Engineering Careers

ENGINEERS HAVE OPTIONS
- Traditional Career
- Non-traditional Career
- Terrific choices

A degree in engineering opens many doors. An engineering graduate may work for a corporation, non-profit organization or government agency. On the other hand, they may take a non-traditional career path and become a manager, patent attorney, teach, work in the financial sector, or pursue any other life dream! Opportunities are bright for young engineers!

ENGINEERS ARE ALWAYS NEEDED
- To solve problems
- To help deal with change
- To make things better

Throughout history, engineers have solved problems. In fact, some historic challenges still exist today and will, no doubt, last into the future. For example, transportation needs will continue to evolve as our needs evolve…that’s an engineering opportunity!

ENGINEERS ADDRESS EMERGING NEEDS
As early as the 14th century, railways called ‘wagon ways’ were being used in Europe as a means of transporting goods. Horses were still used as the main source of power. As shipments became heavier, a need for a mechanized source of power emerged. An engineer named George Stephenson is credited as the first inventor of the steam engine. His invention built the foundation for our modern day railway system.

ENGINEERS SHARE & BUILD UPON GOOD IDEAS
With the popularization of railway transportation, a new critical problem arose: too many accidents and collisions! In the late 17th century, an engineer named Granville T. Woods revolutionized communication in the railway system. His most noted invention was an electric system that warned train conductors of nearby trains. Engineers are the driving force behind the transportation evolution!

ENGINEERS MAKE A DIFFERENCE
Today’s engineers are faced with huge issues like pollution, the energy crisis and global warming. Many engineers are trying to address these issues by looking at transportation. Specifically, driving cars. In an effort to reduce pollution and reliance on fossil fuels, engineers have designed electric and hybrid vehicles. These vehicles are fuel efficient AND reduce polluting emissions. Engineers are brilliant!
ENGINEERING IS ALWAYS EVOLVING

Have you gotten lost driving lately? Engineers play an integral role in the Global Positioning Systems that provide directions. Some systems can unlock the car doors when you’ve locked yourself out. Other systems are so advanced they notify help centers if you breakdown or police when you are in an accident. This emerging technology is an example of evolving engineering.

ENGINEERS NEED TECHNICAL SKILLS PLUS:
- Presentation skills
- Writing skills
- Knowledge of business issues
- Management skills
- Creativity

One thing is certain – our future holds amazing advances in technology. As technology advances and our global economy changes, the work of engineers will shift to help manage these advances. This shift will require engineers to work in diverse teams with business leaders, environmentalists, social scientists and politicians to name a few. For this reason, engineers must acquire interpersonal skills, business acumen, and management skills in addition to technical skills and sharpening their creativity.

ENGINEERS MUST PREPARE FOR LEADERSHIP ROLES
- Connect with non-technical audiences
- Creatively explain ideas
- Secure support for new ideas

By building soft skills, engineers become more marketable. Along with their much sought-after technical skills, they need to possess the ability to communicate effectively with non-engineers. At times, they need to explain a very technical idea to a very non-technical audience. To successfully complete this task, an engineer needs to use various presentation, communication and marketing techniques. Remember, as our world continues to evolve, so does the role of an engineer. While we may not know what the future may bring, we do know that we are educating students for jobs that don’t even exist yet!

The effects of engineering have a global reach and engineers are constantly being in demand to create new solutions.

ENGINEERS IN ACTION- THE HUMAN HEART

Take the human heart, for example. It is one of the most important organs in our body. Blood is pumped through the chambers, aided by four heart valves. The valves open and close to let the blood flow only in one direction. Engineers help patients with malfunctioning valves. While a medical doctor actually implants the valve, engineers research, design and test the prosthetic valve. Engineers also designed the system to monitor the patient’s progress.
ENGINEERS IN ACTION- GOLF ANYONE?

Golf, anyone? Sports science can analyze a golfer’s actions and body forces during motion. The analysis provides valuable information about the golf swing and physical forces impacting on the golf ball. An engineering lab uses a wireless technique to measure eye, head and putter motions during the putting stroke. The device can be used on the course to provide immediate feedback and help improve the athlete’s performance. Maybe THAT’S how Tiger Woods does it!

ENGINEERS IN ACTION- NEXT GENERATION INTERNET

Do we need a new internet? That is the question posed by researchers at Stanford University. The project, entitled ‘Clean Slate’, is a worldwide investigation to redesign the internet. Engineering researchers are working to answer two questions:

1) “Knowing what we do today, if we started with a clean slate, how would we design a global communications structure?”

2) “How should the internet look in 15 years?”

COOL CAREERS

Engineering has many exciting and cool career choices. Look below to read more about real engineers and what they do!

Mary Hiras

Mary Hiras holds a bachelor’s of science in Packaging Engineering and is currently a Graphic Specialist at a pharmaceutical corporation in New York. Her job is coordinating development of artwork for new product launches in the U.S. as well as international markets. This includes working with market contacts, new product planning, supply chain, manufacturing sites and suppliers to ensure all packaging and labeling requirements are met. She is also responsible for the approval of labeling components for all products. This requires her to work with colleagues in the Regulatory, Legal, Marketing, Medical and Quality departments. Her engineering education has allowed her to incorporate a technical background within the business world, which is an invaluable asset in a fast paced corporate environment.

Chiniqua Gallop

Chiniqua Gallop is currently working in Aachen, Germany. She has a bachelor’s of science in Chemical Engineering and a bachelor’s of art in Spanish. She works in the medical device industry. Medical devices are used to save or improve the quality of peoples’ lives. Some examples of medical devices are: pacemakers, stints for arteries in the heart, heart pumps and artificial hearts. Presently, she is developing a type of heart assistance device. It’s a heart pump, but only a partial pump, that assists the heart with the flow of blood. As the Manager of Quality Assurance, she is establishing an organized...
system to develop and manufacture units. She must insure compliance with U.S. and international standards for implantable medical devices. In supporting development, she helps map out and rationalize test plans, as well as develop statistical justification for the number of samples and the test scheme. In supporting Production, she learns the mechanical engineering behind the physical pump design and the design of the manufacturing process. Aside from the development and production, she interfaces with suppliers and evaluates their facilities and systems, and, also supports laboratory and clinical testing for Clinical Affairs. Talk about a busy lady!

### Lori Laird

Lori Laird received her bachelor’s of science in Mechanical Engineering. She’s a biomedical engineer and works in vascular-intervention. She’s focused on developing medical devices that assist doctors in performing surgery. She’s been out of school for about two and a half years and is trying to decide between a technical or managerial career. When asked how she went from mechanical engineering to biomedical engineering, she replied: “In school I studied general mechanical engineering, with an emphasis on biomedical. I took extra biology classes as well as physiology. I did design projects involving biomedical or prosthetics and things like that. To women students, I say: “Stick with it. It's going to be challenging, it's going to be hard, but there are other people out there that have done it. The world is really opening up to women in engineering.”

### Dave Tabora

Dave Tabora holds both a bachelor’s of science and master’s of science in electrical engineering. He works for a firm in the financial services industry, in the Market Data area (i.e. stock prices, financial statements data, etc.). Dave designs databases to store and process data used by portfolio managers. The challenge of the job rests in coming up with a design that is cost effective while providing fast data retrieval times. Even though Dave originally considered pursuing electrical engineering, he seized an alternative career path. The mathematics background and analytical thinking provided by his engineering college career has been crucial to his success in this position. In addition, his job requires careful coordination with, and understanding of other teams, groups and systems. Therefore, it is essential to have solid communication skills.

### Jodi Gerstner

Jody Gerstner is a technical director of control systems for an amusement and entertainment company. He received his bachelor’s of science in Electrical and Electronics Engineering. As a manager of project engineers, he brings a unique perspective to his job. "I view myself not as their boss but as an agent." Just as an agent gets work for an entertainer and negotiates for him, "I'm acting as the engineers' agent to make sure that they have everything they need to get their projects completed." Secondly, he gives them the benefit of his experience by pointing out concerns they may have missed. Not surprisingly, he is highly esteemed by his team.
There is one quality Gerstner values in his engineers: "An outgoing personality is mandatory, in my opinion, if you want to grow in this job - you have to be able to communicate effectively." Engineers have to be able to negotiate with the creative people about the best way to achieve the effects they desire. They then have to give clear directions to the shop people who actually have to build the attractions. "You have to bridge the gap between pure technical stuff and hands on, how to put it together. So, if you can't communicate, then no one will know what you have to offer, and no one will know how to build what you are conceptualizing."

Gerstner advises young engineers to get their licenses. Taking the exams right after school is absolutely the right thing to do because all the knowledge is still fresh in your mind.

**Thomas Niederdorn**

Thomas Niederkorn is the Core Technology Leader for a consumer products company. He received his bachelor’s of science in Chemical Engineering, and his doctorate in Chemical Engineering.

Thomas did a number of summer internships as an undergraduate. These internships were with a personal products company, a consumer products company, and a petroleum company. It was an experience he would definitely recommend to undergraduates. It provides an insight into how industry works, how relationships with supervisors work, and what types of jobs might be interesting.

His interest in engineering began as a child with a fascination for planes and model airplanes. When he got into high school and got more involved in chemistry, he found he had a natural interest in chemistry and mathematics as well. So putting those things together, chemical engineering seemed to be the way to go.

When asked about why he decided to attend graduate school, he replied, “I originally wanted to become a professor. I enjoyed teaching. However, while I was in graduate school, my desires changed. I became more interested in actually working in industry. I enjoyed the transition from graduate school to business. Work on real businesses issues and having an impact has been very rewarding.”
Erin Fletcher

Erin Fletcher is a Project Manager for an engineering company. Currently, she is the Project Engineer for three Washington State Department of Transportation (WSDOT) noise mitigation projects.

Ms. Fletcher has excellent communication skills. She is often called upon to represent the project team as a technical representative and a role model for young women interested in engineering careers. She frequently makes presentations to technical groups and to the community regarding WSDOT projects.

Ms. Fletcher also worked on the Seattle Monorail Project. Her responsibilities included managing many of the technical issues associated with the Green Line alignment; particularly as it related to the Design Build Operation & Maintenance. Ms. Fletcher led a team of engineering and architectural consultants to resolve technical issues associated with a proposed 6,000-foot long, 400-foot main span monorail-only bridge.

Ms. Fletcher is an active ASCE member at both the local and national levels. She currently serves on the Committee for Annual and Special Conferences, which makes policy decisions regarding national ASCE events. She has also served as a corresponding member on the Committee on Diversity and Women in Civil Engineering, volunteering for various task forces.

Ms. Fletcher holds a Bachelor of Science in Civil Engineering from Stanford University and a Master of Science in Civil Engineering from the University of Washington. She is licensed in Washington and California.

Lydia Prendergast

Lydia Prendergast has her bachelor’s of science in Applied Science and master’s of science in industrial engineering. Currently, she is an Assistant Dean with the Rutgers University School of Engineering. Lydia describes her academic profession and how her engineering background comes in handy. “As an Assistant Dean for the School of Engineering, my role is comparable to that of a Principal and a Guidance Counselor. I help students with all of their academic needs including tours, registration, transfers, accreditation, certification, etc.

Prior to my deanship, I worked as a high school math teacher. Changing my career path to academia gave me the opportunity to combine my educational and professional experiences into a career path where engineering and education truly blend. My engineering background helps me advise students properly. The analytical skills that I attained as an engineering student help me manage the electronic database systems and creatively solve problems as they arise.”
TRADITIONAL RESPONSIBILITIES AND ROLES
Traditionally, engineers work in office buildings, laboratories or industrial plants. They may work for a corporation, a non-profit organization or a government agency. Let’s take a look at some of the traditional roles and responsibilities of an engineer.

The analytical design engineer is involved in the mathematical modeling of physical problems. They convert this information into detailed plans and specifications from which a finished product can be manufactured.

The development engineer develops products, processes or systems. The major part of the development engineer’s work involves using well-known principals and employing existing processes or machines to perform a new function.

If you are successful as an engineer and have strong leadership skills, you could be management material.

A sales engineer is the technical liaison between the company and the customer.

A consulting engineer is an independent professional engineer who performs services for clients on a contract basis.

The research engineer is involved in obtaining new data, devising new methods of calculation and gaining knowledge to help solve global issues.

The engineering professor is involved in teaching, research and service.

ENGINEERING- A FUTURE OF POSSIBLITY
GO FOR IT!

A degree in engineering opens many doors. A change in your profession may occur immediately after graduation or after many years in a traditional engineering job. Engineers may be promoted to managerial and leadership positions. A practicing engineer may even decide to open their own business or teach students.

Engineers have many opportunities to succeed; all they need to do is GO FOR IT!
Engineering Careers

Brought to you by:

ASCE
With over 140,000 members, the American Society of Civil Engineers (ASCE) represents the civil engineering profession worldwide, and is America’s oldest national engineering society, founded in 1852.
www.asce.org
E-mail: outreach@asce.org
Phone: 800-548-2723

ASME
Founded in 1880 as the American Society of Mechanical Engineers, ASME is a not-for-profit professional organization promoting the art, science and practice of mechanical and multidisciplinary engineering and allied sciences. ASME develops codes and standards that enhance public safety, and provides lifelong learning and technical exchange opportunities benefiting the engineering and technology community. ASME has more than 127,000 members worldwide.
www.asme.org
www.asme.org/education/precollege
E-mail: infocentral@asme.org
Phone: 800-843-2763

IEEE
The IEEE (Institute of Electrical and Electronics Engineers, Inc.) is the world’s largest technical professional society. Through its more than 375,000 members in 150 countries, the organization is a leading authority on a wide variety of areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics. The organization annually sponsors more than 850 conferences worldwide.
www.ieee.org/education
E-mail: pre-university@ieee.org
Phone: 800-678-4333

JETS
JETS makes engineering and technology come to life through top academic competitions, career exploration materials, a dynamic e-newsletter, and new online resources for secondary school students, parents, and educators. Explore...Assess...Experience Engineering with JETS.
www.jets.org
E-mail: info@jets.org
Phone: 703-548-5387
Many thanks to Dr. Evelyn H. Laffey for her contribution to this project:
Dr. Evelyn H. Laffey has a bachelor’s in mathematics and doctorate in mathematics education. She has approximately ten years of student programming and teaching experience and is a recognized professional development provider for the state of New Jersey. Her student programming work includes serving as a Program Development Specialist with Rutgers University School of Engineering and as the Assistant Director of the Upward Bound program at the University of the Virgin Islands. Dr. Laffey has taught various mathematics courses at Middlesex County College, Rutgers University, and Rowan University. She has provided professional development seminars for various K-12 schools in New Jersey and New York and worked with the Institute for Electrical and Electronic Engineers to develop engineering education modules for K-12 teachers and guidance counselors. Currently, she is an Assistant Dean and the Director of Women in Engineering Programs in the Office of Student Development at Rutgers University School of Engineering.

Many Thanks to the Sloan Career Cornerstone Center
The Sloan Career Cornerstone Center is an ever-expanding resource for anyone interested in exploring career opportunities in science, technology, engineering, mathematics, computing, and healthcare. Site visitors can explore hundreds of degree fields and find out about education requirements, average salaries, networking, precollege ideas, and career planning resources.
(www.careercornerstone.org)