Dean Charles Nguyen Presents Approved Engineering Degree Candidates at the 124th CUA Commencement
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CUA delegation in India. (Left to right) Professor Frank Pao, Dean Charles Nguyen, Provost James Brennan.
During 2012–2013, the final year of my third term as dean, I had the fortunate opportunity to witness many successes and achievements in the School of Engineering. I am happy to report them to you below.

In the fall semester 2012, the school matriculated a record 138 new undergraduate students, including new freshmen, joint degree students, and transfer students. This number of new students set an unprecedented record, with about a 45 percent increase in total new students and, more important, a 70.1 percent increase in new freshmen as compared to the fall semester of 2011. The school also matriculated 83 new graduate students. During the past academic year, the school granted 68 bachelor’s degrees, 77 master’s degrees, and four doctoral degrees to its graduates. Their names and degrees are listed in the back cover of this issue.

As presented in the Faculty Section, our faculty continued their excellent performance in teaching, research, and service, manifested by their frequent publication, active participation in grantsmanship, and service in technical and professional societies.

Regarding accreditation, as the school moved into the final stage of the preparation for the upcoming ABET visit, the program chairs worked diligently with faculty, students, and advisory boards to prepare their self-study reports, that were submitted to ABET on July 1. The computer program successfully passed the ABET readiness review and will be reviewed at the same time as other engineering programs including biomedical, civil, electrical, and mechanical engineering.

As part of the Five-Year Plan submitted to and approved by the provost to deal with the student enrollment increase in the last several years, the school hired two new clinical professors and six tenure-track professors. We also welcomed a new assistant to the dean for administration.

Melvin G. Williams Jr., who served as the associate deputy secretary of energy and earned a Master of Science in Engineering from CUA in 1984, received the 2012 Engineering Distinguished Alumni Achievement Award at the School of Engineering Homecoming Luncheon in October 2012.

The international programs of the school continue to do very well. During the spring semester 2013, nine CUA engineering students studied at the Hong Kong Polytechnic University (PolyU) and 10 students from PolyU came to study at CUA under the existing student exchange program between our universities. Through the 2+2 program and other programs with the top-ranked engineering universities in Vietnam, 45 Vietnamese students currently study at CUA. In May 2013, nine Vietnamese students received their bachelor’s degrees; most of them will stay at CUA to pursue graduate degrees. In January 2013, the first student from Christ University in Bangalore, India, arrived at CUA for the 2+2 program we recently entered into in January 2013; he is pursuing a Bachelor of Mechanical Engineering degree. More information about our trip to India is below.

The School of Engineering Executive Development Board continued to be very active in fundraising for the school. The board held several phone and face-to-face meetings with its members. After serving as the board chair for five years, Matt Burns stepped down and the board elected John Heisse as its new chair.

In October 2012, I traveled with Provost James Brennan and Director of International Programs Hsien Pao to India to visit Christ University in Bangalore, Rajagiri School of Engineering and Technology in Cochin, and St. Francis Institute of Technology in Mumbai. In addition, the school hosted several officials from other institutions, including Christ University, India; Ho Chi Minh City University of Technology, Vietnam; Southeast University, China; National Vietnam International University, Vietnam; and Rajagiri School of Engineering and Technology, India. Agreements and Memoranda of Understanding for educational program and research collaboration were signed during the visits.

The Summer Camp Engineering New Frontiers hosted about 50 students from high schools around the country in July 2012. This one-week program provided students with hands-on activities as well as field trips to local research facilities and cultural events.

As evidenced by the facts presented above, last year the school did very well in terms of enrollment, research, and development. In January 2013, after a formal consultation with the faculty of the school, CUA President John Garvey expressed his desire to appoint me for the fourth term as dean and I am happy to inform you that I gladly accepted his offer. I look forward to serving the school in the next four years. I hope you enjoy reading the Fall 2013 issue of *CUA Engineer*.

Regards,

Charles Cuong Nguyen, D.Sc.
Dean, School of Engineering
nguyen@cua.edu
Nurturing Ideas to Improve Human Health

Improving human health through development of Microsystems is something that Xiaolong Luo, assistant professor in the Department of Mechanical Engineering, feels passionate about.

“Taking an interdisciplinary perspective in research is most rewarding,” he says. “Having an open mind is the gateway of turning our curiosity into success in science and engineering. What excites me most in my work is seeing how the basic engineering principles can be applied in the fields of biology or medicine to accomplish beyond what was done before.”

Luo teaches fluidic mechanics, thermodynamics, mechatronics, and microfabrication. In his research, he works with fluids in microscale (called microfluidics), fabricates devices and systems with technology developed in microelectronics (known as microfabrication), develops novel approaches to integrate biology into devices (called biofabrication), and diagnoses biological events (biosensing) with optical signals. In his work, Luo uses polysaccharides derived from crab and insect shells and seaweed algae in microfluidic networks.

“My research aligns with the big picture of transforming conventional laboratory functions into Microsystems, known as lab-on-a-chip, to speed up drug discovery and thereby improve human health,” he says.

He is currently involved in three projects. The first is studying active modulation of cell-to-cell communication in a microfluidically partitioned synthetic ecosystem. “Like a human being communicating with cell phones and Twitter, bacteria are known to communicate with ions and small molecules,” he says. “This project has demonstrated the communication of signals among multiple cell populations, locally or remotely, in a synthetic ecosystem in microfluidic networks.”

The second project involves developing a miniaturized microsystem with freestanding membrane structures that integrates both antibody manufacturing cells and on-chip detection of manufactured antibodies, and in the third project Luo is developing integrated optical sensors to detect signaling molecules for cell-to-cell communications.

Luo also values inspiration from other disciplines. Once a presentation on a chemistry topic at an international conference inspired him to use the same mechanism discussed for biofabrication in microfluidics. “I immediately started the exploration, and the research project eventually evolved as the thrust of my post-doctoral research,” he says. His plans to continue to apply engineering principles in his research to develop novel, integrated Microsystems for the biomedical field.

“Most of the fantastic ideas from my night dreams or daytime idling end up nowhere,” he smiles. “However, what I enjoy most of research is the freedom to exploit a naïve idea, nurture it like a baby, grow it like a tree, and turn it into something useful.”
Robotic Systems That Help Humans
on the Ground and Under the Sea

Assistant Professor Erion Plaku

Artificial intelligence and robotics are often treated like fantasy realms out of a Hollywood movie. However, they are quite real, with research in the field conducted by scientists and engineers around the world. One of those researchers is Erion Plaku, assistant professor in the Department of Electrical Engineering and Computer Science.

“My research is on intelligent planning to enhance the autonomy of robotic systems and provide assistance in human-machine cooperative tasks,” says Plaku. “The need for intelligent planning arises in diverse applications, such as those targeted in my research — mobile robotics, robotic-assisted surgery, and autonomous underwater vehicles.”

In addition to his research, Plaku teaches robotics, artificial intelligence, computer programming, and theory of computing, as well as working as an adviser to Ph.D. students.

“This year, my Ph.D. student James McMahon and I have started to work on motion planning and decision-making mechanisms to enhance the autonomy and capabilities of underwater vehicles to carry out search and inspection missions in confined waterways and constrained environments,” he says.

He is also working with Ph.D. student Turkey Aboalola and undergraduate students Duong Le, Tuan Nguyen, and Thanh Nguyen to enhance planning frameworks so robots equipped with arms and grippers can pick up objects and transfer them. “Such research has applications in service robotics where the robot can act as a personal assistant and in search-and-rescue missions.”

In robotic-assisted surgery, Plaku says he “seeks to enhance automation and assist in training novice surgeons.” Robotic-assisted surgery also presents significant challenges. “Even suturing, which is elementary in open surgery, requires the surgeon to determine sequences of high-level actions, such as ‘Grasp, Push, Pull.’ ” The framework he is working on would automatically plan motions for the robot to perform common surgical tasks, he added.

As his research progresses, Plaku plans to make supervision of robotic systems similar to the supervision of human operators, which will increase productivity and capabilities.

In considering what aspects of his work are most rewarding, two things come to mind, he says. One is the state-of-the-art infrastructure the School of Engineering has put into place that allows him to work most efficiently. The other is the opportunity to involve undergraduate students in the research conducted in his lab. Their enthusiasm in getting a robot to carry out commands or developing algorithms for Microsoft Kinect to interpret sign language, for example, “is infectious and certainly recharges me after long days or weeks of programming.”
School of Engineering Expands Collaboration with Universities in India

Following up on an April 2011 exploratory trip to India made by Dean Charles Nguyen and Director of International Programs Frank Pao, representatives from Christ University visited CUA in July 2012. They included Father Thomas Mathew, vice chancellor of Christ University, and Father Thomas TV, director of the Institute of Management. During the visit, an agreement for 2+2+1-B.S.+M.S. Program between Christ University and CUA was signed.

In October 2012 a CUA delegation, including Brennan, Nguyen, and Pao, again traveled to India to visit several Indian Universities, including the main campus of Christ University in Bangalore and its recently built campus for engineering faculty in Bangalore’s suburbs. That visit led to an agreement for a 4+1 Program and a memorandum of understanding (MOU) between Christ University and CUA.

Leaving Bangalore, the CUA delegation traveled to Cochin, India, visiting Rajagiri School of Engineering and Technology, a trip that also resulted in the signing of an MOU between the two schools. Nguyen and Pao then travelled to St. Francis Institute of Technology located near Mumbai and met with several key officials of the institute.

During the trip, the CUA leaders also visited Infosys, the biggest IT company in India, meeting with Adam Grotsky, executive director of US-India Educational Foundation (USIEF), which oversees the Fulbright Program.

CUA welcomed the first student from India in January 2013. Jacob Sunny, a student from Christ University, arrived at CUA campus to participate in the 2+2 program. Sunny is a junior pursuing a bachelor’s degree in mechanical engineering at CUA.

Deputy Secretary of Energy Honored with School Alumni Award

Melvin G. Williams Jr., M.S.E. 1984, vice admiral, U.S. Navy (retired) and former associate deputy secretary of energy, received the 2012 Engineering Distinguished Alumni Award during the School of Engineering Alumni Homecoming Luncheon. The award is given to engineering alumni based on their excellent professional achievements.

As associate deputy secretary of energy, Williams led the department in its goal to achieve management and operational excellence. He ensured that the department’s mission was efficiently and effectively implemented.

Williams, a nuclear trained submariner, served in the U.S. Navy for 32 years as a commissioned officer and one year as an enlisted sailor. Among his significant operational assignments are deputy commander of U.S. Fleet Forces, director of global operations at U.S. Strategic Command, chief of staff for the Kitty Hawk Carrier Strike Group, and executive officer on USS Louisville.

Williams holds a Bachelor of Science in Mathematics with merit from the U.S. Naval Academy and a Master of Science in Engineering from CUA. He also attended Harvard University’s JFK School of Government. He has received numerous awards, including the Black Engineer of the Year Award for Professional Achievement, the National Society of Black Engineers Award for Lifetime Achievement in Government, and the Thurgood Marshall Award for Service and Leadership. He has been inducted into the STEM Hall of Fame.

With his father, Master Chief Melvin G. Williams Sr. U.S. Navy (Ret.), Williams wrote the leadership book, Navigating the Seven Seas, which was nominated by the U.S. Navy in 2012 as “essential reading” for all Navy personnel.

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Civil Engineering Professor Receives ASCE Award

Gunnar Lucko’s innovative and creative scholarly work in relation to construction engineering and management has earned him the 2013 Daniel W. Halpin Award for Scholarship in Construction from the American Society of Civil Engineers.

The award, announced on April 16, recognized Lucko, who is an associate professor of civil engineering and director of the construction management program, “For extraordinary creativity and innovation in introducing singularity functions into construction engineering and management scholarship and developing novel modeling and analytical procedures for integrated project scheduling and budgeting. His research work has significant potential to improve project planning and control.”

Lucko’s creative research approach is based on identifying conceptual analogies between construction project management and seemingly unrelated areas, such as structural engineering. This talent in viewing established knowledge from a new and different angle leads him to see the limitations of traditional “tried-and-true” approaches in project planning and find completely new approaches.

For more on the work that won Lucko this recognition, see “New Research Protects Construction Schedules Against Delays,” pg. 8.

EECS Robotics Exhibition at the DC FIRST Regional Robotics Competition

The DC FIRST Regional Robotics Competition this year involved 45 Washington area high schools and teams from eight states and two countries — Israel and Brazil — competing in Frisbee® flinging and pyramid climbing. Starting without any human assistance, robots would fling Frisbees into baskets similar to free throws in basketball. Afterwards, students teleoperated the robots, attempting to score as many points as possible. The more advanced robots would even try to climb and place Frisbees on top of a pyramid.

Based on last year’s success, the EECS Robotics and Artificial Intelligence Laboratory, headed by Assistant Professor of Engineering Erion Plaku, was invited again to showcase the robotics program during the competition. Undergraduate students Duong Le, Thanh Nguyen, Tuan Nguyen, and Hung Tran demonstrated their projects on autonomous robotics in which robots equipped with Microsoft Kinects follow people; interpret body-language gestures; and respond to voice commands to find, pick up, and bring back different objects. The interactive nature of the exhibit provided exciting moments as people would dance in front of Kinect or walk in funny ways to see if the robots would follow (and they did). The Microsoft exhibitors, which were next to CUAs, were so impressed by the projects that they invited the students to run the exhibit at one of their flagship stores in D.C. These exhibits are part of the long-term commitment of EECS and School of Engineering to broaden the research and educational efforts in our community and inspire young students to science and technology.
Out-of-Classroom Experience: Students and Faculty Tour Plant

On March 3, a group of CUA students and their professors were treated to a tour of a fully functional wastewater treatment plant, supplementing classroom study in Introduction to Environmental Engineering (ENGR 538) with a real-life application. George Mpoyo, a process engineer with 17 years of experience in DC Water who is also a master’s degree candidate in the Department of Civil Engineering, guided the group through the Blue Plains Washington, D.C., plant, explaining the physical, chemical, biological, and thermal processes and describing the chemicals, waste-eating microorganisms, aeration air, and disinfectants used to cleanse the waste stream. Professor Sen Nieh, Ph.D., chair of the Mechanical Engineering department, and Adjunct Assistant Professor A. Wolfe, Ph.D., P.E., who co-teach ENGR 538, initiated the field trip, which was cosponsored by the Department of Mechanical Engineering and ASME.

The tour presented the students with some surprises — from the initial separation of foreign objects that would damage equipment and pumps from the wastewater stream to the pervasive rotten egg smell natural to wastewater — as well as visual evidence of the treatment process. As the students moved through the plant, they observed the slow, progressive change in the color and turbidity of water, from brown to light yellow to crystal clear.

No class, even one in the field, would be complete without a test. At the end of the tour, Nieh held up two beakers of water and asked which sample was from the faucet and which was treated wastewater from the plant. Key to answering correctly was discerning the difference in smell: the tap water smelled of chlorine; the plant-treated water didn’t. That’s because the treated wastewater has no added chlorine or other chemicals. What renders the wastewater undrinkable — no chlorine — makes it healthy for the fish in the Potomac River, where the treated wastewater is discharged.

At the end of the tour, the students were excited to have seen in action the processes they studied in their classroom.

Mechanical Engineer Brings Pope Emeritus’ Thought to Light

As an associate professor in the School of Engineering’s Department of Mechanical Engineering, J. Steven Brown has a record of publications dealing with refrigerants, his specialty, in such journals as HVAC&R Research, International Journal of Refrigeration, and Journal of Chemical and Engineering Data. But in May 2013, Brown added a new subject and a new outlet to his CV with the publication of Pope Benedict XVI. A Reason Open To God: On Universities, Education, & Culture, a book of the pope’s writings collected and edited by Brown, published by The Catholic University of America Press (CUA Press).

In January 2010 when Brown was asked by CUA’s new President to participate in a panel discussion on faith and the intellectual life, Brown immediately began researching addresses on the subject by Benedict XVI, who had addressed Catholic educators on CUA’s campus in 2008, and used them as the foundation for his 10-minute talk, later presenting the Pope’s addresses as an inaugural gift to President John Garvey. A fellow faculty member recommended that Brown try to get them published. “I showed what I had collected to the director of CUA Press, hoping he’d send me away, but he said, ‘We’d love to publish this,’” Brown recalled in a recent interview. He began grouping the addresses around the themes of faith and reason, freedom and truth, education and love, pedagogy and learning, faith and community, culture and universities, and science and theology. The addresses in the book, Brown says, “are crucial to understanding the thought of Pope Benedict.”

At the heart of Catholic University’s mission is the belief that faith can be informed by reason. Throughout his nearly 16 years teaching mechanical engineering, Brown says the question of the nature of a Catholic university is one he has “lived existentially, dramatically.” His new book is testament to that daily engagement, in and out of the classroom.

For more information or to order Brown’s book, see cuapress.cua.edu.
Concrete Canoe Innovates for Success

Each year CUA students, and engineering students around the country, tackle the task of designing, fabricating, and racing a canoe made out of concrete while adhering to the rigorous parameters set by the American Society of Civil Engineers (ASCE). This year, Catholic University’s 2013 ASCE Concrete Canoe Team, led by captains Nick Colameco and Rachel Berry, prepared for success by adopting approaches that had worked in the past and innovating where they felt they could improve on the process. To start, the captains recruited close to 30 new team members from disciplines that included civil engineering, mechanical engineering, and architecture. The new team revitalized several aspects of the program, the most important of which was the composition of the concrete mix. Tapping the expertise of concrete professionals, the team generated a strong, lightweight concrete mix that could float on water while maintaining structural integrity under the stresses of racing.

But the team didn’t stop there. One of the most noticeable improvements was in the realm of aesthetics. The captains recruited artistically talented CUA students who designed and painted a mural depicting Washington, D.C., architectural icons on the canoe’s hull. (See photo.) The canoe, appropriately, was named The District, celebrating the art as well as Catholic University’s 20th anniversary of being the only District of Columbia school to compete in the competition.

This year the Virginias Regional Conference was hosted by Howard University at Black Hill Regional Park on April 5. Breaking an eight-year dry spell, despite limited resources and a tight schedule, the team placed third in final product display, rowing, and overall. In addition, the team’s design report placed second in the region.

In honor of these successes, on April 9, the American Concrete Institute’s National Capitol Chapter awarded the team $1,000 in scholarship money toward next year’s activities.
Promising Research On Protecting Construction Schedules Against Delays

Associate Professor Gunnar Lucko visits the Monroe Street Market project across the street from the University’s campus.

“Be on time!” What seems like a straightforward goal in daily life is a professional challenge for construction managers, who are responsible for all work on their site. Specific tasks like pouring concrete or installing windows are coordinated by a complex schedule that is vulnerable to weather and other unforeseen circumstances, yet often with little built-in flexibility.

“The traditional approach weaves discrete tasks into a network schedule, but causes its longest uninterrupted sequence to be critical, which in scheduling means inherent inflexibility,” explains Gunnar Lucko, associate professor of civil engineering and director of CUA’s Construction Engineering and Management Program. “It’s paradoxical to create a group of tasks that is automatically important, yet especially vulnerable.”

With those challenges in mind, he began National Science Foundation-funded research in summer 2013, investigating ways to remove criticality.

“Although scheduling flexibility is essential to protect against and accommodate changes, no method exists to calculate how much flexibility is needed and where in a schedule to strategically place it,” he says. “Currently each manager must judge by gut feeling to include some buffer, because we lack a formula for the exact portions of flexibility that would level the playing field.”

Industry participation is an important aspect of his research. Bozzuto Construction, currently building Monroe Street Market south of CUA’s campus, will provide schedules to be simulated using the new buffering technique. Key is allocating time buffers to critical tasks in proportion to their inherent risk.

Lucko’s research is inspired by his interest in exploring analogies across scientific fields. “I enjoy asking myself what a concept could mean if we apply it to construction.”
Engineers Without Borders Travels to Paraguay

In May 2013, members of the CUA Engineers Without Borders (EWB) student chapter traveled to the rural community of Naranjaty Guazu in northeastern Paraguay. The group included three undergraduate students — senior John Burns, junior Hannah Gillis, and sophomore Frances Anne Tosto — chapter adviser John Judge, associate professor of mechanical engineering, and their professional mentor, civil engineer Clifford Schexnayder. Their mission was to perform an initial site assessment for a project to design and construct a honey processing facility.

The campesinos of rural Paraguay are peasant farmers who raise livestock and grow crops, predominantly for their own use. Georgia native Lester Moore first came to Naranjaty Guazu (which means “Big Orange” in the local Guarani language) as a Peace Corps volunteer in the early 90s, to teach the community members to keep beehives on their farms and sell the honey in cities as an source of cash income. A passionate beekeeper, Moore has remained in Paraguay and devotes his time to helping residents harvest, process, and distribute their honey, as well as educating new beekeepers. For years, he has used space in his own kitchen for the equipment necessary to extract honey from the honeycomb and then filter and bottle the honey.

The CUA EWB chapter will design and construct a separate facility for the community to house honey processing equipment for use by all the local beekeepers. The building will be constructed using local materials and must be engineered to protect the honey from extremes of temperature and humidity. Once the processing operation is moved into the new facility, Moore plans to train all his beekeeper associates to extract, filter, and bottle their own honey, freeing him to dedicate his time to outreach efforts to bring beekeeping to more Paraguayan farmers.

The weeklong trip involved two days of travel in each direction, including a seven-hour bus ride between the Asunción, the capital of Paraguay, and Horqueta, the nearest town to the village of Naranjaty Guazu. The group spent four days in the community, discussing preliminary plans with Moore and local contractors, surveying possible sites, and meeting with members of the community, including some of Moore’s beekeeper protégés. They also enjoyed local cuisine, cooked by one of Moore’s neighbors, and learned about the history and culture of the country and its native Guarani people. The chapter looks forward to returning to Paraguay with a larger group once design work is complete to begin construction of the honey processing facility.
Development Board Sponsors Entrepreneurship Panel Discussion

On April 11, 2013, the School of Engineering hosted a panel discussion on entrepreneurship entitled “Catching the Global Innovation Wave — Turning your college degree or research interests into a meaningful and lucrative business,” sponsored by the school’s Executive Development Board. The event was well attended, with an audience of more than 50 student and faculty members representing the schools of engineering, nursing, and business. The panel discussion was designed to pique the interest of students and faculty in creating a business. The panel was moderated by Bob Kavetsky, (B.M.E. 1975, M.M.E. 1978, and M.S.E. 1980), president of the Energetics Technology Center in Southern Maryland. Panelists included Michael Tracey, (Ph.D. 2000), head of Global Surgical Device R&D, Johnson and Johnson; Shirley Collier, president of Tech Growth, Inc., nationally known speaker, author, technology entrepreneur, philanthropist, and advocate for economic development through innovation; Michael Dailey, former executive director and president of the Frederick Innovative Technology Center, currently a principal with Next Level Performance Consulting; and Matthew Burns, B.E.E.1980, president and CEO of Burns Engineering, as well as outgoing chair of the Engineering Development Board.

Tracey kicked off the discussion by commenting on some dimensions of innovating, such as the “environment,” or that innovation should focus on solving human-centric problems, not machine-centric problems. Collier followed with her own story of how she came to be an entrepreneur, initially following her mother’s advice to get a good job with a big company, with good benefits. Dailey shared his experience in running a high-tech incubator and being an entrepreneur himself. Burns concluded the individual presentations, noting that his time at CUA was an excellent preparation for taking over a very small, family business and growing it into a company of more than 120 people, and pointing out the importance of integrity and ethical behavior in building a business. Kavetsky shared how taking philosophy classes at CUA kindled in him an interest in writing, resulting in his having published six books to date, highly unusual for an engineer.

Following the individual presentations, panelists fielded a wide array of questions from the audience, including whether it was preferable to obtain an M.B.A. or a master’s degree in engineering, (the panelists provided a mixed response) and whether it is better to start work with a startup versus a big company, (the general consensus of the panel was big company experience was highly useful, albeit for different reasons). A question was posed as to what role diversity plays in starting a business. All of the panelists felt that diversity of thought was key to a successful business, in that each individual has a unique way of approaching problems and with a diverse outlook everyone’s experiences can aid in the success of a company. Attendees also asked about the importance of intellectual property, and if one should be concerned with its protection. The panelists suggested that it is important to protect your ideas, but Tracey did note that the original idea behind creating patents was to share information that might inspire others.

Executive Development Board Elects New Chair

At its semiannual meeting in April 2013, the School of Engineering Executive Development Board elected John Heisse (B.C.E. 1976) as its new chair. At the meeting Matt Burns (B.E.E 1980), who had served as the board chair for the last five years, officially handed over the charge to Heisse, a board member since 2008.

Heisse recognized Burns for his vision and the hard work that have brought the board to its excellent state today. Dean Nguyen joined in praising Burns for his contribution to the school, manifested by the substantial increase in alumni participation and donation and for his successful recruitment of board members during his tenure as the board chair. The dean went on to thank Burns for his willingness to serve as the chair when asked and for the establishment of the Burns Family Fellowship Program through an endowment from the Burns family. This fellowship program has given seed grants to the faculty of the School of Engineering to conduct initial research that often led to successful proposals, to agencies, including NSF, NIH, and other grant-making institutions. Because the Executive Development Board was first was established when Burns assumed his chairmanship, Nguyen declared Burns the founding chair at a luncheon after the meeting attended by students, staff, and faculty and presented him with an appreciation plaque.

Later, at a dinner hosted by Burns chair, the members welcomed the new chair and intensively discussed the board’s future activities.
Alumni Corner

1950s
Thomas G. Nagle, B.M.E. 1953, just turned 85, and is enjoying his 23rd year of retirement after 36 years in aerospace (five with Douglas; 31 with Lockheed). The past 16 years he has lived in Eagle, Idaho. He is in pretty good health, still travels, and has three of his six children and their families nearby, including eight of his 12 grandkids. He feels life couldn’t get much better!

1960s
Michael Edward McCormick, M.S.E. (Applied Mechanics) 1961, Ph.D. (Mechanical Engineering) 1966, has held faculty positions at David Taylor Model Basin, Swarthmore College, The Catholic University of America, Trinity College, U.S. Naval Academy, and Johns Hopkins University. He has written many books, including Ocean Engineering Wave Mechanics, as well as numerous technical publications. McCormick has given presentations, edited a few journals, and has three patents. Among his numerous awards is the First Alumni Research Award from the U. S. Naval Academy.

1970s
Brian W. Sheron, M.S. 1971, Ph.D. 1975, is the director of the Office of Nuclear Regulatory Research at the U.S. Nuclear Regulatory Commission in Washington, D.C., a position he has held since 2006. Sheron started with the U.S. Atomic Energy Commission in 1973, moved to the NRC in 1976, and has held progressively more responsible positions throughout his career there.

Edward P. Donovan, B.S. Engr. 1975, received a doctorate in applied physics from Harvard University. He worked at the Naval Research Laboratory in Washington, D.C., for 12 years, then with Science Applications International Corporation for 18 years. Donovan is now with American Systems, Inc., where he supports the Joint Improvised Explosive Device Defeat Organization in test and evaluation of systems to help prevent death and injury to members of the U.S. Armed Forces.

1980s
Steven A. Strazzella, B.C.E. 1989, is the president of Bozzuto Development Company, a national commercial apartment owner/developer/manager. Previously, he was an executive vice president, responsible for a number of the company’s largest and most complicated apartment projects. In his new role, Strazzella will preside over the team responsible for creating, planning, and executing all new apartment developments.

2000s
Rebecca C. Roques-Davis, B.B.E. 2000, attended medical school at Louisiana State University School of Medicine in New Orleans, La., and currently works as a physician in oncology and hematology in Hammond, La. She loved her years at CUA and always enjoys hearing what’s happening here these days.

Melissa (Currie) Impastato, B.C.E. 2002, is celebrating her 10th year with Clark Construction based in Bethesda, Md., where she is currently a senior project manager working on the City Center DC project in downtown Washington, D.C.

Suttinut Sahasakmontri, dual degree in Project Management and Environmental Management, 2006, has been the director of Thai Tenox Co., LTD, which specializes in soil cement, and assistant managing director of Thai Petchaboon Company, a car transportation business since 2010. Both businesses are located in Bangkok.

Nicholas Berg, B.M.E. 2009, is currently serving as a mechanical engineer at the Armament Research, Development, and Engineering Center at Picatinny Arsenal, a U.S. Army base in New Jersey where he supports the Cannon Artillery Munitions Division managing projectile design and development. Berg has served as team leader for a major four-year Army Technical Objective project. He earned his master’s degree in management in 2011 from the Florida Institute of Technology and is pursuing an M.B.A. degree there. Berg coaches basketball and baseball at Morris Catholic High School, Denville, N.J., and is a member of the CUA Alumni Association Board of Governors.

Career Services Fall 2013 Events

We invite engineering alumni to be involved in preparing students for their first career opportunities. To volunteer or sign up for any these events, contact the Office of Careers Service at careers.cua.edu or 202-319-5623.

Employer Recruiting Panel
Sept. 24, 2013
Alumni/employers speak to students about how to get noticed when applying for jobs/internships.

Fall Career Fair
Oct. 4, 2013
Engineering alumni are invited to participate in the Career Fair and talk to students about job and internship opportunities at their place of employment.

Salary Negotiation for Women
Oct. 22, 2013
Presents strategies and tactics for women to even the playing field regarding compensation.

Etiquette Dinner
Nov. 15, 2013
Networking activity between graduating seniors and alumni.
New Frontiers Engineering Summer Camp

High school juniors and seniors from around the country explored engineering disciplines during the annual New Frontiers Engineering Camp, held July 15–19 at Catholic University. The 36 students participated in lessons and hands-on activities in civil, mechanical, biomedical, and electrical engineering, and toured local engineering facilities. They also attended a National’s baseball game and a theatrical performance. Five CUA engineering seniors participated as camp counselors.

The camp’s goals were twofold, said this year’s camp organizer Greg Behrmann, clinical assistant professor of biomedical engineering. “We give the high school students the experience of what being on a college campus is like, and we also expose them to the different engineering disciplines at the same time.” A final project for the group was to build and race miniature hovercraft.
CUA Mechanical Engineering Students Succeed in Texas

This year, four teams of senior mechanical engineering students entered the Society of Automotive Engineers (SAE) Aero Design competition, held in Fort Worth, Texas. A fifth team composed of junior mechanical engineering students also worked on the project and prepared for next year’s competition. The SAE Aero Design competition is a yearly international competition that provides undergraduate and graduate engineering students with an opportunity to design, fabricate, and fly radio-controlled RC airplanes.

The five teams spent countless hours during the fall semester, each designing their own unique airplanes specifically for the competition. Through careful consideration of multiple different design decisions, each team arrived at a final design and the fabrication began. Once the planes were constructed and successful test flights completed, the planes and students set off for Texas, a two-day, 1,360-mile trip.

Seventy-five teams from all over the world, including South America, Europe, Canada, and Mexico, entered the competition. One of CUA’s teams, composed of Chelsea Good, Hong Nguyen, Nick Pavia, and Joe Quigley, scored 4th in the flight portion of the competition with three successful flights through the six rounds. The team was one of only four that had more than three successful flights during the competition.

The competition was made possible by course instructors Associate Professor Joseph Vignola and lecturer Ken Romney, and supported by the mechanical engineering department chairman, Sen Nieh; machinist, Don Smolley, who helped the students build their planes; and Ruth Hicks, who provided administrative support throughout the project.
New Faculty

Chanseok Jeong, Ph.D.
Chanseok Jeong, Ph.D., joined the civil engineering department as an assistant professor in August 2013. Prior to joining CUA, he was a postdoctoral research associate and lecturer in the Civil and Environmental Engineering Department at University of California, Los Angeles. He received his M.S. and Ph.D. degrees in civil engineering from the University of Texas at Austin in 2006 and 2011, respectively, and his B.S. degree in civil engineering from Yonsei University, Korea, in 2003. His current research interests include wave propagation analysis and inverse problems, associated with energy geoscience (elastic wave-based enhanced oil recovery and geophysical inversion of a hydrocarbon reservoir), nondestructive evaluation, and condition assessment of structures, and dynamic soil-structure-interaction analysis.

Hang Liu, Ph.D.
Hang Liu, Ph.D., joined the engineering school as an associate professor in the Department of Electrical Engineering and Computer Science in January 2013. He came to CUA with more than 10 years of research experience in the networking industry, having held senior research and leadership positions at InterDigital Communications LLC. Liu received his Ph.D. degree in electrical engineering from the University of Pennsylvania. His current research interests include wireless communications and networking, cognitive radio networks, Internet of Things, network security, mobile content distribution, media streaming, mobile computing, future Internet architecture, and network economics.

Xiaolong Luo, Ph.D.
Xiaolong Luo, Ph.D., joined the faculty of the School of Engineering's Department of Mechanical Engineering as an assistant professor in January 2013. Prior to joining CUA, Luo was a research associate of the Institute of Bioscience and Biotechnology Research, and a member of the Maryland Biochip Collaborative at the University of Maryland. He received his Ph.D. in bioengineering from the University of Maryland in 2008; his M.S. in mechanical engineering from Temple University, and his B.E. in mechantronics from Zhejiang University in China. For in-depth information on Luo's current research, see the faculty spotlight on page 2.

Georges Nehmetallah, Ph.D.
Georges Nehmetallah, Ph.D., came to The Catholic University of America as a clinical assistant professor in January 2013 and was named assistant professor in the EECS department in August. Prior to joining the faculty, he was a research professor at the University of Dayton from 2012 to 2013, a research engineer at Dayton from 2008 until 2012, and a post-doctoral fellow at the university in 2007; he received his Ph.D. from the University of Dayton in 2006. His research interests are in digital holography, holographic interferometry and microscopy, compressive holography and metamaterials, with applications to sensors technology and super-resolution imaging.

Patricio Simari, Ph.D.
Patricio Simari, Ph.D., joined the School of Engineering as an assistant professor of electrical engineering and computer science in August 2013. He received his licentiate degree in computer science from the Universidad Nacional del Sur in Bahia Blanca, Argentina, in 2001, and his M.Sc. and Ph.D. in computer science from the University of Toronto in 2004 and 2009 respectively. Simari worked at Johns Hopkins University as a visiting scholar and postdoctoral fellow from 2008 to 2010. From 2011 to 2012 he held research scientist position with Autodesk Research, after which he joined the faculty at the University of Maryland, College Park, as a research associate until late 2013.

Sahana Kukke, Ph.D.
Sahana Kukke, Ph.D., joins the biomedical engineering faculty from the National Institutes of Health (NIH), where she completed a three-year post-doctoral fellowship in a joint position between the Rehabilitation Medicine Department of the NIH Clinical Center and the Human Motor Control Section of the National Institute of Neurological Disorders and Stroke. Her postdoctoral work focused on elucidating biomechanical and neurophysiologic characteristics of movement disorders due to early brain injury, research she plans to continue exploring in her faculty career. Kukke received a Ph.D. in bioengineering at Stanford University in 2009, an M.S. in biomedical engineering at Case Western Reserve University in 2002, and a B.S. in biomedical engineering at Northwestern University in 1999. Through her academic and laboratory work, she has developed expertise in electromyography, motion analysis, force platforms, posturography, transcranial magnetic stimulation, and electroencephalography. She is enthusiastic about teaching and mentoring undergraduate and graduate students at CUA with an interest in engineering and clinical neuroscience.
New Staff

Cecelia Harper

Cecelia Harper has joined our school as the new assistant to the dean for administration. She spent several years working in the budget section of the Department of Homeland Security. She also used to work at the School of Engineering and Applied Science of the George Washington University. Harper has a bachelor’s degree in management studies as well as a master’s degree in technology management from the University of Maryland University College. She resides in Maryland.

Attention Alumni

If you would like your summary of accomplishments to be included in next year’s CUA Engineer please send them to harpera@cua.edu.

Student Awards, Service, and Honors

Diego Blasco received The C.C. Chang Award for Excellence in Mechanical Engineering, 2013.

Danika Coaplin, biomedical engineering, received the School of Engineering’s Anthony Scullen Award for Academic Excellence, 2013.

Nicholas Colameco received the 2012 American Society of Civil Engineers National Capital Section Award and the Dennis Mc Cahill Award for Service in Civil Engineering.

Chelsea Good received the American Society of Mechanical Engineers Washington DC Regional Award/Scholarship, 2013.

Philip Gookasian, civil engineering, received the 2013 Benjamin T. Rome Award and the Timothy Kao Award for Excellence in Civil Engineering.

Amber McClung received the Biomedical Engineering Society Award, 2013.

Leticia Melchor Garcia received The John N. Welch Award for Excellence in Computer Science.

Lan Tran received The George McDuffie Award for Excellence in Electrical Engineering.

Christina Warner, received the 2013 H.B. Atabek Award from the biomedical engineering department for academic excellence.

Provost Brennan (front left) and Dean Nguyen with the student honorees at the annual year-end luncheon of the School of Engineering.
Faculty

Awards and Honors

- Behrmann, G., co-recipient of the 2013 Kaman Best Teacher Award.
- Chang, L-C., co-recipient of the 2013 Kaman Best Teacher Award.
- Lucko, G., named Outstanding Reviewer for the *Journal of Construction Engineering and Management*, Construction Institute, American Society of Civil Engineers, Reston, Va., May 23, 2012, which recognizes the best 10 out of 355 total active reviewers, 2011; received the Thomas Fitch Rowland Prize (with E. M. Rojas), Construction Institute, American Society of Civil Engineers, Reston, Va., which recognizes papers published during the past twelve months describing in detail accomplished works of construction or valuable contributions to construction management and construction engineering, May 23, 2012.
- Lucko, G., received the 2013 Kaman Best Teacher Award.

Grants

- Luo, X., co-recipient of the 2013 Burns Fellowship for Research.
- Nieh, S., Awarded Honorary Professorship, Yuan Ze University, Taiwan, July 2012.
- Yang, Y., co-recipient of the 2013 Burns Fellowship for Research.
- El-Araby, E., Kilic, O., Chang, L-C., “Acquisition of a High-Performance Instrument for Heterogeneous and Biologically Inspired Architectures Research at CUA, National Science Foundation (NSF), Major Research Instrumentation (MRI) program,” NSF, $140,000.
- Lum, P.S. (PI), “Biomechanics of Upper Extremity function following Stroke,” VA Merit Review Award, April 2012–April 2015, $300,000.


Vignola, J. F., (PI) and Judge, J. A. (Co PI), “Synthetic Aperture Acoustic Detection of Camouflaged IEDs,” Army Research Office, April 2012–March 2013, $37,000.


Presentations and Publications


Brown, J.S., Di Nicola, G., Fedele, L., Bobbo, S., Zilio, C., “Saturated Pressure Measurements of 3,3,3-Trifluoroprop-1-ene (R1243zf) for Reduced Temperatures Ranging from 0.62 to 0.98,” 18th Symposium on Thermophysical Properties, June 2012.


Dutta, B. and Pegg, I.L., 12 presentations to the Board of Directors of ZT3 Technologies, Inc.


Kilic, O., Smith, A., El-Araby, E., and Dang, V., “Investigating Interferometric Imaging in Random Media using CUDA and Jacket Environments for GPUs,” The 9th International Applied Computational Electromagnetics Society Conference (ACES 2012), Columbus, Ohio, April 2012.


focused ultrasound (pFUS) in muscle: implications in chemoattractants following pulse exposures.


Bayesian Inference,” using Chemical Mass Balance method and water contaminant source apportionment

Hybrid Mechanistic-Data-Driven Model

Massoudieh, A.

“Receptor Modeling,” Apportionment in Chesapeake Bay Watershed

Massoudieh, A., Gellis., A., Bank, W.S., and Sharifi, S.


Resources Research and Anthropogenic Chemicals,” Water


You, K., Sun, L., and Gu W., “Risk analysis-based identification of road hazard locations using vehicle dynamic simulation,” Journal

Szu, H., Hsu, C., Moon, G., Yamakawa, T., Tran, B.O., “Smartphone household wire-


Glean, A. A. J., Vignola, J. F., Judge, J. A., Ryan, T. J., “Impact of Mass Ratio and Band-


Pan, T., Lu, Y., and Wang, Z., “Development of an atomistic-based chemophysical envi-

Ma, J., Wang, Z., and Vo, M., “Hybrid two-


Vo, M., Wang, Z., Pan, B., and Pan, T., “Hyper-


Nguyen, T., Nguyen, H., Vo, M., Wang, Z., Luu, L., and Ramella-Roman, J., “Three-
dimensional phantoms for curvature correction in spatial frequency domain imaging,” Biomedical Optics Express, Vol. 3, No. 6, pp. 1200–1214, June 2012.

27, 2012.


Activities

Abot, J. L., Ph.D., developed the Intelligent Materials lab for fabrication and electro-
mechanical characterization of composite materials and their structural health moni-
toring including carbon nanotube sensors research; trained three graduate students and seven undergraduate students on experimental mechanics and materials research, served in the Editorial Board of the Journal of Multifunctional Composites; reviewed manuscripts for more than half a dozen journals; led development of aca-
demic collaborations with universities in Mexico, Brazil, and other Latin American countries to set the foundations for future recruitment of engineering students and as-
sisted on similar efforts with India and other countries; academic director of the Society of Hispanic Professional Engineers (profes-
sional chapter) in the Washington, D.C., metropolitan region; advised and mentored 22 undergraduate mechanical engineering students; advised and mentored 23 students in the Brazilian Science without Borders engineering program; assisted with recruitment efforts in the school and the mechanical engineering department; advised the Society of Hispanic Professional Engineers student chapter; reached out to the local community through visits with students to the National Building Museum and Smithsonian Institution museums in both D.C. and Virginia.

- **Chang, L.-C., D.Sci.,** academic advisory board, the DC Association for Computing Machinery (ACM), 2008–present; reviewer for *Neurolmage*.

- **Dutta, B.,** Ph.D., filed patents on the preparation and properties of high temperature p-type semiconductor—K2O-doped PbTe and preparation and properties of Zn-doped lead telluride; advised two postdoctoral research associates, two M.S.E. graduate student research associates, three physics graduate student research associates, and one graduate student intern from France.


- **Liu, H.,** Ph.D., program committee member of the 9th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), Seoul, 2012.


- **Mathews, S.,** Ph.D., Executive Committee chair and conference co-chair, 13th International Symposium on Laser Precision Microfabrication, Washington, D.C., June 2012.

- **Nieh, S.,** D.Sc., invited lecturer, “Environmental Protection of Renewable Energy Systems,” Department of Bioenvironmental Engineering Seminar, Chung Yuan Christian University, Taiwan, July 24, 2012; presenter to Give a One-day Academic Workshop on “Advanced Vortex Combustion and Gerontology,” School of Engineering, Yuan Ze University,
Nguyen, C. C., D.Sc., taught a course in Technology Management to Fu Jen Catholic University students, June 25–July 09, 2012; attended the 16th Annual Youth Excellence Recognition Luncheon organized by the Vietnamese Culture and Science Association (VCSA) in Houston, Texas, as its advisory board member, Aug. 5, 2012; traveled with Provost Brennan and Director Pao to India to visit Christ University in Bangalore, Rajagiri School of Engineering and Technology in Kochin, and St. Francis Institute of Technology in Mumbai, Oct. 14–22, 2012; attended a meeting of the Board of Directors of the Asian Division Friends Society, Library of Congress as a board member, Dec. 17, 2012; traveled to New Orleans and visited Maria Calzada, Ph.D., dean of humanities and natural sciences at Loyola University to explore establishing 3+2 programs and research programs with Catholic University, March 15, 2013; traveled to visit Peter Kilpatrick, Ph.D., dean of the College of Engineering at the University of Notre Dame, also meeting there with several faculty members and officials in development and discussed about strategies for hiring Catholic faculty, March 27, 2013; attended the 2013 National Meeting of Engineering Deans and Directors from Catholic Colleges and Universities (EDCU) organized by Seattle University, Seattle, Wash., April 28–30, 2013.

Pan, T., Ph.D., member, Transportation Research Board; committee member AHD40: Polymer Concretes, Adhesives, and Sealers, AFN20: Properties of Concrete, AHD45: Corrosion, AFP60: Engineering Properties of Unsaturated Soils, Geo-Institute Pavements Committee, T&DI Highway Pavement Committee; member, American Society of Civil Engineers (ASCE) — (GI, T&D); adviser to the civil engineering/architecture dual-degree program; adviser to dual-degree student Philip Goolkasian, who received the 2013 School of Engineering Rome Award.


Tran, B.Q., Ph.D., biomedical engineering, served as journal reviewer for the IEEE Transactions on Information Technology in Biomedicine, Sensors and IEEE Transactions on Biomedical Engineering.

Tran, B.Q., Ph.D., NIH grant review panels AIDS Clinical Studies and Epidemiology Study Section (November 2012; Mar 2013; July 2013) and NIBIB’s 2012/10 Council ZRG1 SBIB-Q 80 (July 2012; October 2012; March 2013; July 2013); co-director with Wilson, Jr., O.C., of the Sloan Foundation Minority Doctoral Program at CUA.

School Honors Faculty and Staff for Excellence

Each year, the School Award Selection Committee identifies recipients for school awards established to honor members of the faculty and staff for their outstanding performance during the academic year.

For 2012, the Kaman Award for Excellence in Teaching was shared by two recipients, Lin-Ching Chang and Greg Behrmann. Chang, assistant professor of electrical engineering and computer science, was honored for her outstanding teaching evaluations and her vital role in revising the computer science curriculum. Behrmann, clinical assistant professor in the Department of Biomedical Engineering, received the teaching award for his revamping the course ENGR 106 and his dedication to teaching.

The 2012 Kaman Award for Excellence in Research was given to Gunnar Lucko, associate professor of civil engineering, for his preparation and submission of four major grant proposals including two to the National Science Foundation (NSF) for which he was the PI. He published five journal papers and five peer-reviewed conference papers during the academic year.

Two faculty members were named Burns Faculty Fellows. Xiaolong Luo, assistant professor of mechanical engineering, proposed a research plan focusing on the establishment of a consortium of bacterial cells and the interactions among the multiple cell species with the goal of developing a gut-on-a-chip in vitro model. Yi Yang, assistant professor of electrical engineering and computer science, in her proposed research plan, will address the issue of worm attacks in wireless sensor networks and the development of worm detection and prevention. She plans to submit the results of her study in a proposal to NSF.

The 2012 School of Engineering Staff Excellence Award was given to Donald Smolley, machinist in Department of Mechanical Engineering (ME), for his outstanding service to faculty, staff and students of the ME department.
2012-2013 Honor Roll of Donors

The School of Engineering gratefully acknowledges the following alumni and friends for their generosity. This list includes donors who made gifts between May 1, 2012, and April 30, 2013. We have strived to recognize everyone correctly. If you find an error or omission, please contact the Office of Institutional Advancement at 202-319-6910.

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Lisa Baraniecki
Stephanie Francois
George Jabar III
Mary Luongo
Amber McClung
Christina Warner
Jillian Woerner

Bachelor of Civil Engineering
Kirk Kasa
Alexander King
Tri Le
Nicholas Colameco
William Crum
Peter Horgan
Eamon Hughes
Ryan Klein
Kyle Kramer
Louis Nguyen-Blyo
Drew Papas
Sean Pearson
James Romagnoli, Jr.
Daniela Vega

Bachelor of Civil Engineering and Bachelor of Science in Architecture
Philip Goddskian
Matthew Kline
Samuel Mrozinski

Bachelor of Electrical Engineering
Omar Alsomali
Vy Bui
Nguyen-Minh Le
Phuong Pham
Mohamed Al Sedran
Weishuo Huang
Gabriel Isaacs

Bachelor of Mechanical Engineering
Minh Tran
Paul McGee III
Hieu Nguyen
Thanh Nguyen
Tuan Nguyen
Tuan Phan
Hung Tran
Lan Tran

Bachelor of Science in Computer Science
Evan Votta
Alyssa DeChiaro
Leticia Garcia
Meagan Rachman

Bachelor of Mechanical Engineering
Manrique Rivas
Diego Blasco
Christopher Gersais
Chelsea Good
Sean Holden
Ibrahim Makhdami
Matthew McDonagh
Amanda McShane
Edward Mitchell
Joseph Passarelli
Nicholas Pavia
Brendan Place
Garritt Quigley
Mark Weyrick
Carolyn Work

Ph.D. Dissertations and Advisers


Jun Ma, Dissertation: Two-dimensional Continuous Wavelet Transform in Fringe Pattern Analysis, Zhaoyang Wang, Ph.D. (adviser)

Anthony Metzger, Dissertation: Motor Control of Upper Extremity Prosthesis Users, Peter Lum, Ph.D. (adviser)

Teresa Jean Ryan, Dissertation: A Coupled Microresonator Array for Mass Detection, John Judge, Ph.D. (adviser)