Find out about degrees and areas of specialization available through the Department of Biosystems and Agricultural Engineering.

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Welcome to our fifth issue of DISCOVER Careers in Agricultural and Biological Engineering

Choosing a major, deciding on a career, or taking the first steps toward a profession? This special issue of Resource is designed to help you in the process, showcasing opportunities in the growing, thriving field of agricultural and biological engineering.

We hope you will find the profile features inspiring. And we think that you will be impressed with the diverse possibilities—from internships and studies abroad to the jobs awaiting agricultural and biological engineering graduates. Interested? Turn the pages for an instant WOW!
Where can you discover the WOW! in agricultural and biological engineering careers?

There’s something for everyone!

**AQ Energy?**

Energy is a growing field, and energy conservation will pose ongoing challenges for the future. Our society runs on energy, which is produced in many ways, including the combustion of fossil fuels like coal and gasoline. Too often, harmful substances are released when producing or using energy. These waste products cause air and water pollution and may contribute to global warming. Biological and agricultural specialists are developing alternative energy sources, such as plant-based fuels and solar power systems. These energy options may help sustain our quality of life while reducing adverse effects on the environment. These specialists also seek ways to conserve energy and improve the environment using current technology. Alternative energy is a growing field, and energy conservation will pose ongoing challenges for the future.

**AQ Soil and Water Engineering?**

Soil and water engineers study the interaction of plants, animals, and humans with soil and water. They seek ways to control soil erosion and reduce the effects of sediment and surface runoff on water quality. They design, build, and maintain drainage and irrigation systems for agricultural operations as well as water control structures for reservoirs, floodways, and channels. They also design equipment for applying fertilizers and pesticides. Soil and water engineers are experts in the principles of hydrology. They must also understand chemistry, environmental science, and the mechanics of water and wind erosion.

**AQ Bioprocess Engineering?**

Bioprocesses include bioreactors, fermenters, and other systems for the production of pharmaceuticals, vitamins, preservatives, and food supplements. Bioprocess engineering also includes the use of biological organisms to produce energy, including fermentation to produce ethanol and anaerobic digestion to produce methane. Graduates in this new, rapidly expanding field pursue careers in medicine, biomedical engineering, environmental engineering, natural resources, agriculture, and related areas.

**AQ Power and Machinery Engineering?**

Modern agricultural machines must be mechanically sound and biologically sensitive, and onboard computers are becoming standard equipment. These machines are designed and tested by engineers educated in a power and machinery curriculum. To keep up with the growing demand for innovative, high-tech equipment, equipment manufacturers need more university-trained engineers. Power and machinery graduates are commonly employed by farm equipment manufacturers, but they also qualify for positions outside the farm equipment industry. Many have found engineering employment with other companies, including industrial facilities and manufacturers of construction equipment.

**AQ Food and Process Engineering?**

Food and process engineers work on the boundary where biology meets engineering. They combine design expertise with large-scale manufacturing to develop the processing methods needed by industry. They are experts in food pasteurization, sterilization, freezing, and dehydration as well as packaging, transportation, and storage of perishable products. They also use microbiological processes to produce fermented foods, fuels, biochemicals, and pharmaceuticals, and to treat municipal, industrial, and agricultural wastes. Increasing concerns about food safety and environmental protection are creating a growing demand for food and process engineers.
As in other industries, information and electrical technologies provide agriculture with increased efficiency, reliability, and safety. Information and electrical technologies are used throughout modern agriculture, from radio-frequency identification collars on livestock, to electronic yield monitors and obstacle sensors on harvesters. The future of this field is very promising, and includes combining computers and sensors with mechanical systems for automated harvesting and sorting of produce, and using satellite-based guidance systems and robotic actuators to create tractors and combines that steer themselves across the field.

Structures and Environment Engineering?

Structures and environment engineers design and build greenhouses and animal housing, storage structures for food products, and waste handling facilities. In particular, these engineers design the systems that provide environmental control for these facilities, including ventilation systems and equipment that heats, cools, lights, reduces harmful emissions, and controls conditions in and around specialized agricultural facilities, such as plant growth chambers, bioprocessing laboratories, commercial greenhouses, animal production facilities, cotton gins, grain elevators, and food processing plants.

Aquacultural Engineering?

Aquaculture refers to raising fish and shellfish to sell as food and for other uses, such as ornamental and bait fish. Aquacultural engineers concentrate on increasing production while decreasing costs and environmental impacts. They seek ways to reduce pollution from aquaculture production systems, reduce excess water use, and improve ponds and other fish-rearing systems. They also work with aquatic harvesting, sorting, and processing systems. Agricultural and biological engineers who specialize in water quality, biotechnology, power and machinery, natural resources, food processing, environment, and sanitation are well-suited for careers in this expanding field. As natural fish supplies decline around the world, aquaculture is an area that will continue to grow.

Environmental Quality Engineering?

Environment concerns are in the news: food processing plants are asked to reduce the pollutants returned to estuaries and bays, large-scale livestock production systems affect local water and air quality, and questions arise about the sustainability of the seafood industry. These and other environmental issues illustrate the opportunities available for engineering graduates who understand the Earth’s sensitive ecosystem and the biological and physical treatment of pollution. The demand for environmental engineering graduates has never been greater, because everyone must do a better job of protecting and improving the environment.

Standards and Safety?

Modern agriculture depends on mechanization, but these large machines can present hazards, especially when combined with long hours and solitary working conditions. Manufacturers strive to build equipment that is safe to operate and maintain by following industry-wide safety standards. Using injury data, field tests, and laboratory analysis, safety specialists study the use, and possible misuse, of agricultural machines, and help ensure the equipment’s compliance with safety regulations. To keep informed of new standards, they often participate in the organizations that develop these guidelines. Safety specialists and engineers are employed by equipment manufacturers and government agencies, and they often work as consultants.

Thank you to Paul Heinemann, Professor and Head, Penn State Department of Agricultural and Biological Engineering, for his expertise and valued editing of this information.
I discovered ABE by chance, and I am grateful I did. With a background in math and science, engineering was an easy choice. I also wanted a “living” aspect to my career, so agricultural and biological engineering was the best fit.

The greatest benefit of an ag and bio engineering curriculum is the diversity that it provides. Students explore various subjects as they discover their interests through intern experiences and research positions with professors. Another way to find out more about ABE is by joining ASABE. I learned about career possibilities at talks by industry professionals at ASABE student meetings and by attending the ASABE Annual International Meeting, where various industries are represented.

Starting in the fall of my junior year, I interned at the Caterpillar Champaign Simulation Center (CSC). I performed analyses of Caterpillar products, including articulated trucks, track-type tractors, and transmissions, and I gave presentations to company executives, explaining the student program at CSC and demonstrating the value of student work.

Later, I traveled to China as part of the Hoeft Technology & Management minor. We visited factories, corporate offices, and cultural sites. We also talked with expats about the opportunities and challenges of working in China. We immersed ourselves in the local culture: flag-raising at Tiananmen Square, ceremonies on the Mongolian plains, and bartering in the pearl market. That program provided great undergraduate experiences: foreign travel, working on interdisciplinary teams, and gaining important professional skills.

If you’re scouting for a school, meet with current students to get their perspectives and get a feel for campus. Ask about internship and co-op opportunities, undergraduate research, and study-abroad programs. Great schools encourage and support their students in pursuing these valuable endeavors.

After graduation, I spent a month traveling in Europe, taking a break before graduate school. It’s amazing what you discover by traveling; you just need to be open to the possibilities! And now, I’m pursuing a PhD, hoping to become a professor so that I can inspire students to become productive, creative, and ethical engineers.
Biological engineering wasn’t my first choice. That changed when the head of the biology department told me that, as an engineer, I would have a better fallback position. That’s a good approach: do your research on the job market before committing to a major! And look for a school that’s cost-efficient. If scholarships are available, take the adventures wherever they lead.

School may not always give you the big picture. I learned more about the job market after I started co-oping and interning. Take summers off and find an engineering internship or co-op job. The money is nice, but the experience is nicer. It’s a tough job market, and experience counts.

My experience as a co-op student in the Mississippi Department of Environmental Quality made me want to be an environmental engineer, and it helped me mature. Later, as an intern at a biodiesel refinery, I was challenged to make quick, logical decisions about issues in a process environment. I maintained plant operations, including repairs to the tanks, pumping systems, control valves, and various filters.

Through an NSF grant, I spent a month in Tasmania, studying remote sensing. Along with advising on research techniques and software packages, I met other graduate students and professionals from similar fields. The trip wasn’t all work. I traveled across southern Australia and even went snowboarding in July—crazy for us northern hemisphere folks!

My most outstanding experience in college was being lead developer and designer for a low-impact rainwater harvesting system at a fully sustainable house on campus. Seeing my work accepted by the faculty and by the guys who pay the bills was amazing!

While I’m an engineer by trade, I’ve also acted in and helped produce a few films, including one that was shown at the New Orleans Film Festival. An old friend directed it, and I wish I could say I got hired because of my movie-star looks. If engineering (and acting) don’t work out, then I plan on opening a brewery. I may do that anyway!

“WHAT MAKES FOR A WOW! UNDERGRADUATE RESUME?

Good grades, of course, but also experiences, like internships and studies overseas, that build skills. Academic departments often have internship coordinators who match students with company openings. Alumni and employers often provide job descriptions directly to the faculty, hoping to find suitable interns. And most universities, and even some departments, host career days or fairs, where companies find candidates for internships and permanent employment. An internship typically involves hands-on work on real-world projects. Interns get paid to use the skills and abilities they acquired in the classroom, and they get some exposure to the career opportunities that await them after graduation.

As our world becomes increasingly globalized, ag and bio engineers need to interact effectively with people from other nations and cultures. Studying abroad is a great way to acquire this kind of experience. Like internships, study abroad programs vary greatly. Study trips guided by professors may last a few weeks. Or you can move in with a host family and attend a foreign university for a full year. Students who study abroad come home with enthusiasm, experiences, and memories that last a lifetime.
She’s into biosensors and the pursuit of clean water.

Her name is

Hanna Miller

Michigan State University
Biosystems Engineering
Microbiology
December 2011

Whether I’m running, hiking, camping, playing ultimate Frisbee, or walking my dog, I love being outside! My small claims to fame are that I have climbed an active volcano and biked around the world’s smallest mountain range.

When I began looking at degree programs, I initially focused on the environmental sciences. As I learned more, I found that I wanted a more technical degree that would better equip me to solve environmental problems. The answer was biosystems engineering. The intersection between engineering and biology cemented my double major, with a particular focus on how microbes can be used to improve the environment.

During my undergrad years, I worked in a biosensors lab, developing rapid methods to detect pathogens in food. I originally worked for a graduate student but then began to explore my own research questions. Since graduating, I’ve continued to work in the laboratory to help commercialize some of the biosensors we developed. Commercialization is an important part of research—many good ideas never make it out of the lab!

For two summers, I interned at DOE laboratories in California and Washington. Those stints allowed me to expand my research experiences. I was exposed to new laboratory techniques and equipment, which helped me solve the problems I faced in my own research at Michigan State. Those experiences also taught me more about research careers and strengthened my desire to attend graduate school.

If you are at a crossroads, consider what field you want to end up in and then backtrack to determine which degree will get you there. Look at which school will give you the most experience in that field through class projects, work experience, or volunteer opportunities. One of the most helpful ways to find career possibilities is by listening to presentations by people who work as biosystems engineers. I attended many of those presentations, and I spent a lot of time talking to professors about career opportunities.

My next step is a PhD in environmental engineering at the University of Minnesota. My research will focus on emerging environmental contaminants. I’d like to develop methods to improve drinking water quality, maybe by working for a consulting company. Everywhere in the world, clean water is the foundation of a healthy life!
He sees the future and wants to make it better.

He’s Warren Blunt

Growing up, I was fascinated with engines, and my goal was to study mechanical engineering. In my freshman year, I became increasingly concerned with unsustainable practices and their contributions to the state of our environment. I decided to pursue a degree in biosystems engineering because it would provide the best education for addressing the environmental challenges we face, and give me the greatest opportunity to affect change. There was also plenty of encouragement from my dad, who works for Manitoba Conservation. Biosystems engineering allows me to pursue my interest, and the wide exposure that biosystems students get—traditional sciences mixed with aspects of all engineering disciplines—is unique.

There are also plenty of opportunities to become involved with cutting-edge research. I joined the biofuels and bioproducts research team in May 2009 as an undergraduate research assistant, and in the summer of 2010, I traveled to New Zealand to work with a research institute on advanced fermentation equipment. This technology was later implemented at the University of Manitoba and was the basis for my undergraduate thesis and my work as a graduate student.

Around the same time, I became involved with Engineers Without Borders (EWB), a non-profit organization that seeks to alleviate poverty in Africa through systemic change. I helped bring the Run To End Poverty (R2EP) campaign to Winnipeg last year to support a water and sanitation project in Malawi. The event is now hosted by 14 cities across Canada.

Biosystems is certainly the least well-known engineering discipline. If I had a dollar for every time I had to explain what “biosystems” means, I could likely retire! However, as a result, I have become pretty good at marketing my profession and myself, and bio-engineering is a progressive and dynamic field. I expect an increasing number of opportunities to become available with each passing year. The professors have been very helpful with career advice. My friends who have graduated have found work in a diversity of companies, including ones involved with agricultural machinery, grain handling, wastewater treatment, land reclamation, pharmaceuticals, biotechnology, and even sportswear.

To relax, my family has a lake cottage, and I spend weekends there whenever I can—swimming, windsurfing, and water skiing. Unfortunately, Manitoba lakes are frozen for five months of the year, and unbearably cold for another four!
I once wanted to be a rodeo clown. It looked exciting to goof around while helping the riders. But then I found something even better—ag and bio systems engineering! Name the world’s top ten problems, and ag and bio engineers will have a hand in solving all of them. It’s hands-on exciting, the work has a positive impact, and there are jobs available.

Over a summer, I worked for Case New Holland (CNH). I traveled around the country, harvesting biomass with prototype equipment. Each week was different, and I gained an understanding of agriculture on a big scale. The highlight was sitting at a CNH desk next to former ASABE president Ron McAllister!

My most rewarding experience was a study-abroad semester in Nicaragua, which allowed me to finish my general business and Spanish minors. Nicaragua also gave me a new sense of purpose as an engineer—it helped me realize how I can be a part of future solutions. I grew up on a farm and really enjoy the outdoors, and I want to preserve that life for my grandchildren.

If you are energized by what ag and bio engineering has to offer, investigate the field and talk with an academic advisor. And get active on campus! Join a few clubs and become active in them. It’s one thing to say you’re a member of a club, but entirely another to show how you made a contribution. Employers are looking for people who do things, not for people who just show up on time.

I stayed at Iowa State to complete a master’s degree. I plan to work in industry for several years and then get a PhD. That will allow me to teach, consult, and do research. I have some specific goals: develop a biopolymer to replace plastic in packaging, further the applications of solar energy, develop an all-inclusive modeling program for energy consumption in buildings, and further the development of biofuels from non-food feedstocks.

Caring about the important stuff—that’s my passion. To unwind, I work at Renaissance Festivals, ride horses, and wear a kilt. And I hauled eight inches of sand into the apartment because my house mates wanted a beach. Don’t worry—we put a tarp down first!
I’m a Scandinavian who lives to bake, but I also love spicy food—thanks to India! I studied in India and worked as an environmental intern at a non-governmental organization (NGO). I learned a lot about the Indian government and how the country regulates groundwater and surface water in rural areas. I worked with another student, and we left the NGO with the opportunity to write a grant using our research and get funding from the government. Overall, it was a great experience, and I hope to go back someday and work on more projects like that.

Ag and bio engineering is a natural for me. I was a big science and math nerd in high school, and I was also interested in the environment. I chose the University of Minnesota because my two favorite fields meet in ag and bio engineering. I learned about career possibilities when I was a confused freshman, frantically trying to figure out what I wanted to do for a career. When a professor told me about what ag and bio engineers actually do, I thought, ‘That sounds pretty cool! I can see myself doing that for the rest of my life!’

For two summers, I worked in the Bioproducts and Biosystems Engineering Department, analyzing wastewater streams to help reduce and reuse wastewater. Last summer, I analyzed soil types at a toxic waste site in Bemidji, Minn., with MnTAP. That project mapped the extent and distribution of hydrophobic soil from a 1979 oil spill. G&K Services, the company that I assisted, hired me!

Research opportunities gave me hands-on experience. After I learned something in a class or lab, I could apply it the next day in the field. For example, in agricultural waste management, the lab dealt with manure samples, and I learned practical testing methods for wastewater and manure application. The homework in that class was challenging, but it was a standout experience—playing with manure for 12 weeks straight!

If you are considering ABE, make friends within your major. Other students know what you are going through with tough classes, and they may know where you went wrong on that homework problem that you’ve been struggling with for hours. And don’t waste time as a freshman—become part of student groups right away!

Meet Leigh Severson

University of Minnesota
Bioproducts and Biosystems Engineering
May 2008
I arrived at Penn State planning to study bioengineering, but a few weeks into freshman year I researched engineering majors and stumbled on food and biological process engineering. It was a perfect fit for me, combining my love of food with engineering. At the time, the ABE website at Penn State indicated that ‘most graduates work at Hershey,’ so naturally I was sold. I got my co-op job as a sophomore, and working at Hershey prepares me for what I will be doing after graduation. I love it!

Through my co-op work, I’ve gained experience at six Hershey plants in Pennsylvania and Virginia. I work with industrial engineers to gather data and evaluate cost-savings. I work with operators, contractors, and plant managers to implement the projects. I’ve gained lab skills and knowledge of good manufacturing practices. And I get to work at Hershey! My favorite product to work on is Reese’s Peanut Butter Cups.

My fluid flow and food chemistry classes were standouts for providing information that directly applies to my job. In fluids, I learned about sizing pipes and pumps along with valves and heat exchangers. The food chemistry class allowed me to gain hands-on lab experience. Your major is important, but it’s also important to pick a good a minor. Consider minoring in business—it’s a good fit with ag and bio engineering.

Over spring break, I traveled to Chile to ‘follow the fruit.’ The trip was arranged through a horticulture class, and we spent the semester learning about las frutas y hortalizas frescas (fresh fruits and vegetables), export, and international production. In Chile, we toured fruit packaging facilities, vineyards, farms, and cities. When there was free time, we experienced Chilean culture and food, and saw how the people live and work. We toured a beautiful vineyard in San Pedro and studied the fermentation process. And the food was delicious—but it was hard to order without really knowing Spanish!
One of my grandfathers was a working cowboy on a ranch in Oklahoma, and my other grandfather was a school superintendent. My dad was an avid outdoorsman, and my mother was a devoted English and Latin teacher. I grew up with a strong appreciation for agriculture and the environment, and a strong desire to learn.

The University of Arkansas offered me a full scholarship, and a visit to UA during my senior year of high school sealed the deal. Biological engineering was the perfect choice. The UA bio engineering department is heavily focused on project work and student-professor collaboration. The department also brings in alumni for regular visits with students. Those alumni showed me the job opportunities that are available.

In our sophomore design class, we designed an aeroponic chamber for growing rice and presented it at the ASABE Annual International Meeting in Sacramento. Placing in the ASABE student design competitions in my sophomore and senior years were standout moments, so I tell others to get involved! Join ASABE so you can make contacts with the professionals in your field. Student membership is inexpensive and well worth the money!

And take time for yourself. During college, I worked out at a boxing gym, and I competed in four sanctioned matches (three wins and one loss). The grueling demands of training allowed me to clear my mind and body of the stress from those difficult engineering courses. Being healthy physically made me sharper mentally.

Now I work as a hydraulic engineer for the U.S. Army Corps of Engineers. The Corps is dedicated to the protection and management of our water resources. I’m hoping for a long career at the Corps, using my education and experience to maximize the benefits of our water resources and protect people from floods. And I love what I do. There are enough challenges here to last an entire career.

A couple of years ago, I raised tilapia in a backyard tank in midtown Tulsa. The winter of 2010 was one of the coldest on record, but I managed to keep the tilapia healthy and happy using a combination of air and water heating and a custom-designed upflow biological filter. That was engineering just for fun.
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I didn’t know what ag and bio engineering was until I took a one-credit course called Intro to Engineering. Each week, we visited a different engineering department. In the ag and bio engineering lab, I met a grad student who talked about her research—she loved what she did, and she loved that it was making a difference in the world. I immediately thought, ‘This is for me!’

I chose University of Florida because my schooling was paid for through the Florida Bright Futures program, and a large university like UF offers many opportunities to find the perfect fit. UF also has active research programs, and I learn best in labs. My strategy is: get a good engineering background, and then apply it to a field you love.

In the summer of 2006, I joined a study-abroad program in Germany. We took classes in statistics and German, we saw state-of-the-art engineering, and we visited some of the world’s largest producers of agricultural machinery. When you can comfortably fit inside the wheel well of a combine, you realize how large-scale agriculture has become!

The following summer, I attended the ASABE Annual International Meeting, where President Bill Clinton gave a moving speech on the importance of ag and bio engineers in solving the world’s problems in food, water, and energy production, and in maintaining a healthy society. His speech made me realize how important this field is, and how my research could really make a difference.

Don’t let a summer go by where you don’t challenge yourself to learn something outside the classroom! I never took summer classes! Summers were for taking advantage of other opportunities—work experience, study abroad, or research.

Currently, as an NSF graduate research fellow, I work in the neural stem cell engineering lab at UF. My research is aimed at identifying biomarkers of cognitive aging in rats. As the human population ages, we must understand how to predict, diagnose, and treat age-related cognitive decline.

I met my fiancé when a car crashed through the café where we were both studying. My homework was ruined, but I met the love of my life! He lives in Washington, D.C., and I plan to move there after I finish my doctorate. And, of course, a summer wedding!
In high school, I worked at a hydroponic greenhouse, and I found agriculture fascinating. At Cornell, I first majored in agricultural sciences, but I wanted more math. Moving to biological and environmental engineering solved that, and the professors and TAs told me about the opportunities available to graduates. Now, having been a TA myself, I helped other students, and I discovered that I learn best by teaching others.

One summer, I participated in an NSF program at the SETI Institute in Mountain View, Calif. I investigated the influence of dust storms on the global temperature of Mars. Aside from learning about our neighboring planet, this internship exposed me to research areas I hardly knew existed—from listening for extraterrestrial radio signals to analyzing the origins of life. It was a fascinating work environment.

As a senior, I spent fall semester in the Icelandic eco-village of Sólheimar. The program focused on sustainability through community. We ate with the village residents, we volunteered in their craft workshops, and I gave ballroom dancing lessons. In addition, I learned a little Icelandic, hiked in that amazing landscape, and milked an Icelandic goat!

If you are searching for an undergraduate program, make sure it’s ABET-accredited, and look for professors who are doing research that interests you. Even if you don’t get involved in research as an undergrad, professors often integrate their research into their teaching. And don’t be afraid to make mistakes. Yes, grades are important, but skipping my ballet classes just so I could study longer wasn’t worth it. I was happier when I made time for something that I enjoyed, and I was able to take on my engineering coursework with more energy. I realized that if I put off the things that helped me de-stress, then I would have been stressed all the time.

This fall, I’ve started at Stanford to work on an MS in environmental fluid mechanics. I hope to continue on to a PhD. My goal is to become a university professor, to pursue my passion for the environment, and hopefully inspire the next generation of engineers. Oh, and I’ve memorized pi to about 135 decimal places. It started out as a competition with my father when I was in 4th grade, and now the numbers are stuck in my head!
In high school, I thought I would major in something related to chemistry, medicine, or engineering—like biomedical engineering. But when I read the core curriculum I hated it! I met with one of the advisors in the biomedical engineering program and shared my interests with her. She steered me to ag and bio engineering, and for that I am wildly grateful! I loved the curriculum for bio and food process engineering. I learned about the vast array of career possibilities in my freshman year, but I was introduced to an even bigger range of opportunities during a sophomore ag and bio engineering seminar.

Even if you are already interested in ag and bio engineering, choose a school that has other programs that pique your interest. Keep your options open and learn as much as you can, even outside your chosen major. I’ve learned a lot in all of my classes, but the class that sticks out the most is thermodynamics. It was my first ag and bio engineering course, and I ate it up.

The summer after my sophomore year, I interned at Oscar Meyer in Madison, Wisconsin. As a food engineer intern, I worked with marketing executives from different companies. While in Madison, I was hospitalized for two weeks, and during that time Oscar Mayer became my family away from home. It was one of the best experiences of my life, and I would love to work there permanently. And, oh yeah, I got to ride in the weiner-mobile!

I also interned at the University of Strasbourg in France for three months. I was the first Purdue student in this new exchange program. I worked in the microbiology department and studied the effects of Lyme disease on rabbits and mice. While I was in France, I saw how much the European Union is dependent on the United States for technological advances. And I was traveling alone! I had never been out of the country, and I had to put my trust in complete strangers. Staying true to my sorority, at the Château du Haut-Koenigsbourg, a castle in Orschwiller, Alsace, France, I gave the triangle hand sign of Delta Sigma Theta for the benefit of my family of members stateside.

Following graduation, I plan on pursuing a PhD in a medical science field, maybe microbiology or virology. Long term, I aspire to own my own lab, focused on drug discovery.

She’s just 4’11”, but she’s big on ag and bio engineering.

Her name is Venecia Wilson

Purdue University
Biological and Food Processing Engineering
Pharmaceutical Science
May 2013
During my “first” junior year, I was diagnosed with Hodgkin’s lymphoma. I’ve been battling it since, and I’m a four-time cancer survivor. I don’t sport much hair, as if that matters. What draws people to me is that I always try to be positive, encouraging, and friendly. A smile goes a long way, and kind words go even farther. I try to make everyone feel welcome and wanted—because they are. Plus, God gave me two ears and one mouth—that means listen twice as much as talk!

In college, I had five internships! That’s unusual—but count ‘em up:

1. John Deere Dallas Training Center: As a training intern, I taught dealers about integrated distance training and evaluated their training needs. (I flew everywhere.)

2. John Deere Davenport Works: As a manufacturing engineering intern, I coordinated rebuilds of four-wheel-drive loaders and provided support for production builds. (I had a great time with the floor guys.)

3. John Deere Ottumwa Works: As lab test intern, I programmed a test stand and ran tests with it. (I traveled to Arizona for product testing.)

4. John Deere Ottumwa Works: As a maintenance and facilities intern, I managed a factory-wide project to install efficient T8 fluorescent lighting. (The project was recognized by the State of Iowa for energy efficiency.)

5. John Deere Ottumwa Works: As a supplier quality intern, I maintained the parts database and worked with suppliers on part issues. (I traveled to St. Louis for a supplier visit.)

And I found time to study abroad. In Austria, I learned German and enjoyed lots of wiener schnitzel! China was an even bigger culture shock. I ate food with chopsticks, and I didn’t always know what it was.

Now I work at John Deere Des Moines as a structural engineer. I make sure that the floors can withstand heavy loads and that the overhead cranes don’t come crashing down. I enjoy the challenge of an engineering problem—the more complex problem, the better. I especially like working with the people who are involved in the problem! I love engineering, and I love people. Here’s the thing: Do what you love and love what you do; find happiness first, and the money will come later.
I grew up working the land. I’ve been interested in agriculture ever since I was able to drive a tractor and help my father, fetching tools and fixing machinery. Now I have bigger responsibilities, but the equipment problems that farmers face are still my challenge.

Engineering is not limited to design and technical analysis. Engineers must understand how their work can affect the world. As Bobby Moser, vice-president for agricultural administration at Ohio State wrote, ‘We now ask ourselves four questions: Is it economically viable? Is it efficiently productive? Is it environmentally sound? Will society accept it?’ That kind of thinking inspires me!

While interning for Case New Holland (CNH), I traveled across the United States testing equipment. From southern California to North Dakota, the journey opened my eyes—not only to the ever-growing possibilities in agriculture but also to how a company must meet the specific needs of farmers in different geographical regions.

Improving people’s lives is why I enjoy this field so much. I also love thinking like an engineer—from differential equations to drainage problems.

When you shop for an ag and bio engineering school, it isn’t the size of the school that matters. No matter the school, it’s only as big as you make it. Your college experience is in your hands, so take advantage of all opportunities.

As I approach graduation, I’ve already got numerous job offers, and I am also considering graduate school at Ohio State. My dream job is designing and testing agricultural equipment. I want to farm as well, and educate people about agriculture. The gaps between the farmer, the engineer, and the consumer get larger every day. I want to bridge those gaps and educate everyone involved while working as an engineer, farmer, and agriculturist.

My work can affect every aspect of the economy—from how food is harvested to how it is processed, and even how it will be eaten. That’s a huge privilege, and I don’t take it for granted.
After graduating from CÉGEP (the Québec equivalent of the last year of high school and the freshman college year), I chose bioresource engineering because I thought it would combine my different interests: protecting the environment, designing things, agriculture, and biology. Outside of the engineering curriculum, I’m taking social sciences courses as a minor.

I decided to attend McGill because it’s an anglophone university in a francophone province, and therefore an opportunity to strengthen my second language. The faculty of agricultural and environmental sciences is located on the river, with lots of green space, and access to farms and forests. In a class on forest management, I learned to identify the trees native to Québec and eastern Canada, which gave me a new perspective on a familiar landscape.

Engineers Without Borders sent me to Ghana, in West Africa, as a consultant in small-scale agricultural management. I worked with two local businesses and a Ghanaian NGO. The businesses offered field preparation on credit to small farmers—a rare service in Northern Ghana. I got some useful experience in international development as well as immersion in a very foreign culture.

Later, I took advantage of an international exchange program. I went to Argentina—a beautiful country, with many wild places as well as a rich culture. Learning a new language and then adapting to a different environment teaches you things you can’t learn in school, and the differences in the culture and professional practices teach you a lot about your own way of doing things.

There is a stereotype that engineers lack social skills and tend to be narrow-minded. I think the engineering curriculum should incorporate more social sciences, humanities, and other disciplines that involve interpersonal communication. The people you work with will shape your world, at school and elsewhere, so look for a school that includes a strong non-engineering aspect in the engineering curriculum.

Although I have no idea what’s next, I hope to find a stimulating job with nice coworkers! I also hope that my occupation will involve some leverage to change things. Environmental resources—land, water, forests, minerals—are invaluable and should be cared for much better than they are now.
I sometimes catch myself doing incongruous things. Not long ago, I was eating Italian food with chopsticks while listening to Spanish music and grading my Brazilian students’ English papers! Maybe it’s because of my travels!

In 2009, I interned at the World Vegetable Center (AVRDC) in Taiwan. I conducted an experiment in the virology unit, screening peppers for resistance to viruses. I was there for two months, but it wasn’t long enough! It was a challenge—at first, I knew as much about viruses as the average high school student—but my experiment was a success, and I presented my work to other AVRDC researchers.

In 2010, I traveled to Uganda for a five-week service-learning program. Students from Iowa State and Makerere University in Uganda taught local elementary school children how to care for their school gardens. Working with a bi-national team on a development project was a fantastic experience that I would gladly repeat.

In 2011, I traveled to Italy to work with the Food and Agriculture Organization (FAO) of the United Nations. Our Iowa State team wrote a paper about standards in the U.S. livestock industry and developed a questionnaire that the FAO can use to survey the value chain. Working with the FAO gave me insight into how huge, international policy organizations really work. I also learned a lot about standards in the United States and Europe and how they affect the value chain, which is a hot topic in ag policy.

Most recently, I finished a semester at the Universidade Federal de Viçosa in Brazil in early 2012, learning Portuguese, taking classes, and completing a project on grain storage, and then moved on to an internship with Centreinar, the Brazilian national center for training in ag product storage.

Whatever you do in ag and bio engineering, study abroad. It is cheaper and easier to travel while you’re in college than it ever will be again. And you grow as a person when you put yourself in unfamiliar situations. In my ideal job, traveling is a must. I want to design technology for small-scale farmers in developing countries, flight by flight!
I love the unexpected! During my study-abroad experience, I traveled alone through South America. In Bolivia, I mountain biked the notorious Death Road through the Andes—one of the most dangerous roads in the world, with 200-meter drops and narrow hairpin turns. In Peru, I participated in the five-day Salkantay Trek to Machu Picchu.

In high school, my math and science teachers pushed me to consider engineering, and I participated in a marine biology program at the Shedd Aquarium. Another source of inspiration was my grandparents. I spent a lot of time on their farm, and they taught me so much about agriculture that my decision to study ag and bio engineering is, in part, for them. After I chose my major, I decided on the University of Illinois because of its ag and bio engineering department. Even though it's a large university, there's a friendly atmosphere in the ABE department.

The summer after my freshman year, I traveled to Brazil with a study group. We toured coffee and sugar-cane farms, ethanol plants, and universities. We also completed several projects. After that experience, I went back to Brazil—for seven months and alone! A new language, music and dance, new cuisine, new friends, Carnaval, and my classes made the seven months fly. I went there to learn about agriculture, but I came back with much more.

As an undergrad, my favorite class was thermodynamics, which focuses on how and why physical processes occur and the applications of those processes. I gained problem-solving skills, as well as an understanding of energy system efficiency and its impact on society and business.

This past summer, I worked at Caterpillar in Peoria, Illinois, and I have begun my job search! My experience at Caterpillar is guiding me in my search. I’m looking for a job that gives me the opportunity to travel while doing what I love!

There are many options and many career opportunities. If you're just starting out, get involved with a hands-on project and be active in your department. And remember to take a few classes in subjects that interest you—just for the fun of it! 

She seeks the unusual and lives for the unexpected.

She’s **Leigha Curtin**

University of Illinois at Urbana-Champaign  
Agricultural and Biological Engineering  
International Minor in Latin American Studies  
May 2013
My father showed me the career possibilities in ag engineering. He had an ag engineering degree, and he worked as a manager and designer in a variety of disciplines, in and out of agriculture. That flexibility was what I was looking for, because I wasn’t sure what career I would pursue.

In my sophomore year, I took a core class on materials. It was tough, and I studied more for that class than any other. Reviewing the material after class and reading ahead for the next class really helped. In the end, I learned more from that class than any other, and I realized that what I really learned was how to learn.

With time, I got interested in control systems, so I pursued a master’s degree in that area. Now I’m with NASA’s launch services program, which manages the rockets used for satellites and planetary rovers. I work as a guidance, navigation, and control (GN&C) engineer. In the GN&C group, we run computer simulations of rocket designs to make sure the vehicles place their payloads at the intended targets.

Look for a school that fits your interests. If you know what field you want to work in, make sure that the school’s graduates are getting jobs there. And then get some experience in your field, to prove you can do the job and build connections in the industry. Find a company, academic lab, or other organization that can give you experience. At worst, you’ll learn you don’t really like the job as much as you thought you did—and that’s a good thing to find out! Second, be able to tell potential employers what you’re passionate about and what makes you special. As college degrees become more common, job seekers with minimal credentials won’t be able to compete for the best positions.

I’m not sure I’ll ever know what I want to be when I grow up, but for right now, I really enjoy my job. I learn more every day, and my work supports science that improves people’s lives. But if another opportunity comes along, and I can make stronger contribution there, then I’ll take that step—just like my dad!

“M
At Clemson, I started with a major in environmental science. I quickly learned, however, that the people who really have the power to make a difference are policy makers and business owners. I decided to switch to engineering because it had a much larger problem-solving component.

As an undergrad, I learned the most in a unit operations class and in my instrumentation classes. Unit operations can easily become a bottleneck in the process, and that’s where economics can make or break a company. Instrumentation is important for accurately measuring the parameters of a process. Measuring the process—that’s fundamental to any engineering problem!

During two summer internships for the Savannah River National Laboratory, I raised a beautiful ‘garden’ of cyanobacteria, one of the largest and most important groups of bacteria on earth. I designed photo-bioreactors and learned how to use analytical equipment. Now I work in the fermentation department at Myriant Corporation, an industrial biotech company. And I was just promoted to process engineer—a hoped-for position! Although my story is short, it’s sweet—because I am right where I belong!

When considering which school to attend, look for strong job placement and internship/co-op placement programs. And get involved with people! The friends I made in engineering were the best. They all shared a slightly nerdy sense of humor, and our study groups and camaraderie made for solid friendships. If I could change one thing about my college career, it would have been not to spread myself so thin—and spend more time with those who crave mountain biking and love, love, love country music!
I started out in chemical engineering, eager to work on biofuels, but my work with the Committee of 19 changed that. This Auburn student organization creates awareness about world hunger and is actively involved in fighting hunger locally. Auburn is the hub of the UN World Food Program’s college-based efforts. Working on these projects gave me hope for the world’s future.

In addition, my involvement with Engineers Without Borders made me want to work with water resources and sanitation. Biosystems engineering allowed me to take more environmental classes, and the curriculum aligned perfectly with my interest in natural water treatment systems.

Over the summer, I completed a seven-week study-abroad program in India. Mornings, I took classes on Indian culture, and afternoons I worked with a company that makes products for sewage treatment plants. I got a thorough look at engineering work in India, and I got to study with a guru of Hindustani/Classical Indian song!

True story: I was recruited to spy! The company wanted me to visit treatment plants with a translator who would steal information about emerging technologies. I didn’t think that was right, so I visited the plants with my own translator. (The poor girl had to smell sewage all day!) I also met with government officials to learn about upcoming regulations. In India, lack of government transparency and communication is a major issue. Even basic information, that would be publicly available in the United States, is hard to find.

Last fall, I began the Peace Corps Master’s International program for environmental engineering. I will complete one year of classes (12+ hours of graduate classes per semester) and then work as a water and sanitation specialist with the Peace Corps. Ideally, I’d love to work in south Asia with an NGO or non-profit that focuses on water and sanitation.

My advice? Take time to get involved in campus organizations, and share your passion and knowledge with students in other disciplines—and maybe convert them to ag and bio engineering! As ag and bio engineers, we are in a position to make a huge difference in the world.

He knows first hand: everybody needs clean water.

Meet Nathan Warner

Auburn University
Biosystems and Ecological Engineering
May 2012

University of Minnesota
Environmental Engineering
Peace Corps Master's International
2015
picked up photography in 4-H, and I’m still honing my skills. Photography is all about focus, and that applies to school as well. It is better to selectively concentrate on a few things and do them well than to be spread over too many things and be slack in all of them.

Growing up, I enjoyed spending time outdoors, gardening, and raising livestock. My high school grades showed I had a knack for math and physics. In my freshman year at Purdue, I got to know several of the professors in the ag and bio engineering department, and I was attracted by the smaller class sizes, as well as the many career options that an ag engineering degree provides. Ag engineering combined my engineering skills and my agricultural interests, with benefits!

Still an undergrad, I’ve been doing research on rural transportation in developing countries. This allowed me to coauthor an ASABE conference paper on student service learning and jump start the design of a new basic utility vehicle (BUV). The goal was to develop an inexpensive vehicle that can be locally manufactured and used to carry water, people, crops, and supplies in off-road conditions.

Purdue’s partner organization in Africa wanted a design that they could manufacture locally. During three weeks on location in Cameroon, our Purdue team built a prototype BUV, scavenged for parts, ate the local food, met the local chief, and learned volumes about on-site manufacturing. After Cameroon, my design-and-test abilities got another workout as a product-engineering intern in Lafayette, Ind., at Oerlikon Fairfield, a global manufacturer of engineered gear and drive products. I worked full-time over the summer, doing hardware modeling and control system design.

If you are considering agricultural engineering and want to work in industry, find out what industry partners your school has. Check out the courses, talk to professors and students, and find out what hands-on activities are available, such as labs, internships, and team projects. Some of your best skills will come out of these experiences.

I don’t have any firm post-graduation plans yet. I may enroll in a graduate engineering program or work full-time for an engineering firm. Either way, I am certain that I will work overseas again sometime in the future.
You get the idea.

If it has to do with making life better, biological and agricultural engineers do it.

Find your place in one of our three flexible emphasis areas:

- Environmental and natural resources engineering
- Food and bioprocess engineering
- Machinery and bioenergy engineering

Find out more about biological and agricultural engineering at Texas A&M. Visit our web site:

http://baen.tamu.edu
switched from electrical and computer engineering to biosystems and ag engineering after seeing the opportunities in BAE. If you’re interested in more than one type of engineering, then ag and bio engineering is a great choice. It incorporates mechanical, electrical, biological, civil, and many other disciplines into a single degree.

You also have to balance the quality of your education with the cost. Many programs specialize in certain areas, especially at the graduate level, so don’t be afraid to move away from home to attend a university that suits your needs. My search led me to the University of Kentucky, where autonomous vehicles, including tractors and remote sensing airplanes, are a focus. I haven’t looked back.

Being part of the University of Kentucky’s 1/4-scale tractor team has been the best experience in my academic career. It provided me with a greater understanding of what it takes to design, build, and test a product from the ground up.

When I finish my doctorate, I plan to apply for a faculty position in ag and bio engineering at a land-grant university. In the meantime, I’m a lead engineer designing laboratory-grade research tools that are used by universities in the United States, Canada, and China to study ventilation rates in animal housings.

The development of University of Kentucky’s dynamic global positioning system (GPS) test facility is also important to me. This facility was instrumental in the current ISO standard for evaluating the dynamic accuracy of satellite-based positioning devices in agriculture. Dynamic GPS testing provides manufacturers with a method for evaluating their products and for communicating performance results to consumers.

I spend a lot of my free time on woodworking projects. I’m currently building a computer-controlled router to speed up some of my more complicated projects. And I come from a long line of winemakers, a tradition my grandfather brought over from Italy. I still travel home twice a year: every spring for pruning and every fall for harvest.
Travel is in my DNA. By the time I graduated from Oklahoma State, my passport documented a full year in Germany, a half year in Japan, three weeks in Singapore and Malaysia, and another three weeks in Italy!

In high school, I went to science camp and loved it—no homesickness for me! Later, when checking out engineering pathways, I learned about biosystems engineering at Oklahoma State. It was a perfect fit! The diversity and balance of the BAE curriculum was a big draw—mechanical, food processing, and natural resources were equally emphasized. All students had to take a class in each option. That was beneficial, as I was exposed to things that later helped me in my career.

One of my professors helped me obtain an internship with a consulting firm. He also worked as a consultant, and the projects he worked on were exciting. I like working with people, and I wanted the challenge of an engineering problem, too. Consulting was the answer!

Since graduating, I’ve been working for an engineering, planning, and environmental services firm. I’ve been involved at every level, from preliminary studies to detailed design and construction administration. I started off as a design engineer, moved to project engineer, and now I’m a project manager. It’s a fantastic job!

The engineering sciences can be difficult, but working through it with a buddy makes it more manageable. The best friends I made were those who were struggling along with me. So hang in there! Get to know your peers. And take your time. Too many students want to finish college in a hurry, and they over-load. Take time to enjoy things—like a study-abroad experience—before the 9-to-5 routine gets you.

And learn to relax along the way. On the weekends, you’ll find me in dirty overalls, digging in my garden—or out with friends in my favorite peep-toe pumps! I almost accepted a scholarship to attend art school in Boston, but I chose biosystems engineering at Oklahoma State instead!

“Shes
Mary Elizabeth Mach

Oklahoma State University
Biosystems Engineering
May 2006

She never goes anywhere without a Camelback water bottle and a handful of almonds.
While I was in high school, my family purchased Pflueger’s Candy Company. We melt the chocolate and hand dip everything right in the store. I help out when I’m home—dipping, packaging, labeling, pricing. I can’t say the family business pushed me toward a career in food engineering, but it certainly whet the appetite.

For a summer, I worked at ConAgra Foods as a quality assurance intern to identify trends in quality data and correlate them to consumer complaint records. The plant in Milton, Penn., is the fourth largest cannery in North America, where Chef Boyardee products and Healthy Choice soups are made. I updated their 60,000-record database and created a statistical template for analyzing quality data and identifying potential problems.

I moved on to R&D in a process-engineering co-op at Rich Products Corp., in Buffalo, N.Y., working with toppings and icings. I was able to experience both the plant and the corporate environment before I received my undergraduate degree. They were completely different experiences, which helped me see both sides of the food processing industry early on in my career. I worked with a small team of engineers focused on analyzing and implementing processing improvements for non-dairy whipped toppings and icings. I was regularly in the pilot lab, evaluating the newest breakthrough food processing technologies. I had my own project focused on analyzing under a microscope the air cell size and distributions of whipped toppings and icings and then related the data to various process parameters searching for possible improvements.

The best decision I ever made was to do a co-op. I know there’s a need for some to graduate in four years, but taking a semester or two off to do a co-op will help infinitely more than rushing through college with no real work experience.

You can look at a school website, but that’s only going to tell you so much. Rankings and statistics are all well and good, but you have to find the faculty and the program that’s right for you. You’d be amazed how many alumni, specifically at Penn State, come back to hire from the same department they graduated from. Emails about job postings abound, and it’s remarkable to see the wide variety of industries that are looking to hire someone with an ag/bio engineering degree.

I started working for Rich Products Corporation in May after graduation as an R&D process engineer for the desserts group. I really enjoy R&D, testing out the latest technology on a daily basis. I think down the road I might apply to an MBA program, so I can take on more responsibility and larger leadership roles within the company.
I love making things—from sewing and craft projects to sculptures. I once made myself a custom coat out of sweaters. In the autumn, you’ll find me reveling in a collection of fall leaves.

When shopping for a college, I looked at several schools. Purdue had the biggest bang for the buck because I’m interested in agricultural development. Everyone in the department was very friendly, open, and helpful, and there were several hand-on projects focused on developing countries. Before that initial visit was over, I was signing up and packing my suitcase!

Internships are the way to go—literally! I had a Purdue Discovery Park research internship that focused on hand presses for biomass fuel briquettes. As part of the internship, I spent two months in Cameroon doing field research. It was a “wow” experience! Following on the heels of that globe-trotting adventure, I took an internship with a Purdue agronomy professor and worked in Kenya for three months, building agricultural development extension and training materials.

Yeah, an engineering curriculum can be tough, but it’s worth it. My basic soil science class was intense, but I learned a lot that I still carry with me. I also learned a lot in my independent study classes—especially the class on developing a basic utility vehicle and another on writing business plans.

At present, I am considering graduate school or interning with a non-governmental organization (NGO) in ag development. My dream is to work with appropriate technology in developing countries.

Sound good to you? Then do it! Get involved with outside projects your first undergrad year. Get to know the professors, and work with your fellow students. If I could change one thing about my university years, it would be to work with my fellow students even more than I did.
For a long time, I was undecided between engineering and journalism. I chose engineering because my father was a role model, and I was good at math and science. During freshman year, I discovered biological systems engineering. I was drawn to its emphasis on natural sciences—as well as the small classes. The breadth of the program was also reassuring because, at the time, I was still unsure of my path.

Ag and bio engineering can mean different things at different schools, so make sure the school you’re considering offers the concentration you’re interested in. Also look at the research. Seeing what the professors are doing can inspire you. ASABE guest speakers, many of them recent graduates, regularly came in to talk about their work, and that gave me a glimpse of career possibilities, too.

Today, I am a senior engineer for a small civil engineering firm that specializes in sustainable site design and water resources planning. One of the benefits of a small business is that you can grow quickly, which is exactly what I did. I started as an entry-level designer, revising CAD drawings and formatting specifications. Now I design and manage entire projects. I just relocated to Brooklyn to open the company’s New York office!

If I could change one thing, I would have squeezed in a summer internship at a design firm. That would have made me less nervous about entering into the real world. Take advantage of your opportunities while you’re in school. Pay attention, and when you fall behind, ask questions. To make sure I understood everything, I stayed after class, and met with professors during their office hours. And have fun with your fellow students. The relationships that I formed made engineering classes (almost) fun. Surrounding myself with people who knew exactly what I was going through made the tough curriculum bearable.

During the summer, I traveled to Spain with other Virginia Tech students. We lived with host families, attended Spanish language and culture classes, and traveled. I also studied water resources and watershed management in Brazil. My goal is to visit all seven continents. So far, I’ve seen three.

Oh, and I’ve just started making kombucha (an effervescent fermentation of sweetened tea). I’ll let you know how it goes.
1. Have fun with your engineering courses.
   Don’t believe the rumor that engineering courses are too tough. Far from being inscrutable and indecipherable, engineering courses are among the most ordered, logical and, therefore, understandable courses. And they’re fun!

2. Check your assumptions.
   Always be aware of the assumptions that you’re making, and validate them periodically. (Indeed, this is not just an engineering lesson, but a life lesson as well.)

3. Develop your creativity.
   It’s a myth that engineers are like automatons that deal with numbers, hardware, technical stuff, and nothing else. Absolute nonsense! At the same time, don’t despise the required non-engineering courses. That’s where you find the ideas and insights that can provide you with just the right solution to an engineering problem in the future.

4. Learn effective communication.
   Another myth is that engineers are introverts, and not very comfortable with language. More nonsense! Engineers can be fluent in expressing abstract ideas in mathematical form or in computer code, so there’s no reason why they can’t be effective in expressing their ideas in English or any other language. Read widely so that you get exposed to various language and communication styles.

5. Seek to gain research experience.
   Typical classroom engineering problems are mostly idealized, with imagined or predetermined scenarios and parameter values. Gaining some experience in research eases the transition from the ideal world to the real world.

6. Pursue internship opportunities.
   An internship gives you the opportunity to observe, mingle, and work with engineers in their natural habitat—an office, a laboratory, or out on the field. More important, an internship can give you a vision of what your future could look like as a practicing engineer.

7. Network professionally.
   Join your professional engineering society. It has benefits, one of which is getting to meet the practicing engineers in your field locally, nationally, and internationally—an excellent way to learn about the profession’s culture. By interacting with working engineers, you learn about your field—and they get to know you and what you can offer now and in the future.

8. Connect what you are doing now with what you want to do in the future.
   The most successful engineering students are those who have a picture in their minds of where they would like to go professionally, and who understand how what they do now connects to that future. If you practice making those connections, it will be easier to maintain your motivation all the way through to your program’s finish line.

9. Take care of yourself.
   Take care of yourself, not just mentally, but emotionally, physically, and spiritually. Aim for a balanced life. Treasure family ties and friendships. Do something good for others, and remember those who do not have as many opportunities in life as you do.

10. Plan for continuous career improvement.
    Your education doesn’t stop when you graduate. Take the Engineers in Training (EIT) examination immediately. A master’s degree is highly recommended, and keep in mind that being an engineer doesn’t necessarily mean working for a company. You could start your own business—get an MBA or partner with someone knowledgeable in business. Maintain membership in your professional engineering society, and attend its annual meetings. Get that Professional Engineer’s license! Plan to keep learning and growing as an engineer and as a person.

Excerpted from “10 Things Engineering Students Should Mind to be Successful” by Joel L. Cuello, Department of Agricultural and Biosystems Engineering, The University of Arizona, Tucson, USA. Read the article in its entirety at: http://ag.arizona.edu/abe/People/Faculty_Homepages/Joel_Cuello/.
SEARCHING FOR AGRICULTURAL AND BIOLOGICAL ENGINEERING PROGRAMS?

Finding your school requires some time and research. All the schools listed below offer degree programs in agricultural and biological engineering. Contact them directly for more information. School representatives or admissions advisers will be happy to answer your questions and arrange for a campus visit. Try to schedule appointments with the engineering departments before you go. Then, prepare to be enthused!

UNITED STATES
ALABAMA
Auburn University Biosystems Eng Auburn, Ala. www.eng.auburn.edu/programs/bsen/

ARIZONA
The University of Arizona Agricultural & Biosystems Eng Tucson, Ariz. www.ag.arizona.edu/abe

ARKANSAS
University of Arkansas Biological & Agricultural Eng Fayetteville, Ark. www.baeg.uark.edu
Arkansas State University College of Engineering Jonesboro, Ark. www.astate.edu/engr

CALIFORNIA
University of California, Davis Biological & Agricultural Eng Davis, Calif. http://bae.engineering.ucdavis.edu

DELWARE
University of Delaware Bioresources Eng Newark, Del. http://ag.udel.edu/breg

FLORIDA
University of Florida Agricultural & Biological Eng Gainesville, Fla. http://abe.ufl.edu

GEORGIA
University of Georgia College of Engineering Athens, Ga. www.engr.uga.edu/aboutus/new-college-of-engineering

IDaho
University of Idaho Biological & Agricultural Eng Moscow, Idaho www.uidaho.edu/cals/bae

ILLINOIS
University of Illinois at Urbana-Champaign Agricultural & Biological Eng Urbana, Ill. http://abe.illinois.edu

INDIANA
Purdue University Agricultural & Biological Eng West Lafayette, Ind. http://engineering.purdue.edu/ABE/index.html

IOWA
Iowa State University Agricultural & Biosystems Eng Ames, Iowa www.abe.iastate.edu

KANSAS
Kansas State University Biological & Agricultural Eng Manhattan, Kans. www.bae.ksu.edu

KENTUCKY
University of Kentucky Biosystems & Agricultural Eng Lexington, Ky. www.bae.uky.edu/BAE_Home.asp

LOUISIANA
Louisiana State University Biological & Agricultural Eng Baton Rouge, La. www.lsuagcenter.com/en/our_offices/departments/Biological_Ag_Engineering

MAINE
The University of Maine Chemical & Biological Eng Oronoko, Maine www.umche.maine.edu/chb

MARYLAND
University of Maryland Bioengineering College Park, Md. www.bioe.umd.edu

MICHIGAN
Michigan State University Biosystems & Agricultural Eng East Lansing, Mich. www.egr.msu.edu/BAE

MINNESOTA
University of Minnesota Bioproducts & Biosystems Eng St. Paul, Minn. www.bbe.umn.edu

MISSISSIPPI
Mississippi State University Agricultural & Biological Eng Mississippi State, Miss. www.abe.msstate.edu

MISSOURI
University of Missouri Biological Eng Columbia, Mo. http://bioengineering.missouri.edu

MONTANA
Montana State University Civil Eng Bozeman, Mont. www.coen.montana.edu/ce/

NEBRASKA
University of Nebraska-Lincoln Biological Systems Eng Lincoln, Nebr. http://bse.unl.edu/

NEW JERSEY
Rutgers–The State University of New Jersey New Brunswick, N.J. Civil & Environmental Eng www.civeng.rutgers.edu/Bioenvironmental

NEW YORK
Cornell University Biological & Environmental Eng Ithaca, N.Y. http://bee.cornell.edu/
State University of New York Environmental Resources Eng Syracuse, N.Y. http://www.esf.edu/ere/
NORTH CAROLINA
North Carolina Agricultural and Technical State University
Chemical, Biological, & Bio Eng
Greensboro, N.C.
http://www.ncat.edu/aadem/colleges-faculties.html

NORTH DAKOTA
North Dakota State University
Agricultural & Biosystems Eng
Fargo, N.D.
http://www.ndsu.edu

OHIO
The Ohio State University
Food, Agricultural & Biological Eng
Columbus, Ohio
http://fabe.osu.edu/fabe

OKLAHOMA
Oklahoma State University
Biosystems & Agricultural Eng
Stillwater, Okla.
http://biosystems.okstate.edu

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http://bee.oregonstate.edu

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Agricultural & Biological Eng
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http://abe.psu.edu

PUERTO RICO
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http://agricultura.uprm.edu/ingenieria

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Bioengineering
Clemson, S.C.
www.clemson.edu/ces/bioe

SOUTH DAKOTA
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Agricultural & Biosystems Eng
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www.sdstate.edu/abe

TENNESSEE
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Biosystems Engineering & Soil Science
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http://bioengr.utk.edu

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Cookeville, Tenn.
www.tntech.edu/agriculture/home

TEXAS
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Biological & Agricultural Eng
College Station, Texas
http://baen.tamu.edu

UTAH
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Biological Eng
Logan, Utah
http://be.usu.edu/

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Seattle, Wash.
Bioengineering
http://depts.washington.edu/bioe/

Washington State University
Biological Systems Eng
Pullman, Wash.
http://www.bsys.eewsu.edu

WISCONSIN
University of Wisconsin
Biosystems Engineering
Madison, Wis.
http://www.bsee.wisc.edu

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River Falls, Wis.
http://www.uwrf.edu/AGEN/index.cfm

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www.ales.ualberta.ca/a/ca/en.aspx

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Biological Eng
Truro, Nova Scotia
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www.uoguelph.ca/engineering/undergrad-biological-engineering

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www.fsaa.ulaval.ca/sga.html

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professional opportunity

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Additional information on the position and the University of Nebraska can be found at: http://waterforfood.nebraska.edu.

Individuals interested in making application should access the web site: http://employment.unl.edu, search for requisition number 120421, and complete the faculty academic administrative information form. Attach a letter of application, a curriculum vitae, contact information (mailing address, phone number, and e-mail address, if available) for three professional references, and a vision statement for a research agenda for the Daugherty Water for Food Institute (Other). Review of applications will begin November 1, 2012, and will continue until the position is filled or the search is closed.

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