VILLANOVA UNIVERSITY
College of Engineering

VILLANOVA ENGINEERS
IGNITING CHANGE
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COLLEGE OF ENGINEERING
UNDERGRADUATE PROFILE

FAST FACTS

1,054
UNDERGRADUATES

84%
GRADUATE WITHIN 5 YEARS
(VERSUS NATIONAL AVERAGE OF 47%)

91%
FRESHMAN-TO-SOPHOMORE RETENTION RATE
(VERSUS NATIONAL AVERAGE OF 76%)

29%
FEMALE (VERSUS NATIONAL AVERAGE OF 21%)
WHAT CHANGE WILL YOU IGNITE?
Dear Prospective Villanova Engineer,

With an engineering degree you’ll learn how the world works—and how to make it work better. Many schools graduate engineers who solve problems. We graduate engineers who ignite change.

**IN THE CLASSROOM**

From day one, you’ll learn to think like an engineer in small classes taught by faculty members. You’ll benefit from the expertise of those who bring engineering to life through hands-on instruction that bridges theory and practice. Entrepreneurially minded learning experiences both inside and outside the classroom will help you realize your creative and innovative potential.

**IN THE LABORATORY**

Work alongside faculty on their latest research. Connect with industry professionals on real-world challenges in the Multidisciplinary Design Lab. Collaborate on a senior project, which may benefit a community down the street or around the world. In the process, you’ll develop leadership and team building skills, and learn best practices for laboratory research and technical communication.

**IN THE COMMUNITY**

With service learning built into the curriculum, there are countless opportunities for Villanova engineers to take what they learn in the classroom and apply it to some of the world’s most complex challenges. Our rigorous curriculum is rooted in the liberal arts and our Augustinian values. You don’t just learn what to do as an engineer, but how to do it in a way that benefits humanity and builds a sustainable society.

Let us help you—in the words of St. Augustine—“become what you are not yet.”

Gary A. Gabriele, PhD
Drosdick Endowed Dean of Engineering
THE FRESHMAN EXPERIENCE

A SOLID FOUNDATION

Your Villanova Engineering experience begins in the fall semester of your first year with courses in math, science and Augustinian culture, as well as core courses in engineering fundamentals. Our active-learning, problem-based approach prepares you for a team-based, faculty-mentored multidisciplinary engineering project later in the semester. In the spring you choose a different project, exposing you to other engineering disciplines. Each student team presents its project findings, which strengthens communication skills and teaches best practices for presenting scientific information. The semester concludes with a seven-week educational immersion in your major.

RECENT MULTIDISCIPLINARY FRESHMEN PROJECTS:

- Robotics
- Artificial Kidney
- Electric Car
- Engineering for Developing Societies
- Smart Structures
- Biofuel-Process and Sustainability
As a freshmen you are assigned an academic advisor who is a full-time faculty member in your major. Your advisor will help ensure proper course selection and your advancement in the program.

PROFILE OF THE FRESHMAN CLASS (CLASS OF 2021):

- **265** students
- **31%** female
- Represents **26** states and **5** countries
- **1470 - 1330** combined range SAT score (math/verbal)
- **96%** in the top 25% of their high school class
- **17%** ethnic/racial minority

“The freshman project gives you a chance to see a real application of what you’ll be doing as an engineer, and provides a great introduction to the field as a whole. It also helps you adjust to working in teams, which is something you’ll do throughout your career.”

DANIEL FETSKO
CIVIL ENGINEERING

“Villanova is going to provide you with so much more than a piece of paper with a degree on it. Your classmates will quickly turn from strangers to lifelong best friends. This is all thanks to the freshman engineering program.”

KENNA BRYAN
COMPUTER ENGINEERING
CHEMICAL ENGINEERING

CAUSING A REACTION

Using the principles of mathematics, chemistry, physics and engineering sciences, Villanova chemical engineering students learn to produce, transform and properly use chemicals and energy to produce almost anything. You will be taught to creatively solve technical, commercial and social problems arising in industries which manufacture bulk chemicals, fuels, pharmaceuticals, cell therapies, plastics, cosmetics, foods and much more.

THE FUNDAMENTALS

- Fluid Mechanics
- Heat Transfer
- Thermodynamics
- Reactor Design
- Chemical Process Control
- Process Design

TECHNICAL ELECTIVES

- Bioengineering
- Advanced Materials
- Energy and Sustainability
- Advanced Chemical Engineering

RELATED MINORS

- Biochemical Engineering
- Biomedical Engineering

- FAST FACTS -

11
FULL-TIME FACULTY

255
CHEMICAL ENGINEERING UNDERGRADUATES

44%
FEMALE
UNDERGRADUATE RESEARCH OPPORTUNITIES

About one-third of chemical engineering seniors pursue a two-semester research course that allows them to work directly with professors on cutting-edge projects, while others participate in summer research opportunities. Undergraduates have co-authored papers and presented at conferences with faculty in a variety of areas.

RECENT UNDERGRADUATE RESEARCH PROJECTS INCLUDE:

• Biochemical analysis of wild type and genetically modified pennycress
• Mathematical models for metabolism and transport of cholesterol
• Synthetic production of plasmids for gene therapy
• Optimization of wetland microbial fuel cells using novel electrodes

ORGANIZATIONS AND TEAMS

• American Institute of Chemical Engineers Student Chapter
• Chem-E Car
• Omega Chi Epsilon Honor Society

OUTCOMES

Demand is increasing for chemical engineers in emerging areas such as nanotechnologies, alternative energy and biotechnology. The Bureau of Labor Statistics reports that the retirement of many current chemical engineers by 2024 will create favorable job prospects.

In 2016, 22 percent of Villanova Chemical Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $59,027.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:

• Air Products & Chemicals
• Dow Chemical
• GlaxoSmithKline
• Hargrove Life Sciences
• Merck
• Praxair
• Procter & Gamble
• U.S. Navy

“My ChE professors taught me to think through problems critically to find unique solutions. I felt as if I was genuinely pushed harder and harder by each professor, all of whom wanted me to live up to my potential and succeed.”

BRANDON WESLEY
CHEMICAL ENGINEERING
ONE OF 35 GATES CAMBRIDGE SCHOLARS FROM THE U.S. IN 2016. BRANDON IS NOW PURSUING A PHD IN SURGERY AT CAMBRIDGE UNIVERSITY.
Civil and environmental engineers design, construct and protect the physical and natural built environment. Because the scale of these projects often affects large segments of the population, the responsibilities of civil engineers extend beyond mere physical facilities. Villanova faculty prepare students to play vital roles in enhancing quality of life while protecting the environment and improving sustainability.

THE FUNDAMENTALS
• Environmental Engineering
• Geotechnical Engineering
• Structural Engineering
• Transportation Engineering
• Water Resources Engineering

RELATED MINOR
• Sustainability Studies

- FAST FACTS -

17
FULL-TIME
FACULTY

222
CIVIL AND ENVIRONMENTAL
ENGINEERING UNDERGRADUATES

36%
FEMALE
UNDERGRADUATE RESEARCH OPPORTUNITIES

In addition to a senior capstone design project, students may take a course of undergraduate research where they work directly with a faculty advisor and a graduate student mentor, and receive academic credit.

RECENT UNDERGRADUATE PROJECTS INCLUDE:

• Integration of flood risk factors into roadway systemic safety assessments
• Green stormwater infrastructure for Panama City, Panama
• Intelligent transportation system enhancements
• A campus renovation plan for Villanova’s rail station
• Design of a single span steel superstructure highway bridge
• Water supplementing solutions for the dry season in India

ORGANIZATIONS AND TEAMS

• American Society of Civil Engineers Student Chapter
• Chi Epsilon Honor Society
• Collegiate Traffic Bowl
• Concrete Canoe
• GeoWall
• Institute of Transportation Engineers Student Chapter
• NovaCANE (Villanova Community Action by New Engineers)
• Steel Bridge

OUTCOMES

Civil engineers and environmental engineers rank among the “100 Best Jobs” and the top 25 “Best STEM Jobs,” according to U.S. News & World Report (2017). Civil engineers also account for the most jobs of any engineering field and the U.S. Bureau of Labor Statistics predicts continued growth.

In 2016, 21 percent of Villanova Civil Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $59,914.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:

• AECOM
• City of Philadelphia
• Dewberry
• Skanska USA
• Thornton-Tomasetti
• Turner Construction
• Urban Engineers
• Whiting-Turner

“I am most grateful for the Civil Engineering department faculty. It is encouraging to be in an environment where our professors truly want to see us succeed. They take pride in their students!”

LENN A V O N ALT
CIVIL ENGINEERING


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LENN A V O N ALT
CIVIL ENGINEERING
Computer engineers blend theories from computer science and applications from electrical engineering to develop new hardware and software for computer systems. These engineers optimize and advance the core technologies behind the Internet, wireless communications and mobile computing.

**FUNDAMENTALS**
- C Programming Language
- Computer Algorithms
- Computer Architectures
- Computer Interfacing
- Digital System Design
- Microprocessor Systems

**SPECIALIZATIONS**
- Computer Networks
- Cybersecurity
- Microcontrollers
- Multimedia
- Real-time Digital Signal Processing
- Software Engineering

**TECHNICAL ELECTIVES**
- Biomedical Signal Processing
- Android Mobile Apps Programming
- Advanced Digital Systems Design
- Select courses from the Department of Computer Science

**RELATED MINORS**
- Electrical Engineering
- Mechatronics

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**- FAST FACTS -**

**19**
FULL-TIME FACULTY

**157**
COMPUTER ENGINEERING UNDERGRADUATES

**17%**
FEMALE
UNDERGRADUATE RESEARCH OPPORTUNITIES

Every student completes a senior capstone design project, which covers three semesters and involves student teams working on a variety of real-world problems, many of which are sponsored by industry partners. You can also speak with your advisor about research opportunities with faculty.

RECENT UNDERGRADUATE PROJECTS INCLUDE:

• Next generation smartwatch
• Measurements of multicore microstructured optical fibers heated up to 100 C
• Information management system for El Bluff hospital in Nicaragua
• Wheelchair communication system
• Facial recognition of Philadelphia Zoo animals
• Active defense cybersecurity

ORGANIZATIONS AND TEAMS

• Eta Kappa Nu Honor Society
• National Cyber Analyst Challenge
• RobotX

OUTCOMES

The College Board lists computer engineers among the top 10 occupations with the most job openings (2018).

In 2016, 16 percent of Villanova Computer Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $70,223.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:

• Brooks Instrument
• ESPN
• Lockheed Martin
• MIT Lincoln Laboratory
• Harris Corporation
• RT Logic

“As a Fulbright scholar, I plan to conduct research on the integration of computer vision object identification with assistive robotics. My goal is to help advance this technology for people living with disabilities.”

ENMANUEL ALMONTE, COMPUTER ENGINEERING, 2016 FULBRIGHT SCHOLAR
ELECTRICAL ENGINEERING

HARNESSING THE POWER

Electrical engineers use mathematics, science and technology to design, construct and maintain a wide array of products, services and information systems. From the nanoscale to the macroscale, products and systems that utilize electromagnetic waves, electrons and photons in their operation belong to the field of electrical engineering.

FUNDAMENTALS
• Analog and Digital Electronics
• Communication Systems
• Control Systems
• AC and DC Circuits
• Electric Energy Systems
• Electromagnetics
• Electronic Materials and Devices
• Signal Processing

SPECIALIZATIONS
• Biomedical Engineering
• Electric Energy Systems
• Electronics
• Embedded Systems
• High Frequency Systems
• Signal Processing

RELATED MINORS
• Computer Engineering
• Mechatronics

- FAST FACTS -

19 FULL-TIME FACULTY
109 ELECTRICAL ENGINEERING UNDERGRADUATES
18% FEMALE
UNDERGRADUATE RESEARCH OPPORTUNITIES

Over three semesters, students complete a real-world senior capstone design project with a team of fellow EE/CpE majors. These projects are often sponsored by industry partners or reflect international service work.

RECENT UNDERGRADUATE PROJECTS INCLUDE:

• A cost-effective chromatography system
• Interfacing the smart home with the smart grid
• Channel simulator fading models
• Autonomous perceptive vision through haptic feedback
• Smart baseball

ORGANIZATIONS AND TEAMS

• Eta Kappa Nu Honor Society
• Formula SAE (Nova Racing)
• Institute of Electrical and Electronic Engineers Student Chapter
• RobotX

OUTCOMES

The National Association of Colleges and Employers lists Electrical Engineering majors among the top 10 most in demand by employers (2017).

In 2016, 15 percent of Villanova Electrical Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $64,886.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:

• Exelon
• Harris Corporation
• Jaros, Baum & Bolles
• Lockheed Martin
• Texas Instruments
• U.S. Navy
• Verizon

“Villanova Engineering is unique. The community is one of collaboration, where students challenge each other to be better engineers, rather than compete for grades.”

NICHOLAS FLORIO
ELECTRICAL ENGINEERING
**MECHANICAL ENGINEERING**

**EXPLORING INNOVATIVE SOLUTIONS**

The field of mechanical engineering nurtures designers and inventors who layer scientific principles on a strong mathematical foundation to develop creative solutions to the world’s challenges. As one of the broadest engineering disciplines, mechanical engineering students are exposed to many different career possibilities, including robotics, aerodynamics, biomedical and energy systems. The curriculum includes both engineering fundamentals and cutting-edge technology.

**CONCENTRATIONS**
- Mechanics and Materials
- Thermal Fluids Systems
- Dynamics and Controls

**TECHNICAL ELECTIVES**
- Biomechanics
- Flight Dynamics
- Mechatronics
- Nanomaterials
- Robotics
- Renewable Energy
- Mechatronics

**RELATED MINORS**
- Aerospace Engineering
- Biomedical Engineering
- Mechatronics

- **FAST FACTS** -

23 FULL-TIME FACULTY
311 MECHANICAL ENGINEERING UNDERGRADUATES
22% FEMALE
UNDERGRADUATE DESIGN AND RESEARCH OPPORTUNITIES

All seniors complete a two-semester capstone design experience. Many of these projects are industry-sponsored, while others are based on international service learning projects. Research opportunities are available for a selected number of students, both during the academic year, and over summers.

RECENT UNDERGRADUATE PROJECTS INCLUDE:

• Lap time simulator for motorsport applications
• Hybrid-electric system for AWD Christini Technologies’ fatbike
• 3-D underwater mapping with stereo sonar
• Unexploded ordnance remediation robot for Cambodia
• Water technology for Madagascar

ORGANIZATIONS AND TEAMS

• American Institute of Aeronautics and Astronautics Student Chapter
• American Society of Mechanical Engineers Student Chapter
• Formula SAE (Nova Racing)
• Pi Tau Sigma Honor Society
• RobotX

OUTCOMES

The National Association of Colleges and Employers lists Mechanical Engineering majors among the top five most in demand by employers (2017).

In 2016, 22 percent of Villanova Mechanical Engineers continued their education after graduation. Those who entered the job market earned an average starting salary of $64,417.

GRADUATES ARE WORKING FOR COMPANIES INCLUDING:

• The Boeing Company
• Harris Corporation
• Jaros, Baum & Bolles
• Lockheed Martin
• Naval Surface Warfare Center
• SencorpWhite
• Skanska USA
• SpaceX

“At Villanova, I learned engineering fundamentals and had the opportunity to conduct state-of-the-art research on globally important engineering problems with professors who are experts in their fields.”

JOSEPH SCHAADT
MECHANICAL ENGINEERING, 2016 FULBRIGHT SCHOLAR
ENGINEERING MINORS

BROADEN YOUR HORIZONS

Engineering students may choose to expand their studies in a number of engineering minor program areas. You can satisfy other curiosities by exploring dozens of options offered by Villanova’s College of Nursing, College of Liberal Arts and Sciences or the Villanova School of Business.

MINORS IN THE COLLEGE OF ENGINEERING

The following programs are available to all engineering students who satisfy the prerequisites:

AEROSPACE ENGINEERING
Provides a thorough background in aerospace topics to prepare students for careers or advanced study in the aerospace field.

BIOCHEMICAL ENGINEERING
Prepares graduates for the biopharmaceutical industry—designing and optimizing processes for the manufacture of antibiotics, vaccines, antibodies and cell therapy products.

BIOENGINEERING
The broadest of the bio-engineering minors provides students with a foundation in science/nursing, engineering and ethics.

BIOMEDICAL ENGINEERING
Combines engineering principles with medical and biological sciences such that students learn to design and create equipment, devices, computer systems and software used in healthcare and the human body.

COMPUTER ENGINEERING
Provides students with the fundamentals of computer engineering and offers electives in networks, security, programming, design and more.

ELECTRICAL ENGINEERING
Provides a foundation in MATLAB programming and electromagnetics and offers courses in Signal Processing, Electronic Materials and Devices, and Analog Electronics.

ENGINEERING ENTREPRENEURSHIP
Provides a thorough introduction to the “entrepreneurial mindset” for all students. The College’s most popular minor program begins with a course in Creativity and Innovation and covers a range of topics, including opportunity identification, technical and business feasibility, prototyping and business model development.

The Engineering Entrepreneurship minor can be completed over three years, or through the Engineering Entrepreneurship Summer Institute, a condensed, 7-week, 16-credit program.

MECHATRONICS
Offers an interdisciplinary look at the design, development and control of advanced hybrid systems—robotics, vehicles, automotive subsystems and more.

SUSTAINABILITY STUDIES
This interdisciplinary minor (offered with the College of Liberal Arts and Sciences) requires all students to take Seminar in Sustainability Studies, and to select two courses from the humanities, social sciences and technology. The Sustainability Studies program also offers two summer study abroad opportunities in Lille, France, and Costa Rica.

“My Engineering Entrepreneurship minor helped me to stand out and create a brand for myself while looking for post-grad employment. The ability to think not only analytically, but creatively and with a business sensibility are skills that not every chemical engineer possesses.”

PAIGE INNAMORATO
CHEMICAL ENGINEERING
As part of Villanova’s comprehensive undergraduate engineering program, students learn not only the scientific, mathematical and engineering principles expected of every engineer, but also the professional skills they need to succeed in any career. Career Compass is a professional development program that augments the College’s technical engineering curriculum. Spanning the freshman through junior years, Career Compass was designed in collaboration with industry leaders, alumni, faculty and current students and consists of four areas of focus:

• THE ENGINEERING PROFESSION
• SETTING THE STAGE FOR PERSONAL SUCCESS
• POST-GRADUATION PLANNING
• COMMUNICATING IN THE 21ST CENTURY

In addition to these areas of focus, in year two, Career Compass matches students with alumni and industry mentors. Summer internship, research and engineering service programs are also important experiential components.

Year four of the Career Compass Program is voluntary for all engineering students and is directly focused on project management by industry, not by major. This will help prepare students for the specific industries that they’re planning to enter after graduation.
Villanova’s College of Engineering believes the best way for students to learn engineering is to practice engineering. With that in mind, the College offers undergraduates the opportunity for hands-on engineering experiences, many of which are supported by partner companies.

**MULTIDISCIPLINARY DESIGN LAB (MDL)**

Teams of senior engineering students can be found in the MDL working with professional engineers to produce real-world design projects. Students help companies solve engineering challenges in a space custom-made for and dedicated to high-tech collaborative design—a core activity of engineering.

**RECENT MDL PARTNERS AND PROJECTS:**

- **Air Products**
  - Cryogenic tank insulation optimization
- **Base2 Engineering**
  - Internet of Things
- **Boeing**
  - Ad hoc communications with autonomous vehicles
- **Christini Technologies**
  - Primary electric hybrid AWD motorcycle
- **GlaxoSmithKline**
  - 3-D printing of single-use tubing exoskeletons for process flowpath routing
- **Harris Corporation**
  - 3-D underwater mapping with stereo sonar
- **PPL Corporation**
  - Equipment and line monitoring
- **RT Logic**
  - Satellite communication channel simulator

“Working on our own self-directed project taught us a lot about managing our time and resources. It definitely helped to have faculty mentors whom we could turn to, but at the end of the day we are incredibly proud to know how much we were able to accomplish in such a short time.”

**HSIP PARTICIPANT**

**STEPHANIE KRAKOWER**

**CIVIL ENGINEERING**
HARRIS SUMMER INNOVATION PROGRAM

HSIP is a competitive, self-directed engineering design program for multidisciplinary student teams. This partnership program of the College of Engineering and Harris Corporation allows students to engage in the open design process to pursue innovative solutions to unmet societal and technological needs. Students manage all aspects of their projects, from initial design concepts through delivery of prototypes and final presentations at Harris Corporation. During their two-month residency, students receive stipends, free on-campus room and board, project budgets and access to subject matter experts, labs and facilities.

RECENT HSIP PROJECTS:

- Solar and cycle chargers for head lights and cellular phones in Burundi, Africa
- Hemabyte: a low-cost, portable blood testing unit
- AtmoGEN: an atmospheric water generator
- Zoo animal recognition app
- Conjoined PVC pipes for Panama water system

“Villanova’s College of Engineering provides students with project-based experiences through the whole product lifecycle—from visioning to prototyping to testing and retesting, through producing a finished product and interacting with customers. Students also have to manage a budget and meet timelines. These experiences set Nova engineers apart.”

JOHN MONAHAN ‘86 EE
PRESIDENT, RT LOGIC

“Working with an industry-leading company like Christini Technologies (owned by Villanova Engineering alumnus Steve Christini ‘95 ME) was an incredibly rewarding experience that allowed our team to transition our work from the classroom to the real world. We utilized a diverse set of skills and perspectives to elevate our design and transform it into a working prototype.”

BEN CRAWFORD
MECHANICAL ENGINEERING
Villanova’s size, access to top-notch facilities and committed teacher-scholars mean that Villanova Engineering students enjoy research opportunities rarely available to undergraduates in other top-tier engineering programs.
STUDENT RESEARCHERS:
• Apply classroom and laboratory concepts to real world problems
• Become motivated to pursue graduate studies
• Network with and receive mentoring from faculty outside of class
• Make industry connections
• Develop leadership and team-building skills
• Understand best practices for research and scientific communication
• Improve critical thinking skills
• Get paid, get credit and get experience!

“There are tons of professors doing world-class research that want to use undergraduates in their labs. Through my department I got to stay on campus researching and earning money for a summer. I had an awesome experience to put on my resume, comparable to an internship, and I contributed to a paper that is in the process of being published.”

NICHOLAS FONZO
CHEMICAL ENGINEERING

CENTERS OF EXCELLENCE
In addition to research conducted within individual departments, undergraduates have opportunities to work in the College’s high profile research centers:

CENTER FOR ADVANCED COMMUNICATIONS
CAC advances the state-of-the-art in the analysis and development of wireless communications, satellite navigations, acoustic and ultrasound sensing, and radar imaging.

CENTER FOR NONLINEAR DYNAMICS AND CONTROL
CENDAC is distinguished by its strong interdisciplinary teams working on real-world applications of nonlinear dynamic systems and control theory.

CENTER FOR ENERGY-SMART ELECTRONIC SYSTEMS
This National Science Foundation Industry/University Cooperative Research Center develops methodologies, tools and systems to maximize energy efficiency for the operation of data centers.

VILLANOVA CENTER FOR THE ADVANCEMENT OF SUSTAINABILITY IN ENGINEERING
The VCASE mission is to protect and restore our environment through the integration of sustainability principles in engineering practice.

VILLANOVA CENTER FOR THE ANALYTICS OF DYNAMIC SYSTEMS
The College’s newest research center, VCADS develops new tools and techniques for uncovering the underlying dynamics of big data in medicine and engineering.
THE ENTREPRENEURIAL MINDSET

The College’s unique Engineering Entrepreneurship minor (page 16) is just one example of the entrepreneurial mindset you’ll find across Villanova’s campus. As a member of the Kern Entrepreneurial Engineering Network, the College has incorporated entrepreneurially minded thinking throughout the curriculum, and offers numerous extracurricular activities and competitions as well, including:

**INNOVATION CHALLENGE**
Every month in the Idea Accelerator (the physical home of the University’s Innovation, Creativity, & Entrepreneurship Institute), teams of students are given an hour to complete an impromptu challenge for prizes.

**IDEA BOUNCE®**
A required freshmen event, teams are given 90 seconds to present, or “bounce,” an idea to an audience and panel of judges.

**24-HOUR IMAGINATION QUEST**
In this quick-moving, innovative entrepreneurship competition, students work on multi-disciplinary teams across colleges to develop new ideas, products or services in just 24 hours.

**ARDUINO AND RASPBERRY PI WORKSHOPS AND HACKATHONS**
After learning the basics of these platforms, teams are challenged to put their newfound knowledge to work.

**VILLANOVA STUDENT ENTREPRENEURSHIP COMPETITION**
This one-semester, interdisciplinary competition asks students to innovate, create and design products, businesses or services to fill a variety of needs. Finalists work with outside judges and mentors and deliver pitches to an investor boardroom.

**HARRIS SUMMER INNOVATION PROGRAM (PAGE 19)**
Self-directed teams of engineering students receive resources and support to tackle real-world challenges. Students spend two months on Villanova’s campus in an incubator-like environment pursuing technological solutions of their own design.

“Idea Bounce helped us get a taste of the product marketing and delivery aspect of product development, which is crucial in the professional development of any engineer.”

BRYAN RAMIREZ
CIVIL ENGINEERING, CO-FOUNDER OF ATMOGEN, WHICH HE AND HIS TEAM DEVELOPED THROUGH HSIP
STUDY ABROAD

According to the Institute of International Education, only 5 percent of U.S. engineering majors study abroad. At Villanova University, that figure is an impressive 22 percent. The College of Engineering has made adjustments to the curriculum to allow more of its students to pursue this transformative experience, whether for a summer, a semester or an entire academic year. In fact, individual departments have mapped out course selections to enable students to take advantage of study abroad opportunities. Your faculty advisor will be happy to work with you to make your international education experience a reality.

VILLANOVA ENGINEERING STUDENTS HAVE RECENTLY STUDIED IN:

- Melbourne, Australia
- New South Wales, Australia
- Sydney, Australia
- Lille, France
- Dublin, Ireland
- Galway, Ireland
- Rome, Italy
- Siena, Italy
- South Korea
- Krakow, Poland
- Madrid, Spain
- Dubai, United Arab Emirates

The University’s Office of International Studies offers information sessions four days a week, twice a day, so there are plenty of opportunities to get information about studying abroad!

“Take the leap. Don’t be afraid of going to an unfamiliar place—the experiences and lessons you will learn will all be worth it. Going abroad was the best five months of my life, so don’t hesitate in anything you do, be all in and at the end you will look back and see how incredible the entire experience was.”

ASHLEY MEIER
ELECTRICAL ENGINEERING

“Living and working abroad allowed me to live independently, further my professional development and communication skills, learn about and conduct research in an advanced field, and experience a completely different culture.”

BRENT STUDENROTH
MECHANICAL ENGINEERING, WHO CONDUCTED RESEARCH AT THE GRENOBLE INNOVATION FOR ADVANCED NEW TECHNOLOGIES CAMPUS IN FRANCE

“In an increasingly global environment, studying abroad as an engineer taught me the valuable lesson that not everyone does it like America does it.”

GEORGE ZIMMER
CIVIL ENGINEERING
AUGUSTINIAN IDEALS IN ACTION

Whether rolling up their sleeves halfway around the world or inspiring the next generation of American engineers, our students’ passion for serving others is unparalleled. In fact, in Colleges that Create Futures, the Princeton Review ranks Villanova among 50 schools that launch careers by going beyond the classroom. Specifically referencing the College of Engineering, it says, “Not every engineering program in the country offers service learning opportunities to its students, but in the College of Engineering at Villanova, service forms the ‘cornerstone of the engineering curriculum, and in many cases students participate by applying the engineering skills they learn in the classroom to help benefit communities around the world.’” The review also recognizes the strength of the College’s STEM outreach programs.

VILLANOVA ENGINEERING SERVICE LEARNING

VESL provides students with project-based learning experiences that reinforce engineering fundamentals and build a commitment to service with a global perspective. Participation comes in a variety of forms, from in-class projects, independent study and undergraduate research, to school break trips and summer internships.

RECENT PROJECTS INCLUDE:

- School design and STEM education in Cambodia with the Caramanico Foundation
- Unexploded ordnance detection, removal and remediation in Southeast Asia with Golden West Humanitarian Foundation
- Water resources, renewable energy and STEM outreach in India with Profugo and Himalayan Hope Charitable Foundation
- Community infrastructure in Panama with the Cheypo-Bayano Mission
- Community water supply in Nicaragua with El Porvenir
- Water and sustainability in Madagascar with Catholic Relief Services
- Handpump sustainability in Ghana with Lifetime Wells
- Sustainability projects in Tanzania with Catholic Relief Services

“My time in Panama has yielded some of my favorite memories. My service there made me not only a better student of engineering, but of life. I encourage every student to take advantage of at least one of the many service trips, reap the rewards, and do what we Villanovans do best: Ignite Change!”

SAMANTHA SCHAFER
CHEMICAL ENGINEERING
The College of Engineering has been involved with STEM (Science, Technology, Engineering and Math) education outreach to middle- and high-school students for more than a decade.

In addition to outreach initiated by individual students and faculty, and student chapters of professional organizations like the Society of Hispanic Professional Engineers, the College of Engineering established these programs:

**NovaCANE (Villanova Community Action by New Engineers)** volunteers visit area middle schools where they conduct hands-on engineering projects with students and provide teacher education.

**VESTED (Villanova Engineering, Science, and Technology Enrichment and Development)** brings Philadelphia-area high school students to campus over seven weekends for engineering experiences, college preparation classes, team-building opportunities and discussions with industry leaders.

**Engineering Is for Girls!** brings local Girl Scout troops and school students to campus for a full day of hands-on, mechanical engineering projects.

**NovaEDGE (Villanova Engineering Diversity Growth Experience)** is a one-week, on campus program that introduces students from different ethnic and social backgrounds to the traditional fields of engineering. The program also includes a presentation on the college admissions process.

**HE2ARTS (Health Education and Enrichment in Arithmetic, Technology and Science)** is a collaborative program that assists Catholic middle schools in Brooklyn, New York, with the enrichment of existing science and math curricula.

**VILLANOVA ENGINEERING ALSO PARTICIPATES IN NATIONAL STEM PROGRAMS AND EVENTS:**

In partnership with the School District of Philadelphia, Villanova hosts a **FIRST** (For Inspiration and Recognition of Science and Technology) Tech Challenge, an annual robotics competition.

Villanova’s Department of Mechanical Engineering organizes one of the regional **MATE** (Marine Advanced Technology Education) competitions, which involves underwater robotics.

Villanova’s Department of Civil and Environmental Engineering participates in **Introduce a Girl to Engineering Day** with a local, all-girls school.

“Villanova’s Society of Hispanic Professional Engineers will continue its efforts to inspire young Hispanic/Latinos to pursue STEM careers.”

**JANINE ROSARIO**
CHEMICAL ENGINEERING

“Villanova Engineering sets itself apart with the number of opportunities it offers. Whether through an internship, a career or service experience, Villanova engineers are privileged with a seemingly endless amount of opportunities.”

**JACOB HOLMAN**
CIVIL ENGINEERING
“Many people at Villanova are involved in extracurriculars because we recognize that while academics are the focus, it is important to participate in other activities we enjoy to have a proper balance and contribute to the community.”

AUSTIN HAKE
CHEMICAL ENGINEERING
PROFESSIONAL ASSOCIATIONS

• American Institute of Aeronautics and Astronautics
• American Institute of Chemical Engineers
• American Society of Civil Engineers
• American Society of Mechanical Engineers
• Institute of Electrical and Electronics Engineers
• Institute of Transportation Engineers
• National Society of Black Engineers
• National Society of Professional Engineers
• Society of Asian Scientists and Engineers
• Society of Hispanic Professional Engineers
• Society of Women Engineers

INDUSTRY EXPOSURE

Students connect with members of the engineering industry through a variety of on- and off-campus opportunities, such as:

• Alumni career panels
• Career Compass (see page 17)
• Career fairs and information sessions
• Company site visits
• Engineering and University-wide student competitions
• Guest speakers
• Industry-sponsored projects
• Internships
• Research opportunities
• Service learning and STEM programs

“I was looking for a school that had big time sports, but also matched what I was looking for with academics. I wanted the whole college experience and Villanova has everything I wanted.”

EMMA MEYER
CHEMICAL ENGINEERING, FORMER WOMEN’S VARSITY SOCCER GOALIE
V MARKS THE SPOT

WITHIN REACH

WHAT MAKES VILLANOVA SO EASY TO GET TO, BUT SO HARD TO LEAVE?

The location. Our stunning 260 acres are nestled in the safe, storied and lush Main Line, just 12 miles (19 km) west of Philadelphia, the most historic city in the United States. Should you need to expand your reach, or just want to go adventuring, Washington, DC is 135 miles (215 km) south and New York City is a mere 95 miles (150 km) north.

The transportation. Three campus rail stops provide quick access to all that Philadelphia has to offer: from culture to dining to the arts to professional sports. If shopping is your thing, turn to our car sharing service or free weekend shuttle to visit the King of Prussia Mall—one of America’s largest retail corridors. Outdoor enthusiasts, too, can tap into their interests, with Valley Forge National Historical Park a short ride away.

The sites. The Philadelphia area has a number of points of particular interest for engineering students. The military-minded may want to check out the Navy Yard, Battleship New Jersey and Independence Seaport Museum. The Franklin Institute demonstrates the science involved in disciplines ranging from sports to space. You can take the “Engineering in the City” self-guided walking tour to better understand engineering’s role in creating some of Philadelphia’s most recognizable landmarks and some lesser-known attractions, including the Fireman’s Hall Museum and Waterworks. And, if museums are your thing, head to the Chemical Heritage Foundation Museum, the SEPTA Transit Museum or the American Helicopter Museum.
GRADUATE STUDIES

NEXT STEPS

Your Villanova education doesn’t need to end with a bachelor’s degree. The College of Engineering offers a five-year BS/MS option for each of its undergraduate majors, plus nine master’s degree programs, a PhD program and more than 15 graduate certificates. Degrees can be pursued on a full- or part-time basis, online or on campus, entirely at your convenience. With more than 100 courses to choose from, you can tailor a program to meet your professional interests.

MASTER’S DEGREES
Biochemical Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Cybersecurity
Electrical Engineering
Mechanical Engineering
Sustainable Engineering
Water Resources and Environmental Engineering

PhD PROGRAM
Earn a doctorate in engineering with a focus in any of the above disciplines.
“I was able to take courses from renewable energy and manufacturing to composites and finite element analysis—a wide range of topics that I couldn’t find in other programs.”

MARY BETH BIDDLE  
MASTER’S IN MECHANICAL ENGINEERING

“I formed close relationships with my professors. The faculty genuinely want to see you succeed. If it were not for them, I would not have ended up in a job that I am excited to go to each and every day.”

TERESA LORD  
MASTER’S IN CIVIL ENGINEERING

“There aren’t really any comparable programs to Villanova’s MSSE. The forward-thinking curriculum, and professors who are industry experts, played a large role in my decision to attend.”

MATTHEW MCMONAGLE  
MASTER’S IN SUSTAINABLE ENGINEERING

“I would have been hard-pressed to complete my degree without the E-learning option, and I found the recorded lectures and online tools to be a tremendous help in learning and retaining the material.”

JEFF NAUMICK  
MASTER’S IN WATER RESOURCES AND ENVIRONMENTAL ENGINEERING
WHERE WILL VILLANOVA TAKE YOU?

95.4% SUCCESSFUL PLACEMENT RATE (CLASS OF 2016)

$5,807 AVERAGE SIGNING BONUS
ANYWHERE YOU WANT TO GO!

95% GRADUATES WITH INTERNSHIPS, RESEARCH OR MILITARY EXPERIENCES

$63,457 AVERAGE STARTING SALARY FOR ENGINEERING GRADUATES (CLASS OF 2016)

28% PERCENT OF GRADUATES WHO RECEIVED A SIGNING BONUS

MEAN STARTING SALARY BY MAJOR (CLASS OF 2016)

Chemical Engineers: $59,027
Civil Engineers: $59,914
Computer Engineers: $70,223
Electrical Engineers: $64,886
Mechanical Engineers: $64,417

$5,807 AVERAGE SIGNING BONUS
A SAMPLING OF OUR ALUMNI CHANGE MAKERS

Lt. Col. Andrew M. Allen (USMC, Ret.) ’77 ME
Former NASA astronaut who served as commander of a 1996 mission of the space shuttle Columbia

William M. Brown ’84 ME, ’87 MSME
Chairman, CEO, and President, Harris Corporation; Former member, National Security Telecommunications Advisory Committee

Susan M. Castellan ’84 CE
Vice President, Whiting-Turner Contracting Company

Charles DeAngelis ’85 CE, PE
Chief Executive Officer and founding owner, Vericon Construction Company

Nance K. Dicciani, PhD, ’69 ChE
President and CEO (Ret.), Specialty Materials, Honeywell International Inc.; Former member, President’s Council of Advisors on Science and Technology

Coleen Burke-Finney ’90 ME, ’99 MBA
Senior Director, Strategy & Market Development, Boeing International

John "Jack" G. Drosdick ’65 ChE
President and CEO (Ret.), Sunoco Inc.

Richard Faris ’69 CE, ’70 MSCE
Senior Vice President, Product Development, Oracle; Co-founder Primavera Systems, Inc.

Gerard Fasano ’87 EE, ’90 MSEE
Executive Vice President and Chief of Business Development and Strategy, Leidos

Craig J. Fennie, PhD, ’93 EE, ’96 MSEE
2013 MacArthur “Genius” Fellow; Associate Professor, Department of Applied and Engineering Physics, College of Engineering, Cornell University

Christine Fossaceca ’16 CpE Cybersecurity
Researcher, MIT Lincoln Laboratory

Dustin Gleich ’13 CpE, ’18 MSCpE
Software Engineer Project Lead, Naval Surface Warfare Center

Brian Glaister ’03 ME and Alex Pacanowsky ’03 ME
Co-founders, Cadence Biomedical

John L. Hennessy III, PhD, ’73 EE
President (Ret.), Stanford University; Member, National Academy of Engineering and National Academy of Sciences

John Paul Jones III ’72 ChE
Chairman and CEO (Ret.), Air Products and Chemicals Inc.

Colin D. Joyce, PhD, ’02 EE
Engineer, U.S. Naval Research Laboratory; Recipient, Presidential Early Career Award for Scientists and Engineers

Drew Lakatos ’92 EE
Chief Executive Officer and Co-founder, ActiveProtective

Anne Mullins ’87 MSEE
Chief Information Officer, Corporate Vice President, Lockheed Martin Corporation

Adelene Q. Perkins ’81 ChE
Chair, President and Chief Executive Officer, Infinity Pharmaceuticals Inc.

Glenn Reitmeier ’77 EE
Senior Vice President, Technology Standards and Policy, NBC Universal

Anne Roby ’86 ChE
Senior Corporate Vice President, Praxair Inc.

Jessica Bradley Sant ’00 CpE
Senior Director, Software Development and Engineering, Comcast

Larry Scally, PhD, ’83 EE, ’85 MSEE, ’06 MBA
President and Chief Technical Officer, Colorado Engineering

Rory D. Sparrow ’80 EE
Former NBA player; Vice President, Player Development, NBA

Patrick Treacy ’87 ME
Co-founder, Onkos Surgical

Susan M. Ward ’80 ChE
Head, M&A and Commercial Finance Americas, Shell Oil Company

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