

VEU

VILLANOVA ENGINEERING UPDATE

VILLANOVA UNIVERSITY COLLEGE OF ENGINEERING

GHANAIAN CARDINAL SHARES THOUGHTS ON “LAUDATO SI”; RECALLS HIS ENGINEERING DAYS

One of the highlights of the spring semester in the College of Engineering was a visit by Ghanaian Cardinal Peter Kodwo Appiah Turkson. As president of the Pontifical Council for Justice and Peace, Cardinal Turkson wrote the draft of “Laudato Si,” On Care for Our Common Home, Pope Francis’ encyclical. During his two-day visit to Villanova, Turkson spent time in the College where he was introduced to Villanova Engineering Service Learning (VESL) and the College’s sustainability-related programs.

Committed to Service and Sustainability

Describing the College’s service learning program, Director **Jordan Ermilio ’98 ME, ’06 MSWREE** spoke of VESL’s nine partners in seven countries, and explained how the experience is about more than completing projects: “We are often asked how many people we’ve impacted in the communities in which we work, but we can only attest to how we have been impacted by the communities we’ve served.”

Following the VESL overview, **William Lorenz**, director of Villanova’s graduate program in Sustainable Engineering (MSSE), cited “Enough, for all, forever” as the foundation for the College’s sustainability efforts. He explained that the program’s curriculum and teaching is just one part of a three-pronged approach that includes

research through the Villanova Center for the Advancement of Sustainability in Engineering (VCASE), and outreach via the RISE (Resilient Innovation through Sustainable Engineering) Forum, which engages with industry partners.



Villanova Engineering students presented “Villanova Cares for Our Common Home.”

The Villanova portion of the morning’s highlights concluded with the unveiling of a new sustainability endeavor inspired by “Laudato Si” and the Paris Climate Talks. MSSE graduate student **Ava Calvano ’15 CE**, who spent spring break collecting data and visiting potential water network sites in Ghana, and Electrical Engineering senior **Sajid Hossain** presented “Villanova Cares for Our Common Home.” Built upon the Villanova tradition of Veritas, Unitas and Caritas, the effort is intended to ignite change for sustainable development on campus, in the greater Philadelphia area and across the globe. The goal, Calvano says, is to “foster an ethos in which living with nature is understood as essential in the pursuit of an equitable future for the human species.”

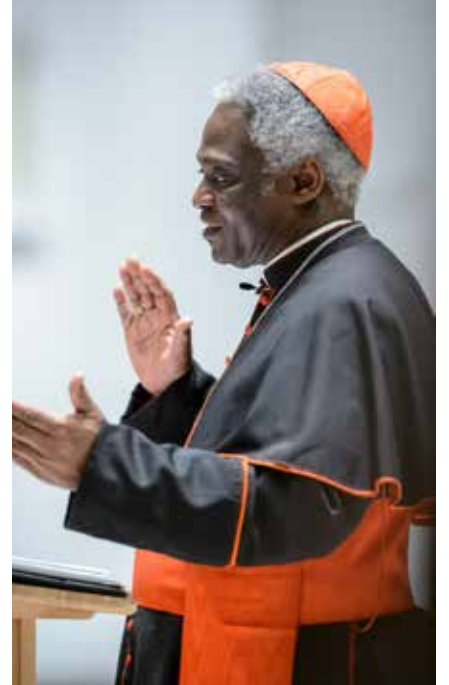
“Villanova Cares for Our Common Home” is forming its leadership team now and hopes to launch an educational campaign in fall 2016.

Words from His Eminence

Cardinal Turkson began his address saying, “It is certainly overwhelming; everything you’re doing here; and for me it is also very nostalgic.” Once a science and technology student, the cardinal ultimately chose to study theology instead. His knowledge of science and engineering was obvious throughout his talk, however, and is reflected in “Laudato Si.”

The process of drafting the encyclical began in March 2014 with a simple request from Pope Francis for Turkson to “think about the idea.” The cardinal elicited laughter from the audience when he recalled that only a few weeks later, when he asked the Holy Father about convening a meeting to discuss it, Pope Francis replied, “No, no, you begin to write.” Turkson gathered a team from around the world and worked quickly to deliver a draft only four months later. In October 2015, the encyclical was officially presented.

Today, Turkson’s thoughts have turned to writing a critique or challenge regarding human progress as relates to the directives in “Laudato Si.” He shared with the audience the papacy’s long history of addressing issues related to globalization and development.



Cardinal Turkson delivered “The Care of Creation as a Work of Mercy,” in St. Thomas of Villanova Church.

Turkson expressed his appreciation for Villanova’s initiatives around “care for our common home,” and he emphasized the word “care,” noting that it replaces the word “stewardship,” which is used only twice in the encyclical. He explained: “One can be a good steward without feeling connected; care is a more intimate relationship. Care is more passionate, and speaks to a greater level of commitment.”

The cardinal concluded his presentation with this powerful statement, which captures the heart of both “Laudato Si” and Villanova’s commitment to sustainability: **“We received the earth as a garden, we may not pass it on as a wilderness.”** ■

MESSAGE FROM THE DEAN



As you probably are aware, the Carnegie Foundation for the Advancement of Teaching recently elevated Villanova University to the Doctoral Universities category from the Master’s Colleges and Universities category. This new classification means that the College of Engineering also will be moving—in our case, to *U.S. News & World Report’s* list of national universities for the purposes of its annual ranking. I am pleased to say that the College’s 10-year strategic plan has brought us to where we rightly belong!

A number of factors have played a role in our reclassification, including the growth of our graduate degree programs. We offer master’s degrees in high-demand fields like Sustainable Engineering, Cybersecurity and Biochemical Engineering, and are seeing increased enrollment across the board. The College has steadily grown its doctoral program as well. In the past 10 years we graduated 28 PhDs, including six in 2014–2015—numbers that played a significant part in the University’s reclassification.

In addition to our graduate programs, the quality of Villanova Engineering’s undergraduate experience has not gone unnoticed. The curriculum, new teaching methods, growing numbers of real-world projects, and recognized commitment to teaching are highly desirable factors for prospective students. We also can’t overlook the impact of faculty research and the College’s new research centers—the Villanova Center for Analytics of Dynamic Systems and Center for Energy-Smart Electronic Systems—which present invaluable hands-on opportunities. The undergraduate application pool is indicative of our reputation; each year presents even more exceptional candidates than the year before.

The academic climate in Villanova’s College of Engineering is better than ever and we look forward to taking our proper place on the list of engineering programs at national universities. Please take time to enjoy the VEU!

Gary A. Gabriele, PhD
Drosdick Endowed Dean College of Engineering

ACCELERATING THE TRANSFORMATION

In 2007, The Kern Family Foundation awarded Villanova University College of Engineering its first grant to support implementation of the Kern Entrepreneurial Engineering Network (KEEN) initiative. The partnership with KEEN enables Villanova to collaborate with more than 20 other partner institutions focused on elevating engineering education by incorporating entrepreneurially minded learning principles into curricular and extra-curricular activities. For nearly a decade, the College has been transforming its culture to develop more innovative and business savvy graduates. In May 2016, the Foundation granted the College of Engineering \$743,160 to accelerate the engineering educational transformation initiated nine years ago.

What's Been Done

Through the leadership of **Gary A. Gabriele, PhD**, Drosdick Endowed Dean; **Priptal Singh, PhD**, chair and professor of Electrical and Computer Engineering; and **Edmond Dougherty '69 EE, '86 MSCS**, director of the Engineering Entrepreneurship program, the College has established itself as one of the leading KEEN institutions. Progress includes:

- Entrepreneurially Minded Learning (EML) integration in the freshman core engineering class
- The popular Engineering Entrepreneurship minor that graduates 25–40 students per year
- Deep Dive faculty training workshops
- EML exercises in 18 upper level engineering courses
- Co-curricular entrepreneurial activities and competitions

What's Next

With the support of this latest grant, the College plans to integrate EML exercises throughout the four years of the undergraduate engineering curricula. Specific goals include:

- Training additional faculty to implement EML exercises in their courses
- Enhancing the curriculum within the engineering entrepreneurship minor to allow student customization to meet discipline-specific needs
- Launching a summer version of the engineering entrepreneurship minor program

Student Activities

The College of Engineering hosts a variety of activities and competitions to give students more opportunities for entrepreneurially minded learning. “Students participate in co-curricular activities when they are interested or passionate about the topic, and they may not have time to pursue it as part of their regular curriculum,” says Dougherty. To that end, the College has offered a number of popular activities related to engineering entrepreneurship:



24-Hour Imagination Quest (VU 24 Hr IQ):

There have been four Villanova-hosted iterations of this fast-paced, time-sensitive entrepreneurship competition, which lends itself to working across colleges in multidisciplinary teams. To date, 82 Villanova students and 21 non-

Villanova students have participated in the VU 24 Hr IQ, and 10 Villanova students traveled to the University of New Haven to participate in their competition.

Villanova Student Entrepreneurship Competition (VSEC):

VSEC is a semester-long, interdisciplinary extracurricular entrepreneurship competition designed to give Villanova students the experience of creating and designing products, businesses and/or services to fill a variety of needs. Those who reach the final round work with outside judges and mentors to refine and enhance their ideas and then progress to deliver their final pitch to a boardroom of investors.

Android Hackathon:

In the Android Hackathon, undergraduate and graduate students from engineering, computer science and business compete in teams to develop an award-winning Android application within a 24-hour period. Nearly 100 Villanova students have taken part with the involvement of partners like Verizon and Lockheed Martin.

Arduino Workshop and Hackathon:

This workshop trains students in the use of the Arduino open-source electronic prototyping platform and is followed a week later by an Arduino hackathon.

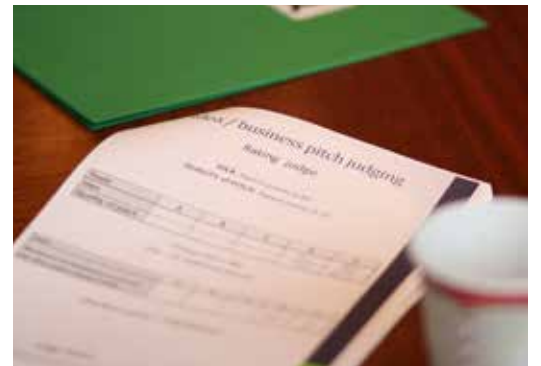


Villanova Summer Innovation Incubator (VSII):

Funded by the Harris Corporation, in summer 2015, VSII supported four student teams in developing and prototyping solutions to real-world problems of their choosing. Harris is supporting four new projects this summer.

Pitch Day:

A campus-wide, all-day event, Pitch Day serves as the culmination of all entrepreneurship activities at Villanova and the final event for VSEC. From 2011 through 2015, 915 students have participated in this annual event, 30 percent of whom are engineering students.



The ICE Institute

In addition to these activities, the Innovation, Creativity, and Entrepreneurship (ICE) Center, formerly a center located in the Villanova School of Business, has elevated to a university-wide institute. The ICE Institute presents the annual ICE Challenge, which requires participation by freshmen in Engineering, the College of Nursing and the Villanova School of Business.



The ICE Institute now has a new physical space for supporting development of entrepreneurial activities. In the Idea Accelerator students from any major can work on their entrepreneurial venture concepts in a stimulating and supportive environment. ■

“The College of Engineering has a strong team of faculty, staff and alumni who are passionate about bringing entrepreneurial topics to our students, and as a result, have created a myriad of academic and extra-curricular activities that have enriched the student experience. Our graduates have numerous opportunities to exercise their curiosity, make connections with peers and alumni, and understand that creating value for society is the ultimate goal of engineering in our nation’s future innovation economy.”

—Drosdick Endowed Dean of Engineering Gary A. Gabriele, PhD

FORMER NASA DIRECTOR GRETCHEN MCCLAIN PRESENTS 2016 PATRICK J. CUNNINGHAM JR. AND SUSAN WARD '80 ENDOWED LECTURE SERIES IN ENGINEERING

In February, the College welcomed business and thought leader Gretchen McClain as the 2016 Patrick J. Cunningham Jr. and Susan Ward '80 Endowed Lecture Series in Engineering speaker. The founding CEO of an S&P 500 global water technology company, and NASA's former Chief Director of the International Space Station, McClain spoke to several hundred engineering students and guests about "The Doors Technology Can Open: The Broad and Exciting Career Opportunities in Front of You."

Coming from a family of engineers and holding a degree in mechanical engineering from the University of Utah, McClain is understandably a champion of the STEM disciplines—Science, Technology, Engineering and Math.

"Looking at life's challenges through an engineer's eyes gives you a powerful advantage: You have the analytical skills and technological acumen to untangle the most complex problems, as well as the perspective to see the bigger picture."



Gretchen McClain shared words of wisdom and encouragement in The Patrick J. Cunningham Jr. and Susan Ward '80 Endowed Lecture Series in Engineering.

With the goal of helping students become "revved up about the future," McClain reflected on lessons she has learned over her impressive 25-year career:

1. Push yourself; never stop learning; and try new things.

McClain's impressive biography is evidence of her interest in "exploring new adventures and developing your curiosity ... There's the expression 'knowledge is power,' but I would argue that 'learning is power,'" she says.

2. Build confidence and courage, while ...

"Being a team player," McClain emphasizes. "Ultimately, the way you work on a team will define you as a leader."

3. Make engineering your powerful advantage, coupled with entrepreneurship and creative storytelling.

McClain explains, "A professional who has the ability to create, build and inspire is a rare find." Engineering teaches us how to think and reason; entrepreneurial thinking transforms ideas into innovation; and storytelling is about inspiring and influencing. She adds, "These qualities will determine how fast and far your career advances."

4. Stay in your rookie mode.

Describing rookie mode as the tension between having nervous butterflies and confidence in your abilities, McClain advises students and professionals: "Remember the first time you had to do something important. How did you feel? How did you operate? That feeling of being stretched is important to keep you on your toes and passionate about what you're doing."

5. Find meaning in what you do.

McClain says, "Make it matter" and recommends students go to work for companies and leaders whose mission they believe in.

Peppering her reflections with personal stories, fields of engineering to consider and potential employers, students found McClain's lecture inspiring and encouraging. Freshman Civil Engineering major Daniel Fetsko says, "It reinforced what our professors and advisors are saying, and reminded us of the countless opportunities that lie ahead."

The Patrick J. Cunningham Jr. and Susan Ward '80 Endowed Lecture Series in Engineering is made possible by a generous gift from College of Engineering alumna Susan Ward '80 ChE and her husband Patrick Cunningham. Since the inaugural lecture in 2010, industry leaders have covered topics ranging from interactive digital games and human expression to the multimillion dollar expansion of the Panama Canal. Lectures are recorded and available on the College website. ■

MCCLAIN ENGAGES SMALL GROUPS OF STUDENTS AND FACULTY

Before delivering her presentation, Gretchen McClain spent the day with small groups of Villanova faculty and students. Her morning began informally with the College's female faculty and graduate students. When the conversation steered toward women in engineering, she offered this advice:

- Sit at the table and speak up. Women have a tendency to hang back, not ask questions or contribute to the conversation.
- Don't spend all your time with women in the workplace. "Integrate—otherwise you're setting yourself apart as different," says McClain.
- Surround yourself with good people and prove yourself as a leader. Demonstrate your value.
- Be role models and mentors for other women—something that Villanova female faculty already are committed to.

Over lunch in Villanova's Idea Accelerator, part of the ICE (Innovation, Creativity, and Entrepreneurship) Institute, McClain took part in an innovation roundtable in which students from across the University pitched their ideas and benefited from her feedback and questions.

Impressed by the students' talents and ability to connect their work to a greater purpose, McClain says: "It's always energizing to be around our next generation of highly skilled engineers and leaders; however, the entrepreneurial spirit I observed during my visit at Villanova is truly 'igniting change.' Spending just a few hours in the Idea Accelerator highlighted how these talented teams are transforming their ideas into successful innovations." ■



McClain made time to speak with students throughout her visit to Villanova.

VILLANOVA ENGINEERS SHOOT FOR THE STARS

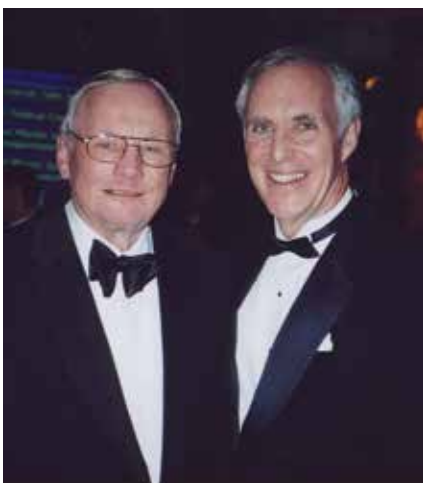
Villanova's College of Engineering has a long and storied history with the aerospace industry, and the National Aeronautics and Space Administration (NASA), in particular.

First Strides

NASA was only a few years old when Villanova Mechanical Engineering graduate **James "Jim" Correale '44** moved from Philadelphia to Texas to work on the agency's spacesuits and life-support equipment. His impressive career included determining how to remove carbon dioxide from the air that enveloped the astronauts in the tiny Apollo 13 spaceship in 1970. In 1979, he retired having served as chief of the NASA Crew Systems Division.

Though he never worked for Correale, **Tom Sanzone '68 EE** began his NASA career in that same division. Assigned to The Johnson Space Center in Houston, Sanzone worked for Hamilton Sundstrand (now United Technologies Corp. Aerospace Systems) and trained Neil Armstrong and other Apollo astronauts in the use of the company's Portable Life Support System backpack worn on the moon. Sanzone became engineering manager for the company's spacesuit, after which he served as general manager of the Houston office for 22 years until retiring in 2011. During his 43-year career, Sanzone was awarded NASA's Exceptional Public Service medal. Today, he is a member of the Villanova University Alumni Association Board of Directors and has been instrumental in connecting current and recent Villanova engineers with opportunities in the aerospace industry.

In 1977, Villanova's College of Engineering graduated its first future astronaut, Mechanical Engineering major **Andrew "Andy" Allen**. Allen spent 10 years at NASA, during which time he conducted three space flights, logging 900 hours on the space shuttles Atlantis and Columbia. Allen also served as director of the International Space Station (ISS) Program in Washington, D.C. Today, he is CEO of Aerodyne Industries LLC, and the project manager for the Test and Operations Support Contract at Kennedy Space Center.



Neil Armstrong and Tom Sanzone '68 EE in 2004.

Leading Today's Flights

Following in the footsteps of the College's first NASA pioneers, dozens of Villanova Engineers have interned, conducted research and held a variety of positions with the agency. **Brian T. Smith '93 EE** began his career as a flight controller at The Johnson Space Center in 1998. In 2005, he was selected as one of nine new mission control flight directors, and by 2008, he was leading his first flight. Smith led a variety of missions over the next six years for which he earned NASA medals for leadership, service and achievement.

Smith's current mission is the Bigelow Aerospace Expandable Module (BEAM), and he has spent most of his time working on the module's deployment, a first for the ISS.



Brian T. Smith '93 EE in NASA's Mission Control Center during the Orb-1 Cygnus mission to ISS.

Faces of Tomorrow

The allure of space exploration continues to call to Villanova students. **Samantha Testa '16 ME** is pursuing a Villanova master's degree in Mechanical Engineering through the College's E-Learning program, while working full time this summer as a Pathways Co-op at Kennedy Space Center. This is Testa's third summer with NASA; she is an Engineer in Training with the Structures and Mechanisms Design Group in Ground Systems Development and Operations.

Testa acknowledges the Villanova connections that have led her to NASA, "Tom Sanzone has been invaluable to me as a mentor and has helped me make connections in the NASA community." In addition to the support she has found in Sanzone, Testa worked closely with Villanova Mechanical Engineering Professor Sridhar Santhanam, PhD, as the experimentation lead on a NASA launch pad refractory material project.

After the co-op program, Testa hopes for a full-time position in structures and mechanisms, "potentially followed by training astronauts at The Johnson Space Center, and ultimately becoming an astronaut myself." She



Andy Allen '77 ME met with intern Samantha Testa '16 ME. She recalls, "Despite his busy schedule, he found time to meet with me; what was scheduled as a 30-minute meeting quickly turned into two hours of astronaut advice and chit chat."

recognizes this will be no easy feat. In 2015, NASA received a record 18,000-plus applications from which they will select 14 for the coveted position.

Another student who feels NASA's pull is **John Paul Naughton '18 ME** who has held two summer internships at Ames Research Center. In December 2015, Naughton connected with a family friend who works on the research center's lunar plant project. The need to test a project-related irrigation system's feasibility for use on the moon led to Naughton's experience on the so-called "Vomit Comet."

As part of the Ames team, Naughton took a 2.5-hour parabolic flight on which he helped test the pump's effectiveness in the moon's gravity.



John Paul Naughton '18 ME represents Villanova in weightlessness on the so-called "vomit comet."

"As the flight reaches its maximum height and makes its way down, that's when you experience a brief period of weightlessness, about 30 seconds," he explains. Naughton is applying for another internship at the Ames Research Center in the hopes of expanding his experience and skillset. His goal is to become a Navy pilot.

Fueling the Passion

Beginning next fall, Villanova's College of Engineering will offer a new Aerospace minor to introduce contemporary topics in aerospace engineering to undergraduate students. "The goal of this minor is to broaden their knowledge in this area and to provide them with the in-depth training necessary to enter the specialized aerospace field," says Mechanical Engineering Associate Professor Ani Ural, PhD, who, as curriculum chair, helped make the new program a reality. The minor will consist of 27 credits, including required courses in Elements of Aerodynamics and Aerospace Vehicle Design. A variety of electives include Compressible Fluid Flow, Introduction to Finite Elements, Flight Dynamics, Orbital Mechanics, Fiber Composite Structures and more. ■

"WORKING FOR NASA"

by **Brian T. Smith '93 EE, NASA lead flight director**

First, and most importantly, find something you really enjoy doing. Look into NASA field centers to learn what they specialize in and decide which areas match most closely what you enjoy doing. Explore opportunities with both NASA and NASA contractors. There are pros and cons to both. Work hard in school, and participate in extra-curricular and volunteer activities. NASA attracts the best and brightest. Prepare for the competition by excelling in all you do at Villanova and be confident that Villanova has prepared you to stand among the best in the country.

COLLEGE OF ENGINEERING SETS CAREER COMPASS FOR CLASS OF 2020

Technology, globalization and critical world issues are transforming the engineering profession. Today's graduates are no longer needed to perform routine work that can be accomplished by trained technicians. Instead, both the public and private sectors are looking for engineering professionals who are driven to innovate, lead and manage in ways much different than their predecessors. The demand is for those who can identify, design, construct, deploy and implement technological solutions to the needs of today and future generations.

In response to this changing landscape, the College of Engineering will augment the traditional technical tracks with professional development to create a more comprehensive undergraduate engineering education. Known as Career Compass, this new, required program will stimulate and develop broad-based innovative, leadership and management skills. "Most importantly," says Associate Dean of Academic Affairs **Randy Weinstein, PhD**, "Career Compass will provide Villanova Engineering students with the direction they need to pursue and achieve their professional goals."

Developed in consultation with engineering alumni, faculty and students, Career Compass will operate parallel to the technical track throughout all four years of undergraduate education. The specific disciplines of focus are grouped into four modules, and each has activities spread over the students' four years:

1. The Engineering Profession
2. Setting the Stage for Personal Success
3. Post-Graduation Planning
4. Communicating in the 21st Century

Elements of the program will be delivered in a variety of formats, including, online videos, modules, quizzes and directed learning; professional events; in-person workshops; and a significant professional experience each year.

In addition to its four modules, Career Compass will include college-wide mentoring and summer internship programs. Beginning sophomore year and continuing through graduation, students will be professionally linked to Villanova Engineering alumni for mentoring. The internship program will assist students in securing worksite opportunities, allowing them to apply both their technical and professional skills to real-world, relevant projects. Career Compass leader **Frank Falcone**, director of professional development and experiential education, adds: "The internship program will help organizations identify future professional employees. Our long-term goal is to put students on a path toward an initial professional position."

"Given that it will appear on students' transcripts, Career Compass will distinguish Villanova engineers from other new graduates."

Career Compass will launch in fall 2016 with the freshmen class and modules will be added each year. The class of 2020 will be the first to graduate with the Career Compass distinction.

If you are interested in participating as a mentor or have internship opportunities to offer, please contact the College at careercompass@villanova.edu. ■



COLLEGE PRESENTS 4TH ALUMNI CAREER PANEL

This spring, four Villanova Engineering alumni returned to campus to speak to students about careers in the bioengineering field. Panel participants included **Brian Glaister '03 ME**, cofounder and chief operating officer, Cadence Biomedical; **Thomas B. Hartman '88 ME**, vice president, GMP Operations, GlaxoSmithKline; **Jenny P. Johnson, '03 ChE, '06 VLS**, senior patent attorney, Endo; and **Alisha Trocciola '05 ChE**, senior process engineer, Global Manufacturing & Supply, GlaxoSmithKline. The event was part of the popular Alumni Career Panel series that launched in 2014.

The panelists each offered valuable insights into their specific areas of expertise and experience. As a founder of Cadence Biomedical, Glaister noted the challenges and rewards related to working for a startup. Being involved in every aspect of the business, he noted, "You can get 20-years worth of experience in four or five years." As an executive for a large pharmaceutical company, Hartman emphasized the global nature of the business, which

requires flexibility and an ability to work with many different types of people.

The alumni also shared advice for entering the bioengineering field. Glaister recommended becoming involved in industry associations and networking. Trocciola encouraged students to take advantage of the Nova Network, find a mentor and tap into the University's chapters of professional engineering societies. She added, "Your first job doesn't have to be your dream job," and suggested a number of factors to consider when weighing employment options. Similarly, Johnson advised accepting a job "that will serve as a stepping stone." Hartman noted, "Don't let 'experience required' on a job posting stop you from applying."

The panel concluded with a piece of general career advice from each of the alumni. Johnson challenged students to accept assignments outside their comfort zones. Trocciola added, "Don't be afraid to ask questions; know who the experts are; and learn from them." Glaister stressed the importance of being passionate about the work. Hartman advised, "Make sure you really understand the business you're getting into, and be able to translate your technical training into business results." ■

Bioengineering at Villanova

For Undergraduates

Since 2009, the College of Engineering has partnered with the College of Liberal Arts and Sciences and the College of Nursing to offer an interdisciplinary Bioengineering minor. Beginning in fall 2016, the College also will offer minors in Biomedical and Biochemical Engineering—sub-fields of bioengineering for which the required courses already are in place.

Randy Weinstein, PhD, Associate Dean of Academic Affairs, explains the rationale for the new programs: "Students are interested in careers in these burgeoning fields. A minor in any of the three will make them more competitive in the job market."

More information on College minors can be found in Undergraduate Studies on the College's website: engineering.villanova.edu

For Graduate Students

The College offers a master's program in Biochemical Engineering designed for engineering and science professionals looking for advanced training. This degree exposes students to upstream and downstream bioprocess fundamentals and provides the tools to design and optimize pharmaceutical facilities, processes and products, using state-of-the-art analysis and technology.

To learn more, visit biochemical.villanova.edu or contact Assistant Professor Noelle Comolli, PhD, at Noelle.Comolli@villanova.edu.

DR. TRAVER JOINS ELITE LIST OF DISTINGUISHED VILLANOVA FACULTY

In May 2016, Robert G. Traver, PhD, PE, D.WRE., F. EWRI., F. ASCE, '82 MSCE, the Edward A. Daylor Chair in Civil Engineering, was presented with Villanova University's prestigious Outstanding Faculty Research Award. The annual award recognizes a faculty member who demonstrates the highest standards of excellence in research, scholarship and contributions to their field.

A member of the Water Resources and Environmental Engineering program at Villanova since 1988, Dr. Traver is a nationally recognized expert in stormwater management, green infrastructure and sustainability, and serves as director of both the Villanova Center for the Advancement of Sustainability in Engineering (VCASE) and the Villanova Urban Stormwater Partnership (VUSP). He teaches graduate courses in hydrology, hydraulics and urban stormwater management, and undergraduate courses in all facets of water resources. Believing that research supports and enhances the educational experience, Dr. Traver involves both undergraduate and graduate students in VCASE and VUSP projects.

Nationally Recognized Expertise

Active in professional organizations and engaged in high-level national committees, Dr. Traver has been distinguished as a fellow of the American Society of Civil Engineering (ASCE) and a Diplomate of the American Academy of Water Resource Engineers, which he served as president. In 2007, he received the Outstanding Civilian Service Medal from the Commanding General of the United States Corps of Engineers for his work on ASCE's external review panel of the Corps' investigation of Hurricane Katrina. He also served on the National Research Council Committee that authored "Urban Stormwater Management in the United States" (2009), an opportunity that he particularly enjoyed because it "required addressing issues that vary dramatically throughout the country."

In 2014, Dr. Traver was honored with the ASCE's William H. Wisley American Civil Engineer Award for his leadership of ASCE's Task Committee on Flood Safety Policies and Practices. He also was responsible for editing and presenting the Committee's final report, "Flood Risk Management: Call for a National Strategy." Dr. Traver continues to serve the profession as an associate editor of the *Journal of Sustainable Water in the Built Environment*, which he helped to create.

"With all his success, Rob has remained humble and is the first to offer help, guidance, advice and support to faculty and students. He has been a tremendous influence on me and my own career."

—Associate Professor Bridget Wadzuk, PhD, '00 CE,
Civil and Environmental Engineering



The green roof on the Center for Engineering Education and Research (CEER) is just one of several stormwater research and demonstration sites on campus.

Research

Given that his decades of research could fill many pages, the following highlights represent only the past couple years—and roughly \$2.2 million in grants—of Dr. Traver's impressive career:

- "Philadelphia's Clean Water Initiative"—U.S. Environmental Protection Agency. Also on this project: Mechanical Engineering Associate Professor **Garrett Clayton, PhD**.
- Villanova's stormwater research and demonstration park, a "Best Management Practice National Monitoring Site"—Pennsylvania Department of Environmental Protection. Civil and Environmental Engineering colleagues **Bridget Wadzuk, PhD, '00 CE**, associate professor; and **Andrea Welker, PhD**, professor, also are engaged in what has been a 15-year partnership.
- "Rain Garden Configuration to Maximize Hydrologic Performance"—Pennsylvania Growing Greener. Dr. Welker also is on this project.
- "Green City, Clean Water"—City of Philadelphia's Water Department (PWD). Drs. Wadzuk and Welker also are active in this program.

Describing their ongoing research as one of his most rewarding collaborations, Dr. Traver says: "PWD is a forward-thinking organization, and it is a pleasure to work on the city's stormwater problems with young, innovative engineers, several of whom are Villanova graduates."

"Dr. Traver treats everyone on his research team like family, providing continuous support and guidance. In the classroom, he creates an atmosphere that encourages students to produce their best work. He is an inspirational role model and mentor."

—Graduate Assistant Stephanie Rindosh



Assistant Professor John Komlos, PhD; Water Resources Laboratory Director Erica Forgione '12 CE, '15 MSWREE, E.I.T.; Professor Andrea Welker, PhD; Associate Professor Bridget Wadzuk, PhD, '00 CE; and VCASE and VUSP Director Robert Traver, PhD

Stormwater and Sustainability Symposia

In 2012, VUSP began hosting Pennsylvania's biennial stormwater symposium for engineers, scientists and conservationists. The program begins with a day-long workshop for municipal officials, followed by two days of lectures and presentations by experts in academia, industry and government sectors.

In 2015, VCASE launched a separate research symposium, also hosted by Dr. Traver. The event brings together professionals from academia, industry and government sectors to share best practices and research findings to promote sustainable solutions to critical issues relating to water quality, infrastructure and energy. VCASE will hold its second annual research symposium, "Resilience in Engineering Design or Practice," in September 2016.

"Unbelievable"

That's how Dr. Traver describes the honor of receiving Villanova's Outstanding Faculty Research Award. "The nice thing about doing this kind of work is that it's almost always as part of a team. I wish this could be a team award. I certainly couldn't do what I do without the participation of VCASE staff, faculty and students."

Drosdick Endowed Dean of Engineering Gary A. Gabriele, PhD, finds Dr. Traver most deserving of this award: "Through hard work, Rob has established a national and international reputation as one of the leading scholars in stormwater management. He has developed an outstanding team of faculty, and together they are addressing some of the most important challenges we face in achieving a sustainable planet." ■

College of Engineering Recipients of Villanova's Outstanding Faculty Research Award

2016: Robert Traver, PhD, PE, D.WRE., F. EWRI., F. ASCE, '82 MSCE, the Edward A. Daylor Chair in Civil Engineering, and director of the Villanova Center for the Advancement of Sustainability in Engineering and Villanova Urban Stormwater Partnership

2013: C. Nataraj, PhD, professor and director of the Villanova Center for the Analytics of Dynamic Systems

2007: Ahmad Hoorfar, PhD, director of the Antenna Research Laboratory

1997: Moeness Amin, PhD, director of the Center for Advanced Communications

TALENT SHOW

They're known for their brilliance in the classroom, their experience in the laboratory, their impressive academic presentations and their dedication to students, but are you aware that Villanova Engineering faculty also possess a variety of unique talents?



This interlocking chess board is just one example of Dr. Elmer's complex wood projects.

Jacob Elmer, PhD
Assistant Professor, Chemical Engineering

Hobby: Woodworking
"Woodworking naturally appeals to engineers—being able to design and build your own things is pretty cool. It gives you a level of control that you don't have with most commercially available products."



Frank Falcone and Dr. Hampton lead graduates in Villanova's Alma Mater at the conclusion of the College Recognition Ceremony.

Frank Falcone
Associate Professor, Civil and Environmental Engineering

Hobby: Singing
"I sing as a soloist at our parish about every other week or so, plus funerals and weddings. A few years ago, I had an opportunity to sing at a 50th wedding anniversary in St. Thomas of Villanova Church here on campus. The acoustics are outstanding!"



Dean Gabriele in competition mode.

Gary A. Gabriele, PhD
Drosdick Endowed Dean of Engineering

Hobby: Racecar Driving
"I compete in the Philadelphia section of the Sports Car Club of America Solo Series (Autocross) races. It's a hobby for me, but there are professional racers as well. Three years ago, I finished the season in second place, winning two races and placing second or third in a number of them."



Dr. Hampton (far right) performs the role of Truffaldino in Richard Strauss's "Ariadne Auf Naxos" with the Des Moines Metro Opera Company.

Frank Hampton, PhD
Assistant Professor, Civil and Environmental Engineering

Hobby: Professional Opera Singer
"I would say, 'I did not find opera, but opera found me.' I've had the good fortune to study voice privately with excellent teachers, and I was able to study for periods at both the Juilliard School and Westminster Choir College."



Percussionist and Visiting Assistant Professor David Jamison, PhD, ME

David Jamison, PhD
Visiting Assistant Professor, Mechanical Engineering

Hobby: Percussion
"Performing in front of people is a rush! Sharing something that you love is a joy. Also, playing with other talented musicians and learning from them is one of the best parts of playing music."



Dr. Jones displays one of his antiques.

Gerard "Jerry" Jones, PhD
Senior Associate Dean, Graduate Studies and Research

Hobby: Collecting and tinkering with antique clocks
"I've been working on antique clocks for about 30 years, and by antique, I mean clocks that are roughly 100 years old or older. I have a shelf clock that dates from pre-Civil War times, several from the late 1800s and a few from the early 1900s. All but one are mechanical clocks, which means they are driven by a spring or a falling weight."



Sarah McCarthy, 6, is following in her mom's footsteps, or in this case, ballet slippers.

Leslie McCarthy, PhD, P.E.
Associate Professor, Civil and Environmental Engineering

Hobby: Ballet
"I started dancing ballet when I was 3 years old. It is a passion for me that never died. I still dance at the Philadelphia Studio Ballet, but we are a group of former dancers who no longer perform in public."



Dr. Nataraj captures the beauty of natural lighting in his landscape photos.

C. Nataraj, PhD
Professor and Director, Villanova Center for Analytics of Dynamic Systems, Mechanical Engineering

Hobby: Photography
"Photography is a fabulous convergence of engineering and creativity—it is an activity that uses both right and left brains. I also see that I will never become an expert, so there is unlimited growing potential."



Dr. Weinstein (left) with the cast of "Proposals" performed at Celebration Theater in Lansdowne, Pa.

Randy Weinstein, PhD
Associate Dean, Academic Affairs

Hobby: Theater
"I originally became involved with theater to better my chances of getting into a good college. I was very good academically, but my extra-curricular activities were all academic in nature. I decided to pursue something outside my comfort zone, really enjoyed it and have stuck with it ever since."

WHOM DO YOU KNOW? MEET COLLEGE OF ENGINEERING STAFF

As Coordinator of Student Support Programs, **Gayle Doyle** is the face of the College of Engineering for many prospective undergraduates and first-year students.



In 2015, Gayle was presented with the Farrell Award, which recognizes an engineering faculty or staff member who has demonstrated exemplary personal concern for students.

Q: How long have you been at Villanova?

A: I've been at Villanova for 13 years. I started in Development in 2003, before moving to the College of Engineering in 2005.

Q: What specific responsibilities do you have as coordinator of student programs?

A: My main area of responsibility is the coordination of recruiting events, including one-on-one visits with prospective students, candidates' weekends and undergraduate open house. I also oversee funding for the College's student organizations, and directly advise PEERS (Peers Enhancing Educational Resources for Students) and the Engineering Student Council. I serve as the liaison for the University Career Center, and I am also coordinator of the current professional development program.

Q: What is your favorite thing about your work?

A: The students. I love working with them. A lot of students will introduce me to their parents as the "mom" of engineering. I just really appreciate getting to know them and seeing where they go, and how they grow.

Q: If you could give students one piece of advice, what would it be?

A: Take advantage of every opportunity available to you. Students think the

professional development requirements are hard, but students learn so much from them. It makes me feel good when they say, "I wouldn't have attended this if I didn't have to, but I really learned a lot."

"Gayle exhibits infectious enthusiasm and spirit for the College of Engineering. She embraces our values of Veritas, Unitas, Caritas, not only here on campus, but in the mountains of Nicaragua."

—Gary A. Gabriele, PhD, Drosdick Endowed Dean of Engineering

Q: What are some of your hobbies and interests?

A: Well, my kids, although they're grown up now—26 and 24. I actually work with the costume committee at the high school my kids attended and continue to help put together costumes for their shows.

Q: What is one thing that people would be surprised to know about you?

A: That I have a degree, but not in engineering: My bachelor's degree is in textile design. When I went to college and met with my advisor, he told me I could be an engineer. But, I wanted to be a designer. If I knew then what I know now, I definitely would have switched into engineering.

Q: What was your dream job as a kid?

A: Well, in third grade I wanted to be a teacher. Once I got to college, my dream was to be the next Chanel. I was going to be a fashion designer and work in New York. But now, this is really my dream job. ■

ENGINEERING STUDENT NAMED GATES CAMBRIDGE SCHOLAR



Villanova University College of Engineering students have a tradition of distinguishing themselves. In the past five years the College has had a Goldwater Scholar and George J. Mitchell Scholar, as well as recipients of the Udall, David L. Boren and U.S. Department of State Critical Language scholarships. In 2016, the College added its second Gates Cambridge Scholar to this impressive list. Chemical Engineering senior **Brandon Wesley** is the third Villanovan to receive this honor, and the first in 11 years.

The Rev. Peter M. Donohue, OSA, PhD, University president says, “It is a prestigious honor and Brandon serves as a prime example of the type of student Villanova seeks to develop—one that is academically strong and shows a commitment to creating positive change in his or her chosen field.”

The Gates Cambridge Scholarship supports postgraduate studies at the University of Cambridge in England. Among the most prestigious and competitive

scholarships, the program is unique in placing emphasis on both outstanding academic ability and social leadership in its admissions process.

The 35 Gates Cambridge Scholars from the U.S. were selected from an initial field of 826 applicants. Twenty-two scholars will study for one-year master’s degree courses, while 13—including Brandon—will pursue doctoral degrees.

“In being named a Gates Cambridge Scholar, Brandon has distinguished himself and Villanova’s College of Engineering. We couldn’t be more proud and happy for him.”

—Gary A. Gabriele, PhD, Drosdick Endowed Dean of Engineering

Brandon plans to earn a doctoral degree in Surgery with a focus on using stem cell therapies to treat degenerative diseases. He developed his interest in regenerative medicine while studying and conducting laboratory work at the McGowan Institute for Regenerative Medicine. Brandon also held a summer research position in pharmaceuticals at Merck & Co., Inc. He completed his undergraduate thesis in gene therapy, analyzing how different genetic elements affected the uptake and expression of a plasmid vector in cancer cells. ■



IT’S ANCHORS AWEIGH FOR VILLANOVA ENGINEER

While many of her fellow engineering graduates will be working in corporate offices, laboratories, or construction sites, and still others will return to the classroom for graduate school, 2016 Mechanical Engineering graduate **Abigail Kaiser** is headed to a U.S. Navy destroyer in Rota, Spain. As one of the top five Naval Reserve Officers Training Corps (NROTC) midshipmen in the country, Kaiser had the unique opportunity to personally select her ship, and she chose the USS Donald Cook. Among more than 280 midshipmen from 70 college

units, Kaiser was ranked third, based on her grade-point average, aptitude scores and physical fitness levels. In February, she and the others in the top five were invited to a “Google Hangout” chat where they made their selections. In *Navy Times*, writer Mark D. Faram referred to an environment “more reminiscent of the National Football League draft than a military duty selection.” This new selection process allowed family and friends the opportunity to share in what is a special moment at the commencement of a surface warfare officer’s career.

About her choice of the USS Donald Cook, Kaiser says, “I knew that I wanted to either be on a destroyer or a cruiser, and the opportunity to go to Europe was something I wanted to take advantage of.”

After completing Basic Division Officer School this summer, Kaiser will report to her ship as a Navy ensign. The ROTC program, which pays all college expenses, requires a five-year commitment. Kaiser’s next step is nuclear power school in a couple years. ■



Abigail Kaiser ’16 ME selects her ship while Col. Kenneth M. DeTreu, USMC, commanding officer and Naval Science professor; MIDN Tracy Grim ’16 CLAS, and senior class advisers Lts. William G. Kamm and Rafael Arias, USN, look on.



STUDENT SUCCESS STORIES

From undergraduates through doctoral candidates, Villanova Engineers continue to impress. These are just a few of our standouts.



Almonte



Kabalan

Institute of Electrical and Electronics Engineers (IEEE) Awards Villanova Students

IEEE Philadelphia Section presented **Enmanuel Almonte ’16 CpE** with the 2016 Alan L. Kirsch Award for Outstanding Student Member, and doctoral candidate **Mahmoud Kabalan ’11 MSEE** received the Young Engineer of the Year Award.

At the IEEE Region 2 Student Activity Conference in Cleveland, **Liesl Krause ’16 EE** won first place in the ethics competition.



Krause



Qin

At the Drexel IEEE Graduate Forum’s Annual Research Symposium, doctoral candidate **Si Qin** took second prize for his poster, which presented new research results on sparse sampling and arrays.



Conrath

Record-setting Student Athlete

Wildcats Women’s Water Polo goalie and co-captain **Julie Conrath ’16 ChE** owns Villanova’s school record for individual career saves and individual season saves. Conrath graduated with a 3.8 GPA and is working at the Naval Sea Systems Command in Philadelphia.



Cox

Falvey Award Winner

Thomas Cox ’16 ME won a Falvey Award for outstanding undergraduate research for his project “Measuring the Adoption and Deployment Rates of Disruptive Business Technologies.”



Gordon

Engineers Week Winner

William Gordon ’16 CE received one of the 2016 Delaware Valley Engineers Week Undergraduate Student Paper Awards for “Retrofit of Improperly Installed Metal Truss Plates in Tension Splice Connections between Prefabricated Wood Truss Members.”



Studenroth

Summer Fellowship Sends Graduate to France

Brent Studenroth ’16 ME was awarded a Partnerships for International Research and Education summer fellowship from the National Science Foundation. He will conduct research at the Grenoble Innovation for Advanced New Technologies campus in the French Alps.



Truong

College Sponsors Third Innovation Fellow

Sarrah Truong ’18 CpE completed training to join Epicenter’s University Innovation Fellows, a national program that empowers student leaders to increase campus engagement with innovation, entrepreneurship, creativity and design thinking.



Zoccoli



Saldutti

Civil Engineering Students Earn Scholarships

Nicholas Zoccoli ’16 CE was awarded two scholarships from the Delaware Valley Section of the American Society of Highway Engineers, and **Thomas Saldutti ’17 CE** received the American Society of Civil Engineers Philadelphia Section scholarship.

MULTIDISCIPLINARY ENGINEERING TEAMS COLLABORATE ON INDUSTRY-SPONSORED PROJECT

For the past century, sonar data has been used at sea to navigate, communicate and detect objects on and under the water's surface. In addition to detection, its high resolution images enable localization and classification of objects lying on the sea bed. Because they are highly corrupted by noise, however, the spatial and radiometric resolutions of sonar images are often reduced.



Members of project teams three and four visited Harris Technology Center's satellite assembly lab.

For the past two years, Villanova Engineering students have been engaged in a capstone project whose objective is to obtain high resolution 3-D models from sonar, enabling

object identification using the next generation of unmanned underwater vehicles and remotely operated vehicles. The project is sponsored by Harris Corporation.

The sonar mapping project began in fall 2014 with a team of then-senior Mechanical Engineering students. Their role was to research sonar requirements, select an appropriate system and develop a towed, submersible vessel to carry the sonar transducer.

Once those elements were in place, a team of Computer Engineering students—2016 graduates **Shannon Lemmer**, **Catherine Gallagher**, **Megan Underwood** and **Kenna Bryan**—was called on to learn the complexities of operating

the sonar system, collect sonar data, convert data images, and perform registration and stitching operations to create 3-D mosaics from the data.

The work of the project's first two teams was handed off in fall 2015 to another group of Mechanical Engineering students—2016 graduates **Matt McGuire**, **Abbey Buckenheimer**, **Nicholas DiGiacomo** and **Carly Danek**—whose job was to design and build an autonomous submersible vessel capable of maintaining a fixed depth, steady speed and straight trajectory to execute preprogrammed search patterns while gathering sonar data.

"Last year's rover was designed to be towed by a boat with the sonar sensor attached to the bottom to collect data while it traveled, but that design induced far too many variables, so we decided to make an entirely new vessel," says Buckenheimer. Variables of concern included weight balancing, neutral buoyancy and leaks. Thrusters for propulsion and a waterproof box for electronics were among the project pieces worked on by representatives of team three, which traveled to Harris Corporation's headquarters in Melbourne, Fla. in March 2016. There, the students presented their

work to project mentor, research scientist Mark Rahmes, PhD; senior engineering manager Bryan Wilkers; and Chief Technology Officer Tom Wells.

After learning from and assisting the second and third teams during the spring semester, in fall 2016, a team of Electrical Engineering students (class of 2017)—**Olivia Cleveland**, **Thomas Doucet** and **Steven Machi**—will program and deploy the autonomous vessel, gather sonar data, and create 3-D mosaics of the sea floor and objects upon it. These team members joined team three for the Harris presentation in March.

"This project is a great example of the multidisciplinary work that we like to expose students to," explains **George Simmons '87 MSCS**, director of the College's Multidisciplinary Design Lab. "Teamwork across disciplines is what they'll encounter in the real world." ■



ENGINEERING TEAMS TEST THEIR METTLE

by Daniel Fetsko '19 CE

Throughout the year, teams of engineering students spent countless hours designing, welding, experimenting, casting and more. Their hard work was tested in competition this spring.

Both the Steel Bridge and GeoWall team events were held at Drexel University in late April as part of the American Society of Civil Engineers (ASCE) Mid-Atlantic Region Student Conference.



Steel Bridge

Under the leadership of team captain **Sean Pousley '16 CE**, the Steel Bridge team spent the fall semester on the initial planning, design and testing phases. After deciding what type of bridge to build based upon competition rules and guidelines, the team determined which types of connections, materials and dimensions worked best. After several months and hours in the lab, the pieces for the entire bridge were completed, and testing was performed to determine the most efficient way to assemble it.

On the first day of the competition, bridges were assembled to be judged on aesthetics. On the second day, each team was given 45 minutes to competitively reassemble their bridge within a predetermined layout, which included a 6-foot 6-inch-wide artificial river and two staging zones. Villanova's team built its bridge in under 28 minutes with only four people, a significant improvement from 2015 when it took six team members 45 minutes.

After the bridge was examined by officials, the load test process began. This consisted of adding 50-pound weights, one at a time, at two locations along the span of the bridge. Unfortunately, one of the welds on Villanova's bridge failed during the load test as it approached the maximum 2,400 pounds, and the team was forced to halt loading.

Sean says, "Despite this unexpected setback, we are very proud of all that we have accomplished, and we learned a lot for next year."

GeoWall

Five Civil and Environmental Engineering majors led by graduate student **Zachary Zukowski** took part in the ASCE Conference GeoWall competition. This event requires teams to fabricate a reinforced retaining wall using only poster board and craft paper. With set dimensions, students build a wooden box with the paper wall constructed to retain 800 pounds of sand temporarily shielded by a wooden panel. Craft paper is strategically placed in between levels of sand for reinforcement. Once the box is filled with sand, the panel is removed, exposing the poster board retaining wall. Teams demonstrating stable walls are then judged on the amount of reinforcement used.

This year, Villanova's team placed second after facing off against teams from Bucknell, University of Delaware, Lafayette College, Morgan State and Penn State University, Main Campus.

Nova Racing

Since 2008, Nova Racing has participated in the Formula SAE competition hosted by the Society of Automotive Engineers. Last year, the team made Villanova history by placing 18th out of 120 teams—its best showing to date.

A majority of the design process for the 2016 car occurred in summer 2015. The next phase was manufacturing, followed by electrical and powertrain systems assembly. The rest of the spring semester was devoted to testing and refining before the competition in May at Michigan International Speedway.

At the competition, teams are judged on three static presentations—engineering design, business and cost presentations—and the dynamic portion of the competition, which includes four races: skidpad, acceleration, autocross and endurance. Each race tests different aspects of the car's design and manufacturing.

At this year's race, Nova Racing struggled during the endurance test, completing 10 of 20 laps. In the acceleration race, however, the team came in third out of 138 cars. Villanova also performed exceptionally well during the static events, placing fifth in the cost presentation, tying for twelfth in design, and ranking fifteenth in the business presentation.

The 2016 Nova Racing team consisted of 22 members, two of whom were graduate students. Team Captain **Sofia Gizzi '16 ME** notes, "Many teams have as many as 90 members, half of whom could be graduate students. Being such a small team allows every member of Nova Racing to get heavily involved and gain more experience in every aspect of the car." ■

VILLANOVA IMMERSION PROGRAM LANDS GRADUATE STUDENT DREAM JOB IN SILICON VALLEY

by Meg Amis

In 2014, graduate student **Chad Yantorno** entered Villanova's Master's program in Cybersecurity with a specific goal in mind—to work in Silicon Valley. He looked for opportunities to network with alumni and faculty in order to turn his dream into a reality. When he discovered the “Villanova in the Valley” (VinV) program, Yantorno jumped at the opportunity. Created by Villanova's Innovation, Creativity, and Entrepreneurship (ICE) Institute, this unique program exposes students from all disciplines to the unique ecosystem of Silicon Valley. Those selected to participate—Yantorno among them—take a week-long trip to learn about the inner workings of Facebook, Google and other leaders in high-tech industry.

As part of the program, each student is required to research one of the participating companies. One company in particular caught Yantorno's eye—the IT security firm ForeScout Technologies Inc., whose CEO **Mike DeCesare '88 CLAS** is a Villanova alumnus. Before leaving for California, Yantorno connected with DeCesare at an ICE Institute event, and DeCesare invited him to reach out if he was interested in a job opportunity. Yantorno submitted his resume and the interview process began.

In January, 2016, Yantorno joined 14 other University students for the Silicon Valley trip. Over the course of five days, the group spent time visiting more than a dozen companies, meeting their executives and learning about the risk-taking culture of the Valley. A dinner reception was held with local Villanova alumni and guests, which provided the students with additional networking opportunities. When it came time to visit ForeScout, the company arranged for Yantorno to have his final interview, and he was offered a position as an IT security engineer. He gladly accepted and joined the growing company in February 2016.



Fourteen Villanova students participated in the Villanova in the Valley program, including Chad Yantorno (second from right, back row).

Yantorno credits Villanova with helping him land his dream job. When asked what advice he would give to others pursuing their career goals, he emphasizes: “I am proof that if you set a goal, you can achieve it. At Villanova, there are so many avenues available to you. Go out and network; make connections; and talk to as many people as you can. Look for any opportunity, and go after it.”

Yantorno is settling into his new position, while continuing his master's degree through the College's E-Learning program. He looks forward to participating in the VinV program in the future, but this time, from the employer side. ■

GRADUATE ENGINEERING STUDENT SEEKS SUSTAINABLE WATER SOLUTION FOR GHANA

by Meg Amis

Ava Calvano '15 CE always knew she wanted to continue her education and fulfill her passion for helping other countries overcome social, economic and environmental challenges. In fall 2015, she enrolled in Villanova's Sustainable Engineering master's program and expressed her interest in finding an international project for her thesis. Program Director **Bill Lorenz** put Calvano in touch with **Jordan Ermilio '98 ME, '06 MSWREE**, director of the Villanova Engineering Service Learning program, who thought she would be a great asset to a long-term project in Ghana. There, the College has partnered with Wells for Relief (WFR), a nonprofit organization whose mission is providing safe drinking water throughout the world.

Since 2014, Villanova engineers have partnered with WFR in the Lower Volta region of Ghana, where they are mapping and monitoring hand pumps for functionality, reliability and quality. Since their first visit, the team has mapped more than 400 wells in hundreds of villages to provide access to clean water through the use of hand pumps. The greater issue, however, is ensuring that the pumps are a long-term, sustainable solution.

Calvano explains one of the challenges: “Historically, water has been viewed as a free and shared resource in Ghana, with no single person or group financially responsible for ensuring its continued flow. WFR formed water sanitation committees at the beginning of this project, but they were ineffective as it isn't common practice to pay or collect money to access clean water. Given this cultural mindset, when a pump breaks down or becomes polluted, it is simply abandoned and people go back to drinking unsafe water.”

Clearly this is an obstacle to using hand pumps as a long-term solution, so WFR set out to learn more from the community. Calvano joined the team for a visit to Ghana in October 2015, for which there were three objectives. First, obtain the GPS coordinates for all the existing pump locations to create a map of installations. Second, conduct interviews with community members to understand how the pumps were working to date. Third, present a workshop for water sanitation committee members.



Peter Sinesi '16 ChE and Christina Tobin '16 CE accompanied Sustainable Engineering graduate student Ava Calvano '15 CE to Ghana to address water supply issues.

In the workshop, which was largely led by Ghanaian officials, strategies were shared to help communities become more self-sufficient in maintaining the hand pumps. Attendees also were educated on skills such as opening bank accounts, maintaining the water supply,

and dealing with conflict in the community. Calvano notes the importance of having the community leaders take ownership of these initiatives, “Outsiders being too involved can negatively impact the long-term sustainability of the project, because it builds reliance.”

Calvano returned to Ghana over spring break 2016, leading a group of three undergraduates with alumnus **Benjamin Lawrence '13 ChE**. Over the course of five days, the group collectively visited 130 communities, meeting with local residents, determining the best sites for drawing water and building piping networks, and collecting data that would help WRS understand the types of pumps needed depending upon their locations. Calvano reflects on meeting with so many people in such a short time: “When you only visit one part of a country, you make assumptions about the whole country's culture, but by visiting so many communities and talking to the people, you learn there is just as much diversity in Ghana as there is in the United States.”

Calvano is collecting as much information as she can about Ghana, as her master's thesis will be on the social, political, economic and geographic factors affecting the sustainability of the country's clean water supply. She plans to return to the country for five weeks this summer and take part in the fall and spring service learning trips in coming years. Calvano hopes spending more time there will help her gain a deeper understanding of the leverage points that allow certain villages to succeed and cause others to struggle in accessing and sustaining clean water. ■

WHERE ARE THEY NOW?

FROM BIO-MECHANICS TO BEARINGS

Kathleen Bommer '11 ME

In spring 2009, Kathleen Bommer was looking for a summer job when her advisor piqued her interest in bio-mechanical engineering research being conducted by Mechanical Engineering Professor Hashem Ashrafiuon, PhD. That experience led Bommer to pursue the College's then-new Bioengineering minor, as well as a second related research opportunity with Mechanical Engineering Professor Jens Karlsson, PhD.

"Throughout my time at Villanova I worked with fantastic professors who taught me that engineering is so much more than math calculations," says Bommer. One faculty member who had a particularly strong influence was her advisor, Mechanical Engineering Professor and Chair Amy Fleischer, PhD, '91 ME, '96 MSME. "Dr. Fleischer helped me to set my goals and determine how to achieve them. Her door was always open for me, whether it was to help me navigate course selections or find summer research opportunities. She also taught me very

valuable lessons about what it means to be a female in the field of engineering," says Bommer.

"Kathleen was one of those exceptional students who sought every opportunity to learn and grow. She had the confidence and maturity to seek out faculty for research opportunities, mentoring and advice that would put her on the path to academic and professional success."

—Amy Fleischer, PhD, Professor and Department Chair, Mechanical Engineering



Though she originally planned a future in the bio-mechanical engineering field, Bommer ultimately chose a different direction for her career: "SKF USA Inc.—the world's leading manufacturer of bearings—was doing on-campus

interviews for their Philadelphia office so I decided to interview. I had never considered an applications engineering position before but found myself very interested." Bommer spent two years in the company's Philadelphia office before moving to Chicago to cover the Midwest territory. In her role she supports customers in the use of SKF's products and particularly enjoys the opportunity to visit customers. "Being in the field enables me to better understand my customers' products and major concerns. I can also help to improve their daily operations." Her position has enabled Bommer to participate in professional societies and publish journal articles on behalf of SKF.

Bommer is working part time on her MBA at DePaul University and would like to get more involved in the sales or management side of engineering. "If I had known where my career was going to lead, I would have taken some business classes as an undergraduate to better prepare me for working in a sales-oriented industry," says Bommer. She adds, "I also would have paid better attention in mechanics of solids when they taught us what bearings were!"



"My career is nothing like I imagined it would be," admits Bommer. "I thought I would be working in the bio-medical field somewhere in Philadelphia. Instead I am exploring mines and paper mills in the Midwest and really enjoying it." Having seen firsthand that life doesn't always work out the way we planned, Bommer offers this advice for today's undergraduates, "Keep your mind open to all kinds of career paths!"

Kathleen Bommer's research with Drs. Ashrafiuon and Karlsson was noted in both the 2009 and 2010 College of Engineering Spring magazines. ■

FROM COMMENCEMENT ADDRESS TO PROFESSIONAL SUCCESS

Robert Pencek '07 EE

In 2007, Electrical Engineering major Robert "Bobby" Pencek delivered Villanova University's Commencement address. In his speech, he said, "We were caterpillars, and Villanova was a four-year cocoon. Now at graduation, we emerge as mature beings, as butterflies." Looking back nearly a decade later, Pencek recalls feeling reflective and grateful. "During my senior year, every time the alma mater was sung, I would get a chill up my spine because the lyrics speak of college days ending and going out from Villanova. I thought to myself 'Does something this special really have to end?'"

Along with great friends, and many memorable experiences, when asked about the highlight of his years in the College of Engineering, Pencek points to his advisor Frank Mercede, PhD, former assistant professor of Electrical and Computer Engineering, and Professor and Department Chair Pritpal Singh, PhD. "They helped me pursue my passion for combining technical and business disciplines into a 'total package.'" Drs. Mercede and Singh encouraged Pencek to earn a business minor, for which he says, "I am very thankful for them taking the extra time to help a very green freshman engineer achieve a customized education."

Accepting that he did, indeed, have to leave Villanova after graduation, Pencek pursued a graduate degree in electrical and biomedical engineering at the University of Virginia. After graduate school, he took a job as an engineering consultant for Technology Service Corporation (TSC) in the Washington, D.C. area, helping clients with high-tech and electronic systems. Putting his business and entrepreneurial skills to use, Pencek grew a client base and a team of engineering consultants into a stand-alone business unit within the company. He now serves as client manager and leads the team as engagement manager. In 2014, he was named to the board of directors of one of TSC's subsidiaries, and in May 2015, he earned his MBA in finance from The Wharton School at the University of Pennsylvania.

"I remember Bobby as a bright, dynamic individual who clearly showed leadership abilities even as an undergraduate."

—Pritpal Singh, PhD, Professor and Department Chair, Electrical and Computer Engineering

When thinking about what lies ahead, Pencek says: "I am excited to find a role that combines my MBA and engineering background—the best parts of quantitative, analytical engineering, and enterprising, entrepreneurial business. I'm interested in opportunities in private equity, venture capital and management consulting. He adds, "Any



Robert with son Bobby, wife Erin and son Thomas in Salzburg, Austria.

chance to work with fellow Villanova alums would be fantastic!"

Speaking of fellow Villanovans, Pencek encourages today's undergraduates to look out for one another professionally: "You'll want to work with others whose competence and ethics you can trust. Use this network. If you're in a position to help one of your classmates, do it. If younger alums reach out to you, do what you can to help or mentor them."

Pencek describes his life as "way better than what I imagined it would be." He refers to his wife Erin and their sons, Bobby and Thomas, as "the best part of my life." With his family beside him

and his Villanova foundation, Pencek knows he possesses the technical competence and well-rounded qualities that prepare him for whatever career opportunities come his way.

Robert Pencek's commencement address was printed in the Summer 2007 Villanova Magazine. He also was quoted in the College of Engineering's 2006–2007 Annual Review. ■



**VILLANOVA
UNIVERSITY**

College of Engineering

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VILLANOVA ENGINEERING UPDATE

VILLANOVA UNIVERSITY COLLEGE OF ENGINEERING

SPRING 2016

REPAYING GENEROSITY WITH GENEROSITY

by Meg Devine Maxwell

THE MERKERTS HONOR LIFE-CHANGING MENTORS BY PROVIDING FOR VILLANOVA'S NEXT GREAT ENGINEERS

For Robert J. Merkert Sr. '59 EE, choosing Villanova was an easy task: Affording his education was not. His was a hardworking family of modest means, and Villanova's tuition, room and board—topping out around \$1800 during his senior year—meant careful planning and scrupulous saving.

In the middle of Merkert's sophomore year as an electrical engineering major, his father underwent surgery and medical bills piled up. Merkert met with Father Thomas Burke, OSA, the University registrar, to put his studies on hold until his family's financial stress eased. Father Burke responded with a \$500 scholarship to get Merkert through the year.

The following summer, Merkert received a call from Father Burke: "The first thing he said to me was, 'Did you go to Mass today?' After that, he said, 'I've just awarded you the Scott Paper Company Scholarship. It'll give you \$1000 a year for your junior and senior years.'" Father Burke's call changed the entire shape of Merkert's collegiate experience, and he remains grateful.

"I always considered that a half scholarship," says Merkert.

"Early in my career, my wife Marge and I decided that if we ever had the means, we would love to set up a half scholarship to repay Father Burke. We also wanted to recognize Professor Joseph Hicks, who introduced me to these newfangled things called transistors. He had a very strong feeling that the future of electrical engineering was in electronics and computer work. He changed my whole direction."

Professor Hicks' guidance pointed Merkert down a road that led to a 50-plus year career, including decades at the forefront of the smart card industry. Today, he is president of his own consulting company, IntelACS LLC, as well as president of the Americas for Advanced Card Systems Ltd.

In 1995, the Merkerts found themselves in a position to give back: DANYL Corporation, the pioneering smart card company that Merkert had co-founded, was bought out. The Merkerts used a portion of their profit to establish The Professor Joseph J. Hicks University Scholarship, an endowed fund that provides a

partial tuition award to a student majoring in electrical engineering.

The Merkerts want the Hicks Scholarship to be a game-changer for worthy students,

just as the Scott Paper Company Scholarship was for Bob. To that end, they have added to the fund every year, with

a total contribution of nearly \$250,000 to date. One student is selected to receive the award for the full four years of his or her enrollment. The Merkerts meet with each Hicks scholar, typically a few times per year. They share the story behind the scholarship, build a relationship with the scholars, and encourage them to consider—if they ever have the means—creating their own fund or adding to the Hicks endowment.

A past recipient, **Paige Castle '14 EE** expresses gratitude for this scholarship, "I am extremely lucky to have received the Hicks Scholarship and to have met the most genuine, kind benefactors. The unique opportunity to develop a personal relationship with Bob and Marge has made me extremely grateful, and one of my biggest goals is to be able to give back as they have."

Until then, there are plenty of ways to support today's engineering students, at all levels of giving capacity. Merkert, who is the current president of the Engineering Alumni Society (EAS), reflects, "One of the things we do through the EAS is support student projects. This year we gave out more than \$5,000 to support six student projects, and that funding came from Engineering alumni donations. Dean Gabriele is starting a mentoring program that will be part of the engineering curriculum, and that will be another meaningful way for alumni to give back. There are always opportunities, and we encourage alumni to get involved." ■



Marge Merkert, scholarship recipient Paige Castle '14 EE and Robert Merkert '59 EE at the Endowed Scholarship Reception. Castle is pursuing her PhD in biomedical engineering at the University of Michigan.