This Fall, The College of Engineering welcomed the largest Freshman class in recent history. Amazingly, the class of 2017 surpassed last year’s engineering freshman enrollment by 40%. This is a remarkable achievement compared to the modest national increases (5-7%) posted this Fall for incoming engineering freshmen classes and the annual 5% increases CoE has registered in the past 6 years. Indeed, the 299 engineering freshmen comprise approximately 15 percent of the total 2035 freshmen enrolled at UM for the Fall semester.

The increase in enrollment continues the upward movement in the College’s undergraduate student body, which has grown from 766 in 2007 to 930 through 2012. The new class (of 299 students) reflects the usual breakdown by departmental major, with Biomedical Engineering drawing the highest percentage among declared majors.

Dean James M. Tien, in his welcoming remarks, noted that this class boasts some of the highest SAT scores within the UM freshman class. “You are both the biggest and brightest freshman engineering class that I have had the privilege to welcome to the College! We congratulate you and hope to challenge you to gain the skills and can-do attitude necessary to become the technology leaders of tomorrow.”

The Dean also pointed out that the large class adds increased urgency to the College’s drive to expand its educational resources to meet the needs of all CoE students, both present and future. “Part of our Momentum2 campaign centers on providing the physical and academic resources essential to broadening the horizons of our students and ensuring their future success as industry leaders.”

According to David Poole, CoE Director of Admission, “The noticeable jump in enrollment is in part attributable to the increased national exposure of the College (such as President Obama’s visit to the College in 2012) as well as the realization of the critical importance of a quality engineering education. Today’s national issues demand graduates with the ability to think critically, one of the hallmarks of our College.” He adds that this year’s freshmen maintain the College’s documented diversity, especially with female and minority groups. Indeed, recently, UM was named one of the top 50 Colleges advancing women in Science, Technology, Engineering, and Math (STEM) programs by Online College Database, Inc.

Although their reasons for choosing CoE may be varied, the Engineering class’s goal is singular — to become tomorrow’s technology leaders. In the accompanying article, their impressions after the first few months of classes validates both their career choice and their decision to come to Engineering at UM.

The feedback received during these interviews reveals that the Class of ’17 is ready and willing to accept the challenges and rewards of pursuing their Engineering degree at UM.
TREATING HIGHER EDUCATION AS A COMPONENT OF R&D

In August 2013, the U.S. Bureau of Economic Analysis adopted the revised 2008 System of National Accounts whereby research and development (R&D) expenditures – by both government and industry – are no longer expensed but are recognized as capital expenditures – by both government and industry – as an asset in its calculation of the total value of economic output. In fact, the federal tax credit for R&D should not only become permanent but, more importantly, the HE component should be emphasized and recognized. Government agencies need to be mindful of the impact and import of higher education to R&D and to the overall economy; they have played and must continue to play a critical role in HE. In the latter part of the 20th Century, industry – likewise invested deeply in HE, contracting with campus researchers to engage in placing company researchers in campus laboratories, encouraging – and paying – their employees to become doctoral candidates, endowing distinguished professorships, and funding state-of-the-art equipment to furnish campus facilities. But these crucial investments in HE have gradually dissipated as companies have become more concerned with quarterly dividends and increased competition, especially as the half-life of technical innovations has become shorter and shorter. Companies that were quite generous in their support of HE – including DEC, IBM, GE, Motorola, Bell Laboratories, AT&T, INTEL – are either out-of-business or very limited in their R, D & HE support.

U.S. higher education, still the envy of the world, is being dismantled by limited tax revenues, industry, fee sequestration, and surging costs. HE requires the strong political and financial support of both government and industry; they must both be encouraged to revitalise and renew their investments in higher education. Certainly, the Bureau of Economic Analysis must expand their definition of R&D to include HE, which is indispensable to the creation of things (e.g., patents, software, enhanced Internet, etc.) that is a lot of government and industry support for a future stream of income and help generate future output. And, more importantly, a permanent tax credit should be given to R, D & HE. The critical importance of HE to R&D cannot be ignored; higher education constitutes the foundation on which research and development can be sustained and advanced.

Today, we applaud the fact that research and development has gained an enhanced economic status. Tomorrow, we look forward to research and development obtaining a permanent tax credit status. Always, we need to be reminded that higher education is an integral part of research and development and must therefore be accorded the same recognition and support.

(Note: Previously submitted as an Op Ed)

In the revised GDP recognition that R&D underpins a nation's domestic product (GDP) rose by about 3.6%; industry – are no longer expensed but are expenditures – by both government and industry.

DEAN’S CORNER

In August 2013, the U.S. Bureau of Economic Analysis adopted the revised 2008 System of National Accounts whereby research and development (R&D) expenditures – by both government and industry – are no longer expensed but are treated as “intellectual-property-related” or investments with potential future income streams. As a result, the revised U.S. gross domestic product (GDP) rose by about 3.6%; other G20 and EU nations are also planning to adopt the revised procedures. The revision is quite appropriate and consistent with the recognition that R&D underpins a nation’s economic growth, productivity, and competitiveness. Indeed, the Federal Tax Code 41 for Research and Experimentation Credit, originally introduced in the Economic Recovery Tax Act of 1981, recognized the value of R&D; in December 31, 1985, it has expired eight times and has been extended fourteen times; the current expiration date is December 31, 2013. Together with the revised GDP recognition of R&D, a revised R&D Tax Credit Act should become a permanent part of the nation’s Revenue Code. Moreover, it should be recognized that R&D is based heavily on the contributions of higher education, and that prior investments in HE do not yield negative results and the creation of new technology, not only yield positive results, but also create new industries and stronger employment opportunities.

As a consequence, the revised GDP should also include higher education (HE) activities – by both government and industry – as an asset in its calculation of the total value of economic output. In fact, the federal tax credits for R&D should not only become permanent but, more importantly, the HE component should be emphasized and recognized. Government agencies need to be mindful of the impact and import of higher education to R&D and to the overall economy; they have played and must continue to play a critical role in HE. In the latter part of the 20th Century, industry – likewise invested deeply in HE, contracting with campus researchers to engage in placing company researchers in campus laboratories, encouraging – and paying – their employees to become doctoral candidates, endowing distinguished professorships, and funding state-of-the-art equipment to furnish campus facilities. But these crucial investments in HE have gradually dissipated as companies have become more concerned with quarterly dividends and increased competition, especially as the half-life of technical innovations has become shorter and shorter. Companies that were quite generous in their support of HE – including DEC, IBM, GE, Motorola, Bell Laboratories, AT&T, INTEL – are either out-of-business or very limited in their R, D & HE support.

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(Note: Previously submitted as an Op Ed)
Faculty involved in interdisciplinary Medical Physics Program:

- Weizhao Zhao, Ph.D., Co-Director: Associate Professor of Biomedical Engineering, Neurology and Radiology

- Negin Dogan, Ph.D., Co-director: Professor of Radiation Oncology and Biomedical Engineering

- Dr. Justin Sanchez, Associate Professor of Biomedical Engineering and Co-Director: Associate Professor of Biomedical Engineering and Biophysics Research Institute of America, Florida

- Dr. Shahriar Negahdaripour, Professor, ECE: Global Office of Naval Research in Murter, Croatia

- Dr. Justin Sanchez: Associate Professor, BME and Director, Neuroprosthetics Research Group (NPRG) is currently serving as the National Institute of Biomedical Research (NIBR) Director

- Dr. Shahrab Aghababaei: Professor of Biomedical Engineering and Radiology

- Dr. Joseph Both, Ph.D., Co-Director of Radiation Oncology and Biomedical Engineering

- Dr. Pradip Pattany, Ph.D., Associate Professor of Biomedical Engineering and Ophthalmology

- Dr. Chunsong Luo, Ph.D. (2003), Chief Medical Physicist, Saint Anne's Hospital, Massachusetts

- Dr. Weizhao Zhao, Ph.D., Associate Professor of Biomedical Engineering and Co-Director of the program

- Dr. Neerja Dogan (Professor of Radiation Oncology and Biomedical Engineering and Co-Director of the program)

- Dr. Justin Sanchez: Associate Professor, BME and Director, Neuroprosthetics Research Group (NPRG)

- Dr. Joseph Both, Ph.D., Co-Director of Radiation Oncology and Biomedical Engineering

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Jordan, a senior in IE, traveled across the country (from Los Angeles) to UM and was a walk-on for the football team. “I chose UM for the rich tradition this school has with football and the strong academic program that keeps students challenged in the classroom.” He also pointed out that the environmental engineering curriculum was a major factor in choosing UM. “This type of program is exactly what I want to pursue and not readily available everywhere.”

Anthony, a BME junior, gives full credit to his faith, family, teachers and friends for helping him handle the pressures of excelling in competitions and academic pursuits. “I have been blessed with so many people expect so much from me that helps me stay focused,” he said. “I am exhausted and drained. I can remember studying for a Physics exam between events at the ACC indoor track championships! But it’s worth it to make those who believe in you proud.” Despite 6:15 am practices and a demanding class load, Anthony relaxes his time at UM, advising all student athletes to take full advantage of all the resources (tutors, study halls, classmates) to make the most of their opportunities as well.

Balancing the demands of the rigorous curricula and athletic competitions, seven engineering students share how they’ve implemented personal priorities. “Engineering students are part of both the ACC Academic Honor Roll and Excellence in football, rowing, basketball, and track,” these seven College of Engineering scholars demonstrate how to balance academic and athletic careers. They even manage to incorporate engineering skills (time management and problem-solving strategies) into their athletic endeavors. Each engineering student athlete has distinguished themselves in their domains and inspires admiration for their dedication to both athletic performances and academic pursuits.

The seven outstanding honorees are: Raphael Akpejiori (Senior, MAE), Garret Nygren (Senior, BME), Anthony Wolliston (Sophomore, BME), Nicole Zayan (Senior, BME), Jordan Tolson (Senior, BME), Anthony Wolliston (Senior, IE), Anthony Wolliston (Sophomore, BME) and Nicole Zayan (Sophomore, BME).

Notable Students

Marilyn Pope (IE) was awarded a $5000 scholarship from Honda America through their Hispanic Scholarship Fund for “demonstrating excellence in the general field of Engineering and in particular for her contributions to automotive industry.” During the past summer, Marilyn was a guest at the Honda America Launches, in Marysville Ohio, at which the award recipients are invited to discuss career opportunities with several young engineering professionals working at Honda. Marilyn added, “Hispanics and women are both underrepresented in the engineering field; I’m taking it upon myself to change those statistics.”

Gerald Coven (BME) spent the summer as an intern with Google in their Technical Program Manager Division. “I knew this internship would be like no other; that I would have the opportunity to work with the brightest minds in the software industry in the world.” Google taught me to think big and work incredibly hard. So for a second year as a Google Student Ambassador at UM, Gerald also sits on UM’s Student Government and on the College Engineering Advisory Board. “Being at Google has pushed me to elevate my performance and do more than I ever thought I could,” Gerald said. “I am learning to make my work clear, maintainable, and scalable is a great way for any student or at the office.”

Zachary Seed (CAE) was named Student of the Year by both the Miami Dade Chapter and the Florida state chapter of ASCE (American Society of Civil Engineers), in large part in recognition of his extraordinary leadership of the recent regional convention that was jointly hosted by UM and FIU. His leadership talents have also been acknowledged by the Board of Trustees, who appointed him one of two student representatives for 2013-14.

James Johnstone (MAE) also had an extraordinary internship this summer, working for Zenica, a sports apparel company that is focused on athletic compression. According to Cory Gill, Project Manager at Zenica, James “did not fit the typical profile for our firm but did such a phenomenal job he was the only intern we allowed to stay through the Fall.” This Fall, James continues to work for the firm on projects involving wearable technology and 3D printing and looks forward to “incorporating engineering concepts into real world problems.”

Sam Dorman (MAE) became the first Hurricane diver to ever capture three gold medals at the National Diving Championships. “It’s a dream come true,” said Dorman, who took 1st place in the 1-meter and 3-meter events, as well as the 1-meter synchronized event. “Before I came here, I thought about winning three events, but I never expected this would actually happen.”

Anthony Wolliston (Senior, BME) believes that “the determination and focus of our chapter under pressure stood out to the national committee when they bestowed this prestigious award on us.” The nominations were based on the excellence of programs in academic achievement, community outreach, professional development, and membership retention. General Motors, in recognition of the Chapters’ awards, invited the various NSBE officers, including Amanda and Bianca, to join the “Chevy Cruz Tour,” which invited these officers to drive the Chevy Cruz from Ohio to Michigan and visit engineering plants and factories en route. Both Amanda and Bianca agreed the experience was “extremely valuable.” We not only gained insights into the manufacturing aspects of engineering, but also a mini in “making it” and for our hold on the world of engineering.

The Tempe, AZ., native redshirted the 2012-13 season while recovering from surgery, but has come back with a vengeance this year. In particular, Raphael’s dedication and hard work has been recognized at the ACC Academic Honor Roll level. “It helps direct my mind and focus my efforts,” for him, it appears that concentration and thinking skills are vital to both engineering programs and internships. A student athlete who is able to manage his academics and extracurricular activities well understands professors are they able to succeed in their various disciplines. If there is one overriding piece of advice from all seven is that time management is absolutely critical. Only understanding professors are they able to succeed in their various disciplines. If there is one thing they want to impart to student athletes it is “try not to feel overwhelmed… just do the best you can.”
Fortinet, which pioneered Unified Threat Management (UTM) and was lauded by Renaissance Capital as #1 2009 IPO of the year, is a leader in this critical market segment; indeed, recently the company’s market share rivaled Juniper Networks. Mr. Xie’s vision and foresight have certainly contributed to the company’s success and reputation. Mr. Xie is an MS in Electrical Engineering from Stanford, a BS and MS in Electrical Engineering from Tsinghua University and is an elected member of the US National Academy of Engineers.

Mr. Xie fervently believes that the future successes in cyber security will be underscored by collaborations with educational institutions and researchers. He comments that “The endpoint security market is in an interesting transition period. Today’s rapidly evolving threats—changing market needs—mobile, social, big data, and cloud—constitute the areas of opportunity, and future developments will revolve around ensuring that data, networks, and applications are protected.” And utilizing the skills and creativity of researchers at educational institutions makes perfect sense. He is a firm believer in R&D spending, in terms of Fortinet’s global employee output segmented by function, 81 percent is allocated to R&D. But, “the greatest challenge facing his company is the speed of innovation occurring in their market. “We need to develop creative solutions by reaching out not only to our in-house developers but also to innovative academic researchers,” adds Xie.

This is indeed the fundamental reason Fortinet has funded the Fortinet Cybersecurity laboratory at the College of Engineering. By collaborating on many levels with CoE faculty and students, “it enables the company to hold an ideal position of driving innovation, balanced by having breadth and depth of solutions to lead the market.”

Dr. Eric Rozier and Saman Zonouz (Assistant ECE Professors) are directing this Lab, whose mission critical is to foil the ever increasing attacks on personal and corporate data bases. Both professors concur, “A research institution like ours has the freedom, the capacity, and the assets to do things that the profit-driven private sector can’t.”

David Redberg (Product Manager at Fortinet) agrees that these professors “have some ingenious ways to do encryption for keeping data safe, yet accessible and that is the key issue in this rapidly growing market.”

When discussing what else can be done, beyond the research collaboration, Mr. Xie cites the recent Capstone Project Funded by President Fortinet and the College. “The Capstone projects will allow seniors to participate in real-time problems we are facing daily. They will benefit from the opportunity to work with leading professionals and we will have the opportunity to recruit savvy practitioners. It’s definitely a win-win proposition.” The relationship will certainly grow to be multi-faceted, with the Lab being the focal point for not only Capstone-related activities, but also dedicated research projects with immediate industry usefulness.

As Dean James M. Tien emphasizes, “With an investment of $2.8 million in both the Cyber Security Lab and the Capstone Partnership, Fortinet and Ken Xie certainly believe in the capabilities of the College. We deeply appreciate the confidence and backing of Ken and will unquestionably dedicate resources and faculty to justify his continued support.”

President Donna Shalala echoes this sentiment. “The impact the College of Engineering and Fortinet can make together on a crucial national issue is extraordinary. This partnership between Fortinet and the College illustrates how the University of Miami can become the next great research university.”
UPCOMING DISTINGUISHED SPEAKERS

Monday, December 2, 2013
Mr. Frederick Adkins  
Senior Vice President of BNI  
Corporate Strategy, Member of the National Academy of Engineering  

The Innovation Imperative  
Innovation is a key to survival in today’s business climate. It is an important driver for the growth of an economy, and a key to providing good jobs and upward mobility. It is an important measure of a country’s productivity and potential for prosperity. It is obvious that innovation is a crucial factor in the world economy. In this talk, Mr. Adkins will discuss the importance of innovation and how to foster it in the business world.

Monday, January 21, 2014  
Dr. Hajuan Gao  
Professor of ECE, Georgia Institute of Technology  

Neuroinformatics of Engineering and Biological Systems  
Neuroinformatics is a highly interdisciplinary field that attempts to combine the state-of-the-art experimental techniques with theoretical approaches to probe the unique mechanical properties of materials at nanoscale. Dr. Gao will discuss two major examples of recent progress in this field. The first is aimed at understanding the structure of biological systems at the nanoscale. The second is concerned with the mechanical properties of biological tissues at the nanoscale. Dr. Gao will discuss how these studies can be used to improve the efficiency and lower the cost of power use and distribution.

Monday, February 3, 2014  
Dr. William Merklin  
Professor of ECE, University of Miami  

Smart Grid and theNext Generation of Electric Distribution  
The smart grid involves the imposition of an advanced cyber-infrastructure on the traditional electricity grid to improve the efficiency and lower the cost of power use and distribution, and to allow for the effective integration of variable energy sources and storage grids into the system. Dr. Merklin will discuss the technical challenges and opportunities associated with the development of the smart grid.

Monday, March 3, 2014  
Dr. Jindrich Henry Kopecek  
Professor of BME, University of Miami  

Frontiers of Biomedical Materialsh Care  
Dr. Kopecek will describe two examples of recent progress in the science of polymeric biomedical materials. The first is concerned with the development of new materials for the design of new medical devices. The second is concerned with the development of new materials for the design of new medical devices. Dr. Kopecek will discuss how these studies can be used to improve the efficiency and lower the cost of power use and distribution.

Monday, April 7, 2014  
Dr. Nathaniel J. Paul  
Professor of Civil and Environmental Engineering, University of Miami  

Urban Water and Infrastructure Security  
The science of urban water and infrastructure security has moved from the laboratory to the real-world. In this talk, Dr. Paul will discuss recent work on three aspects of this problem: applications of advanced analytics to improve the efficiency and lower the cost of power use and distribution, and to allow for the effective integration of variable energy sources and storage grids into the system. Dr. Paul will also discuss the technical challenges and opportunities associated with the development of the smart grid.

Tuesday, April 8, 2014  
Dr. Ruth Daniel  
Professor and Chief Executive Officer, Engineering Research and Development Center, National Academy of Engineering  

Building Resilient Social Technical Systems  
The concept of resilience dates back to the 1950s, when it was defined as “resilient, recoverable.” During the past seven years, the term has been exploded across diverse domains ranging from ecological sustainability to critical infrastructures to societal and organizational constructs, and a variety of domain-specific definitions have emerged. Dr. Daniel will discuss the technical challenges and opportunities associated with the development of the smart grid.

Class Notes

David Kajdi, BSE '80, John Chambers, MSEE '80, and Lisa Kajdi, MSEE '80. The team that created the world’s first fully computerized hydrogen storage facility, received the award in the area of hydrogen energy systems.

Renee Oates, BSE '85, MA '92, MBA '00, and Jose Rosario, MSEE '80, and Lisa Kajdi, MSEE '80. The team that created the world’s first fully computerized hydrogen storage facility, received the award in the area of hydrogen energy systems.

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