

VILLANOVA

ENGINEERING

ROLE OF AN ENGINEER
Spring 2012

- Solidarity
 - Educate Yourself
 - Use Your Voice and Power
 - Lead by Example
- Technical Aspects
 - Work on Improving Sanitation for Countries
 - Drug Delivery
 - Scale Up Processes



VILLANOVA
UNIVERSITY

INSIDE: Going "Pro"

Greener, Cooler, and
Better for Business

Service Learning:
Supply and Demand

A Heartfelt Legacy

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News & Events

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On the Cover:

Manhattan Ishimi ChE '12 presents a project from Catholic Social Thought and the Engineer to Elizabeth Predmore CE '12 and Marcus Ketcha ChE '12.



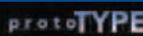
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Meet the alumni who have honored their Villanova Engineering experience with a planned gift, which offers special incentives and helps ensure the future of the University's and College's missions.

Message from the Dean

Greetings,

By now you may have seen some elements of the University's new "Ignite Change. Go Nova." branding, which showcases the transformational opportunities that define the Villanova experience.

You'll be happy to know that our own engineering "changemakers" are playing a central role in the new campaign, which includes a commercial aired during nationally-televised men's basketball games. From student biodiesel production and service learning in Panama, to graduate studies and more, we're sharing what it means to be a Villanova Engineer with the world.

In the College of Engineering, transformational change starts in the classroom, through innovative curriculum updates and new ways of teaching. In this issue, you'll learn about:

- **New professional development requirements** for freshmen, designed to give our students a career advantage from their first semester (page 4).
- **Two new course offerings:** the award-winning, cross-disciplinary Mobile Device Programming (page 2), and Catholic Social Thought and the Engineer, which puts engineering at the center of social advancement (page 9).
- **Our new, state-of-the-art Center of Learning** at the Philadelphia Navy Yard, which brings Villanova Engineering graduate studies to the city (page 10).

The classroom experience transforms the way our students envision the impact they can have on others. In this issue, we'll introduce you to:

- **Our first group of service-learning interns**, who spent the summer in service to others (page 14).
- **Our involvement with LEAD Engineering**, a national program designed to connect the nation's top high school students of diversity with a transformational summer engineering experience (page 12).

Our teacher/scholar faculty continue to conduct research that transforms the way we live and work. In this issue, you'll learn about a group of mechanical engineering faculty who are collaborating with colleagues from around the country to **revolutionize the data center industry** (page 6).

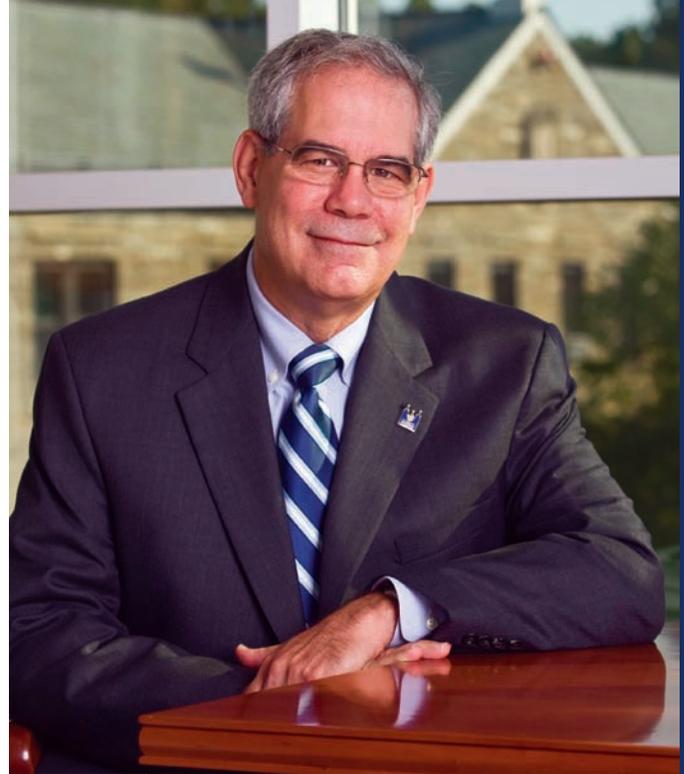
We'll also celebrate the transformational effect that the College of Engineering has had on our alumni. In this issue, you'll meet a number of Villanova Engineers who support the mission of the College and the University through **planned giving** (page 17).

We hope you enjoy this issue. You can always keep up with our College news at www.engineering.villanova.edu, [www.Facebook.com/VillanovaEngineering](https://www.facebook.com/VillanovaEngineering), or through our College of Engineering group on [LinkedIn.com](https://www.linkedin.com/company/villanova-engineering).

Sincerely,



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



BUILDING AN FOR THAT

app

By David Erickson

“Build a better mousetrap, and the world will beat a path to your door.” The line, attributed to Ralph Waldo Emerson, may have been true in 1855, but it is certainly not true in 2012, not even in the field of engineering, where technical superiority has long been considered the ultimate goal.

“Many engineers still believe that a great idea sells itself,” says Dr. Sarvesh Kulkarni, Associate Professor of Electrical and Computer Engineering. “They view marketing colleagues and managers as adversaries, and vice-versa. They need to understand the perspective of the business team to sell their ideas more effectively and to overcome the adversarial mindset.”

Bringing the perspective of the wider world to engineering students was the motivating idea for Mobile Device

Professor of Computing Sciences and Director of Villanova’s Center of Excellence in Enterprise Technology, and Dr. Bill Wagner, Associate Professor of Decision & Information Technology. Uniting them was a common background in working with iPhone, Android, and similar smartphone platform technologies.

Having an unorthodox mix of engineering, computer science, and business students sharing a single classroom called for non-traditional teaching strategies. The three professors each lectured separately on aspects of mobile computing applications, and students were assigned to teams comprised of one representative from each discipline—engineering, computer science, and business—who were expected to deliver what Dr. Kulkarni calls a “close-to-market” mobile application product by the end of the course. Each participant got a taste of the other’s fields: in lab work, business students worked on programming, while engineers helped develop business plans.

“The emphasis was on having students step outside their comfort zones,” says Dr. Kulkarni. “Engineers need to learn about the sometimes harsh realities of business decisions, and business majors need to learn the technological challenges, limitations, and thought processes that go into designing a technical product.”

While the course had regular assignments and a midterm exam, a large portion of the final grade depended on each team’s design, execution, business plan, and the persuasiveness of their final presentations, which were judged by course faculty. Industry judges have also been included in subsequent offerings.

The objectives of the course were to encourage entrepreneurial thinking, to emphasize that real-life solutions to product development problems span multiple disciplines in equal measure, to demonstrate the value of reaching out to

peers across disciplines and organizations to find solutions—and, finally, to help students realize that, in Dr. Kulkarni’s words, “Success is not guaranteed, but it is not incidental, either. One needs to make a concerted effort to champion one’s ideas.” In short, the better mousetrap is certainly necessary for success, but not in itself sufficient.

Engineering Meets Business

“The interdisciplinary aspect really hit home,” says Nick Bruno CpE ’11, MSCpE ’12.

“As an engineering student, from day one you’re exposed to other engineers. In this course, there were not just new faces but new perspectives. I’ve had courses with final projects before, but never one where I was working with students who weren’t engineers. It’s an experience that kind of brings you down to earth. It makes you realize that there are times when you have to collaborate with people who may not exactly understand what it is you do.”

Bruno says he has long been aware that success in today’s world of engineering calls for more than just technical skill. This conviction was reinforced, he says, by an internship at AT&T, where he saw that there was a business side as well as a technical side to a career in engineering. Taking Mobile Device Programming “solidified that belief,” he says, and drove home the importance of being able “to present your work successfully to those not well-versed in your field.”

His interdisciplinary team’s project was the development of a content management system that integrated with Joomla, a popular open-source Web application framework. Its strength as a mobile app was its efficiency and seamless integration on the phone for a native application, as opposed to the slower and more cumbersome method of having to load up a full website to the phone’s browser. And, as Bruno points out, the app could easily be adapted to handle other information content besides text articles. “It was a



Programming, an interdisciplinary course that bridges engineering, business, and computing sciences. Introduced last spring, the course was taught by Dr. Kulkarni, along with Dr. Frank Klassner, Associate



Dr. Sarvesh Kulkarni, Associate Professor of Electrical and Computer Engineering, reviews the prototype for a mobile application developed by Nick Bruno CpE '11, MSCpE '12.

‘proof-of-concept’ project,” he says. “It had to be user-friendly and intuitive—not flashy.” Other teams’ apps included “Gift Grabber,” “Mobile Inventory Manager,” and “Homework Helper.”

Alumni Support

The Mobile Device Programming course owed part of its success to an engineering alumnus who made important material contributions.

Anthony J. Melone EE '82, Executive Vice President and Chief Technology Officer for Verizon Communications, learned of the project from James Drobile, Jr. VSB '83, MBA '92. As a talented engineering student who was drawn to the world of business management, Melone recognized and understood the value of the interdisciplinary concept. “It’s important for engineering students to understand that

they have options,” he says. “I was a good student at Villanova, but in my heart I knew I didn’t want to be a pure engineer.”

Melone says industry will always need people with strong technology skills, but it also, increasingly, needs what he calls “potential technology leaders of the future”—individuals who are not only skilled in technology, but who are also interested in how technology can be applied to business. “It’s not for everyone,” he says. “You end up being 70 percent business and 30 percent tech, and I think most engineering students don’t necessarily want to end up there, but some do.”

It is important, he believes, that this subset be exposed early to the business side, to see that there are career possibilities for them. And regardless of their eventual career path, he says, even those most interested in pure technology need at least

some understanding of how business works.

Through Melone, Verizon Communications provided phones for the students to use in their coursework and also provided guest speakers for the course.

The interdisciplinary course has proved successful in more ways than one. The next iteration of the course, which began this spring, filled up immediately, according to Dr. Kulkarni. The course has also received wider public acclaim. Late last year, The Global Consortium of Entrepreneurship Centers—a group of 200 university-based entrepreneurship centers—honored the course with its annual award for “Excellence in Entrepreneurship Teaching and Pedagogical Innovation.”

Perhaps Emerson was right after all—the world is recognizing Villanova’s better mousetrap and is beating a path to its door.

GOING “PRO”

By Christopher Murray



Freshman Ryan Flynn reviews his résumé with Kevin Grubb, Assistant Director of the University's Career Center.

From the start, Villanova takes engineering education “seriously beyond the technical,” according to Dr. Gerard F. ‘Jerry’ Jones, Associate Dean for Academic Affairs and Professor of Mechanical Engineering.

Call it a left brain *and* right brain approach. The College of Engineering educates the whole student.

An important concept to the College, the curriculum has long included service learning to support the mission of the University and ethical decision-making and design to maintain the integrity of the profession; but, for the majority of its 100-plus-year existence, the College has principally focused on instilling technical excellence in students.

“Historically, we’ve developed the technical core,” says Dr. Jones, “but there is a whole world beyond that. Students need to understand corporate environments, how

government entities operate, what decorum means in a business setting, and even how to write an impressive résumé or formal letter.”

While 30 or 40 years ago, employers prioritized technical ability, today there is also a need for engineers with a broader skill set. As a result, professional development has become even more critical to personal and career advancement.

“The Career Center is a true resource that is better discovered now rather than later.”

– Katie Edin, freshman

That was Then

According to Dr. Jones, the College has always offered professional development opportunities, with seminars and speaker series typically offered toward the end of a student’s career.

“We’ve always taught students how businesses operate, but hands-on professional development activities have been squeezed out of the curriculum on the college level over the years,” Dr. Jones says.

When preparing for today’s business environment, it is no longer practical or effective to simply offer enrichment classes or seminars. “Students were missing out on opportunities to practice what they learned, either in class or in an internship setting,” Dr. Jones says.

This is Now

The College’s response was to put together a multidisciplinary program for freshmen in which students are required to participate in a minimum of three professional development activities per semester.

These could include taking field trips, attending a master’s thesis defense, participating in professional society events, hearing outside speakers, or taking a service trip to Panama, where Dr. Jones recently led a team of students.

In addition, students are exposed to a mock interview during freshman year and are coached on how to make an impact during an interview. They also create a résumé in the fall of freshman year and finish it by spring, so they are prepared for internship opportunities right away.

“The Undergraduate Research Poster Session was a great way to see what kind of research was being done in the College by undergraduates,” says Katie Edin, freshman. “For my freshman engineering class, we had a similar poster session, so it was beneficial to attend a real poster session to get a feel for how the whole thing works.”

Fellow freshman Ryan Flynn agrees. “The ability to see older engineers at work and read their posters and projects helps us learn from example.”

Industry Insight as Catalyst

“We had to do this,” Dr. Jones says. “Our industry advisory groups tell us they want

our engineers to hit the ground running; they need productive engineers from day one.”

The day after graduation, engineers today need to know how to interact with colleagues and approach a project, how to dress, write a professional letter and email, and how to get questions answered the right way.

“There is a degree of informality students have grown up with, and that’s not how you communicate in a professional environment,” says Dr. Jones. “Now, during freshman year, these career development opportunities help students start to understand the benefits of being professionally astute.”

Rave Reviews

“By September 1, students were emailing us about how great these experiences are and that they had already completed two activities,” says Dr. Jones. “I expected excitement but to have students take the time to write an email was an eye-opener.”

The students truly appreciate the practical nature of the requirement.

“The professional development requirement is teaching us effective ways to market ourselves as amazing Villanova engineers—tenacious, hardworking, and smart people—as opposed to nerdy kids playing with robots all day,” says Edin. “We do love robots, but now our résumés and interview skills are as polished as our

math skills. Who wouldn’t want that?”

Flynn adds, “The most beneficial professional development requirement was the résumé writing workshop we all had to attend and having a chance to write a real résumé and get it checked by the University’s Career Center. I hope to perfect mine soon so that when it comes time to find an internship, I will be ready.”

Future Plans

While the College will certainly continue to offer extracurricular lectures and seminars to help students develop professionally throughout their academic careers, requiring professional development for all freshmen is a strong, systematic approach to putting students on the right path. The program provides the framework and the scope to provide professional development opportunities in a broad way.

“After one semester, I am pleased with what I see and am looking forward to hearing more feedback,” adds Dr. Jones.

The future of professional development could take engineering students to a local grade school or high school to judge a science fair or act as ambassadors for the University while judging a poster session at an academic event, continues Dr. Jones.

“We’ll revisit professional development each year to ensure we continue to prepare students to meet the needs of industry,” he says.

Ongoing Opportunities

Professional development in freshman year is just a start. Students have numerous opportunities to strengthen their skills, sharpen their business acumen, and build upon the foundation developed in their first year.

Professional development exposure comes from:

- Career Center opportunities: résumé reviews, career fairs, employer information sessions, and employer recruiting
- Professional networking through College and University events
- Guest speakers in class, at special presentations, and via student chapters of professional organizations
- Career panels and special industry-focused events
- Industry-sponsored research opportunities through the Villanova Multidisciplinary Design Laboratory
- Work on faculty-led research projects for industry or department-specific research projects

Students may satisfy professional development requirements by attending various events, such as the annual Undergraduate Research Poster Presentation, to help them build skills outside the classroom.



GREENER, COOLER, AND REVOLUTIONIZING THE DATA CENTER INDUSTRY

by Carly Keeny

The touch of a button. The click of a mouse. The swipe of a touch screen. In today's digitally-driven society, keeping the data flow that controls everything from financial markets and private health records, to commerce and homeland security, running smoothly and unimpeded goes beyond the merits of convenience—it is crucial.

the work of a data center. Often tens of thousands of square feet in size, data centers house millions of dollars in computer server equipment and constitute the nerve center of the Internet. As our reliance on instantaneous access to information grows, so does the need for data centers.

In order to meet and manage the demand for data, these centers require a significant amount of electricity—estimated at about 3 percent of the nation's total use per year. As the electronic machines these centers house process information, they

Engineering faculty has joined forces with colleagues from around the country to explore the possibilities on behalf of some of the world's best known multinational corporations—and in the process, revolutionize the way data centers are designed and managed.

Introducing I/UCRC E3S

Last fall, the National Science Foundation (NSF) elevated the importance of data center energy issues to national prominence by awarding its first Industry/University



Dr. Aaron Wemboff, Assistant Professor; Dr. Kamran Fouladi, P.E., Adjunct Professor; Dr. Amy Fleischer, Associate Professor; Dr. Alfonso Ortega, the James R. Birle Professor of Energy Technology and Associate Dean for Graduate Studies and Research; and Dr. Gerard F. "Jerry" Jones, Professor and Associate Dean for Academic Affairs, in the Laboratory for Advanced Thermal and Fluid Systems.

“Data centers are the lifeline of any business,” says Gary Aron, Vice President of Business Development for software provider Asset Vue. “Without access to critical data, businesses can't operate.”

Then there's the Internet. Every email sent, video downloaded, or breaking news story read online triggers a chain reaction of information processing, which requires

dissipate huge amounts of heat and require sophisticated cooling systems, all of which drives up the costs of operation. Currently, about half of the electricity delivered to a modern data center operates the cooling systems.

How can these data centers be made more energy efficient, sustainable, and more cost-effective to run? A team of Mechanical

Cooperative Research Center (I/UCRC) on “greener” data centers. With five-year funding of \$3.4 million, the Villanova team and partners from Binghamton University and the University of Texas at Arlington, with collaboration from the Georgia Institute of Technology, established the I/UCRC on Energy-Efficient Electronic Systems (I/UCRC E3S).

BETTER FOR BUSINESS:

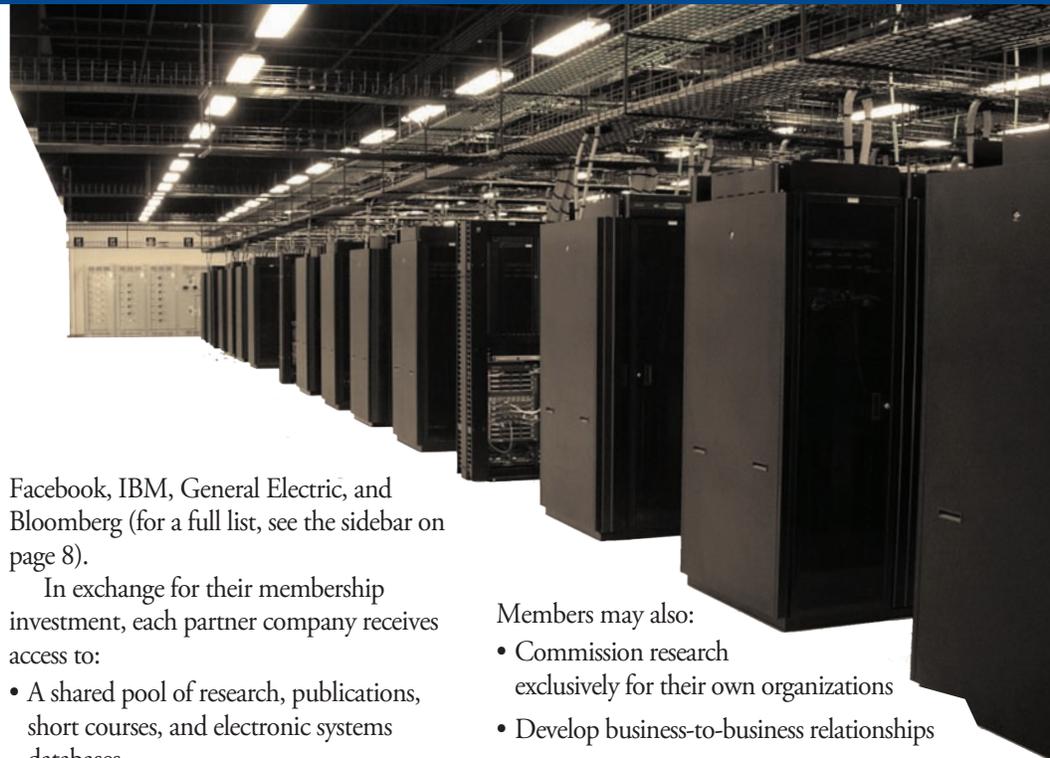
“Our goal is to develop innovations that will make data centers more efficient and sustainable,” says Dr. Alfonso Ortega, the James R. Birle Professor of Energy Technology and Associate Dean for Graduate Studies and Research. “By working together, we can take a holistic approach to designing the physical structure of a data center and its subsystems, allocating computing resources, and deploying solutions for environmental control. Together, we may also create non-traditional ways of reusing waste energy.”

Each institution brings its own area of expertise to the Center, but members from each university work collaboratively on a number of research projects. Contributing a focus on thermal fluid sciences, the Villanova team draws from the Mechanical Engineering Department, including:

- **Dr. Alfonso Ortega**, the James R. Birle Professor of Energy Technology and Associate Dean for Graduate Studies and Research, E3S Villanova Site Leader
- **Dr. Gerard Jones**, Professor and Associate Dean for Academic Affairs
- **Dr. Amy Fleischer**, Associate Professor
- **Dr. Aaron Wemhoff**, Assistant Professor
- **Dr. Kamran Fouladi, P.E.**, Adjunct Professor and aerospace industry consultant

Binghamton brings computing science and data center thermal management expertise, while the University of Texas at Arlington focuses on thermal management systems and dynamic systems controls, and Georgia Tech offers leadership in simulating fluid dynamics and flow internal to data centers.

The NSF’s award also requires each institution to recruit industry partners as contributing members of E3S. To date, the Center has attracted nearly 20 members, representing the entire supply chain, from hardware manufacturers and software developers, to end-users. The Villanova team has recruited Verizon Wireless; Comcast; DVL, Inc.; and Steel ORCA. Other members include Microsoft,



Facebook, IBM, General Electric, and Bloomberg (for a full list, see the sidebar on page 8).

In exchange for their membership investment, each partner company receives access to:

- A shared pool of research, publications, short courses, and electronic systems databases
- PhD-level consultative services

“Data center owner/operators are working with the manufacturers of technology, academia, and many think tanks to use less power, or at the very least, use it as efficiently as possible. Not to be forgotten is the social responsibility of America’s companies to be leaders in energy conservation.”

— *Richard Werner, Executive Director of Data Center Services, Comcast*

- Access to research equipment, infrastructure, and expertise at partner campuses
- Graduate students, mentoring and recruitment opportunities, and workforce training programs and internships

Members may also:

- Commission research exclusively for their own organizations
- Develop business-to-business relationships
- Initiate research partnerships across E3S

Partners that join at the full membership level also enjoy a stake in the strategic planning of the Center’s research initiatives. When the full complement of university and corporate partners meet at biannual Industry Advisory Board (IAB) meetings, these members help choose the research projects in which E3S will invest its resources. Representatives from these companies also serve as industry mentors for projects, with responsibilities for maintaining close oversight of progress and offering real-world insight and support when needed.

Keeping Their Cool

In data centers, heat is the enemy of smooth, reliable performance, which makes cooling a priority, and also the number one source of power consumption for these buildings. “Many data centers still in use today were built in the 1980s and 1990s. In those days, we would add cooling as needed,” says Aron, who has more than 30 years of experience designing and managing data centers for Fortune 500 companies. “Today, we’re starting to incorporate tools that modulate

“Our participation in E3S is extremely exciting. Our goal is to provide a dual platform for researchers to use our digital utility center labs to innovate, test, and prove theory. We are also pleased to provide a production theatre for commercial applications consequent to the work done in the lab.”

– Dave Crocker, CEO, Steel ORCA

cooling and have controls to drive energy conservation, which not only saves money but also decreases waste heat.”

In December, the IAB approved nine projects put forth by the university teams deemed to offer the best value to E3S. The highest rating went to a project spearheaded by Dr. Ortega, which emphasizes achieving energy efficiency by leveraging targeted cooling only to the areas of the data center that truly need it, when they need it.

Dr. Ortega is working with Dr. Wemhoff and Dr. Fouladi to build a thermodynamic model capable of assessing data energy consumption as a function of server activity loads, computing temperatures, and cooling needs. The team can then use this information to define the optimum layout of a data center’s design and integrate that layout with recommendations for its management and operation. Representatives from Panduit, Microsoft, and Steel ORCA serve as mentors.

“The simulation tool we are building can also help us model viable methods to conserve energy and help us keep track of the exergy, or quality, of waste energy, based on how well we can harness it for reuse,” says Dr. Ortega.

PhD candidate Marcelo DelValle and Kayvan Abbasi MSME ’13 will participate. They will be joined by a student in the College’s Master of Science degree program in Sustainable Engineering, who will focus

on lifecycle assessment and be co-advised by William Lorenz, Adjunct Professor of Chemical Engineering.

Recovering Waste Energy

E3S members also approved a project led by Dr. Fleischer, in collaboration with Dr. Jones, aimed at capturing waste energy before its exergy deteriorates. By comparison, the electricity used to power data centers maintains a high exergy level, while the warm air dissipated by computer equipment ranks lowest in terms of its potential for reuse. But what if you could capture the waste energy before it becomes warm air?

Dr. Fleischer and Dr. Jones have begun a comprehensive literature review, spanning a number of industries, to survey the best ideas for improving waste energy potential in data centers. Concepts may include an exploration of the merits of replacing fans in electronic equipment with liquid heat sinks or exchangers, which can pick up the heat highly locally and capture it in liquid. Perhaps that hot fluid could then be converted into electricity that could be put back into the grid or used to heat and cool the building.

“Through our partnership in E3S, we see an opportunity to test the limits of technology in a lab environment while developing and leveraging the talents of future leaders in this very important and highly competitive field.”

– Richard Craig, Director of Engineering and Operations Support, Verizon Wireless

Once the literature review is complete, the team will make recommendations on the most viable options for improving waste energy reuse in data center environments, which will commence an experimental phase of the project. Endicott Interconnect Technologies and Facebook serve as mentors. The team will also support a graduate student.

E3S Corporate Partners

Advanced Electronics Company, LTD
Bloomberg
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Commscope
Corning, Inc.
DVL, Inc.
Emerson Network Power
Endicott Interconnect Technologies
Facebook
General Electric
IBM
Microsoft
NYSERDA
Panduit
Sealco/Bick Group
Steel ORCA
Verizon Wireless

Just Getting Started

The NSF’s funding will support E3S for five years, with the potential for five-year funding renewal. New projects will be considered once a year, and both industry and university partners will provide formal updates (separate from regular mentor meetings) on projects twice annually.

Along the way, university partners may offer their expertise to any of the inaugural nine projects as needed. For example, faculty from all three collaborating universities will offer valuable insight into the development of Villanova’s computer simulation tool for energy consumption, while a student at the University of Texas, who has a particular interest in water sustainability, may participate in both Villanova-led projects.

“I envision Villanova being able to offer a great deal of additional analyses from a sustainability point of view, which is unique to the College of all the E3S partners,” says Dr. Ortega. “This work dovetails perfectly with work of the Villanova Center for the Advancement of Sustainability in Engineering (VCASE), and we hope VCASE faculty eventually will be able to bring their strengths to bear on our projects.”

For more information on E3S, visit www.binghamton.edu/e3s

CATHOLIC SOCIAL TEACHING IN ACTION

By Karen Murray

Dr. Vito Punzi, P.E., Professor of Chemical Engineering, often shares a case study with his students about the Columbia River Watershed, where hydroelectric dams were built to provide an inexpensive and clean source of power to the region.

While there are several technical angles to explore, Dr. Punzi uses it to illustrate the principles of Catholic Social Teaching (CST), whose roots can be traced to Pope Leo XIII's encyclical *Rerum Novarum*. "Engineers are generally trained to pursue the 'greater good,' and usually seek the best solution that results from cost-benefit analysis," he says. "The bigger challenge for engineers, from a social consciousness perspective, is the pursuit of the 'common good'—obtaining solutions that seek to minimize the impact of a new development on the most vulnerable members of the community."

In this case, the new dams destroyed fishing routes and other resources upon which native tribes depended for survival. As a result, Catholic bishops of the region drafted an International Pastoral Letter to express the injustice of the situation and prompt action.

Dr. Punzi hopes to prepare his students for these types of challenges in "Catholic Social Thought and the Engineer," a new course offered for the first time in spring 2011 that exemplifies the University's Augustinian Catholic tradition. At Villanova, CST is woven into the curricula of courses throughout the University. Select faculty members enroll in summertime Curriculum Development Workshops about incorporating key CST principles into their



Marcus Ketcha ChE '12; Dr. Vito Punzi, P.E., Professor of Chemical Engineering; Manhattan Ishimi ChE '12; and Elizabeth Predmore CE '12

classrooms. After participating in 2006, Dr. Punzi sought to build CST into new and existing courses within the College of Engineering.

He initially dedicated one 75-minute class period per year to understanding and applying CST. He then developed the one-credit course, which leverages real-world case studies, like the Columbia River Watershed example, papal social encyclicals and messages, and pastoral teachings to fuse CST principles with tactics that engineers can incorporate into their designs.

For students who took the course's initial offering, the experience helped them bridge the gap between theory and practice. Marcus Ketcha ChE '12 took interest in the course's focus on applying social justice to the field. He especially appreciated approaches on "how to carry discussions into the workplace" and "where you can make a stand."

Manhattan Ishimi ChE '12 had been

feeling "frustrated with integrating CST into [her] work," particularly for sharpening the focus of that work on people. She benefited from Dr. Punzi's knowledge of CST and its practical applications.

Elizabeth Predmore CE '12 was also interested in learning more about Catholic doctrines and the intersection of engineering and social justice issues. She enjoyed the "engaging discussions" and evaluating real-world situations from various industries through class projects.

Dr. Punzi hopes to expand the curriculum into a three-credit course for future offerings. "My hopes are that this course will provide engineering students with a knowledge and understanding of social issues that they'll be able to carry with them once they graduate," says Dr. Punzi. "We can aspire to develop engineers who are not only technically competent and ethical, but are socially conscious and responsible as well."

DISTANCE LEARNING GROWS UP

By Debbie Clayton

It was a “no-brainer” for Steve Wilrigs, an MSME student, to take one of the inaugural graduate engineering classes at the College of Engineering’s Center of Learning within Philadelphia Technology Park at the historic Philadelphia Navy Yard last fall.

“The facility is absolutely gorgeous, and it’s right down the street from where I work,” says Wilrigs, a graduate intern in the Major Programs Division at the Naval Surface Warfare Center. “I actually prefer to take my classes in the classroom when I can, and this is probably the most high-tech classroom I’ve ever been in.”

Designed as the next step in distance learning, the College’s state-of-the-art

classroom at the Navy Yard features the latest in web broadcasting and video teleconferencing capabilities. Professors use tablet PCs to project notes to students, who view them on 17-inch monitors and interact on-site via web technology. All lectures are simulcast to distance-learning students, who participate in discussions through texting or voice interaction. Lectures—including discussions—are digitally archived in perpetuity for later viewing.

“From the furniture in the room, to the glass walls, to the screens used, the classroom was built for heightened efficiency of learning,” notes Sean O’Donnell, Director of E-Learning and Graduate Marketing for the College of Engineering. “Everything has a purpose and functionality, seamlessly integrated with technology. The biggest advantage is that everything done in the classroom can be re-watched throughout one’s career.”

When O’Donnell began working on distance learning as a Villanova computer engineering student in 1997, the blueprint involved TV networks, satellites, and microwave transmission. The Internet, of course, changed everything.

“In the last few years, I’ve seen distance learning evolve into e-learning,” says O’Donnell, who graduated in 2000 and began working at Villanova in 2001. “Here on campus, we have an ambitious e-learning program, but we have a large contingency of engineering graduate students who work for the Navy and for companies like Boeing, Kimberly Clark, Sunoco, and Lockheed Martin—all located within 10 miles of the Navy Yard—and not all that close to our main campus.”

Expanding Student Reach

The Philadelphia Navy Yard has a rich history, including serving a strategic shipbuilding role in World War II.

Though the Navy officially closed the Yard in 1995, it kept several significant military facilities there.

“In the past, we would send our professors down to the Navy Yard to interface with students,” adds O’Donnell. “But the only area available was located inside the Navy facility, meaning no one except Navy employees could be in the classroom. So we were expanding our reach but limiting our market space within that reach.”

In recent years, the Navy began working with the city to foster technology development, attracting a number of industry players. It has since become the fastest-growing technology and life-sciences zone in the Mid-Atlantic region. In September 2010, the Philadelphia Technology Park opened at the Navy Yard, featuring a \$25 million, 25,700-square-foot single-use, fully redundant enterprise data center. When the opportunity arose to occupy a 1,400-square-foot facility within Philadelphia Technology Park, the College snapped it up.

“It took a year to develop the space available to us, but we built our curriculum to match the facility,” explains O’Donnell. “Our two models for revenue were graduate



Rev. Peter M. Donohue, O.S.A., Ph.D., University President; Dr. Gary Gabriele, Drosdick Endowed Dean of Engineering; and John Grady, President, Philadelphia Industrial Development Corporation, cut the ceremonial ribbon at the new Center of Learning at the Philadelphia Navy Yard.

Notable Neighbors

The College of Engineering rubs elbows with several recognizable residents of the Philadelphia Navy Yard, including:

- Tastykake—world headquarters and manufacturing plant
- Urban Outfitters—world headquarters
- Aker Philadelphia Shipyard
- Glaxo Smith Kline—regional headquarters
- NSWCCD—Naval Surface Warfare Center



In the foreground: The Greater Philadelphia Chamber of Commerce's Joseph W. Mahoney, Jr., Executive Vice President, and Chermaina Roundtree, Partnership Marketing Coordinator. Back row: Mechanical Engineering Professors Dr. Sridhar Santhanam and Dr. Hashem Ashrafiuon, Director of the Center for Nonlinear Dynamics and Control, are among the first faculty members to teach in the new space.

nighttime education and educational space design/online learning expertise for lease by corporations. We are now up and running with both initiatives.”

Three classes were offered at the Navy Yard Center of Learning during fall semester, and all exceeded enrollment expectations. For spring semester, the curriculum expanded to include four classes, taught by both adjunct and full professors. Classes run from 4:30 to 7:30 p.m., allowing nearby working engineering graduate students to put in a full day’s work and still avoid rush hour traffic.

If they are called out-of-town for work, as Wilrigs was during his class, they can participate online in real-time, as if they were sitting in the classroom. Wilrigs is hoping to take another class this summer during a job rotation in Washington, D.C. “Flexibility is the key,” he says. “The e-learning component is definitely a benefit for me.”

Enriching the Experience

Dr. Sridhar Santhanam, Professor of Mechanical Engineering, teaches advanced engineering math at the Navy Yard during spring semester. “The new program allows Villanova to reach beyond our geographical vicinity and serve more students with different needs and backgrounds,” he notes. “The experience they bring always makes a big difference—especially in a graduate class. It really enriches the classroom experience.”

Similarly, Dr. Hashem Ashrafiuon, Professor of Mechanical Engineering, feels

the biggest innovation the new facility offers is that each student sees class notes close-up on the monitors provided. “This makes it easy for them to follow the notes and simultaneously watch the instructor,” he adds.

O’Donnell agrees. “Students are no longer looking at the back of the professor’s head as he writes on the blackboard,” he says. “It’s more friendly and collaborative. Anecdotally, it increases the caliber of learning. Plus, we are integrating it seamlessly online to make distance students feel they are right in that classroom.”

In total, the College now offers 32 distance education classes per semester. According to O’Donnell, that’s 96 hours of live lecture every week. Over the course of a semester, it adds up to 1,200 hours of live

lecture—all archived for viewing on demand.

Beyond the classroom, as part of its second initiative, Villanova leases the state-of-the-art Navy Yard facility to corporations for in-house training. “There are huge advantages for our corporate clients, including a centralized location dedicated to training with a high-tech classroom and exciting space,” adds O’Donnell.

Also on tap for the facility are continuing studies courses, graduate recruitment events and STEM (science, technology, engineering, and mathematics) outreach programs for the region’s K-12 students and educators.

“There’s so much we want to do with the space that it’s a matter of being patient and doing them one at a time, so they are done appropriately,” O’Donnell explains. “It’s a thrilling time for the College of Engineering.”



The 1,400-square-foot facility houses a 40-seat classroom and 10-seat collaboration area—both of which employ the latest in web broadcasting and video conferencing capabilities.

LEADing THE WAY

By Jill Monahan

The summer of 2010 painted a fairly accurate picture of how Britney Davis envisioned her college years. A rigorous academic program in engineering, excellent faculty, an engaging day of learning and teamwork, and a pervasive community spirit all added up to an excellent experience.

Back then, Davis was just a bright, high-achieving high school junior who spent three weeks on campus, not an undergraduate. But the bar had been set so high by the time she began looking at other colleges that Villanova became the school by which all others were measured. Today, she is a freshman engineering student.



Freshman Britney Davis fell in love with Villanova Engineering as a junior high school student participating in the summer LEAD Engineering program.

Davis came to the College of Engineering through LEAD (Leadership Education and Development) Engineering, which debuted at Villanova in 2010. A three-week program, LEAD helps top high school students of diversity reach their potential and develop leadership skills. This July, the arrival of 30 students will mark the third year of the College's participation in LEAD's Summer Engineering Institute.

A national nonprofit organization, LEAD collaborates with universities to offer students enrichment in business, engineering, computer science, and global studies. LEAD Engineering exposes high school rising juniors and seniors to STEM (science, technology, engineering, and math) careers.

Three years ago, LEAD approached Villanova to host a summer program. Georgia Tech and the University of California Berkeley were already a part of the cohort, and the College seemed like a perfect addition.

"We were thrilled at the prospect of participating in LEAD Engineering, and I think we bring that Villanova focus on service," says Dr. Frank Hampton, Assistant Professor of Civil and Environmental Engineering and LEAD Director. "We pair learning with helping others so students see engineering in a way that showcases all the good it can do in the world."

Engineering in Action

Upon arrival, the engineering immersion experience begins. Mornings are comprised of lectures, with the first week dedicated to the basics of chemical, civil, computer, electrical, and mechanical engineering. Group projects are also assigned. Afternoons include teamwork sessions, lab experiments, guest lectures, and workshops, followed by evening "fireside chats" with faculty, students, and alumni.

Field trips also bring engineering careers to life, through visits to places such as The Boeing Company, Fairmount WaterWorks, Google's New York office, and PECO headquarters.



Nnaoma Oji of Brighton, Minn., participated with now-freshman engineering student Britney Davis during the College's first year hosting LEAD Engineering.

Toward the end of the program, the students lead a lab experience of their own for middle school students.

The program culminates with student presentations of their group research and design projects.

“Our goal is to tie the projects to a timely engineering topic, so the focus for this year’s program will be a combination of sustainability and social entrepreneurship,” said Dr. Hampton. “We throw challenges at them like developing a brick that can withstand earthquakes more easily in developing countries or building a solar-powered lantern. The goal is to give them the fundamentals, expose them to the field, and see what they come up with. They never fail to surprise and delight us.”

Engineering out Loud

LEAD Engineering at Villanova challenges students to get comfortable with presenting an idea—not just thinking up one—thanks to that same group project. While the content of the project takes up a significant amount of time in the first two weeks, the third week is all about presentation. Everything from dress to talking points to PowerPoint presentation is rehearsed and critiqued.

“I mentioned surprise and delight, and that comes in when we see a new and exciting twist on a product they’ve developed,” continues Dr. Hampton.

“But it is also associated with the maturity and polish we see in the presentation of their ideas.”

Dr. Hampton, a Juilliard-trained professional opera singer who has sung throughout the U.S. and Europe, believes that being able to stand up and communicate an idea is an invaluable lesson. “The knowledge we share with them over the three weeks, paired with the public speaking training, is something they have never gotten in their lives. It opens up a whole new world for them.”

A Lasting Impression

It takes a village to make LEAD Engineering a success, including dozens of student resident advisors (RAs), faculty members, and staff members from the College of Engineering. With RAs serving as everything from mentors, fellow engineering fans, and recreation directors, they keep the students busy outside the classroom.

While the Villanova team forms strong bonds with the students, the bonds the students form with each other are even stronger.

“We go around the room on the last night and talk about what the students did and didn’t like,” says Dr. Stephen Jones, Associate Dean for Student and Strategic Programs, who co-directs LEAD with Dr. Hampton. “And while what they didn’t like is often something small, what they did like

DID YOU KNOW?

The College’s LEAD Engineering program consistently ranks highest in student satisfaction among all LEAD Engineering host schools!

is invariably what they learned about college life and the people they met on the journey.”

Sometimes the experience inspires a new path. “We had one student who was undecided about engineering when he arrived,” says Dr. Jones. “His long-term goal was to launch his own line of sneakers, so I was really surprised to learn that the experience had been an epiphany for him. He didn’t know what mechanical engineering was when he arrived, but the program ignited a keen interest in the field.”

Facebook pages for each year of the program, ongoing friendships, and close relationships with the RAs keep the camaraderie alive long after the program has ended.

In fact, Davis made three friends through LEAD and now lives across the hall from one—a testament to the importance of the program, which brings intelligent, motivated students to Villanova.

Her experience made such a lasting impression on Davis that she couldn’t forget it.

“When visiting other schools, I always compared them to Villanova. In the end, I could actually see myself here because of my summer experience. The engineering program is excellent; I really liked the people, and the campus was beautiful,” says Davis. “Also, it really appealed to me that Villanova was small enough to have a real sense of community. I didn’t want to be lost in the crowd at college.”

Never Say Goodbye

Encouraging these smart, ambitious students to apply to Villanova means they do not always have to say goodbye. “We have eight students from the 2011 program who have applied to Villanova, and two had been accepted early action,” says Dr. Jones.

At the end of the day, it’s a win-win situation. Just ask Davis—and her professors.

SERVICE LEARNING: SUPPLY AND DEMAND

By Anthony Archibold

Service learning has become so popular within the College of Engineering that demand for participation can sometimes outpace immediate supply. For some students, one-to-two weeks of international experience serves as a teaser. Rather than merely getting their feet wet, they hope to be fully immersed.

“Nothing surprises me more than the level of commitment of our students,” says Jordan Ermilio, Director of the Engineering Service Program. “I often have students that stay involved after they graduate and who want to work on these projects while studying in graduate school or as volunteers. It is one

thing to volunteer for a week working on a water project. It is completely different to spend an entire summer living and working in solidarity with our host partners.”

In response, the College is exploring innovative ways to provide more of these unique learning opportunities. In 2011 the College piloted an international summer service internship, an eight-week program that sent undergraduate students to Panama and the Philippines. Students who were selected for participation were oriented on campus by engineering faculty and spent the summer working on projects identified by international partners.

The internship offers a deeper opportunity to make a difference in the lives of people living in developing communities. During this time, students live with a local

host family and go to work directly for a local organization to help them meet their development objectives. “For the first time, they are completely immersed in a problem by themselves. As engineers, they are called upon as experts and they begin to realize the responsibility and the impact that engineers have on society,” says Professor Ermilio.

A Plan not Wasted

Kyle Johnson CE '13 traveled to Kiangang, Ifugao, in the Philippines to help the local government create a solid waste management plan to prevent potential health and environmental issues.

“Enlightening’ is the word I use to describe my time in the Philippines. Your work feels more important when you get to know the stakeholders personally. No feeling compares to knowing you are making a significant impact in the community,” says Johnson.

Before he arrived, Kiangang had no enforceable plan for solving waste management issues and no sanitary landfill. Instead, the townspeople disposed of waste in a dumpsite where toxins were free to infiltrate and contaminate the water supply. “Once we found a site suitable to develop a sanitary landfill, planning for a sustainable program began,” he says.

Kyle Johnson CE '13 helped the residents of Kiangang, Ifugao, develop a solid waste management plan.





Colleen O'Neil CE '12 contributed to the development of a sustainable eco-tourism plan for Taytay, Palawan.

Johnson facilitated meetings for Kiangnan's Solid Waste Management Board, charged with updating the community on moves toward proper sanitation. He assisted in developing timetables for solid waste collection and helped balance and forecast the program's budget. A design for the future sanitary landfill was then divided into sections for medical and residential waste, accounting for the different decomposition needs of each material. Finally, Johnson helped create a 10-year plan to enforce the new solid waste management program. "The major steps in this plan contribute to the larger picture—achieving a healthy environment," says Johnson.

"I will never forget my time in Ifugao—what I learned is something you cannot learn in the classroom. The implications of a project like this helped me develop a different perspective toward academics. Now, whenever I learn something in the classroom, my first thought is always 'how would this apply in Ifugao or a similar setting?'" he says. "In my time there, Ifugao became a second home to me. The relationships I developed there and the progress we made have me anxious to return as a soon as I can."

A Sustainable Lake

"Like many other students, I wondered how the information we learn in class is truly applicable. After embarking on my voyage to the Philippines, I realized first-hand how the lessons we learn benefit society," says Colleen O'Neil CE '12.

As part of a collaborative team charged with developing a sustainable eco-tourism plan for the small town of Taytay, Palawan, O'Neil helped develop a means by which the area could generate capital. "When I first arrived, I felt overwhelmed. I was flying to a remote island where I did not know anyone or the language," says O'Neil. Things quickly changed when she met the local people, who diminished her anxiety and re-ignited her passion for service. Along with representatives from the local municipal office, O'Neil went to work.

Although the capital city of Manila attracts many tourists, Taytay also has much

to offer visitors. For example, Taytay's Lake Danao is a stunning body of water and home to more than 150 species of birds. "No one is benefitting from this lake, so why not make this spot a tourist destination and have the Taytay villagers who live nearby create goods that can be sold to visitors?" O'Neil asked herself.

To promote the lake, her plan leveraged the town's infrastructure to improve transportation to the site. She also considered the area's attributes, such as population distribution and appearance, throughout the year. She then created a website that captured the beauty of the lake and provided tourist-friendly information about Taytay and Lake Danao. Before she returned to the U.S., O'Neil completed a comprehensive report that detailed findings, research, and future plans to expand their sustainable tourism development plan.

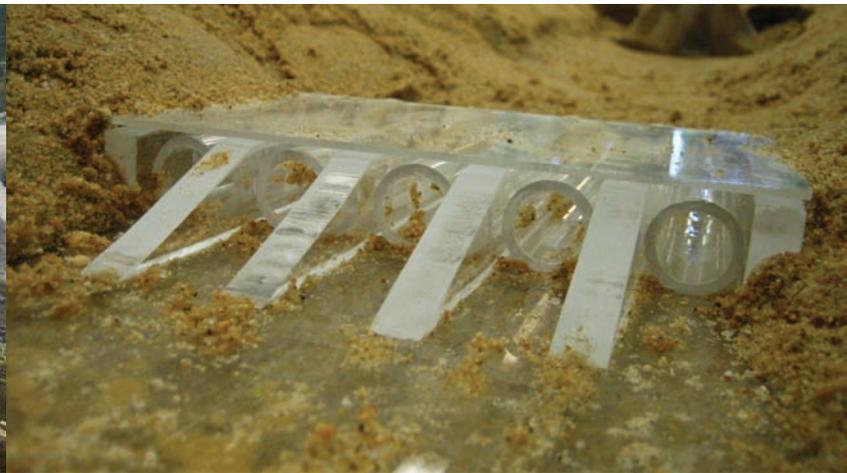
"My experience in Taytay has put engineering in perspective for me. Although I am interested in civil engineering, I know an aspect of my career will have something to do with service," says O'Neil.

Carlin Joseph CE '12 supported the development of an integrated water system for an organic farm on the island of Mindoro in the Philippines.



Service Learning

continued



William Angiolillo CE '12 re-designed local “vados,” or culvert bridges, in Cañazas, Panama, using a special replica.

A Local Garden of Eden

Carlin Joseph CE '12 traveled to the island of Mindoro in the Philippines, where she helped create an integrated water system for an organic farm. “With all of the resources and education we receive, why not help someone else, and in the process, learn about each other’s cultures?” says Joseph.

She admits to being a little nervous upon arriving. The idea of living in an unknown country was frightening. But after a ride in the side-car of a motorcycle and a long boat ride to Mindoro, Joseph’s feelings of apprehension subsided when she discovered the key to assimilation was getting involved. During her stay, Joseph lived in a children’s home, where she befriended several boys and girls. “I shared my talents, and they shared their lifestyle,” says Joseph.

Situated on a mountain, the town of Baclaylan lacks many resources that towns on level ground take for granted, such as abundant food and water. Working with the Stairway Foundation, Inc., Joseph helped the organization develop a sustainable organic farm by utilizing a nearby spring. Part of the plan incorporated ways to teach villagers organic farming techniques.

“Since gravity plays a pivotal role in utilizing the spring, we began by measuring the flow of water. Then we determined the flow during the rainy and dry seasons. We used this information to decide whether we needed water storage and how much,” she says. Next was the “tasty” part: understanding the different types of crops

that the Baclaylan people could grow. Joseph sampled local jackfruit, coconuts, citrus, and mangos—her favorite.

“Before leaving, I created a proposal which includes an implementation plan and various designs and suggestions on how to go about constructing an irrigation system for sustainable organic farming,” she says. “I now look at a career in engineering in a completely different light. Civil engineers are doing amazing work, and I want to be a part of that,” says Joseph.

There in Spirit

William Angiolillo CE '12 impacted projects in Panama from Villanova’s campus. “I may not have interned in Panama, but my heart and work were there,” he says. Besides, having worked there on three prior service trips, he was no stranger to the challenges he would face. “When I was informed I would be working on a project for Panama, I thought to myself ‘fantastic—I am familiar with the country, the people, and even the site I will be designing for,’” says Angiolillo.

His project called for the re-design of local “vados,” or culvert bridges, intended to mitigate the overflow of water from rivers onto streets and stream-crossings. Instead, water should flow through the culverts. The culvert bridge also features large, protruding triangular structures called the “Fingers of God” to counteract potential damage of obstructive objects and debris. However, wet season storms prompt small streams to flood

and occasionally cause bridges and stream-crossings to become impassible.

Working with fellow Villanova Engineer Ian Dardani ME '13, who was working on-site in Panama, Angiolillo received pictures of the culvert and began to re-design the structure to prevent failure. “It was often challenging in the sense that I could not visit the site and examine the structure; I had to visualize,” he says.

Using a model replica of the culvert bridge, Angiolillo used a sedimentation flume to emulate how it would naturally respond to erosion. He tested how different sized culverts affected water flow and sediment accumulation. In the end, he provided a detailed report outlining his recommendations and suggestions on the optimal hydraulic design to benefit the community.

“Humanitarian engineering is the career path for me. I believe everyone is called to do good work, and I feel that my work had purpose,” says Angiolillo.

Gaining Global Perspective

As this program develops, students will strengthen their engineering skills and embrace a new desire for life-long learning. “Students will gain a global perspective, learn how to communicate with different audiences, and gain a holistic understanding of engineering,” says Professor Ermilio.

A HEARTFELT LEGACY

SUPPORTING VILLANOVA'S PROMISE THROUGH PLANNED GIVING

By Carly Keeny

In the late 1950s and 1960s, students pursued their studies against a national backdrop of change. Rock-n-roll became the soundtrack of a new generation. Technology sent humans into space. Marginalized groups fought for equal rights. Political leaders inspired new versions of the American dream. The counterculture pushed for peace. Television made everyone a witness to history.

On campus, Villanova experienced its own growth and change. Just a few years after officially becoming a university in 1953, campus construction boomed with the openings of Dougherty, Sullivan, Sheehan, Garey, Falvey, and Good Counsel Halls. Students qualified for new degree programs in nursing and law. Enrollment soared above 7,000. On the heels of its 50th anniversary, the College of Engineering expanded its degree offerings to the master's level in each department.

At the same time, seven very different engineering students embarked on their own journeys of growth and change. For each, the experience they had as Villanova Engineers has remained indelible, making lasting impacts on their professional and personal lives. As members of the 1842 Heritage Society, each honors his/her experience with a planned gift to the College or University.

Gift and estate planning with Villanova provides a special peace of mind in settling one's affairs with the knowledge that the gift will make an important, lasting, and



Margaret and Robert Merkert, Sr. EE '59 on their wedding day at Villanova, and again at Villanova on their 50th anniversary

tangible impact on the experience of future students.

Bequests

As one of the earliest residents of Sullivan Hall, **Robert Merkert, Sr. EE '59**, President of RM Industries, Inc., fondly recalls the connections he made. "I loved the classmates I had; we were all very close. Many of us lived on the third floor of Sullivan, which mostly housed engineers. I also had many 'day-hop' friends. Two of my closest friends at Villanova, Dave Roop EE '59 and Bill Valitski EE '59, were also groomsmen in my wedding," he says. "Many of us return to campus every five years at reunion time."

As a student, Merkert immersed himself in engineering-specific activities, serving as editor of *The Villanova Engineer* and president of what is now known as the Villanova chapter of the Institute of Electrical and Electronics Engineers, among

others. "I attended Villanova early on in the days of computers and transistors. At the time, we were more focused on power engineering," says Merkert.

"Professor Joseph Hicks helped us get into transistors and computer electronics, drawing on his experience in industry. He also shared business insight that was important for us after college." Merkert's gratitude for Professor Hicks' influence lives on in the Professor Joseph J. Hicks University Scholarship that he and wife Margaret endowed in 1996.

The Merkerts also have included the College in their will. "We can't take it with us. In thinking of what the school has done for us, we want to help future generations," he says. "We hope the funds directed from our will can be used to either increase the amount of funding for the recipient of our scholarship or allow the College to identify additional students who may benefit...those who have good grades but who may not be



able to attend Villanova without additional financial assistance.”

“We should all consider giving back to Villanova because we have received so much. Without the strong education, Catholic upbringing, and ethics and morals training, we may not have done as well as we did,” he says.

Nance Katherine Dicciani ChE '69 echoes these sentiments. In addition to serving as a member of the University’s Board of Trustees, she serves as a Director



Nance Dicciani ChE '69

of Halliburton, Praxair, and Rockwood Specialties, and is an Operating Partner of Advent International. “Villanova gave me the academic foundation and personal confidence to follow my dreams and succeed in many new and challenging professional situations,” she says.

Dicciani built that confidence as a chemical engineering student under the tutelage of Dr. Robert White (or “Doc White” as he is affectionately known to his former students), then-Chair of the Department of Chemical Engineering. “Doc White was really tough on all his students, me included. For four years, he constantly challenged us to be better, and he turned us into capable, confident engineers, ready to take any career path we chose. He dared us to take on the difficult assignments and to excel,” she says.

Dicciani has also named the College as a beneficiary in her will. “My years at Villanova were instrumental in my subsequent career success. I want to help other young people have the same opportunities I had, so I have made a bequest in my will, which will enhance both the value of my estate and the value to Villanova. This type of gift does not require me to part with my assets during my lifetime, so they can be available for unforeseen needs,” she says. “Villanova mirrors my desire to ensure for future generations that this world has the leaders it needs to meet the challenges ahead.”

Henry Seager EE '66



The College had a similar formative impact on **Henry Seager EE '66**, who graduated at the top of his engineering class. “There is no way I could have done what I have without Villanova,” he says.

He credits his education with providing many options for employment. He ultimately committed to PPL Resources in Allentown, Pa., where he spent his entire 34-year career in engineering and supervisory positions with a focus on process control real-time computer systems. Along the way, he earned his P.E., a master’s in Electrical Engineering, and an MBA.

Upon retiring at the age of 56, Seager had achieved financial independence, and with no children or immediate family members who would require his support, he considered how to distribute his resources in the future. “I knew I wanted to help the next generation through education, and Villanova is the best place to do it. It’s how I got my start.”

Rather than making an outright gift, Seager decided to leave his entire estate to the College of Engineering upon his passing. “My estate will endow the Henry P. Seager '66 Endowed Scholarship for Electrical Engineering. If it helps just one person make a significant difference in the world, then it will be a success,” he says.

Seager may also begin funding his endowment in his lifetime.

Charitable Gift Annuity

From the minute he set foot on campus, Villanova has been making a big impression on—and for—**Nicholas Calio ME '65**, Chairman of Rebling Plastics. “I was so excited the first day of my freshman year. I just couldn’t believe I was attending Villanova University,” he says. “The prestige and reputation of the University has also provided the opening to several business opportunities over the years.”

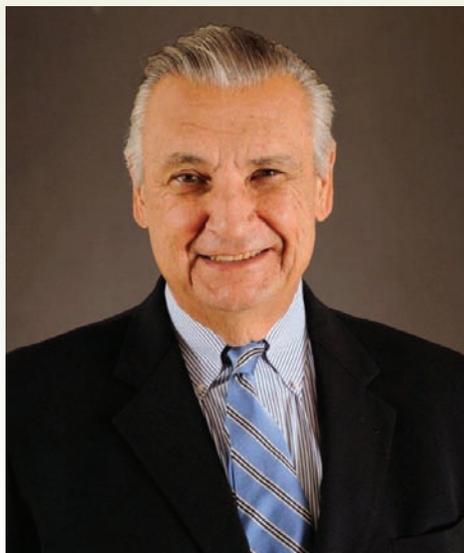
Calio cites the faculty as important contributors to his success. “The professors



Nicholas Calio ME '65

were caring and wanted you to succeed; they were always available to provide additional help,” he says. “Throughout my career, I have relied on the engineering training and discipline I received in solving day-to-day issues.”

Calio and his wife Roselynn have set up a charitable gift annuity to benefit the College. “It provides several benefits, including a tax



deductible charitable contribution; reduction of capital gains taxes (as we used appreciated stock to fund the gift); an income stream for life, part of which is tax-free; and estate tax benefits,” he explains. “Our hope is that this gift will continue the legacy of Villanova and assist the College of Engineering as it strives to achieve its mission.”

Life Insurance

For **John Janitz ME '65**, Chairman and Co-Founding Partner of Evergreen Capital Partners, college highlights include not only fond student memories—but also marriage to wife Alfreda after sophomore year. “My education at the College of Engineering taught me both the basics within the engineering curriculum and provided a process to understand and decipher business and markets. That capability has served me well in my professional life.”

“I was significantly influenced by the faculty, not only for their engineering expertise, but also for their insight into industry and business. Several professors afforded me the opportunity to work (for pay) on development projects for industry. It was a great learning experience and gave me an introductory look at how engineering and business really fit together,” he says.

Janitz received the J. Stanley Morehouse Memorial Award from the Engineering Alumni Society in 1996.

“It is always nice to give back, so when I became President, COO, and Board Member of Textron Inc. in 1999, Alfreda and I decided to designate the College as the beneficiary of my Board life insurance policy. It was a way to recognize what the University did for me at an early age.”

Janitz hopes the gift will support someone who cannot afford the cost of a Villanova education. “There is satisfaction that comes from giving back and working with an organization that will do the right thing with the funds.”

John Janitz ME '65

Charitable Remainder Annuity Trust

Phil DiVita EE '63, design engineer and inventor, continues as Director and Officer of DA-TECH Corporation, the company he co-founded 36 years ago. As an undergraduate, he commuted to class between responsibilities at two jobs. He also met Lucille, his wife of nearly 50 years, as a freshman. A determined person, these experiences matured him and drove his motivation to succeed.



Phil DiVita EE '63

In 1967, while working at a local division of Magnavox, DiVita met **Lawrence Resinski EE '58**. Several surprising common bonds sparked a lasting friendship: both were baptized at the same church in south Philadelphia, learned from the Sisters of St. Joseph, attended catholic boys' high schools in Philadelphia, and commuted as



Villanova undergraduates. In 1975 they opened DA-TECH, a manufacturing and engineering company in Ivyland, Pa., which employs more than 200 people.

A few years later, the Rev. John Farrell, OSA, who handled University development at the time, asked DiVita and Resinski to help engage local Philadelphia-area alumni. Their work inspired them to establish University scholarship funds together, and eventually a charitable remainder annuity trust to benefit Villanova.

Armand Cote CE '61 (standing, second from left)



“We wanted to give back. We both felt that if you become a success, you should contribute to those who want to learn or those who may not be as fortunate as you. It makes you feel good, and the University is respectful with alumni and of their gifts,” he says.

Living Trust

“Opportunities were made available and doors were opened to me as a result of my four years at Villanova and my degree in engineering,” says **Armand Cote CE '61**.

The military draft was on in his senior year, and an invitation for civil engineering students to visit with the Navy Civil Engineering Corps set the foundation for Cote’s career. He joined the Corps after graduation and was commissioned out of Officer Candidates School in Rhode Island in 1962. Leveraging skills in construction and group management, Cote served in Cuba during the Missile Crisis, the Dominican Republic, and two tours in the Vietnam War.

Cote ultimately settled in Hawaii in 1967 as a project manager for a construction company. He founded AAC & Associates in 1990, which has left its mark on dozens of commercial projects on Oahu, as well as the Hawaii Convention Center. “It all started with Catholic education and discipline at home,” he says.

The fruits of his career will benefit a future student. “I have accrued some wealth, so I wanted to provide somebody else the opportunity of an education,” he says. Cote has established a living trust, which will benefit both the College and Assets School, a Hawaii school for dyslexic and gifted children. The funds will establish a scholarship for civil engineering students.

1842 Heritage Society

The 1842 Heritage Society is comprised of alumni, parents, and friends who support the University through estate gifts, life-income gifts, or the transfer of assets. Donors of all income levels have expressed their wishes for the future of Villanova through their participation in the 1842 Heritage Society. We invite you to become a part of this tradition. Membership is voluntary and without obligation.

As a member of the 1842 Heritage Society you will receive special benefits, including recognition in Villanova University publications, invitations to special events, personal communications from the Rev. Peter M. Donohue, OSA, PhD, and a distinctive membership pin to identify your generosity to others.

For more information, visit www.Villanova.edu/plannedgiving

To learn more about the benefits of planned giving and which options may be right for you, contact Scott Janney, Executive Director of Planned Giving, at **800-486-5244** or plannedgiving@villanova.edu, or Cynthia Rutenbar, Director of Development for the College of Engineering, at **610-519-6973** or Cynthia.Rutenbar@villanova.edu.

PLANNED GIVING 101

INTERESTED IN JOINING THE 1842 HERITAGE SOCIETY?

Gift and estate planning with Villanova University can provide peace of mind and the satisfaction of knowing that you are supporting your alma mater. A planned gift may also help you increase income, reduce taxes, avoid capital gains tax, or pass assets to family at a reduced tax cost.

1842 HERITAGE SOCIETY
VILLANOVA UNIVERSITY

SOME OF THE MOST POPULAR GIVING OPTIONS INCLUDE:

Bequests

A bequest through a will or living trust is a gift anyone can make while retaining control of his/her assets.

You can name the University as a direct beneficiary of specific assets, a portion of your estate, or your residual estate.

Bequests are fully deductible for federal estate tax purposes.

Life Insurance

If you no longer need a life insurance policy you own, you can name the University as owner and beneficiary and claim an income tax deduction. You can also name the University as the beneficiary of a term policy.

Charitable Gift Annuity

If you irrevocably transfer cash or securities to the University, you or up to two annuitants receive fixed payments for life. You receive an immediate income

tax deduction for a portion of the gift, and you can choose to defer your annuity payment. The remaining principal is put to use by the University after the lifetime of your income beneficiaries. Your payments are backed by the full assets of the University.

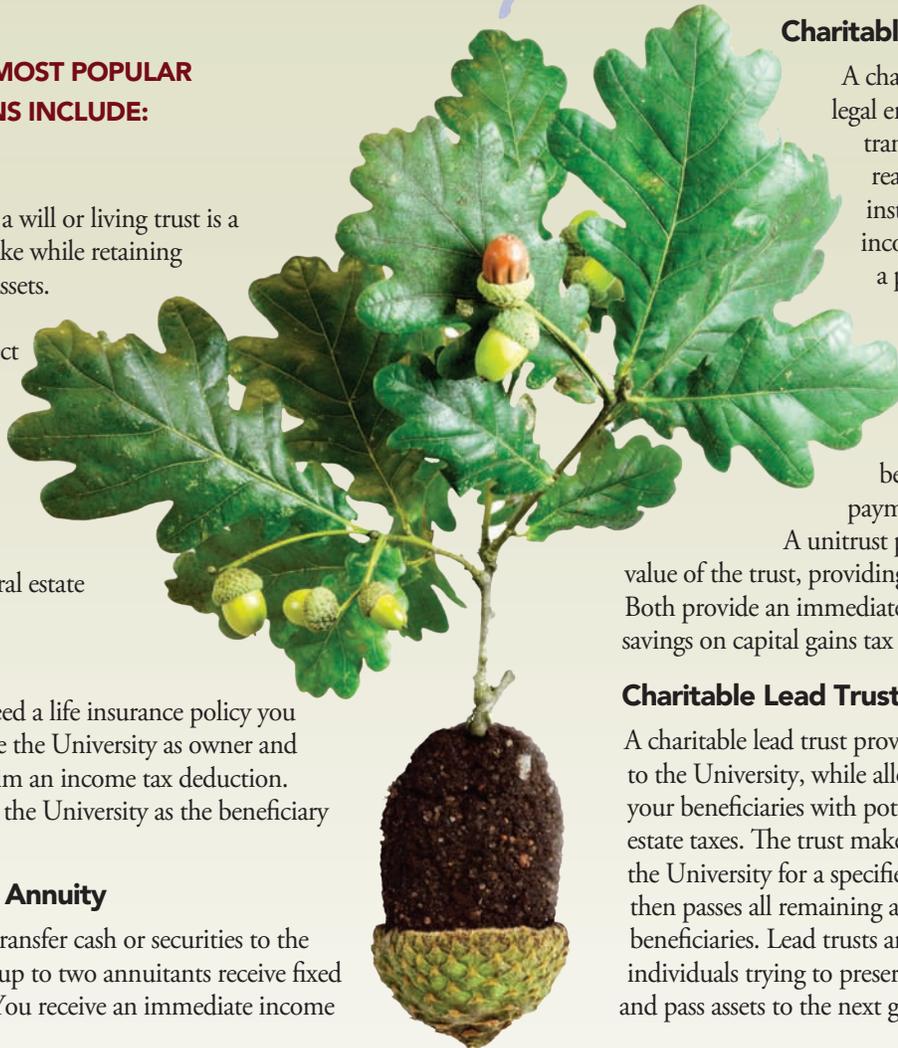
Charitable Remainder Trust

A charitable remainder trust is a legal entity funded by irrevocably transferring cash, securities, or real estate to a trustee with instructions to pay one or more income beneficiaries for life or a period of years. At the end of the trust, the remainder is transferred to the University. An annuity trust pays a fixed dollar amount to the income beneficiaries, ensuring the payment amount never changes.

A unitrust pays a fixed percentage of the value of the trust, providing a hedge against inflation. Both provide an immediate income tax deduction and savings on capital gains tax for gifts of appreciated assets.

Charitable Lead Trust

A charitable lead trust provides immediate support to the University, while allowing you to pass assets to your beneficiaries with potentially lowered gift and estate taxes. The trust makes an annual payment to the University for a specified number of years and then passes all remaining assets to your designated beneficiaries. Lead trusts are good options for individuals trying to preserve the value of their estate and pass assets to the next generation.



For a full list of options, visit www.Villanova.edu/plannedgiving. To find out which option makes the most sense for you, contact Scott Janney, Executive Director of Planned Giving, at 800-486-5244 or plannedgiving@villanova.edu, or Cynthia Rutenbar, Director of Development for the College of Engineering, at 610-519-6973 or Cynthia.Rutenbar@villanova.edu.



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