

Promoting the Entrepreneurial Mindset through Faculty Development

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Abstract

Our university is part of a group of about 20 universities that are seeking to improve our graduates' capabilities by helping them to develop an entrepreneurial mindset while they are yet students. While technical knowledge is essential to engineering, engineers will be more likely to find success and personal fulfillment when they couple these skills with a mindset to create extraordinary value for others.

This perspective is not innate to many students, but they can be exposed to these concepts using the curriculum, if faculty themselves know how to do this. This leads to the critical issue of appropriate faculty development. Our program is committed to this perspective. As a result of this, we added to the department's undergraduate mission statement that our students "will be empowered by innovative problem-solving creativity and an entrepreneurial mindset".

To help our faculty we have created a multifaceted approach to development. We have monthly lunchtime seminars where people from other parts of campus come in and make presentations. In fall 2015 these presentations were on the topics of Curiosity, Connections, and Creating Value. At the end of each semester we have a ½ day workshop where outside experts come in and lead us in a discussion of some aspect of this topic.

A major component of this development was the creation of an internal grant program called Innovators. These Innovators come to the December workshop to learn more about the subject. They then create modules in one of their courses that demonstrate some aspect of the entrepreneurial mindset. Once they complete the project they create documents to show others how these modules can be used. Once this is done they receive a small stipend. By emphasizing modules, rather than entire courses, our faculty create things that other faculty (both here and at other schools) can insert into existing courses. So far we have had 15 faculty members (about 40% of our total engineering faculty) create modules. Another six professors are in the process of creating modules. The degree of this involvement is helping to change the culture within our college concerning the important of helping our students develop an entrepreneurial mindset.

Motivation and background

This work has its origin in feedback from our college's Board of Advocates. This is a group of practicing engineers, most of them alumni from our college's engineering programs. Their recommendations led us to create an alternative two course sequence that combines engineering economics concepts and technical communication concepts in a creative way as the students solve real world engineering problems. We have reported about this as the 2010 and 2011 ASEE meetings^{1,2} and at the 2008 NCIIA conference³. Our goal was to use this to introduce business concepts and an entrepreneurial mindset to our engineering students. One of the issues we faced was that we did not have the teaching capacity to do this course sequence for all of our students. If we could not put all of our students in this course sequence, we needed to develop alternative methods of accomplishing this goal. This has led us to create course modules in various courses

through our KEEN Innovators program that will be discussed later in this paper. If we are to have long term impact upon students, we need to have a group of faculty who are committed to this goal and whom will include entrepreneurial mindset topics in many different courses.

Many papers have been presented at ASEE conferences concerning the creation of course content that involves entrepreneurial topics. We have reported about the development of a network of schools⁴ and the creation of multi-university senior design projects⁵. We have also reported on relating entrepreneurial topics to community development⁶ and justice⁷. How ethics and entrepreneurial topics can be related was presented at a KEEN conference⁸.

What characterizes most of this previous work is a concentration on course modules and course content. What is different about this current paper is that it concentrates on our efforts to change faculty members. Once faculty members have a commitment to the importance of developing an entrepreneurial mindset in our students, they will be motivated to create content that is appropriate to their classes. This paper describes ways in which we have used faculty development activities to promote teaching about an entrepreneurial mindset.

Introduction

We would not have been able to make the changes described in this paper without the financial support provided by our being part of the KEEN Network. This network of universities has been organized by the Kern Family Foundation to promote entrepreneurial thinking among undergraduate engineering majors.

The Kern Family Foundation states that their philanthropic focus is:

We intentionally focus on systemic change, rather than charity, by partnering with broad-impact, long-term programs that align with one or more of our focus areas.

They have defined their focus areas on the web site <http://www.kffdn.org/>⁹

- Forming good character
 - Shaping a sense of moral responsibility for one's self, neighbour, and community, laying the foundation for a meaningful and virtuous life.
- Providing quality education
 - Equipping young people with the academic skills and virtues necessary to realize their potential and contribute to the common good.
- Instilling an entrepreneurial mindset
 - Empowering people to see the world as place filled with opportunities to create extraordinary value.
- Rediscovering the value of work
 - Inspiring people to view their daily work as a source of personal dignity and a valuable contribution to human flourishing

The KEEN Network is an outgrowth of the third topic above, installing an entrepreneurial mindset. They state on their website:⁹

In order to find jobs in a rapidly changing world, individuals require technical knowledge. They cannot, however, rely on a skillset alone if they hope to enjoy fulfilling careers.

Individuals need a mindset that adds “know-why” to technical “know-how” to contribute to the success of their colleagues and employers, as well as to create value for others.

An entrepreneurial mindset is key to personal and professional success. Engineers equipped with this mindset understand the bigger picture and, therefore, can recognize opportunities, evaluate markets, and learn from their mistakes. These engineers are capable of more than solving technical problems; they are constantly looking for unexpected ways to create value

After recognizing the importance of the entrepreneurial mindset, our Entrepreneurial Engineering Program created the [Kern Entrepreneurial Engineering Network \(KEEN\)](#), a collaborative partnership of colleges and universities dedicated to graduating engineers with an entrepreneurial mindset so they can create personal, economic, and societal value through a lifetime of meaningful work.

The KEEN network has developed a definition for an entrepreneurial mindset. The table below is adapted from their materials.

	Characterized by	Shown by these actions
An Entrepreneurial Mindset	Curiosity	Demonstrate constant curiosity about our changing world
		Explore a contrarian view of accepted solutions
	Connections	Integrate information from many sources to gain insight
		Assess and manage risk
	Creating Value	Identify unexpected opportunities to create extraordinary value
		Persist through and learn from failure

These desired student outcomes overlap considerably with the required ABET Student Outcomes. We have discussed this in another paper¹⁰. Instilling this mindset among our students has just been presented at an ASEE regional meeting¹¹.

Our involvement in this network has had a profound effect upon how we teach engineering. Our Mechanical Engineering Program has revised its official mission statement to include:

The mission of the Mechanical Engineering undergraduate program is to educate students, within a caring Christian environment, in the discipline of mechanical engineering. Our graduates will be equipped with the fundamental technical, communication, and teamwork skills to succeed in their chosen careers. They

will be empowered by innovative problem-solving creativity and an entrepreneurial mindset. They will be motivated by Christian ideals and a vocational calling to improve the quality of life worldwide.¹²

This revision includes a reference to the importance of our graduates having an entrepreneurial mindset when they graduate.

Activities to promote an entrepreneurial mindset among our Faculty

This section describes a variety of activities that whose goals were to introduce an entrepreneurial mindset among our faculty members, and to motivate them to teach these concepts to their students.

ICE Workshops

Students will not develop an entrepreneurial mindset unless they see it first in our faculty. To promote this among we have done a number of activities. The KEEN network has created a number of workshops called ICE. This stands for Innovating Curriculum with Entrepreneurial Mindset. They have had a number of short meetings on one topic. We have had faculty attend workshops on:

- Materials engineering
- Engineering mechanics
- Engineering ethics

The first author made a presentation at the engineering ethics meeting⁸.

The network is now sponsoring multiday ICE workshops on entrepreneurial minded learning, active and collaborative learning, and problem based/project based learning. At least six of our faculty members will attend these in the spring and summer of 2016.

Monthly Lunchtime Seminars for Faculty

In 2011, two of our KEEN Faculty Leaders were awarded a summer sabbatical to design and develop a series of faculty teaching seminars focusing on excellence in teaching. The Engineering and Computer Science Teaching Seminars grew out of a desire to refocus on teaching in the School of Engineering and Computer Science, addressing the challenge that is faced by many institutions trying to maintain excellence in both research and teaching. “Maintaining a high standard and expectation from the faculty in both areas can at first glance be unobtainable but it is directly related to the core competencies that the school desires for its students.”¹³

When we first began, these lunchtime seminars focused on the fundamentals of excellence in teaching. The topics included:

- What are our core competencies with regard to teaching?
- How to write and assess a test
- The importance of oral communication
- The making of a great syllabus
- The importance of writing in engineering and computer science

These lunchtime faculty development seminars have continued, with a focus on collaborative teaching and cross-university project-based learning; the importance of curiosity, making connections, and creating value; and remembering the core mission of Baylor University as a Christian University. Again, topics have included:

- Painstorming as an ideation methodology
- How to share lectures between universities
- How to work collaboratively in project-based learning with other institutions
- Encouraging curiosity in the classroom through experimentation
- Making connections through the curriculum between classroom concepts and the world we serve
- Creating real and lasting value through the search for truth
- How our faith can animate all aspects of our lives

These lunchtime seminars have been a great vehicle by which the faculty share what they are doing in the classroom, while remembering the larger, overarching worldview that we share as Christians.

End-of-Semester Faculty Development Workshops

At the end of each semester, we have conducted a teaching workshop, usually hosted by an external speaker or presenter, and many times the speaker has been a colleague from the Kern Entrepreneurial Engineering Network (KEEN). These workshops are designed to be a mechanism by which faculty are given time to consider the immediately ending semester and critically analyze improvements made in their classes while being challenged, based on the assessment of those improvements, to continue to strive for excellence in their teaching methods.

We have brought in a variety of speakers for these workshops, all of who received excellent reviews from the faculty.

2008-09: Dr. Jonathan Weaver, Professor of Mechanical Engineering, University of Detroit Mercy, “The Changing Engineering Profession: New Ways of Introducing Ideation into the Classroom”

Jonathan introduced a variety of ideation methodologies, including the “Spelling Test”, Biomimicry, Bisociation, and the Trimming Technique. He showed us some of the technology entrepreneurship case studies he had produced, as a way to help us share our own successes in the classroom. The workshop focused on what the faculty could do at Baylor to develop the entrepreneurial mindset in our students.

2010-11: Dr. Phillip Doepker, Professor and Director of the Innovation Center at the University of Dayton, “Integrating Innovation and the Entrepreneurial Mindset into the Design Sequence”

In his workshop, Phil had the faculty tell him about the various design activities in each of their classes and led them through a process of how they could change their approach to begin to work across Engineering and Computer Science disciplines, across Baylor University academic units, and across various institutions.

2011-12: “The Mechanics of Teaching: A Workshop Led by Four Baylor University Professors”

This workshop was the culmination of the seminars focusing on excellence in teaching, and featured multiple faculty from across the University discussing the importance of their discipline within the disciplines of engineering and computer science.

2012-13: Dr. Christopher Kitts, Professor of Mechanical and Electrical Engineering at Santa Clara University and Director of the Robotics Systems Laboratory: “Innovations in Teaching Through Collaboration”

When Dr. Kitts visited Baylor University, he spent his time discussing with our faculty the possibilities of collaboration with several of the SCU projects. The workshop focused on the benefits (to both students and faculty) of collaborative student projects. He introduced his method of collaboration as a “Dense Web” of entrepreneurial engineering enterprises across many universities. His workshop was a timely reminder that “few customers have ever stated their needs in disciplinary terms,” and “Few customers have needs that can be optimally met given the work that can be done in a specific course.”¹⁴

2015-16: Dr. Edward B Burger, President, Southwestern University, “Effective Thinking Through the Sciences, Engineering, and Mathematics”

This workshop was opened to all STEM faculty at Baylor University. Ed walked us through what we taught and how we taught it, all through the lens of “How the lessons we offer in our courses will remain with our students 20 years after their class with us.” The workshop focused on change, and helped faculty to consider changes to their pedagogical paradigms that would instill habits of thinking, living, and learning that are modeled through the STEM curricula and will persist for a lifetime.

Internal Grant Programs: the KEEN Innovators Program

Since Baylor became one of the KEEN schools in 2008, each of our grants has had a major objective of faculty development. One of our primary initiatives has been a yearly request for proposals, sent to the Engineering and Computer Science (ECS) faculty, encouraging them to design, develop, deploy, and assess innovative teaching methodologies in their courses.

This year the purpose of the KEEN Innovators Program was to encourage the integration of entrepreneurial concepts and skills in to the engineering and computer science curricula by awarding a stipend to ECS faculty members who develop a course module or modules that illuminate the concepts of curiosity, connections, and creating value within the course(s) he/she teaches.

For the purpose of this RFP, a “module” represents a self-contained fraction of a course’s content for a semester and carries a unique examination/assessment mark. Regardless of the form of the module, the instructor material should include background information, possible discussion questions, and appropriate assessment instruments (fill-in-the-blank questions, short-answer questions, essays, projects, etc.).

The assistance of the Baylor KEEN grant team was offered to enable use of best practices developed by others in the KEEN network who are building entrepreneurial skills and insights into engineering and computer science courses. For awarded modules, the Innovator will develop the module and its content, but the Baylor KEEN grant team will be available to help.

During the 2015-2016 academic year a total of \$40,000 was awarded, varying in awards of \$2,000 up to \$8,000, depending on the duration and quality of the module proposed, along with its applicability in the discipline. Awards were announced on September 17, 2015, with the award of the stipend to be in summer 2016 (contingent on the submission of a complete module by the end of the grant period).

Depending on the proposed module content, the duration of a module could be anywhere from 15-minutes to 1-to 2-hours. A complete module (slide deck or video, background information, discussion questions, assessment artifacts) must be packaged for dissemination to other teaching faculty.

Amount:

The total Innovator budget is \$40,000, with each award ranging from \$2,000 to \$8,000, and includes an expectation that the Innovator will:

- Attend as many of the 2015-2016 ECS Faculty Development Seminars as possible
- Attend the ECS Faculty Half-day Teaching Workshop on December 8, 2015
- Attend a luncheon on December 8, 2015, with past KEEN Innovators to discuss lessons learned/best practices
- Design an implementation plan to design, develop, and deploy the module(s) produced in the award timeframe
- Assess the initial results of the module(s)
- Make the module and all related teaching materials available for use throughout the KEEN network
- Results of implementation and assessment will be published in a discipline-appropriate venue in the 2016-2017 academic year. One faculty member has already published his results in the spring 2016 ASEE Gulf Southwest Conference.

This year's KEEN Innovator stipend totals is being disbursed in two parts:

- 75% of the award for the completed module(s)
- 25% of the award for those awardees who submit their final Implementation/Assessment Report as submitted in a discipline-appropriate venue and approved for regional or national dissemination.

Example Course Modules

This paper includes a description of two example course modules.

Circuit Theory Module

One such module was developed by Erik Blair from the Department of Electrical and Computer Engineering at Baylor University.¹⁵ This course was targeted for non-electrical-engineering majors and the professor was seeking an innovative way to challenge the students. As a first offering, this class included an extra-credit group project designed to give students an opportunity to practice the Creative Problem-Solving (CPS) process. These modules were part of a KEEN sponsored initiative with the faculty to develop classroom activities which supported the 3 Cs: curiosity, connections, and creating value. Twenty nine students out of 39 chose to

participate in this project. This CPS process is based on a method outlined by Osborne, developed by Parnes, and presented by the Creative Education Foundation.¹⁶ A 50-minute in-class module consisted of a lecture/PowerPoint to introduce the students to the CPS and introduce the project. The objectives were:

1. Become familiar with the Creative Problem Solving model
2. Identify the CPS sub-processes
3. Apply the CPS sub-processes to connect and apply circuit topics to real-world tasks
4. Promote the connection of concepts from electric circuit theory to the students' everyday experience

The open-ended project examined manual processes that could be automated, then select one of the processes and describe the design process to include the electrical circuits needed. Some examples like walking, head-shaving, teeth brushing, fishing, golf, driving, flying planes, and steering bicycles were offered to the students. An automated gas pumping system was presented in detail as an example. One of the goals of the project is to yield novel, patentable inventions. Both a pre- and post-project survey was given to the students as an assessment. Improvements were seen in all areas sampled. Some of the student comments highlighted the value added to the education process.

- "...it was a lot of fun and helped me to learn about brainstorming and practical implementation of things we learned."
- "[This was] one of the first group assignments [in which] I have designed a product or created an idea with a group of people in college."
- "I liked that we had the freedom to create whatever we wanted."
- "It made class seem not seem like a class as much, and it made problem-solving seem like it had more of a purpose than just a right answer."

The results indicated that the project successfully engaged the students and fostered creative thinking. All materials for this module are available for dissemination and use at other colleges and universities.

Request for Proposal Modules

Another instance of creating a module occurred in a gas turbine design class in the Department of Mechanical Engineering at Baylor University.¹⁷ The motivation for these modules was to acquaint students with the concept of a Request for Proposal (RFP) and how difficult it is in a business scenario to write an RFP for a specific requirement without being too prescriptive. Students in the aerospace industry will be involved in responding to such documents and the company's future depends on their understanding of what was written and the context in which it was written. Three 50 minute modules were developed to address this topic.

The first module was entitled "Innovation and Creativity" and consisted of a PowerPoint presentation and small exercises for the student to accomplish in their design teams at their seats. They discussed the definitions of creativity and innovation, looked at examples of think tanks in industry, discussed brainstorming, and then looked at the concept of a bicycle for product

improvement in their design teams in a short brainstorming exercise. Homework was to brainstorm new uses for gas turbine engines.

The second module was specifically targeted at the RFP. The first part of the class was to examine the homework on gas turbine engine ideas. The lists were collected and then handed out to a different team. They were to evaluate the ideas and then report back to the class on two selections: the most promising idea and the most outrageous. This was quite fun for the students as they did not expect to “share” their ideas with the other students, especially to be evaluated on the ideas by their peers. A PowerPoint presentation then led a discussion on the RFP document and a case study (the USAF KC-X RFP which eventually led to the KC-46 selection) was used to illustrate this process. This was a good example as it had failed RFPs which resulted in company protests and the re-releasing of a subsequent RFP that was more detailed.

A third module consisted of a presentation to faculty evaluators accompanied by a written report. During this session, the faculty panel emphasized creativity in the process and gave the student design teams feedback which was incorporated into their final, written RFP. The reports were then submitted to the professor and graded.

Assessment was accomplished through the presentation, reports, and multiple choice exam questions on the two semester exams and on the final. All indications lead to the conclusion that students did learn the material and had fun with the modules. Students never expected to have a lesson on creativity in a gas turbine engine course. These modules are also available for dissemination and use at other colleges and universities.

Assessment of these efforts

The initial assessment is based on how many of our faculty members participated in these activities. With respect to the lunch time seminars, we regularly have about 14 faculty attend (about 1/3 of our total faculty).

The end of the semester workshops continue to attract close to 50% of the faculty members in the college. We regard this as a successful level. We will continue to have these seminars and continue to track the participation by the faculty members.

With respect to the KEEN Innovators program, we have had the following faculty members receive KEEN funding to begin teaching entrepreneurial mindset topics as part of our KEEN innovators program.

- Eight Mechanical Engineering (ME) professors have modified ten courses
 - 47% of 17 faculty members
- Ten Electrical and Computer Engineering (ECE) professors have modified 12 courses
 - 67% of 15 faculty members
- Three Computer Science professors have modified 5 courses
 - 17% of 18 faculty members
- One Business professor had modified one course

Since the number of faculty doing entrepreneurial activities before we started on this project was one, this is a dramatic improvement. We will continue to do a longitudinal assessment of this and track how many faculty members continue to use these modules in their courses.

Another assessment is how many papers have been written by our faculty members about what they have done. So far there have been 22 papers and 8 conference presentations written by our faculty members on these topics. Two more are in process for the 2016 ASEE Annual Conference (counting this one). Thirty two papers done over the past 7 years shows a writing rate of about 4.6 papers per year. We will continue to monitor the rate of publication as we move forward.

Continuing Plans

While Baylor University has been successful integrating the 3Cs into its engineering and computer science programs, more can be done. Due to the popularity of the monthly KEEN Faculty Seminars, they will continue. These have been continuing with speakers/experts from across the campus. Last fall emphasized the 3Cs. This spring we have already had a seminar with excellent results. Approximately half the school's faculty attended. The seminar addressed the dimension of Christian Faith at Baylor University and the value created to the program and students because of these beliefs. These Christian characteristics become a valuable addition to any work environment and Baylor students who embody them are sought after. Attendance at these seminars also highlights the need to emphasize teaching in institutions and the desire to have these conversations.

The KEEN Innovator Program is seen as a positive step in the development of modules embracing the 3 Cs. Some funds are made available to the faculty member to help compensate them for their time in preparation. The Dean of the School of Engineering and Computer Science has made public his support for the program and as a result several tenure track professors have been involved in creating modules. KEEN Innovators and the funding is not sufficient to receive tenure however, participating shows a commitment to teaching and teaching improvement. Both are held in high regard at Baylor University.

Students have the opportunity of taking an alternative track for economics and technical writing. Instead of the traditional courses in these topics, the School of ECS teaches a Global Business course that is available to 20 students on a first come first serve basis. The course teaches economics, technical writing and technical presentation in the context of a proposed energy project for a "new subdivision" that is being built. The student teams must evaluate the project and make a recommendation to the faculty. This course had 20 students and 20 more on the waiting list. The second course in this sequence is taught by the Center for Entrepreneurship and involves product development in teams of engineering and business students. This is an educational track that Baylor would like to expand.

Recent activities have been aimed at increasing awareness of KEEN and its mission inside ECS and on the Baylor campus. Some funds were allocated to polo shirts for the faculty involved with KEEN (past or present). T-shirts were also purchased for the students that had the KEEN logo and the 3Cs. Retractable banner posters have been purchased for placement around the

campus. In the department, a breakout session was held at the last Board of Advocates (BOA) (advisory board for ECS) meeting with good success. The last ECS faculty meeting also had a 20 minute segment introducing faculty to KEEN and how to become involved. Involved faculty are encouraged to attend a KEEN sponsored conference or workshop. All of these efforts have increased the awareness of KEEN by the faculty and students both inside and outside the School of ECS.

While Baylor University has embraced EML and the 3 Cs, the leadership of the KEEN program at Baylor is contemplating the next steps. Adding these concepts to the curriculum will make our students more marketable. Discussions with HR representatives typically center on the skills and characteristics that make students desirable. A great GPA is always a starting point however, today GPAs seem high enough to make most students competitive. HR people see many high GPA students and usually ask the next questions of perspective applicants. “What makes you different? What makes you stand out from the rest of the students with high GPAs?” Often faculty encourage students to participate in design, build, test, and compete programs that give students a hands-on dimension and a practical application of their knowledge. These students are sought after by employers. At Baylor University, the KEEN involvement is seen as one of those “value added” activities that will make Baylor students distinctive. This is reinforced by the Board of Advocates for the School of ECS and this is the direction the engineering programs are headed. Capitalizing on this vision, several possible directions can be taken.

1. For fall 2016 we will hire someone into the position of Clinical Professor. This person is someone with many years of engineering experience in industry. This professor will assist us in our entrepreneurially related courses, such as Global Business, Economics, and Communication. The professor will provide valuable guidance in our senior design classes to help make the design process more like the real world of engineering innovation.
2. Christian faith adding value to the work environment – There are numerous examples of businesses founded on Christian principles and Christian faith (Keller Williams Realty, AES Corporation, Amity Technology, Ariba Technologies, Inc., Hobby Lobby, The Awaken Group, Bandwidth International, Boise Fry Company, Cereus Partners, Cummings Inc., Backyard Burgers, Inc., Interstate Batteries, TOMS Shoes, Russell Media, Tyson Foods, and Chick fil A.) While all these companies do not require Christian faith, they are convinced that the ethic and organization of the business benefit from this foundation. Baylor University is a Christian university in the Baptist tradition and central to the mission is to:

“...educate men and women for worldwide leadership and service by integrating academic excellence and Christian commitment within a caring community.”¹⁸

Baylor’s vision is to explore how the mission leads to Christian character development in our students and how this adds value to the workplace and makes them more desirable to employ.

3. The breakout sessions with the Board of Advocates is leading to the discussion of how to involve the industry partners in the education of the students with regard to business acumen. This will lead to more involvement and hopefully some best practices.
4. Many of the faculty come to academia with little or no experience in industry/business, especially those who come directly from a university with the PhD. Faculty internship is a necessary program which would give faculty the opportunity to shadow working engineers in various industries to see what they do on a daily basis. Knowing this would allow faculty to better prepare students for the tasks ahead. This will lead to activities developing the skills needed in industry, not just academic knowledge.
5. Currently, Baylor University has a pilot project with the Teal Residential College, a residential facility for the School of Engineering and Computer Science. This is a living and learning community and as such, EML is being integrated into the extra-curricular activities that occur at the college. This needs to be developed further and assessed.
6. The KEEN Faculty Seminars have recently focused on speakers from across the campus who have topical expertise. The goal is to develop a list of topics and where to go for advice, both on campus and beyond. Developing this within other KEEN schools is absolutely essential.
7. Students need to see where their skills can fit into the larger questions that face humanity, the grand challenges of clean water, energy, disease and food. Engineers and their technology are uniquely positioned to have a major impact with these questions. It will necessitate working with other disciplines and framing the questions to be asked from different perspectives.

These initiatives are nothing without the support of the leadership of Baylor University. This starts with the President to the provost to the Dean to the Chair and finally to the faculty in each department. Support means both monetary and service recognition. Nothing much can be done without this. Addressing the grand challenges through research is also to be encouraged. There are networks, such as the Kern Entrepreneurial Engineering Network of which Baylor is privileged to belong. This topic is too important to ignore with the future generations of engineering students.

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