

Baylor University
School of Engineering and Computer Science
Board of Advocates
Fall Meeting – October 5, 2008
Baylor University

Board members attending: Mark Cannata, Joe Cestari, Larry Johnson, Fred Logan, Lloyd Lund, Rick Maule, Bill Mearse, Jim McDonough, Harold Rafuse, Bill Ratfield, Steve Smith, Harold Spangler, Andy Spencer, Trent Voigt, Matt Watson, and Richard Willis

Board members absent: Craig Nickell, Clell Oravetz, Daryl Sims, Dean Swisher, Kevin Taylor

Others attending: Dean Ben Kelley, Don Gaitros, Bill Jordan, Rob Kennedy, Kwang Lee, Leigh Ann Marshall, Cheryl Tucker, and various faculty, staff, and students from the School of Engineering and Computer Science

Welcome

Following a continental breakfast, Bill Mearse convened the meeting. He introduced Dr. Elizabeth Davis, Interim Provost. Dr. Davis thanked the Board members and gave a summary of the current University leadership, recounting the departure of former President Lilley in the summer, and Dr. O'Brien's transition to Carson Newman University. When Dr. Lilley left, Dr. Harold Cunningham assumed the role of Acting President. During his leadership, Dr. Davis became Interim Provost on July 31 and Dr. David Garland became Interim President on August 22.

Dr. Davis presented a large snapshot of Baylor's \$2 billion endowment goal, which is faring well in the market. Despite the recent market slump, Baylor University's investments outperformed the market. It remains a concern to see how the market impact will affect future enrollment. This fall, Baylor experienced its highest enrollment, with 14,541 students, 80 percent of whom are undergraduate students. Dr. Davis continued by saying, while she and Dr. Garland were not a part of the original decision-making team, they are both "totally committed to 2012" and agree there is still much work to accomplish the goals of 2012. More faculty, staff, and space will be needed. Also, a substantial investment in science and technology and an increase in research will be required, and the University needs to define what directions and parameters will be needed to accomplish those goals. Dr. Davis is "interested in return and impact" related to these areas of growth. She compared Baylor's position as a research university to the University of Texas, Texas A&M, and Rice and reported that students are leaving the State of Texas to study at other research institutions. Dr. Davis confirmed ECS' support of 2012. ECS students are among the highest SAT- and ACT-scoring, and ECS is a good partner in other University endeavors.

Dr. Davis spoke briefly about the acquisition of the former General Tire facility as a potential research park and the implications for ECS and high risk for the University. Laying the groundwork for acquiring it includes inviting external consultants to campus. In a brief question-and-answer, Mr. Voigt asked what the Regents would be looking for in selecting a new President. Dr. Davis respond-

ed that the Regents will be taking time to find the right President. They are studying best practices of presidential selection. They may consider an alternate definition of 2012, including renaming 2012 to reflect goals beyond the year 2012. Mr. Maule asked about implementing the emphasis on ECS. Dr. Davis responded that new faculty lines would be required. With previous expansion in the humanities and arts, the time has come to advance a different area of the University. Funds will need to be strategically invested. Mr. Maule continued by saying “the term interim implies more change is coming.” Dr. Davis responded that people are already talking about increasing research emphasis with the Regents.

Dean’s Report

Following Dr. Davis’ remarks, Dean Kelley brought the Dean’s Report. He introduced the new faculty, listed upcoming events, summarized students’ professional development (internships, career fairs), developments in ECS Student Affairs and Development/Philanthropy, student enrollment, ECS tenure outcomes, strategic initiatives, and reiterated Dr. Davis’ thoughts on the relevance of ECS to the University.

Visioning Discussion

Ms. Ashley Thornton, Director of Professional Organization and Development, led the Board in a visioning exercise. The Board members paired off for a time of interviews. After the interviews, a larger group convened to discuss some of the themes uncovered in the individual interviews. Ultimately, three larger groups of board members shared their table’s “core elements” with the entire Board.

Core Elements

1. Excellent worldwide reputation

Baylor ECS enjoys an excellent reputation worldwide. This reputation is a magnet for the best and brightest students and faculty.

Possible success measures:

- National press rankings (U.S. News, etc.)
- Growth in numbers (Undergraduate and graduate)
- Accreditation
- Ability to attract the best and brightest
- SAT scores

Possible strategies/actions:

- Scholarships

2. Highly qualified, well-rounded graduates

Baylor ECS is the recognized model among schools of engineering and computer science for holistic education. Companies vie for Baylor graduates because they know they can expect to be hiring well-rounded individuals characterized by the following traits:

- Solid, up-to-date technical skills and knowledge and the drive to keep building on that foundation
- Well-practiced communication and social skills
- An orientation toward service
- Practical knowledge of business principles
- A global world view
- Upright ethical judgment and behavior based on a Christian world view
- A habit of hard work and follow through

Possible success measures:

- % of students involved in international projects
- % hired for global/international jobs
- % placement
- Placement salary rates
- Reputation of placement companies
- Number and caliber of companies who recruit regularly at Baylor
- Pass rate
- Community involvement
- Alumni

Possible strategies/actions:

- Attract the best and brightest -- Scholarships
- Boot camp/ "practice court" concept – capstone course where they have to do a "real" project and present it to a group.
- Sell students on electives – Communications, Marketing, Documentaries

3. Strong learning community

Baylor is big enough to be on the world radar, but small enough to provide the personal touch. Students have ample opportunities in and out of class to form personal relationships with professors and other potential mentors. The living learning center and other ECS student programs contribute to an environment where social and spiritual activities dovetail with academic priorities resulting in a supportive, successful learning community.

Possible success measures:

- % living in North Village
- Retention
- Pass rate
- Community involvement
- Alumni

Possible strategies/actions:

4. Training ground for Christian Leadership in engineering and technical professions

Baylor prepares graduates with excellent academic credentials and leadership experience within a caring, Christian environment. These graduates go on to be leaders in the engineering and technical professions, exerting a positive Christian influence on technology related decision-making at state-wide, nation-wide and world-wide levels.

Possible success measures:

Possible strategies/actions:

- Course on Leadership
- Course on entrepreneurship
- Embed – speech/leadership across the curriculum
- Faculty role models
- Student mentoring

5. Pushing the boundaries of technology in service to the needs of the world

Baylor's Christian Commitment drives a commitment within the ECS to push the boundaries of technology and interdisciplinary collaboration in search of solutions to extreme poverty and other pressing world problems.

Possible success measures:

Possible strategies/actions:

- Technology incubator
- Relationship with leading technology firm

Necessary Support/Foundation: Quality faculty and Self-funding

Following the group exercise, the Board adjourned for lunch. Following the meal, Mr. Travis Cooper, a senior mechanical engineering major, gave a presentation recounting his summer internship experience.

Breakout sessions

Computer Science Breakout Session

Dr. Gaitros went over the main items that will be presented.

- 1) We have a position available. Hopefully we can bring in 4 applicants to consider.
- 2) Number of majors is up. Fall premiere interest in CSI was great.
- 3) ME's dropping our CSI 1430 requirement in their degree.
- 4) Dean's Ph.D. prioritizing.
- 5) Tenure decisions from Spring 2008.
- 6) ABET visit
- 7) New programs-SWE, Gaming/Simulation, Capstone course
- 8) Past and future plans of ICPC with Baylor CSI as international headquarters.
- 9) Gaming/Simulation concentration

Dr. Jeff Donahoo gave an overview of the International Collegiate Programming Contest (ICPC). The presentation included comments by Drs. Sturgill, Poucher, Professor Booth, and Mr. Hynan. Next, Dr. Sturgill spoke to the Board about the [Game and Simulated Environments](#) program. Next, Dr. Baker gave a presentation about the [Bioinformatics](#) program. Then, Dr. Hamerly spoke about the machine learning research he is conducting. Finally, Dr. Song gave a presentation about [software engineering](#).

Electrical and Computer Engineering (ECE) Breakout Session

Board of Advocates recommendations to ECE:

1. Determine what would distinguish Baylor's ECE department. This vision must be forward looking to solve big problems in larger markets to best align with industry.
2. Baylor ECS needs to increase the level of funding for research, possible sources include National Science Foundation (NSF), Department of Defense (DOD), industry, small business set asides, and Broad Area Announcements (BAA).
3. ECS and ECS should consider adding non-tenured staff to submit proposals, pursuing contracts not just grants, to secure funding for research.
4. Grants are available from state and relationships must be established with the Governors Office to leverage Central Texas Economic Development, Waco is Central to establishing a Texas Houston, Austin, Dallas Industry Research Triangle.
5. ECE and ECS should consider emulating Baylor's Hankamer Business School's "Best Student Program."

Electrical and Computer Engineering (ECE) Breakout Session Notes

1. Faculty

Jim Farison and Don Farris are retiring, and therefore ECE is recruiting for two positions.

2. Department

- A. Recruitment Committee was established to:
 - Select candidates for a tenure-track position at the assistant/associate professor level and a full time lecturer.
 - Recruit students at Fall Premier
- B. ECE courses are being renumbered to distinguish EE from ME courses.
- C. ECE now has new web pages (no longer with ME) under ECS website
- D. Plans for new PhD Program underway.

3. ABET

The AB ET certification report showed there were no “Deficiencies”, nor “Weaknesses” that needed to be addressed, however, they identified “Concerns”, namely:

- Ageing facilities,
- Limited space for growth, and
- Student equipment that is not current with industry

4. FE Exam Recommendations

As the Circuits section of the exam was below the national average for third year, a recommendation was made to move the Circuits course back a semester and the Electronics course forward a semester thereby improving continuity between these

5. Mission Project

Last year’s small hydropower system in rural Honduras was highlighted. Under consideration for next year is a Ugandan solar power system for an orphanage. The department needs frequent flier miles from KLM and British Airways, scholarship funds to cover student travel costs and tuition fees, and donations from industry and alumni.

6. Internship Program

A listed of students that have participate in internships was provided. ECE wants to develop strategies for reducing the cost to students for internship course credits and improve networking with local employers to showcase value of Baylor engineers.

7. Graduate Program

Baylor needs to increase the number and amount of stipends positions in ECE.

8. Strategic Plan

To-date, the ECE faculty manages more than \$3.0M in research funding, having successfully secured \$1.4M in Research Funding while at Baylor, and currently they have proposals for \$0.820M.

ECE Research

ECE research is focused on strengths in:

- Reconfigurable Computing
- Avionics
- Engineering Applications in Time Scales
- Applied Electromagnetics
- Computational Intelligence/Machine Intelligence
- Power and Energy Systems

Goals of ECE

Current Goals of ECE:

Goal 1: Build a doctoral program that enhances the national reputation of Baylor

Goal 2: Build a research intensive doctoral program that exploits the inter disciplinary nature of engineering applied Electromagnetism

Goal 3: Build a doctoral program that strengthens the undergraduate engineering program. Power and Energy Systems

Goal 4: Build a doctoral program that promotes Christian leadership in higher education, industry, and humanitarian endeavors.

ECE Action Plan

The current ECE action plans calls for:

- Step 1. Submitting a formal Degree proposal for approval
- Step 2. Begin and secure funding
- Step 3. Expand Research
- Step 4. Comprehensive Recruitment Plan
- Step 5. Hire additional faculty
- Step 6. Program for Mentoring Teacher Fellows
- Step 7. Accept inaugural class and begin program instruction

Mechanical Engineering Breakout Session Notes

Submitted by Cheryl Tucker, edited/approved by Ken Van Treuren

Attending: Leader—Dr. Ken Van Treuren, Minutes—Cheryl Tucker, Fred Logan, Lloyd Lund, Rick Maule, Steve Smith, Andy Spencer, Dr. Brian Garner, Dr. Steve McClain, Dr. Lesley Wright

Dr. Van Treuren--opened the meeting with his own introduction as Associate Dean for ECS Research & Faculty Development. He explained that he was filling in for ME Chairman Bill Jordan. He then handed out an agenda for the meeting.

The first topic addressed was about Transitions within the ME Department. Dr. Van Treuren explained that a ME icon, Tommie Thompson, retired. Dr. Lesley Wright has been hired for Thermal and Fluids, which give the department 3 professors in these areas. ME has been approved for another search and the advertising will begin next week. They will choose a faculty candidate that is the "best fit" for the department. ME has also been approved to hire three (3) adjunct positions (Master's degree level). There is a problem in that the hiring pool is not large in the Central Texas area. There is one adjunct person, Jeffrey Castleberry, who has been teaching for ME for several years each spring semester. Dr. Van Treuren mentioned that two of our faculty were tenured this past spring—Dr. Brian Garner and Dr. Carolyn Skurla.

Andy Spencer: Suggested that ME might contact Mitch Harper in the Business School. Mitch teaches Distributed Technology as an adjunct and he might be a good reference to increase the hiring pool for adjuncts.

Dr. Van Treuren then mentioned a new topic about Engineering Service Trips – He mentioned that there was a Honduras project currently going on and was sponsored by ???NCIIA??? (Dr. Bradley would know).

Dr. Van Treuren next discussed Curriculum revision issues facing Mechanical Engineering.

(1) **Senior Design needs** – **Dr. Brian Garner** began the conversation discussing the growth problems pertaining to the Senior Design class. He said that usually a single class has a single project.

They work in teams. Each project has a single leader, single budget, reports created, and a presentation at the end. They have to design, build, demonstrate, and deliver a project. There is usually 1 section of Sr. Design in the Fall and 2 sections in the Spring. This Spring 09, there will be approximately sixty (60) students in Sr. Design. More students mean that they need more projects so that all can have decent participation. Students are of all Engineering majors—Engineering, Electrical & Computer, and Mechanical. One idea to help relieve this overburden would be to have more standard projects with several groups in a competition-type setting. Sometimes it is difficult to find a project that includes all the majors, particularly since there are more ME students than ECE students presently. Dr. Garner then opened the floor to suggestions.

Steve Smith – He said that when Trinity provided a project, the students had a hard time finding something for ECE students to do. Therefore, he suggested the possibility of having discipline-related projects.

Rick Maule – He felt that budget may be a problem if you use the competing method. He then asked which method the ME faculty was leaning toward.

Garner – He felt the preference is to use all Engineering major groups on different projects.

Ken Van Treuren – He re-emphasized that they prefer interdisciplinary methods to get the students communicating. Enrollment is a good but also big problem. The School is doing a better job of retaining students and graduating them. Classes are getting too big.

Rick Maule – He suggested that they could still do the parallel teams, but not compete. Faculty would have to closely monitor the students to make sure all students participate equally. He felt that ME might need less faculty that way. Graduate students could also be used in this monitoring process and be more assessable to students for questions and problems. He mentioned that budget could still be a problem—that companies might be willing to give to one project, but not three.

Ken Van Treuren – He said that using graduate students had not been contemplated up to this point because there are not many MEs in the Engineering Graduate program to date, but that is a good idea to investigate.

Brian Garner – He mentioned that the policy of not enforcing Senior Design to be taken in the last semester before graduation might be adjusted to include any senior semester. This would allow more students to take Senior Design in the fall, but this is not seriously being considered at this date.

Ken Van Treuren – He mentioned that Junior Design now has 10 (ten) teams or so doing some project. There is no budget for these projects.

Andy Spencer – Andy summed up the problems discussed thus far: Find more projects, need more funds, need more faculty.

Brain Garner – He said lack of faculty is a real problem. They presently use two (2) faculty to teach in the fall and four (4) in the spring.

Andy Spencer – He asked about Rob Kennedy in Development getting money for projects and asked why he was not going after these needed funds. He also made the suggestion of creating a “Chair of Christian Engineering” because Chairs provided funds for faculty.

(2) **Changes in teaching computer skills** – Dr. Van Treuren moved to the topic of Mechanical Engineering dropping a presently required course teaching C++ (CSI 1430). He said that a lot of Mechanical Engineering programs do not require such a course. He further stated that ME would like to restructure the present EGR 1302 course to include more teaching of Matlab, Mathcad or other problem-solving software. Me does not want to replace the CSI 1430 course with another course as too many courses are already required within the program.

Lloyd Lund – Mr. Lund said that L-3 does not currently use C++, but they do use Mathcad and Matlab, with more use of Mathcad. **Andy Spencer** agreed with that practice in his company.

Rick Maule – He pointed out that ME needs to make sure that programming is taught somewhere even if C++ is not the software to use. Students need to be able to be given a problem and work it

out, whatever program is used. They need to know languages and thought processes involved and how to use them. He further mentioned that C++ is behind more software programs.

Several Board Members – Several people started mentioning programs they used in their companies: ANSYS, Abidus, Nastran, FeMat, Fluent, Engineering Village (for research), ProE, Auto Cad. It was mentioned that ME presently uses CAD, Solidworks, and Engineering Village.

The last topic raised was (3) **Problems with enough lab space** – **Dr. Van Treuren** mentioned that in the ME lab there were 4 large Jr. Design lab sections this year. He taught them and stayed many hours at work. The pinch point for ME is needed faculty for the growing student enrollment. He said that faculty like the student contact and they don't want TAs teaching courses. So far TAs have only been used in labs, but lack of faculty is getting to be a big issue.

Rick Maule – He stated the practice of hiring others besides full faculty.

Full Board Closed Session

The Board members met in closed session.

Full Board Session

Following the closed sessions, the Board reconvened with the Dean and other Baylor faculty and staff for the final session. Mr. Mearse gave a summary of the closed session. First, he relayed the Board's concern about "crowd control" resulting from the large ECS student population. With the issues relating to lab and classroom space and faculty/student ratio, he said that the "great problem" will continue to worsen. ECS will need to be creative and learn to leverage graduate student and adjunct faculty as well as manage student and Baylor administration expectations. The Board will continue to brainstorm for ideas to help.

Dean Kelley responded that he agreed with the Board's assessment of the need for "crowd control." He looks forward to what effect the future economy and University promised resources will have.

Mr. Mearse continued the discussion on the future of facilities. The Board is "excited" about the possibilities for the General Tire facility. He encouraged ECS to consider strategic industrial relationships. One idea for moving forward might be to hire a full-time individual to manage the industry partnerships and develop a stronger partnership with the School of Business.

Regarding the future Ph.D. programs, Mr. Mearse and the Board wondered how to choose the next program to move forward. The Board recommends a market view: find the niche and assess competition. The Board challenged ECS academic departments to find funding, and the Board is willing to discuss this further.

Regarding the morning's strategic planning exercise, Mr. Mearse and the Board acknowledged that ECS is in the very early stages of strategic planning. It will be important to find where ECS needs to be versus where ECS wants to be. The Board encouraged ECS to stay market relevant, and this may be a challenge if strategic planning is led by someone from within the University. Dean Kelley responded that outside consultants will also participate. Mr. Sedate encouraged ECS to use the Board of Advocates to discover answers to the question of what the future holds for ECS.

Mr. Voigt pointed out that the ICPC holds a large potential for Baylor. He suggested auctioning off pieces of the ICPC to other companies that are anxious to participate. Mr. McDonough added that

having multiple levels of sponsorship adds flexibility. Mr. Voigt also suggested (1) hiring a full-time person to manage the sponsorships and (2) performing market research for a BU/ICPC brand.

The Board of Advocates collectively suggested a joint session with the School of Business Advisory Board. Mr. Willis pointed out that there are overlapping themes as well as similar issues that could be discussed in a joint session.

Mr. Mearse relayed to Dean Kelley that the Board of Advocates see a different School of Engineering and Computer Science than they did at their spring meeting (when the School was faced with the prospect of losing faculty who were denied tenure). The Board was very encouraged by the current state of the School. There are many challenges and lots of positive work ahead.

Dean Kelley responded that it is a different School than previously seen in the Spring. Once the tenure decisions were reversed, things got “back on track.” One challenge remains to solve problems and not become “mired in growth.” Mr. Mearse responded that, while operational issues may cause a drag, continue to focus on strategic thinking.

Following this concluding discussion, the Board agreed that the Spring meeting date would be May 1, 2009.