhance the role of the humanities and the arts in the educational experience of the students.
- A-5:** Improve the physical infrastructure in the CS&E.

Action Items

- E-1:** Provide a high-value education to our students.
- E-2:** Recruit world-class scholars who are committed to education and research.
- E-3:** Enhance research and creative scholarship, building on the CS&E strengths and leveraging interdisciplinary expertise.
- E-4:** By optimizing resources, provide the facilities, faculty workload, and staffing needed to enable excellence.
- E-5:** Strengthen development and communication efforts to expand personal, corporate, and foundation gifts.

Action Items

- L-1:** Cultivate leadership among faculty and staff.
- L-2:** Establish and promote the Student Advisory Board.
- L-3:** Work closely with the Entrepreneurship Program at the Neeley School of Business.
- L-4:** Make leadership a career expectation for students.
- L-5:** Encourage technology transfer and innovation efforts.

1.0 – Mission

The mission of the College of Science and Engineering is to support the mission of the University; to provide a quality and rigorous education in the sciences, mathematics, and engineering; to conduct an active program of research and discovery while integrating the teaching and research missions; and to provide for all students experiences that will facilitate their becoming and continuing to be scientifically and mathematically literate citizens.

2.0 –VIA Objectives

- Recruit and retain students, faculty and staff who can achieve their full potential at TCU.
- Design a vibrant learning community characterized by distinctive curricular, co-curricular and residential programs.
- Sustain an environment in which rich personal interaction is enhanced by outstanding facilities and appropriate technology.
- Accelerate our connection with the greater community: Fort Worth, Texas, the nation and the world.
- Couple wise financial stewardship with a well-planned entrepreneurial approach to academic opportunities.

3.0 Primary Motifs and Goals

The primary motifs characterizing the College’s Academic Plan are **DISTINCTION, ACCESS, EXCELLENCE, AND LEADERSHIP**. These motifs yield four specific goals that are inspired by the VIA Objectives. They are,

- **DISTINCTION**

Goal: While pursuing all aspects of the College’s Mission, strengthen areas of particular importance where TCU has the potential to achieve national and international distinction.

- **ACCESS**

Goal: Provide access to a “personal” educational experience that is characterized by rigor, critical thinking, opportunities for growth, and teamwork, in a community of scholars that cherishes the teacher-scholar model.

- **EXCELLENCE**

Goal: In an environment of continuous improvement, promote a climate where excellence is expected in every aspect of our mission, so that CS&E programs, research, and services are the best they can be.

- **LEADERSHIP**

Goal: Cultivate and inspire an entrepreneurial spirit that will yield the leaders of tomorrow among our students and faculty.

4.0 Action Items for 2011-2016

The actions items for the 2011-2016 five-year period are directly related to the motifs and goals introduced in the previous section.

• DISTINCTION

D-1: Enhance the CS&E educational experience.

Review advising procedures and propose improvements as needed. Continue to develop and implement policies and procedures for assessing programs and measuring student outcomes.

Strengthen graduate programs by putting more emphasis on graduate education and research and by seeking increased graduate stipends to close the gap between CS&E awards and those of competitors.

D-2: Strengthen the undergraduate research experience.

Continue to emphasize and set departmental targets for the involvement of undergraduates in research. Continue to support, promote, and enhance the Student Research Symposium. Provide incentives for journal publications that involve undergraduate students.

D-3: Enhance interdisciplinary collaboration in education and research.

Recognize and reward collaborations across departments and disciplines. Identify areas for collaboration with other TCU units. Provide incentives for collaborative proposals for education and research. Continue to support the Prehealth Program. Support the current and solicit new REU¹ programs from the National Science Foundation.

D-4: Invest in critical areas of science and engineering.

Obtain approval to hire faculty in several important areas including sedimentary geology, biophysics, and cellular & molecular biology. Focus future hires in the areas of energy & the environment as well as bio-inspired science and engineering, while building strength in simulation-based science and engineering.

D-5: Strengthen the College's external reputation.

Increase faculty participation and involvement in national and international meetings. Encourage faculty participation in professional societies. Emphasize the importance of journal publications and conference presentations. Promote the importance of graduate education and funded research. Work with the External Advisory Board to enhance the reputation of the College and engage its alums.

¹ Research Experience for Undergraduates

• ACCESS

A-1: Recruit a talented and diverse undergraduate student population.

The College will enhance its efforts towards recruitment by promoting the CS&E programs and the TCU student experience. It will continue to promote the importance of science, mathematics, and engineering as catalysts for economic development and national security. Units within CS&E will review the number of minority and female students in their programs and develop meaningful targets. CS&E will work to secure additional merit and need-based scholarships.

A-2: Increase the number of graduate students in the CS&E.

The College will emphasize the importance of graduate education internally and externally. Units that have graduate programs will be asked to provide plans for growth of the graduate population. Educating graduate students will become an important part of their success. The College will continue to advocate increases in graduate student stipends.

A-3: Engage the College, its faculty, staff, and students productively with other TCU colleges and units, and with external constituencies.

Currently, the CS&E is engaged in a limited number of efforts across college boundaries. CS&E will evaluate the ongoing activities and expand its interaction with AddRan, Business, Education, Nursing & Health Sciences, and the Honors College. The College will build a significant collaboration with the UNT Health Science Center.

A-4: Recognize and enhance the role of the humanities and the arts in the educational experience of the students.

Educating students in the arts and humanities is extremely important for a flourishing democracy like the United States. The recent emphasis on technology, while economically justified, often omits to highlight that scientists and engineers need to be open-minded, intellectually well-rounded, and well-informed citizens. CS&E will encourage its students to become fully engaged in the intellectual activities within TCU and Fort Worth. Students will also be encouraged to pursue minors in arts and the humanities.

A-5: Improve the physical infrastructure in the CS&E.

CS&E will pursue the expansion/completion of the Tucker Technology Center. This is critical due to the expected growth of the School of Geology, Energy, and the Environment as well as Engineering. The College will also pursue renovations of labs, classrooms, and offices in the SWR building. CS&E will seek funding to develop the SWR Atrium according to plans that have been in place for a number of years. Winton-Scott has reached its limitations relative to the growth of the Psychology department, the Institute of Child Development (ICD), and the Center for Applied Psychology. The College will pursue a permanent space for the ICD in a new or

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renovated building that is appropriate for the needs of this extremely successful and VIA-inspired Institute.

- **EXCELLENCE**

E-1: Provide a high-value education to our students.

Develop additional opportunities for CS&E students to study abroad. Work with other Colleges on campus to provide CS&E students with educational experiences outside their specific disciplines. Continue to support interdisciplinary programs like the Energy minor. Encourage and reward faculty who are continually improving the learning experience of their students. Engage the students in the process of improving their educational experience.

E-2: Recruit world-class scholars who are committed to education and research.

Provide competitive salaries to new faculty. Promote the teacher-scholar model in today's competitive environment. Work to improve startup packages for new faculty. Provide incentives for enhancing departmental graduate programs. Develop departmental plans for equitable workloads that are cognizant of the needs of new faculty.

E-3: Enhance research and creative scholarship, building on the CS&E strengths and leveraging interdisciplinary expertise.

Identify co-curricular opportunities for students to gain experience in high-performance scientific computing environments. Work with other TCU units to identify faculty incentives for increased proposal submission and funded research.

E-4: By optimizing resources, provide the facilities, faculty workload, and staffing needed to enable excellence.

Establish workloads that are consistent with the discipline, strengths, and talents of the faculty, while meeting the college and departmental needs. Monitor faculty and staff salaries to help identify and correct emerging salary imbalances that may be attributable solely to factors related to sex, race, or ethnicity. Monitor salary compression issues. Continue to articulate the pressing need for additional faculty and staff. Plan for the anticipated expansion of the student body and the research enterprise.

E-5: Strengthen development and communication efforts to expand personal, corporate, and foundation gifts.

Work with University Advancement to pursue the CS&E goals. Prioritize and articulate the College goals and engage the CS&E constituents. Develop plans to maintain communication with the CS&E alumni and friends. With the help of the CS&E Advancement Officer, the Dean will continue to pursue funding opportunities for endowed faculty positions, student scholarships, and new facilities.

• LEADERSHIP

L-1: Cultivate leadership among faculty and staff.

Encourage participation in Boards and Technical Committees of professional societies. Encourage participation in the Faculty Senate and other faculty organizations. Develop mentoring programs for young faculty. Encourage and support faculty to consider serving as department Chairs. Promote university-wide leadership programs for faculty and staff.

L-2: Establish and promote the Student Advisory Board.

Establish a Student Advisory Board for the College of Science and Engineering (SAB). The SAB will interact directly with the Dean, providing insight and advice to shape and enhance the educational experience, and will work to address issues of relevance to the CS&E student population.

L-3: Work closely with the Entrepreneurship Program at the Neeley School of Business.

Strengthen the CS&E relationship with the Neeley School of Business. There are significant opportunities for collaboration in the areas of technology transfer, energy, and entrepreneurship. Encourage science and engineering students to learn more about business, accounting, and finance. Engage business students and alumni in discussions about the financial impact and intellectual value of university research and technology in the fields of science and engineering.

L-4: Make leadership a career expectation for students.

Prepare students for today's rapidly changing environment where expertise must be constantly upgraded and "permanent" employment is a thing of the past. Provide an inspiring undergraduate education characterized by emphasis on critical thinking and life-long learning. Encourage the students to participate in community activities within TCU and the community at-large. Encourage participation in study-abroad programs. Encourage internship and co-op programs with local employers.

L-5: Encourage technology transfer and innovation efforts.

Create an environment that encourages the creation of startup companies by faculty and students. Promote collaborations with the UNT Health Science Center in pursuing applied, potentially patented research. Work to establish processes at TCU that will take advantage of faculty talents in applied research. Advocate for the creation of a technology transfer office and intellectual property support at TCU.