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SYNERGY

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MECHANICAL ENGINEERING PROFESSOR DR. LESLEY WRIGHT

and several staff took a team of engineering students from Baylor - for the first time - to participate in the Baja SAE (Society of Automotive Engineers) competition in Burlington, Wisc., last summer.

The competition consisted of three regional competitions designed to simulate real-world engineering design projects and related challenges. Participants were asked to design and build an off-road vehicle that would survive rough terrain, then pitch possible production to a group of professionals who emulated the role of a manufacturing firm.

More than 100 teams participated in the competition, including several other Big 12 schools and even some international teams. Baylor's car passed all technical, safety and design inspections and was very competitive against teams that have been involved in Baja SAE for years. The BU car also finished in the top 25% in two of the five events - pretty impressive for an inaugural outing!



WEB EXTRA

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Photos and video of the
Baja SAE competition

SYNERGY

SPRING 2013 VOL. 11

PREDICTING BEHAVIOR

Dr. David Jack develops
advanced physics-based
prediction methods for durable
lightweight composites



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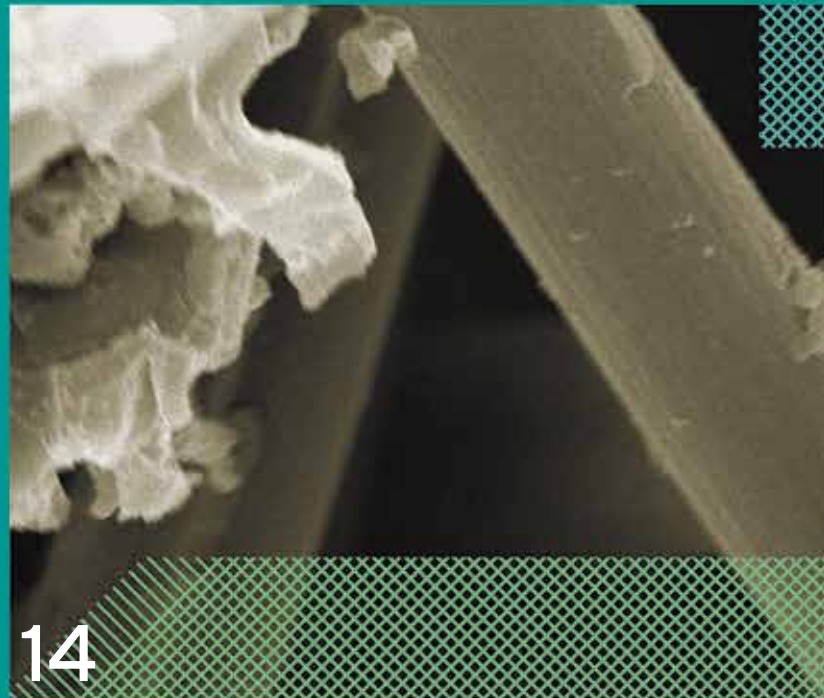
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Andrew Maddox



SYNERGY 

Synergy is a publication of the Baylor University School of Engineering & Computer Science that establishes a communication link to keep alumni and friends aware of the spirit of discovery at the School. Established in 1995 from programs dating to 1974, the School of Engineering & Computer Science has provided a quality education to more than 3,000 graduates in the tradition of excellence, a cornerstone of Baylor's heritage. *Synergy* is produced for the School of Engineering & Computer Science by Baylor's Division of Marketing & Communications.



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WEB EXTRAS

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THROUGHOUT SYNERGY

– for the first time – you'll find "Web Extras" icons signifying additional features exclusively available online at www.baylor.edu/Synergy. We hope these new digital offerings will enhance your experience and knowledge of what's going on both in the School of Engineering and Computer Science and the University as a whole.



"The Times, They Are a-Changin'"

WELCOME TO THE 2013 ISSUE

of Synergy magazine! As you read through this issue, I hope you get a sense of excitement about the many positive things happening in the Baylor School of Engineering and Computer Science. As the new dean, I am pleased to be a part of Baylor and the School. My transition from Texas A&M University has been rapid and I have learned much about the traditions of Baylor, the quality of our School, and the community of Waco.

The strong foundation of academic and student life programs in ECS was laid by my predecessors, Dr. Ben Kelley

and Dr. Jim Bargainer. I salute them for their creative leadership that enabled engineering and computer science education to excel at Baylor University.

Last fall, for the first time in Baylor history, one out of every ten freshmen was enrolled in engineering and computer science. As I am writing this column, we have more than 5,100 engineering and computer science applicants for next fall - double that of only five years ago! Our incoming freshmen had SAT scores comparable to those of freshmen at both the University of Texas and Texas A&M University.

The diversity of our student body has also increased over the past decade so that we are nearly 25% female and about 30% minority.

I received very positive feedback from several major corporations last fall that have recently hired our graduates. They were unanimous that Baylor engineering grads are technically well prepared, have a great work ethic, and communicate well. These companies all want to come back for more!

I have appreciated the opportunity to get to know the faculty in all of our programs. They are dedicated professionals



WEB EXTRA

www.ecs.baylor.edu/Synergy
Photo tour of
the BRIC facility

who desire to provide a quality education to our students. Our faculty numbers will continue to grow to ensure we can maintain the same quality experience that our graduates have received in past years.

With the completion of the first phase of the Baylor Research and Innovation Collaborative (BRIC), ECS is finally getting some sorely needed research space. In January, faculty in the Electrical and Computer Engineering Department began moving their research laboratories to the BRIC. We anticipate that faculty in Mechanical Engineering and

Computer Science will follow sometime in the next year.

Please enjoy this issue of *Synergy*. We'll introduce some new faculty to you and tell you about an entrepreneurial effort by some engineering alumni. You'll learn about our transition from the ECS Living-Learning Center in the North Village to the new ECS Residential College in the East Village, which is still under construction. Bob Dylan's song, "The Times They Are a-Changin'" certainly reflects what's happening in Baylor Engineering and Computer Science! You'll get a glimpse of some of that "changin'" in this issue.

Dr. Ian Gravagne

examines residential colleges and the
“fully developed human being.”





C.S. Lewis once observed (to paraphrase) that Christianity will face headwinds in the modern industrialized world, because we have become used to the idea of innovation as a relentless impersonal force constantly discarding the old for the new, and presumably better.

I often think about Lewis' musing in the context of Baylor's gradual movement toward the residential college system, because it is an example of a centuries-old way that is not only still a good way, but arguably the best way to organize a student housing system. However, the mere facts – the renowned success of the College model, its adoption by many of the world's most admired universities, its 800 year provenance – are insufficient by themselves to answer the question why. Why should Baylor add another residential college? Why should ECS go along?

To answer that, I turn to the wisdom of author Wendell Berry, from an essay that was circulating when I arrived at Baylor in 2002 entitled "The Loss of the University." In it, Berry laments that "the various disciplines have ceased to speak to each other; they have become too specialized, and this overspecialization, this separation, of the disciplines has been enabled and enforced by the specialization of their languages." This critique is notable because it isn't merely another cry to strengthen the liberal arts core curriculum or force all engineers to learn Latin. He notes that the "underlying idea of a university... is that good work and good citizenship are the inevitable by-products of the making of a good – that is, a fully developed – human being."

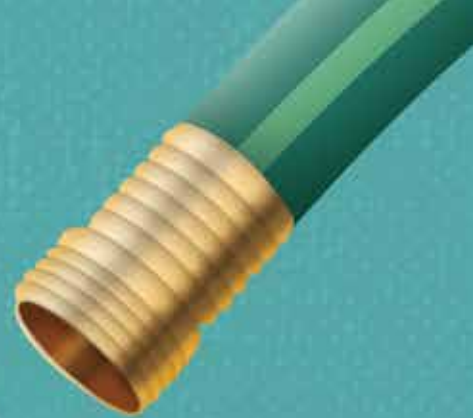
Fully developed human beings are, of course, educated human beings. But it isn't often that anyone thinks about what universities make. If in fact, making good

human beings is a university's goal, then how do we proceed if each bit of the university shares no common channels or modalities of communication with the other bits? Each school or department or division is then only a maker of a part and will have lost any vision of understanding of the desired whole, Berry argues.

My answer to Berry's critique (or, at least, my partial answer) is to thank God that Baylor still has at least one common language left – the language of our faith in Christ and of our Biblical narrative, the language of truth, the language of mercy and grace, the language of redemption – the very language that we call upon to define what we mean by a "good, fully developed human being."

So why do we need residential colleges at Baylor? Because, through them, we can reinforce that common language more concretely, and speak it more influentially, than any other way I know. That is not to diminish at all the role of the classroom and the lab in forming "fully developed human beings," but simply to point out that our common language is one that must be both spoken and lived. The new college will be, by the grace of God, a place in which young adults live out some of their most formative years practicing virtue and selflessness, encouraging and experiencing beatitude, and pursuing their education in the context of calling and equipping the saints.

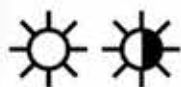
Exciting times are ahead!



Turning GREEN into GOLD

BY DANA WALLACE

LITTLE DID EDUARDO TORREALBA KNOW that a going away present from his in-laws during his move from Waco to Illinois would be the thing that added a little spice to his life.



SENSOR



WEB EXTRA

www.ecs.baylor.edu/Synergy
Photos and a video of the
Oso Technologies Team



BASE STATION

A basil plant that wouldn't grow sparked an idea in the mind of Edward Torrealba (BSME '11), leading him to develop a program that told him when to water. "I do not have a green thumb," said Torrealba. "I needed something like this to help me keep my plants alive."

After doing a little research to learn what options existed, Torrealba discovered a product that would tell him when to water but didn't take into account the type of plant and the soil type. The only other comparable tool was an industrial system that was cost prohibitive.

"I thought to myself, 'I'm probably not the only person out there with this problem,'" he said. It was October 2011 when Torrealba approached his business partners about beginning to develop an idea for a new product.

Four Bears Plus One

At a small-group Bible study, Torrealba connected with three other Baylor engineering graduates and an Iowa State graduate. They all were studying for their master's at the University of Illinois. The four engineering grad students formed Oso Technologies and began their journey.

"The strongest part of the company is the team," said co-founder and Baylor graduate Trevor Hutchins (BSECE '09). "I knew that I wanted to be an innovator of some sort. This really allows for a great opportunity to begin that."

Oso Technologies' Plant Link uses sensors that are placed outside in a garden or inside in a houseplant. The sensors communicate wirelessly to a base station, with a reach of up to 100 meters. The base station works through a homeowner's Wi-Fi router and talks directly to the Internet. Hutchins said the value of the product is in the website where the intelligence is stored.

The company takes information about plants that is available to the public and integrates it into their database, which then provides watering information on thousands of plants.

Each of the team members has a specific responsibility. Hutchins said he invests between 10 and 20 hours each week on Oso, in addition to his studies and job as a research assistant. The group has virtual meetings weekly to hold each other accountable and to connect with two of the team members who now live out of state.

Michael Clemenson (BSME '10), another co-founder and Baylor graduate, said, "This opportunity provides all of us with valuable

experience in both entrepreneurship and engineering while impacting others in a tangible way. It's not every day you get to do that while working alongside some of your closest friends."

Oso – the Spanish word for bear – was originally a play on words for the Baylor Bears, said Torrealba. The group likes the name because it's not specific about what the company does and allows them to be flexible, should they choose to develop future projects.

"I never thought I'd be able to launch a company like Oso this early in my career," said Torrealba.

Angels Among Us

Securing funding is no easy task for most startups, but in this case, Hutchins said things seemed to fall into place. "It's all happening so fast. None of us had much time to be scared," he said. "We really felt like we had an important problem to solve, and we feel like we have a good solution for it."

When the company began, Torrealba said, "I made a spreadsheet and projected possible sales over the next three years, based on market research and the potential number of customers." He determined the amount of funding needed to purchase the hardware and sustain the company. To date, the company has about four different investors.

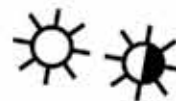
One of those investors came through the Baylor Angel Network. Members of the BAN must meet the U.S. Securities and Exchange Commission's definition of an accredited investor. The BAN is set up a bit like the television show Shark Tank, where ideas are evaluated and investors provide funding, only with a little less dramatization.

MICHAEL CLEMENSON (BSME '10)

ROLE: Works with the physical structure of the device.

THEN: Bachelor's from Baylor in mechanical engineering. ASME officer with Eduardo at Baylor. Roommates with Brad and Trevor throughout Baylor.

NOW: Master's from the University of Illinois in mechanical engineering. Pursuing PhD in mechanical engineering.



ROUTER



TREVOR HUTCHINS
(BSECE '09)

ROLE: Electronics, electrical engineering, prototyping hardware, researching components, testing, debugging, writing code to run the hardware.

THEN: Bachelor's from Baylor in electrical and computer engineering. Roommates with Brad and Michael throughout Baylor.

NOW: Master's from the University of Illinois in electrical and computer engineering. Pursuing PhD in electrical and computer engineering. Roommates with Brad while at the University of Illinois.



Baylor business seniors get experience evaluating real companies for the Angels to consider for investment potential. Entrepreneurs are able to get connected with early stage funding.

Kevin Castello, Executive Director of the Baylor Angel Network, said that several things about Oso Technologies stood out to him. "You have a very smart founder team. They worked well together. They were able to communicate what they were looking to accomplish," he said. "They've got a cogent business plan and, at the same time, they've got backing from another (source)." A venture capital firm in Illinois, Serra Ventures, was already investing and providing guidance for Oso.

Oso will use the initial seed money for research and development. At this stage, Hutchins said, it means researching electronic components, testing them, writing code and interfacing it with the website. "Initially you start out with more expensive prototyping hardware, and you slowly refine it down to the basics of what you need."

The company is just over a year old, and investors appreciate how fast they've been able to move, said Hutchins.

"For the Angel investor, they put that money in now, anticipating that in several years when this company sells, they obviously own a piece of the company; therefore, they get a piece of the sales price," said Castello.

With that profit margin, members of the BAN are then asked to make a donation back to the Hankamer School of Business. For the startup itself, there is no requirement to make a contribution.

AUSTIN LYONS

ROLE: Web development and the code behind it that controls the database, monitors the sensors that upload information to the Internet.

THEN: Bachelor's in electrical engineering from Iowa State.

NOW: Met the rest of the team at a church group in Illinois. Master's from the University of Illinois in electrical and computer engineering. Works for Intel in Austin.



[WWW.OSO.TC](http://www.oso.tc)

Making a Social Impact

Oso hopes to one day take their product overseas to help with water resource management.

"I think back to the verse in Matthew where Jesus tells us to do things for the least of these in that we're doing those things for Him," said Torrealba. "I think that as Christians we all have different callings in our lives to serve the kingdom in some way."

Brian Thomas, Senior Lecturer and Assistant Chair of Electrical and Computer Engineering, said a summer trip to Honduras to install a hydroelectric generator helped shape Torrealba's world view, "Seeds were planted, and their way of thinking was informed and colored by that experience."

Torrealba added, "That was absolutely foundational in the way that I thought about approaching this problem and trying to build up this company over the past several months." He explained, "All the different experiences I had where I saw people with businesses that had an engineering goal, a business goal, and they had a social impact, those things really made me want to do something like that someday."

Thomas said that encouraging students to make sure engineering is their calling is a focus of the curriculum early on. "We are making the assumption you will be happiest, and you will be most fulfilled when you are doing the thing that God has made you and called you to do," said Thomas.

In Africa, Thomas worked on a water purification and delivery system with Brad Sanders (BSME '10), another co-founder. Sanders said of Thomas, "He is the one who really opened my eyes to the fact that God can use engineers to directly affect people's lives for the glory of Christ."

The Next Steps

Oso currently has about 10 products in the homes of customers who signed up on their website to beta test the technology. They anticipate their product will be on shelves by spring 2013. While the final cost to consumers is still being determined, Hutchins estimates it will be around \$99 for the base station and three to four sensors.

The first step is to get the Oso name well known in home gardening. The second is to expand into lawn irrigation and water conservation for small farms. "Having an irrigation system that is intelligent, that can water specific areas depending on how moist that soil is, can really save you a ton of money on your water bill," said Hutchins, who anticipates the system would ultimately pay for itself in savings.

Reflecting on what has made the company so successful so quickly, Torrealba said, it's the people he's surrounded by, from investors who provide insight, to his partners. "(We) have all been able to take off and run with different segments of the product. I think that the sum of those different people together is a lot bigger than the individual contributions."

Torrealba said that giving people the tools they really need to help their gardens grow has a lot of exciting possibilities. "This is the area I'm passionate about, I'm skilled in and that I think I can really have an impact in."

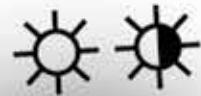


BRAD SANDERS (BSME '10)

ROLE: Developed the sensors and their structure to aid in absorbing water, coordinated the computer aided design of the sensors, works on the database.

THEN: Bachelor's from Baylor in mechanical engineering. Roommates with Trevor and Michael throughout Baylor.

NOW: Master's from the University of Illinois in aerospace engineering. Roommates with Trevor while at the University of Illinois. Serves in the Air Force in California.



EDUARDO TORREALBA (BSME '11)

ROLE: Most business aspects, meets with investors, handles financials, coordinates team's progress.

THEN: Bachelor's from Baylor in mechanical engineering. ASME officer with Michael at Baylor. While in school married Lisa Bradbury (BS '10), then a future Baylor mechanical engineering graduate.

NOW: Pursuing master's from the University of Illinois in mechanical engineering.





Expanding Our Reach

BY ERIC ECKERT

BAYLOR'S DEPARTMENT OF MECHANICAL ENGINEERING IS

seeing a surge in the number of its interns and graduates hired into the growing and evolving petroleum industry.

"We're a young program, and up until a few years ago, Baylor didn't show up on the petroleum industry's radar," said Dr. David Jack, assistant professor of mechanical engineering. "In the last year or two, we've seen a significant increase in the number of our students being hired and offered internships within the petroleum industry."

The strategy is to keep that momentum going with new research projects and increased investments of time and money. In 2012, the department received a new source of funding designed to bolster that strategy and established the Excellence Fund for Baylor Student Advancement in the Petroleum Industry. The Excellence Fund is designed to support student and faculty research, travel, classroom lectures, labs and senior design projects.

The fund was established by a generous gift from Glen and Laurie Benge, whose daughter Maggie is a graduate student in Baylor's Master of Science in Mechanical Engineering program.

"This was seed money. We want it to grow," Glen said. "We want everybody to know what we know – that Baylor is a top-notch engineering school."

Both Glen and Laurie have worked for decades in the oil and gas industry. Glen retired from ExxonMobil as a

senior technical advisor with expertise in petroleum engineering and chemistry. Laurie is an industrial hygienist with a master's degree in environmental science. Their children, John and Maggie, are following in their footsteps.

From a professional standpoint, the Benges say they are impressed with Baylor's interdisciplinary approach to research and the University's dedication to student success. Their goal is to help build Baylor's standing within the engineering sector of the petroleum industry – a thriving field that they believe needs the high-caliber, high-quality mechanical engineers that Baylor produces.

"Baylor students are unique, ethical, and they have a foundation in faith.

"The petroleum field wants mechanical engineers, and there's an interest in Baylor."

They're the kind of engineers we need," Laurie said.

Glen added that not every engineering program trains students for the type of meaningful collaboration that's a daily component of the industry. "Baylor has engineers who work with each other. For example, they design projects that call for teamwork between multiple engineering disciplines."

Dr. Jack said the Benge family's investment, professional insight and guidance provides an integral boost to the program. Because of the Excellence Fund, students will have more exposure and opportunities to interact with leading companies in the petroleum industry.

"We see the market need," Jack says. "The petroleum field wants mechanical engineers, and there's an interest in Baylor."

Glen hopes the fund will help more students find ways to present at professional conferences and work their way into valuable internships. He says the job outlook is "excellent" for qualified mechanical engineers in the industry, and competitive graduates can expect high salaries.

"There are opportunities for mechanical engineers both domestically and internationally," Glen said, adding that one of the best ways to gain experience is to attend the conferences and participate to the fullest extent possible. "With that kind of exposure, more people in the petroleum industry will realize the quality of the engineers at Baylor and will definitely come knocking at your door."

Jack said mechanical engineering faculty continuously looks for research collaborations with leading petroleum companies. "If you go to any of the career fairs, virtually every vendor wants mechanical engineers. We have an opportunity as a faculty and up-and-coming students to make an impact," he said.

The Benges say they view the Excellence Fund as an investment in the future – Baylor's future and the future of the industry they've dedicated their professional lives to for many years.

"We know the University will be a good steward of the money," Glen said. "We don't have to worry about Baylor doing the job right."

TO MAKE A CONTRIBUTION
www.baylor.edu/ecs

> Elsewhere at Baylor



Low pH Levels Can Eliminate Harmful Blooms of Golden Algae

Baylor University researchers are one step closer to understanding the algae that causes a substantial number of fish deaths in more than 18 states.

Golden algae, Texas Tide or *Prymnesium parvum*, as it is known by its scientific name, produces toxins that can severely impact aquatic organisms. Over the past decade, golden algae blooms have been responsible for the death of tens of millions of fish in Texas reservoirs.

Bryan W. Brooks, PhD, professor of environmental science and biomedical studies at Baylor and director of the environmental science graduate program and the environmental health science program, and his research team found that neutral pH levels prevented the algae's bloom development and the toxicity of the algae was greatly diminished.

"Our novel findings identify that surface water pH is a very important factor influencing whether harmful algal blooms of *Prymnesium*

parvum will even occur in a lake or reservoir," Brooks said. "In addition to better understanding the ecology and toxicology of this invasive species, this new information promises to support more sustainable environmental management of fisheries and drinking water supplies."

University Kicks Off Baylor Stadium Bricks Campaign

As construction moves rapidly forward on the new on-campus football stadium, a Baylor Stadium Bricks Campaign has been launched that allows Baylor Nation to join together in support of the football stadium project.

Through the campaign, fans and others have the opportunity to financially support the stadium and have that gift acknowledged with a brick - engraved with a personal message - installed at the new stadium.

When it opens in Fall 2014, Baylor Stadium will be "arguably the most dynamic college football stadium in America," according to Baylor Head Football Coach Art Briles. The \$250 million on-campus stadium - currently under construction - is located on a 93-acre site at the intersection of Interstate 35 and the Brazos River.

Bricks will be sold on a first-come, first-served basis and are available in four different sizes. Gift certificates are also available. Both can be purchased online at www.baylor.edu/stadiumbricks



WEB EXTRA

www.ecs.baylor.edu/Synergy

See an animation of a completed Baylor Stadium.

Hall Named Senior Vice President for University Development and Strategic Initiatives

President Ken Starr recently announced Dr. Kenneth L. Hall, President Emeritus of Buckner International, has joined the President's



leadership team as Senior Vice President for University Development and Strategic Initiatives.

"Dr. Hall brings to the position a world of fundraising experience," President Starr said. "[He] is a natural addition to our leadership team, and we are fully confident in his abilities to help us build Baylor University in the years to come."

Hall joins Baylor after serving as president and CEO of Buckner International from 1994-2010 and as CEO from 2010 until his retirement in April 2012. Prior to his appointment to President Starr's Executive Council, Hall resigned his position on Baylor's Board of Regents where he served as a BGCT appointee.

Partnership Will Help BRIC Discoveries Reach Market Faster

One could develop the greatest product in the world — a better mousetrap, a cure for cancer, etc. — but if it never gets to market, it will never do anyone any good.

Companies utilizing the University's upcoming discovery park, the Baylor Research and Innovation Collaborative (BRIC), will have a distinct advantage in that process. That's because when BRIC opened in January, one of its first tenants was the Innovative Business Accelerator (IBA), led by Dr. Gregory Leman.

The IBA is a joint venture of the Hankamer School of Business and the Office of the Vice Provost for Research. It exists to help new technology companies grow their business more rapidly by taking advantage of Baylor's research and intellectual resources and will provide a broad range of business, science, legal and technical services, some of which will come from Baylor students.

"The IBA is built on a solid foundation of our successful collaboration with global industry," says Leman. "It will become a single point of access to University and

community expertise by providing a critical link between technology companies and Baylor business, science, engineering and law faculty."

Waco Foundation Grant to Provide BRIC Exhibits

Baylor has received a \$60,000 grant from the Waco Foundation to help fund science, technology, engineering, and mathematics (STEM) interactive exhibits and integrate aerospace and industry artifacts throughout the Baylor Research and Innovation Collaborative (BRIC).

"We saw this as a great opportunity to help further one aspect of our community's shared vision - that of reducing poverty and supporting education at all stages - with this BRIC exhibit," said Kyle Deaver of the Waco Foundation Trust.

The funding enables placement of displays which will guide BRIC visitors toward their given interest areas. Baylor was fortunate to obtain, from a recent NASA program and other sources, a variety of exhibit materials from both industry and federal science-based agencies. Some 40 NASA Space Shuttle and

industrial artifacts will be integrated into the BRIC circulation corridors and symposia areas.

Regents Approve New Programs of Study

At its annual Homecoming meeting, the Baylor Board of Regents approved two new doctoral programs in the School of Music and a joint master's degree from George W. Truett Theological Seminary and Hankamer School of Business.

Only seven institutions accredited by the National Association of Schools of Music offer recognized doctoral degrees in church music, and only one of those seven institutions offers the PhD in church music. Baylor's PhD in church music is designed to foster in students the highest levels

of knowledge and skill in the practice of church music and research, while the doctor of musical arts (DMA) degree will include the added component of strong performance skills.

The joint MDiv/MBA will link the faculties, resources and education of Baylor's business school and seminary, offering to students an education that prepares them well for a multitude of leadership opportunities. As religious institutions continue to morph into complex organizations and nonprofits continue to proliferate, the constituencies of such institutions are seeking qualified, competent and well-educated individuals to lead them.

The MDiv/MBA degree program is expected to begin in Fall 2013 while the doctoral degree programs in church music are expected to begin in Fall 2014.

Master's Student Wins Prestigious Environmental Science Award

Baylor continues to gain recognition for its excellence in research as Lauren Kristofco, an environmental science graduate student, received the 2012 Jeff Black Fellowship from the Society of Environmental Toxicology and Chemistry (SETAC) and EA Engineering.

The annual award provides \$2,000 to a graduate student with great accomplishments in the field of environmental science. It is named in the honor of Jeff Black, PhD, an environmental researcher and charter of SETAC, known for his dedication to mentoring students. In 2007, Baylor

graduate student Laura Dobbins received the award for her contributions to SETAC and environmental science.

"For two of the 15 winners of the SETAC/EA Jeff Black Fellowship to be our students highlights the excellent opportunities for graduate studies in environmental science at Baylor," said Bryan W. Brooks, PhD, a professor and director in the department of environmental science in the College of Arts & Sciences at Baylor.





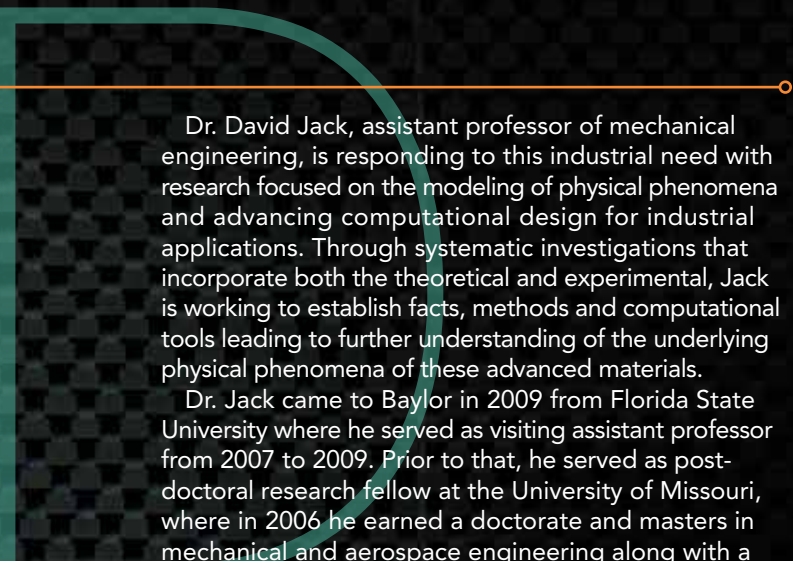
The demand for lightweight, durable composites is on the rise because they have exceptional strength to weight ratio. In fact, for the last 30 years, the use of polymers and polymeric-based composites in industries such as aerospace, automotive, and petroleum has exceeded that of all metals. As that demand grows, so does the need for accurate physics-based prediction methods for both the process and the final product, insuring the proper use of these high-performance materials while reducing the costs.

PREDICTING BEHAVIOR



WEB EXTRA

www.ecs.baylor.edu/Synergy
Video of Dr. David Jack



Dr. David Jack, assistant professor of mechanical engineering, is responding to this industrial need with research focused on the modeling of physical phenomena and advancing computational design for industrial applications. Through systematic investigations that incorporate both the theoretical and experimental, Jack is working to establish facts, methods and computational tools leading to further understanding of the underlying physical phenomena of these advanced materials.

Dr. Jack came to Baylor in 2009 from Florida State University where he served as visiting assistant professor from 2007 to 2009. Prior to that, he served as post-doctoral research fellow at the University of Missouri, where in 2006 he earned a doctorate and masters in mechanical and aerospace engineering along with a second masters in applied mathematics.

Jack said the driving factor to come to Baylor was because it is a Christian university. "There was no hiding that Baylor was a Christian university and they were looking for Christian faculty," said Jack. "I had been taught in school [that] your religion and your career are separate but, at Baylor, I learned it was not the case. You don't have to disconnect your faith and your vocation. They are intricately tied together. You are one person, not two separate people."

Dr. Jack's research concentrates on the analysis and design procedures that effectively and efficiently represent the relationship between the processing conditions and the final product performance for composites fabricated from a wide variety of engineering inclusions. Spanning the component size spectrum – from the nano to the macro – his research covers industrial applications ranging from niche military aerospace multifunctional aircraft panels to large volume, low price, automotive components and to multiscale work on pipe design for the petroleum industry.

"I chose to work with composites and materials because of the challenge," Jack said. "I like that my students and I get to use high level mathematics to predict how something will behave."

Through his work, Dr. Jack and student researchers have developed approaches for physics-based predictive schemes for processing a composite product fabricated through injection, extrusion or compression molding. While there has been a wide variety of processing models developed during the last century for predicting

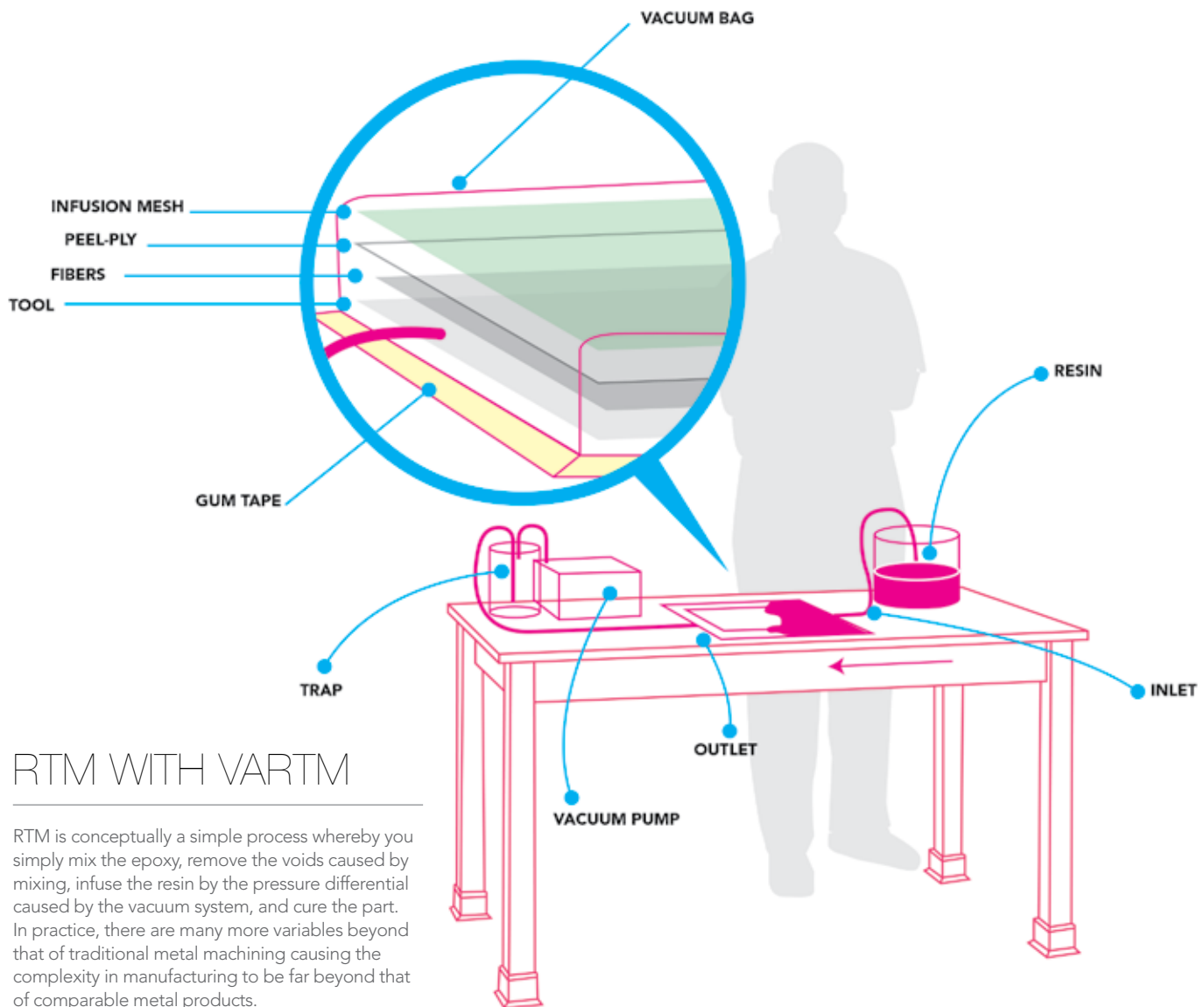
"I chose to work with composites and materials because of the challenge."

inclusion orientation and the underlying microstructure of the final processed part, the existing models drastically over predict the alignment rate. In addition, the most effective models are formulated exclusively for rigid inclusions, neglecting flexible inclusions of current interest to the industry such as long glass/carbon fibers, carbon nanotubes, and of unique interest to Baylor, renewable coconut fibers.

Through multidisciplinary research, the models and predictive equations that Jack creates are also able to be tested. "Having ongoing research in both experimentation and physics-based constitutive modeling is a non-traditional approach," said Jack. "But, it fills a large gap common in many research communities and will allow us to jump several generations in predictive modeling."

The work Dr. Jack and his students are doing has the potential to impact a number of industries. At the manufacturing level, predictive models can have a significant impact on design costs and in industries like the petroleum field, their work can increase safety by predicting the likelihood of accidents. In addition, the potential cost savings of Jack's research impacts the entire supply





RTM WITH VARTM

RTM is conceptually a simple process whereby you simply mix the epoxy, remove the voids caused by mixing, infuse the resin by the pressure differential caused by the vacuum system, and cure the part. In practice, there are many more variables beyond that of traditional metal machining causing the complexity in manufacturing to be far beyond that of comparable metal products.

chain and will reduce processing and development costs, which impacts the final product cost.

Take the automobile industry for example. Better understanding of composite materials shortens the design process for a car. The composite can allow for a design with less drag and less weight, which for the consumer means not just a car that is sleek and appealing to the eye, but a car that gets better gas mileage.

Jack has a positive outlook on what the future holds for Baylor. With a passion for doctoral research, he is working as part of the mechanical engineering doctoral committee to develop a doctorate program in mechanical engineering. He also is looking forward to the Baylor Research and Innovation Collaborative (BRIC)

and the impact it will have on Baylor and the Central Texas region.

"BRIC will be a huge boom for Baylor," Dr. Jack said. "Industrial collaboration and partnerships will not only grow technology in Waco but will provide students with real-world experience."

The BRIC will continue to foster Baylor's relationship with the Waco community and with local businesses, such as L-3 Communications, Birkeland Current and Waco Composites. As Jack explained, "The BRIC will give students hands-on experiences. They will be able to apply their book knowledge to something that is immediately useful to others. Anybody can write a math equation. But is it a useful one and what can you do with it?"

According to Jack, the collaboration that is being forged in the community has its root in the relationships and cooperation that is found across the entire Baylor campus.

"We have a very friendly environment at Baylor and we all help each other out," Dr. Jack said. "I think it is because we all have a bigger purpose for why we are here – to help train and teach the next generation of Christian young men and women. Knowing that the young students you are working with today will become Christian leaders in their chosen vocation, and knowing that they will have a positive impact on society and the world, is amazing."



DEAN DENNIS O'NEAL



After nearly 30 years at Texas A&M, you recently became the third dean of engineering and computer science in Baylor's history. What attracted you to Baylor?

Probably first and foremost is that Baylor is an institution that is intentional about integrating Christian faith and academic discipline. Baylor is one of the few major universities attempting to stay true to its Christian heritage. We are one of the few places where a young person can study in an environment that will both challenge him/her academically and spiritually.

I was also attracted to the opportunity to help build the program here. Baylor has a relatively young engineering program compared to some of the established programs in the state (public or private). While we currently have three departments, I believe that we should be looking at developing some new majors to give our students more options. I also liked our emphasis on entrepreneurship. With the I5 program (Immersion into International Interdisciplinary Innovation), our students have an opportunity to have a unique international experience in entrepreneurship.

How has the transition gone for you?

The first three months here have been extremely busy meeting people (faculty, staff, students and alumni), learning how to get around Waco, and figuring out how to get things done at Baylor. My wife and I have found it a very welcoming community, both at Baylor and in Waco. Probably the most difficult has been moving away from our first grandchild in College Station.

**Where did you earn your degrees?
What is your area of academic
specialization?**

My undergraduate work was in nuclear engineering at Texas A&M University. I graduated in 1973, which was the year of the Arab oil embargo and the peak of the nuclear industry. It was the crisis in energy that motivated me to switch to mechanical engineering for my MS (Oklahoma State University) and PhD (Purdue University). My general area of specialization is thermal systems with an emphasis on heating, ventilation and air conditioning.

How does Baylor's School of Engineering and Computer Science fit within the mission of Baylor University?

(The mission of Baylor University is to educate men and women for worldwide leadership and service by integrating academic excellence and Christian commitment within a caring community.)

I really like the part of Baylor's mission statement that focuses on "educating men and women for worldwide leadership and service." With the globalization of technology and manufacturing, many engineers and computer science graduates of our program will likely spend part of their careers overseas. As such, some will have an opportunity to practice their vocational calling and faith in places of the world where there may be few Christians and where a traditional missionary cannot go.

curriculum for accreditation purposes, there is no teaching on the ultimate source of ethics...it is typically a societal derived ethic that allows you to function responsibly in your profession. At Baylor, students have a chance to learn from faculty who take their faith seriously, who can appreciate God's handiwork in things like the second law of thermodynamics or Newton's laws of motion; who also can teach a Biblical basis for ethics and why Christians should have a higher moral code than the rest of society; and who also want to practice their faith by accompanying students on an engineering missions trip to Rwanda or Honduras.

“

Realize that when you graduate, you have a degree that says you are capable of learning something new.

”

laboratories. With the BRIC, faculty will have laboratory space to conduct research and graduate student offices to house their graduate students. The BRIC will also give our faculty opportunities to collaborate with the engineers and scientists from companies located in the BRIC.

Is there one piece of advice you would like to give students and alumni beginning their careers?

Realize that when you graduate, you have a degree that says you are capable of learning something new. Engineering and computer science are tied to technologies that change rapidly and our graduates have to adapt to the changes.

When I started my undergraduate program, I took a class on how to use the slide rule. Most students today have never seen one, don't know what it is, and don't know how to use it. Yet, it was a technology vital to engineers up until the early 1970s.

Today, we carry smart phones that have more computing power than the computers that went on the Apollo 11 moon mission. The technology that graduates are using today will change. We may not know how, but I am hopeful that it will be Baylor ECS graduates that will be at the forefront of those changes.

The mission of Baylor's School of Engineering and Computer Science is "to provide a superior education through instruction, scholarship and service that prepares graduates for professional practice and responsible leadership with a Christian world view." What does that mean to you?

At Baylor, we are really trying to do something unique – integrating one's Christian faith with one's vocational "calling." Much of education today is taught in a moral vacuum. While ethics has to be a part of an engineering

How do you envision the Baylor Research and Innovation Collaborative (BRIC) playing a part of the School of Engineering & Computer Science?

The BRIC will be vital to the growth of ECS. We just started a PhD program in Electrical and Computer Engineering and hope to get approval to start one in both Computer Science and Mechanical Engineering soon. We will be hiring new faculty in all of our programs. We have no room in the Rogers building to house research



WEB EXTRA

www.ecs.baylor.edu/Synergy
More Q&A from
Dean Dennis O'Neal

1995

Johnny Ferguson (BSE) works in Systems Engineering at L-3 Communications in Waco. Email: johnny.d.ferguson@L-3com.com

1997

Bailey Jones (BSE) is an owner at Bright Product Development, Austin, Texas. Bright Product Development specializes in consumer and industrial product design ranging from electronic packaging to kitchen gadgets and wind turbines, with expertise including project management, concept generation, material and process selection, CAD modeling, and manufacturing support. Email: bigbrother@mad.scientist.com

Steven Vargas (BSE) is a Water Conservation Engineer at Lower Colorado River Authority in Austin, Texas. He conducts facility water audits of schools, public facilities, hospitality industries, manufacturing, and other non-municipal facilities in order to identify, evaluate, and provide recommendations for water conservation

opportunities in order to reduce overall usage. Email: steven_vargas@yahoo.com

1999

Tim Hess (BSE) is an electrical engineer at L-3 Communications in Waco. Email: timothy.h.hess@L-3com.com

2002

On November 13, 2012, Baylor mourned the loss of **Eric Treszoks** (BSCS), technology specialist, who passed away unexpectedly.

2004

Brandon Rich (BSCS) is an Application Development Specialist at the University of Notre Dame, where he has worked since 2005. Email: Brandon.Rich@gmail.com

2007

Thomas Cemo (BSME; MSME, 2009) wrote from California, "I have to say it has been quite a wild ride in the solar industry out here in California ever since I graduated. The initial company I got hired by to install commercial rooftop

PV was acquired by a huge Korean company and then the company I currently work for now is Siliken, a Spanish module manufacturer. The Baylor spirit is alive and well out here and I have had the opportunity to connect with a few alumni." Email: thomas.cemo@gmail.com

2008

Carl Mehner (BSCS, MSIC 2009) works as a Security Analyst at USAA in San Antonio. Email: carl_mehner@baylor.edu

2009

Ryan Richards (BSECE) works as an Enterprise Network Advisor at Apple in Austin, Texas. Email: ryancrichards3@gmail.com

2010

Michele DuVall (BSECE) hails from the Washington DC area. She works as an Electrical Engineer for ComSearch, Inc., which provides Internet based auto parts location and insurance adjustment audit services. Email: Michele_Duvall@baylor.edu

Elizabeth Lemus (BSECE) works in California at Accenture as a Systems Integration Analyst. Email: Elizabeth_Lemus@baylor.edu

2011

Ross Appfel (BSECE) is an Electrical Engineer at Bechtel Corporation in the Houston area. Email: ross.appfel@gmail.com

Jimmy Becker (BSME/MSME) is an Assistant Mechanical Engineer in the Process and Industrial group at Burns & McDonnell, Kansas City, Missouri, focused on the oil and gas industry. Email: Jimmy_Becker@baylor.edu

2012

Aimie Cox (BSECE) works at Jacobs Engineering in Houston, Texas. Email: aimiewith2eyes@gmail.com

Justin Thomas (BSCS) works at Pariveda Solutions in Dallas, TX. Email: Justin_Thomas1@baylor.edu

Andrew Wagner (BSME) works as a mechanical engineer at Technip in Houston, TX. Email: andrew_wagner@baylor.edu

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BAYLOR ALUMNI

PLEASE STAY IN TOUCH.

If you would like to let alumni and friends of the School of Engineering and Computer Science know about recent events in your life, please contact us:

One Bear Place #97356
Waco, TX 76798-7356
Leigh_Ann_Marshall@baylor.edu



Our first issue of *Synergy* was published in the summer of 2002. We are proud to celebrate 10 years in print.



> An Update from Dr. Kelley

Well, I went from the largest office in the building with a bank of windows to the smallest office with no window...and I've hardly noticed the difference. I was expecting, or at least hoping, the pace would slow down, but it's actually picked up a bit. I'm teaching the freshman engineering class and the senior biomaterials class, both for the first time in quite a while...so I'm having to work hard to come up to speed quickly. I am having a blast and I absolutely adore being among the students - they are just so smart!

I'm also directing our general engineering program, which is our legacy, and the dean and faculty are suggesting changes I believe will make it even more of an asset. I'm looking forward to helping the program grow and blossom into another of ECS's hallmarks.

AROUND THE LAB

> FACULTY PUBLICATIONS & PRESENTATIONS

William C. Anderson, 2012: Passive scalar roughness lengths for atmospheric boundary layer flow over complex, fractal topographies. (Under Rev.)

William C. Anderson, 2012: An immersed boundary method wall model for high-Reynolds number channel flow over complex topography. *Int. J. Numer. Meth. in Fluids*. (Accepted)

William C. Anderson, P. Passalacqua, F. Porte-Agel, and C. Meneveau, 2012: Large-eddy simulation of atmospheric boundary layer flow over fluvial-like landscapes using a dynamic roughness model. *Boundary-Layer Meteorol.*, 144, 263—286

S. Uhlich, **William C. Anderson**, P. Passalacqua, D. Mohrig, and G. Kocurek, 2012: Large-eddy Simulation of Boundary Layer Flow over Desert Sand Dune Structures. *Proc. of American Geophysical Union, Fall Meeting*, San Francisco, CA.

William C. Anderson, 2012: Evaluation of scalar and momentum roughness lengths in ABL flow over complex terrain. *Proc. of American Geophysical Union, Fall Meeting*, San Francisco, CA.

William C. Anderson and K. T. Christensen, 2012: LES of turbulent boundary layer flow over complex topographies and comparison with experimental data. *Proc. of American Physical Society*,

65th meeting of Division of Fluid Dynamics, San Diego, CA.

William C. Anderson and P. Passalacqua, 2012: Application of a dynamic drag model in LES of ABL flow over fluvial-like topography (Poster). *Proc. of American Meteorological Society, 20th Symp. on Boundary Layers and Turbulence*, Boston, MA.

William C. Anderson, 2012: LES of passive scalar transport in ABL flow over fractal topography and evaluation of interfacial transfer coefficient relations. *Proc. of American Meteorological Society, 20th Symp. on Boundary Layers and Turbulence*, Boston, MA.

C. Meneveau and **William C. Anderson**, 2012: Dynamic

surface roughness model for LES of atmospheric boundary layer flow over multi-scale terrain with power-law height spectra. *Proc. of European Geosciences Union, General Assembly*, Vienna, Austria.

Charles Baylis and **Robert J. Marks II**, "Small Perturbation Harmonic Coupling in Nonlinear Periodicity Preservation Systems," *IEEE Transactions on Circuits and Systems I*, vol. 59, no. 12, pp. 3034-3045, December 2012.

Charles Baylis and **Robert J. Marks II**, "Evaluation of Harmonic Coupling Weights in Nonlinear Periodicity Preservation Systems," *IEEE Transactions on Circuits and Systems I*, vol. 59, no. 12, pp. 3024-3033, December 2012.

J. Martin, M. Moldovan, **Charles Baylis**, **Robert J. Marks II**, L. Cohen, and J. de Graaf, "Radar Chirp Waveform Selection and Circuit Optimization Using ACPR Load-Pull Measurements," *IEEE Wireless and Microwave Technology Conference*, Cocoa Beach, Florida, April 2012.

Charles Baylis, J. Martin, M. Moldovan, O. Akinbule, and **Robert J. Marks II**, "A Test Platform for Real-Time Waveform and Impedance Optimization in Microwave Radar Systems," *International Waveform Diversity and Design Conference*, Kauai, Hawaii, January 2012.

M. Moldovan, **Charles Baylis**, **Robert J. Marks II**, M. Wicks, and J. Martin, "Chirp Optimization Using Piecewise Linear Approach," *International Waveform Diversity and Design Conference*, Kauai, Hawaii, January 2012.

J. Martin, **Charles Baylis**, **Robert J. Marks II**, and M. Moldovan, "Perturbation Size and Harmonic Limitations in Affine Approximation for Time Invariant Periodicity Preservation Systems," *International Waveform Diversity and Design Conference*, Kauai, Hawaii, January 2012.

J. Martin, **Charles Baylis**, **Robert J. Marks II**, L. Cohen, and J. de Graaf, "A Peak-Search Algorithm for Combined PAE and ACPR Load-Pull," *Power Amplifier Symposium*, San Diego, California, September 2012.

Charles Baylis, "Joint Circuit and Waveform Optimization for Spectrally Confined Radar Transmission," *IEEE Microwave Theory and Techniques Society*, Dallas Chapter Meeting, Plano, Texas, June 2012.

Charles Baylis, J. Martin, M. Moldovan, **Robert J. Marks II**, L. Cohen, and J. de Graaf, "Engineering Reconfigurable, Spectrally Confined Radar

Systems," *Department of Defense E3 Review (Environmental Electromagnetic Effects)*, Orlando, Florida, March 2012.

J. Martin, M. Moldovan, **Charles Baylis**, and **Robert J. Marks II**, "Radar Power Amplifier Spectrum Optimization for Chirp Waveforms Using ACPR Load-Pull Measurements," *URSI National Radio Science Meeting*, Boulder, Colorado, January 2012.

Stephen McClain, S. Mart, **William C. Anderson**, 2012: Roughness temporal response in a turbulent thermal boundary layer. *Proc. of American Inst. of Aero. and Astro., 6th Flow Control Conf.*, New Orleans, LA.

Samantha Simpson and Dwight Russell, Lydia Shannon, **Richard Campbell**, "Transit of Exoplanet TRS 3b", *Czech Astronomical Society Database*, August 2012.

Chiam, T. C. and **Young-Rae Cho**, "Accuracy improvement in protein complex prediction from protein interaction networks by refining cluster overlaps." *Proteome Science*, Vol. 10, No. Suppl-1, S3, 2012.

Young-Rae Cho, Chiam, T.C. and Lu, Y., "M-Finder: Functional association mining from protein interaction networks weighted by semantic similarity." *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, Philadelphia, PA, October 2012.

Pena, F.I. and **Young-Rae Cho**, "Improvements of graph entropy approach to detect protein complexes by ontological analysis of PPIs." *IEEE BIBM International Workshop on Biomolecular Network Analysis (IWBNA)*, Philadelphia, PA, October 2012.

Montanez, G.D. and **Young-Rae Cho**, "Assessing reliability of protein-protein interactions by Gene Ontology integration." *IEEE Symposium on Computational Intelligence in Bioinformatics and*

► Mack Grady

Professor / Electrical and Computer Engineering

Mack Grady, PhD, joined the Baylor faculty in the Department of Electrical and Computer Engineering in the fall of 2012. Dr. Grady's research interests are electric power and renewable energy. Before joining Baylor, Dr. Grady was a Professor of Electrical and Computer Engineering at University of Texas-Austin, since 1983, specializing in electric power systems and renewable energy. In addition to his faculty position, Dr. Grady also works for the Department of Defense on power grid projects.

Of his arrival, Dr. Kwang Lee, Chair of Electrical and Computer Engineering, said Dr. Grady's arrival adds "significant strength to the department, school, and University's growing leadership position in the strategic area of power and energy."

Dr. Grady has consulted with many industrial firms and government agencies, including EPRI, DoD, and GE Wind Energy. Dr. Grady is a Fellow of IEEE for his contributions in the analysis and control of power system harmonics and power quality, and has been active in IEEE serving as chairman of the Transmission and



Distribution Committee, Working Group on Power System Harmonics, and General Systems Committee.

"The opportunity to help build up the ECE program here at Baylor, especially the graduate program" appealed to him. "Baylor faculty, students and campus are a very good fit for me," he said. Dr. Grady is married and has three grown children.

> NEW FACES

Computational Biology (CIBCB), San Diego, CA, May 2012.

Liang Dong, "Cooperative localization and tracking of mobile ad hoc networks," *IEEE Transactions on Signal Processing*, vol. 60, no. 7, pp. 3907-3913, July 2012.

Liang Dong, "Opportunistic media access control and routing for delay-tolerant mobile ad hoc networks," *Wireless Networks*, vol. 18, no. 8, pp. 946-965, 2012.

Liang Dong, "MIMO cognitive radio with channel covariance feedback," in *Proc. IEEE International Conference on Communications (ICC)*, June 2012.

M. Salen and **Liang Dong**, "Adaptive security-aware scheduling using multi-agent system," in *Proc. IEEE International Conference on Communications (ICC)*, June 2012.

J. Grantner, B. Bazuin, **Liang Dong**, J. Al-shawawreh, R. Hathaway, C. Fajardo, M. Castanier, and S. Hussain, "Linguistic model for axle fatigue," in *Proc. IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, June 2012.

M. Saleh and **Liang Dong**, "Real-time scheduling with security awareness for packet switched networks," in *Proc. IEEE Radio and Wireless Week (RWW)*, January 2012.

David Pistruì, Bill Bonstetter, Ron Bonstetter, **Cynthia C. Fry**, "Creating and Assessing a New Class of Entrepreneurially-Minded Engineers," *NCIIA 2012 Open*, March 2012, San Francisco, CA.

Cynthia C. Fry and **Kenneth Van Treuren**, "Excellence in Undergraduate Engineering Education: The Challenge for Research-oriented Programs in Engineering & Computer Science," *2012 ASEE National Conference & Exposition*, June 2012, San Antonio, TX.

Kenneth Van Treuren, Cynthia C. Fry, and **Randall Jean**, "Teaching Creativity and Innovation in the Classroom," *2012 ASEE National Conference & Exposition*, June 2012, San Antonio, TX.

Cynthia C. Fry, Sridhar S. Condoor, Timothy J. Kriewall, Christopher Kitts, "Working Collaboratively Among Universities: A Dense Network Approach," *2012 ASEE National Conference & Exposition*, June 2012, San Antonio, TX.

Cynthia C. Fry, William M. Jordan, Edmond John Dougherty, Nassif E. Rayess, Pritpal Singh, Kenneth Bloemer, "The Helping Hands Dense Network: A Collaboration Across Multiple Universities," *2012 ASEE National Conference & Exposition*, June 2012, San Antonio, TX.

Brian Thomas and **Cynthia C. Fry**, "An Engineering Class for Non-engineering Majors: Technologies for Developing Countries," presented at the *Baylor Symposium on Faith and Culture*, October 2012, Waco, TX.

Paul Grabow, "Can Technology Foster Human Flourishing?" *Symposium on Faith and Culture, Technology and Human Flourishing*, at Baylor University, October 2012.

C. A. Hill, D. Chen, M. C. Such, D. Chen, J. Gonzalez, and **W. Mack Grady**, "Battery Energy Storage for Enabling Integration of Distributed Solar Power Generation," *IEEE Transactions on Smart Grid*, vol. 3, issue 2, pp. 850-857, June 2012.

W. Mack Grady and L. Libby, "A Cloud Shadow Model and Tracker Suitable for Studying the Impact of High-Penetration PV on Power Systems," *IEEE EnergyTech 2012 Conference*, Cleveland, OH, May 2012.

A. Sant, **W. Mack Grady**, S. Santoso, and J. Ramos, "A Screening Procedure to Detect Significant Power System Events Recorded by the Texas Synchrophasor

Network," *IEEE PES Annual Meeting*, San Diego, July 2012.

M. Kai, **W. Mack Grady**, D. Costello, and D. Brooks, "Lessons Learned from the Texas Synchrophasor Network," *IEEE-PES Integrated Smart Grid Technologies Conference*, Berlin, October 2012.

R. Tzartsev and **W. Mack Grady**, "Impact of High-Penetration PV on Distribution Feeders," *IEEE-PES Integrated Smart Grid Technologies Conference*, Berlin, October 2012.

A. Allen, S. Santoso, and **W. Mack Grady**, "Validation of Distribution Level Measurements for Power System Monitoring and Low Frequency Oscillation Analysis," *IEEE-PES Integrated Smart Grid Technologies Conference*, Berlin, October 2012.

D. Poulsen, J.M. Davis, **Ian Gravagne, Robert J. Marks**, "On the stability of mu-varying dynamic equations on stochastically generated time scales," *Proc. 44th Southeastern Symposium on System Theory*, Jacksonville, FL, March 2012.

Ian Gravagne, J.M. Davis, D. Poulsen, "Time scale-based observer design for battery state-of-charge estimation," *Proc. 44th Southeastern Symposium on System Theory*, Jacksonville, FL, March 2012.

Jonathan Drake and **Greg Hamerly**, Accelerated k-means with adaptive distance bounds. To appear in *OPT2012 (5th NIPS Workshop on Optimization for Machine Learning)*, December 2012.

Jonathan Hu, C. R. Menyuk, L. B. Shaw, J. S. Sanghera, and I. D. Aggarwal, "A mid-IR source with increased bandwidth using tapered As₂S₃ chalcogenide photonic crystal fibers," *Optics Communications* (2012).

Jonathan Hu, and C. Gmachl, "QCL-based sensors target health and environmental applications," *Laser Focus World*, 48, 38-43 (2012).

W. Zhang, F. Ding, W.-D. Li, Y. Wang, **Jonathan Hu** and S. Y Chou, "Giant and uniform fluorescence enhancement over large areas using plasmonic nanodots in 3D resonant cavity nanoantenna by nanoimprinting," *Nanotechnology* 23, 225301, (2012).

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B.A. Agboola, **David A. Jack**, and S. Montgomery-Smith, "Effectiveness of Recent Fiber-interaction Diffusion Models for Orientation and the Part Stiffness Predictions in Injection Molded Short-fiber Reinforced Composites." *Composites, Part A*, 43:1959-1970, 2012.

M. Kim, O.I. Okoli, **David A. Jack**, Y.B. Park, and Z. Liang, "Predicting the Mechanical Properties of Multiscale Composites." In *print Plastics, Rubber and Composites: Macromolecular Engineering*, 2012.

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Benjamin Kelley, R.M. Unruh, B.R. Rigby, H.D. Vu, T.V. Vo. "Teaching Modalities Comparison of Biomechanics Course in Vietnam," *Biomedical Engineering Society Annual Meeting*, Atlanta, GA, October 2012.

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- L. Ma, Z. Shi, and **Kwang Y. Lee**, "Superheater Steam Temperature Control Based on the Expanded-Structure Neural Network Inverse Models," *Advanced Materials Research*, Vols. 443-444 (2012) pp 401-407, © (2012) *Trans Tech Publications*, Switzerland doi:10.4028/www.scientific.net/AMR.443-444.401.
- E.-H. Kim, J.-H. Kim, S.-H. Kim, J. Choi, **Kwang Y. Lee**, and H.-C. Kim, "Impact Analysis of Wind Farms in the Jeju Island Power System," *IEEE Systems Journal*, Vol. 6, No. 1, pp. 134-139, March 2012.
- Li, Y., Shen, J., **Kwang Y. Lee**, and Liu, X., "Offset-free fuzzy model predictive control of a boiler-turbine system based on genetic algorithm," *Simulation Modelling Practice and Theory*, Vol. 26, pp. 77 – 95, 2012.
- Kwang Y. Lee**, "A Multi-Agent System-Based Intelligent Control System for A Large-Scale Power Plant," *Presented at the 55th ISA POWID Annual I&C Symposium*, June 2012; <http://www.isa.org>.
- R. Shah, N. Mithulananathan, and **Kwang Y. Lee**, "Robust Power Oscillation Damping Controller for Large-scale PV Plant," #2012GM0269, *IEEE Power and Energy Society General Meeting*, San Diego, July 2012.
- K.-H. Kim, S.-B. Rhee, K.-B. Song, and **Kwang Y. Lee**, "An Efficient Operation of a Micro Grid using Heuristic Optimization Techniques: Harmony Search Algorithm, PSO, and GA," #2012GM0947, *IEEE Power and Energy Society General Meeting*, San Diego, July 2012.
- S.-H. Jang, J.-B. Park, J. H. Roh, S.-Y. Son, and **Kwang Y. Lee**, "Short-term Resource Scheduling for Power Systems with Energy Storage Systems," #2012GM1167, *IEEE Power and Energy Society General Meeting*, San Diego, July 2012.
- E. S., M. M. Farsangi, M. Barati, and **Kwang Y. Lee**, "A Modified Shuffled Frog Leaping Algorithm for Nonconvex Economic Dispatch Problem," (Panel paper) #2012GM1701, *IEEE Power and Energy Society General Meeting*, San Diego, July 2012.
- J. D. Head and **Kwang Y. Lee**, "Using Artificial Neural Networks to Implement Real-Time- Optimized Multi-objective Power Plant Control in a Multi-Agent System," *IFAC Symposium on Power Plants and Power System Control*, Toulouse, France, September 2012.
- X. Wu, J. Shen, Y. Li, and **Kwang Y. Lee**, "Stable Model Predictive Tracking Control for Boiler-Turbine Coordinated Control System," *IFAC Symposium on Power Plants and Power System Control*, Toulouse, France, September 2012.
- A. Sode-Yome, N. Mithulananathan, and **Kwang Y. Lee**, "Reactive Power Loss Sensitivity Approach in Placing FACTS Devices and UPFCS," *IFAC Symposium on Power Plants and Power System Control*, Toulouse, France, September 2012.
- K.-H. Kim, S.-B. Rhee, K.-B. Song, K.-J. Hwang, and **Kwang Y. Lee**, "Optimal Power Flow based on Generation Rescheduling Priority for Transient Stability Enhancement," *IFAC Symposium on Power Plants and Power System Control*, Toulouse, France, September 2012.
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> NEW FACES

► G. Michael Poor

Associate Professor / Computer Science

G. Michael Poor, PhD, arrived at Baylor in the fall of 2012 as a member of the faculty in the Department of Computer Science. His research interests focus on human-computer interaction, and the discipline concerned with the design, evaluation and implementation of interactive computing systems for human use.

After finishing his PhD at Tufts University, Dr. Poor spent four years as a Visiting Assistant Professor at Bowling Green State University. He became interested in Baylor "because of the incredible academic reputation and the scholarly opportunities that the school provides."

He went on to say, "Once I had visited the University and met the fantastic people in the School of Engineering and, more specifically, the



Computer Science department, I knew that this place was for me."

Dr. Poor and his wife, Lauren, also a Baylor faculty member, enjoy outdoor activities, "especially if it is an activity that involves tiring out our incredibly active dog, Dunkin."