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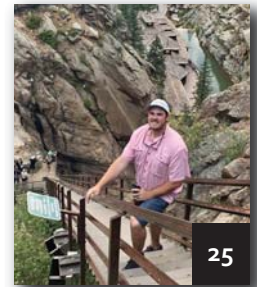
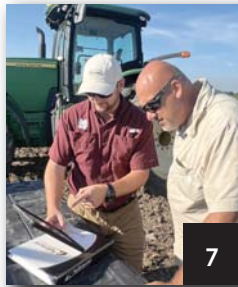
Tristan Thier, Iowa State University, is flying high working on an Ag Systems Technology degree.



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Welcome to **EXPLORE**—a special career edition of *Resource* focusing on everything ag systems management (ASM)! You might be getting ready to start a new chapter of your life. Maybe you will soon be leaving home for college, choosing a major, making new friends, searching for a career. If you aren't familiar with an ASM degree, read on! You'll be impressed with the diverse and interesting possibilities—from hands-on internships and study abroad to jobs awaiting ag systems graduates. If you have decisions in your future, you may discover that an ASM degree is for you. **EXPLORE** is a good place to start your search, you might just find you're going in the right direction.



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LOOKING FOR DIRECTION?

Check out an Ag Systems degree!



What is an agricultural systems degree?

An agricultural systems degree combines an understanding of the agricultural, biological, and physical sciences with business, managerial, and technical skills. Graduates with this type of degree find careers in the production and processing of agricultural products into food, fiber, feed, and fuel, and in the distribution of agricultural products and services. Careers in renewable energy, biofuels, and environmental quality are emerging.

The courses in an ag systems degree program focus on the application of engineering principles, the study of technology used in agriculture, and the integration of business management concepts in agricultural and food industries. However, the skills taught in these courses are applicable to many industries, and a significant number of students find employment in other industries. An ag systems degree is ideal for students interested in technical sales or technical management for an agriculture-related business involved in production, processing, or manufacturing.

Why do the university programs have so many different names?

Prior to the early 1990s, most of the programs were simply called agricultural mechanization as agriculture has become technologically advanced and viewed as a system. Since then, careers for ag systems graduates have expanded far beyond mechanization. Many universities have expanded the scope of their programs to focus on emerging technologies as they apply to food, energy, and environmental systems, in addition to traditional agriculture. These programs address society's need to efficiently utilize natural resources and protect the environment.

So, although they may have different names, these programs are often quite similar. The name of a specific program reflects the philosophy of the school in designing the program. Consult the individual universities about the scope and focus of their programs. Program names currently in use are:

- Agricultural and Environmental Technology
- Agricultural Engineering Technology
- Agricultural Operations Management
- Agricultural Systems Management
- Agricultural Systems Technology
- Agricultural Technology Management
- Agricultural Technology and Systems Management
- Bioresources Engineering Technology
- Engineering Technology Program
- Mechanized Systems Management
- Technical Systems Management.

How does a degree in ag systems differ from a degree in ag engineering?

Today, ag engineers and ag systems graduates both work with the same types of buildings and equipment, the same crops and animals, the same sensors and computers, and the global society, but there is a distinct difference in the work they do. An ag engineer is trained to analyze and design a process, system, or mechanism, while an ag systems graduate is able to identify system problems, formulate possible solutions, analyze the impact of alternatives (including social and economic impacts), and then implement the best solution.

Ag systems graduates have a broad background in agriculture and the physical sciences, along with courses in business, economics, and management. When comparing ag systems to ag engineering, you will find that ag systems programs are less theoretical and more applied. Emphasis is on hands-on learning with equipment, and many courses have laboratory sections.

What do I need to know to get into a program?

An aptitude for science and math, plus an interest in solving problems, is really necessary for this field. You should also have an interest in electronics, computers, and business management. In high school, prepare well in mathematics, physical and biological sciences, English, and agriculture. Take the most advanced high school courses available to you in these areas and, if possible, take computer courses such as CAD and information systems. You don't have to be a math wizard to be an ag systems student, but mathematics is used a great deal.

Do I need a background in agriculture?

No. Ag systems programs have the flexibility to allow students from rural, suburban, and urban backgrounds to develop a program to meet their personal career objectives. If you have a vision of what you want to do after graduation, the curriculum is flexible enough to be tailored to your goals.

Is this a good option for women and minorities?

This field is a great option for women and minorities. The number of women and minorities entering the field continues to rise.

Are internships available?

Yes. Ag systems programs typically offer many opportunities for internship experiences with a variety of companies and organizations. Students find that companies are actively recruiting for interns in this degree as a way to fill future positions. Most experiences are paid internships. For some programs, internships are required for graduation.

How can I find out which schools offer ag systems programs?

The schools currently offering ag systems programs are listed on page 26. Be sure to check with the school in which you are interested regarding its specific program. Begin your search in the agricultural and biological engineering department, which is where ag systems programs are typically administered.

How do I select the school that is a good fit for me?

The internet is a great place to begin your search. Most universities provide detailed information about their programs, including course requirements, on their websites. When you have narrowed your choices, visit the top schools on your list. The faculty, staff, and students will be happy to meet with you and show you their facilities. By visiting the school in person, you will get a better sense of whether the program and setting are right for you.

What are the course requirements for these programs?

Ag systems programs combine a broad education with specific expertise in the agricultural sciences, applied technology, and business management. Courses are relevant to all phases of the food, agricultural, natural resources, and environmental industries. There is no single curriculum for ag systems, but the foundations are similar. ASABE has suggested these guidelines: 15% math/science, 15% technical ag, 15% management, 15% ag systems management, 10% humanities/social sciences, and 15% composition/communication, and 15% electives.

The required coursework balances instruction in agricultural and environmental sciences and agribusiness principles with hands-on knowledge of technology. The supporting courses provide a foundation of mathematics,

“... ag systems programs are less theoretical and more applied. Emphasis is on hands-on learning with equipment ...”

chemistry, economics, communication skills, and computers. In addition to communication and information retrieval, computers are widely used to collect and analyze data and then act on that information to control machines and processes.

How many hours a day will I need to study? Will I have time for extracurricular activities?

How much time you devote to your studies depends on you and your expectations. Many colleges say that for every hour you spend in class (often 15 hours per week) you should spend two or three hours studying outside of class. Tougher courses may require more time, easier courses less. Much

depends on an individual student's ability, attitude, and motivation.

That said, students shouldn't be expected to study at the expense of all other activities. Employers are looking for well-rounded new hires who balanced their study time with involvement in other activities. Involvement in extracurricular activities can also help build your leadership, communication, and organizational skills. Most schools have an ag systems club, and be sure to check out the ASABE student branch at each school you visit. See page 26 for more information about ASABE.

Can I afford an ag systems education?

Typically, the cost of an ag systems degree is comparable to most other college programs. These costs will vary depending on the school you choose. Don't let the cost of higher education prevent you from attending the college of your choice.

Most students need some kind of financial assistance. Numerous types of financial aid are available, such as grants, scholarships, loans, work study programs, and part-time employment. Financial aid is also available from many sources, including the federal government, state agencies, professional societies (such as ASABE), and the university. When visiting a school, be sure to stop by the financial aid office to find out what assistance the school can offer.

What is the career outlook? What types of companies will I work for?

Ag systems graduates are in great demand. Many ag systems programs have a placement rate approaching 100%. The starting salaries are highly competitive and are among the highest of college agriculture majors. The employers and career opportunities are vast and varied. You could be working for a major equipment manufacturer such as Caterpillar or AGCO, a seed and grain company such as Monsanto or ADM, a government agency such as the Natural Resources Conservation Service or the Peace Corps, a consumer-oriented company such as Frito-Lay, Toro, or ConAgra,

or a company in an emerging industry such as biofuels, renewable energy, or controlled-environment agriculture.

Ag systems graduates are also hired by smaller businesses, such as local cooperatives, cotton gins, regional manufacturers, and construction companies, to name a few. Or you could start your own business! The opportunities are endless!

Research and editorial assistance provided **ASABE member Ed Brokesh, P.E.**, Kansas State University, Manhattan, USA. Thank you!



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Age: 27
Hometown: Greenville, Mississippi
Job title: AgrIntelligence Area Technician, Helena Agri-Enterprises
Mississippi State University, BS in Ag Engineering Technology and Business, May 2019, and MS in Agriculture with a concentration in Engineering Technology, November 2020
Likes: Youth pastoring, hunting, Mississippi State University sports
Favorite class: Soil and Water Management

BLADE HODGES

I always dreamed of going to Mississippi State, and when I started the program in the ABE department, I knew I'd made the right choice. My degree program was very broad in that I learned about business management, economics, precision ag technology, ag equipment management, soil and water management, and even agronomics. With such a wide foundation, I knew I would be in a good position to find a job after graduation.


To finish my undergrad degree debt-free, I was able to use multiple scholarships, including departmental scholarships in the ABE department. I started my graduate research project during my senior year, and I completed my MS degree in just a year and a half through a graduate assistantship.

My graduate degree helped me take a deep dive into data analysis and prepared me for the work I do with AgrIntelligence. I also learned many soft skills in grad school, such as time management, meeting deadlines, and how to manage resources, including equipment and people, to be as efficient as possible. Those skills have helped me tremendously in my job.

In my job, I use the field data that my peers and I gather to make agronomic decisions with growers, to help them manage their time, money, and resources more efficiently. No two days are the same. Row crop agriculture is seasonal, so each month brings different challenges, and each year's production is based on many factors that must be managed. That makes the job interesting.

Throughout the year, I gather soil, plant, application, and yield data to help growers make the right decisions at the right time in the right place. I collaborate with a network of salespeople, agronomists, and product specialists to bring solutions to the growers based on the data we collect year round.

I'm inspired by my peers and the work they put in to represent our company in a manner that is beneficial to us all. Based on their example, I strive to better myself every day, to fulfill the role I'm in now and to see where it takes me in the future.

My motivation is my family and my faith. I want to provide for my family and make them proud, and I've always lived by Colossians 3:23-24: "Whatever you do, do it enthusiastically, as something done for the Lord and not for men, knowing that you will receive the reward of an inheritance from the Lord." 



My wife Megan and son Riley are my biggest fans.

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BIOLOGICAL SYSTEMS ENGINEERING



MELANIE HANSEN-WRIGHT

Age: 22

Hometown: Longmont, Colorado

Job title: Farmer

North Dakota State University, BS in Precision Agriculture, minors in Ag Systems Management and AgriBusiness, May 2023

Likes: Farming, breakaway roping, training horses, and dancing

Favorite class: Tractors and Power Units

I grew up on the family farm in Colorado, where we grew alfalfa, barley, corn, and wheat. I always knew that I would eventually come back to the farm, but I planned to work for a dealership first. Plans often change, though, and after marrying my husband, I decided to get right back into farming.

Before my senior year of high school, I switched to Colorado Early Colleges, a network of charter schools that lets students complete an associate's degree in high school. For my senior year, I attended Aims Community College full-time for an AS degree in Agribusiness and an AAS degree in Production Agriculture.

While I was there, I also took two precision agriculture classes, and I was hooked.

After graduating, I attended Northwest Kansas Technical College, where I met my husband. After one year at NWKTC, I began researching BS degree programs in precision agriculture. There was only a handful of choices. I toured North Dakota State University, and between the opportunities that their precision ag program offered and how welcoming the faculty was, especially Matt Olhoft, I knew that NDSU was the right place for me.

I had several internships during college:

- In the summer of 2019, I interned with Miller Coors at their elevator in Longmont, Colorado. I tested the arriving barley and accepted or rejected it based on quality measurements.



- In the summer of 2020, I interned for Farmers Edge in Goodland, Kansas. My responsibilities included training growers on FarmCommand, scouting hail damage, maintaining grower relations, creating field borders in QGIS, and helping the precision ag specialists.
- In the winter of 2020, I worked part-time for Climate FieldView. I was responsible for helping farmers prepare for planting and harvest, pulling data from monitors and uploading it to grower accounts, troubleshooting, and setting up wiring harnesses and FieldView drives.
- From May to December in 2022, I interned with RDO Equipment at their dealerships in Moorhead, Minnesota, and Kindred, North Dakota. That position started as a precision ag internship; however, it transformed into a parts internship when I realized that I enjoyed working at the parts counter.

Best of all, I am the first woman to graduate from NDSU with a BS in precision agriculture!

Since graduating, I farm in Kansas with my husband and his family, along with my family in Colorado. I love farming, and the freedom it gives me to pursue my dreams of breeding and training horses.

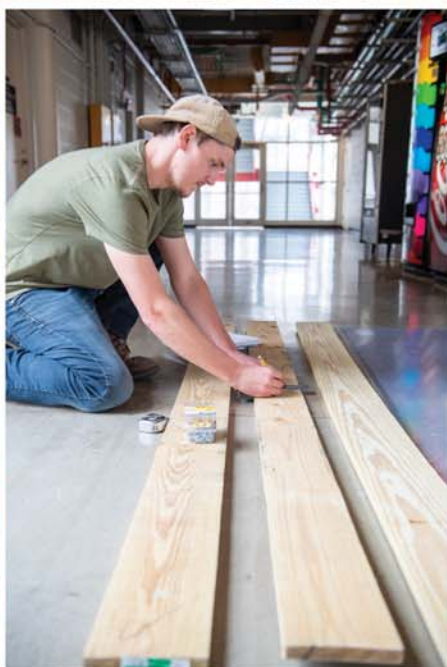
My advice to potential students is to advocate for yourself. Put as much effort as you can into everything you do, because the relationships you create will last longer than your classes and internships. 🌱





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KAITLYNE DIAZ



Age: 24

Hometown: Chicago, Illinois

Job title: Project Engineer at BIG Construction, LLC

University of Illinois at Urbana Champaign, BS in Engineering Technology and Management for Agricultural Systems (ETMAS), May 2021, and MS in ETMAS, May 2023

Likes: Golf, hydroponics, LEED, interiors, hiking, nature, beaches

Favorite class: ETMAS Senior Capstone



I'm a Chick Evans Scholar, which means I'm a recipient of the four year tuition and housing scholarship for cad-dies. I caddied for ten years and met many industry professionals. That was a great experience! I'm also a first-generation college graduate, with both a bachelor's degree and a master's degree, and I proudly represent Guatemala and the Philippines.


At the University of Illinois, I did my MS thesis on the sustainability of freight container farms for food production, as educational spaces, and their impact on the local environment. Since then, because of my interest in project management, I've transitioned from agriculture to construction. I work as a project engineer, supporting a project management team conducting interior buildouts in the Chicago area.

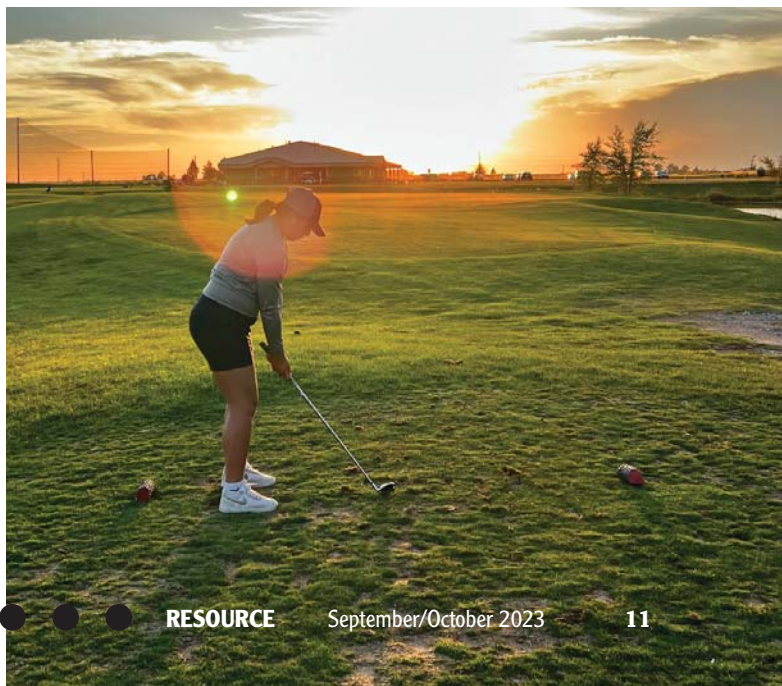
During my graduate program, I took various classes on urban design and LEED principles. Those courses piqued my interest in construction, along with guidance from several classmates and friends who were also headed toward careers in project management in construction.

My professors, including **ASABE member Paul Davidson** and Travis Johnson, were instrumental in helping me decide on a career path. Graduate school prepared me for the position I would eventually be interested in. My graduate degree and work experience also made me more marketable. I had four job offers before I graduated!

At BIG Construction, I see the huge amount of work that goes into starting, building, and closing out a project. My company focuses on interiors, and the number of trades, subcontractors, and overall administrative work that goes into something as simple as an office space requires close attention to detail while dealing with many different factors.

And construction never goes perfectly. Something always goes wrong or is unforeseen, and I often have to think quickly and adapt. Behind every successful project, there is a lot of hard work and brain power, and that has taught me to appreciate the construction workers and the project teams. It's glorious to see a project when it's finally completed.

However, this isn't my my end goal. I want to be a project manager, but starting as a project engineer has been exciting and has helped me learn the basics. One day, I hope to manage projects in entertainment or life sciences. My degree gives me that flexibility! 





TRISTAN THIER

I grew up near the tiny town of Rushmore, Minnesota. In high school, I played basketball and baseball, and I worked on the family farm. My time on the farm helped me develop an appreciation for farm equipment, and I loved solving difficult problems.

After high school, I decided on Iowa State University because of its strong ag engineering program. Another deciding factor was that ISU was not too far from home, but still far enough that I could avoid traveling home for weekend chores!

In my freshman year, I started out as an ag engineering major, but that degree program was not a good fit for me. I didn't enjoy the heavy focus on theory, and I wanted something more hands-on. The Ag Systems Technology (AST) program helped me bridge the gap between ag engineering and my experience on the family farm.

A big factor that led me to AST was how relevant all of the classes were to modern agriculture and ag equipment. Ultimately, the AST program helped me pursue a career in ag machinery testing and validation.

One of the classes in my sophomore year convinced me that AST was the right choice. In TSM 210: Fundamentals of Technology, the instructor, **ASABE member Tom Brumm**, made me feel welcome in AST, and he gave me the practical knowledge I needed in mechanical, electrical, HVAC, and engineering economics. I was hooked!

Age: 21

Hometown: Rushmore, Minnesota

Iowa State University, BS in Ag Systems Technology with minor in Ag Business, May 2024


Likes: 1/4-scale tractor competition, woodworking, tinkering with projects, disc golf, and helping on the family farm

Favorite class: TSM 210: Fundamentals of Technology, and TSM 337: Fluid Power is a close second

ASABE member

A big highlight of my college experience was my speech at the grand opening of ISU's Off-Highway Vehicle Chassis Dynamometer Laboratory (called Dyno Lab for short). I spoke on behalf of ISU's 1/4-scale tractor team and as a student in ISU's Department of Agricultural and Biosystems Engineering.

College is not just coursework. I highly recommend getting involved in organizations outside of class. In my case, the 1/4-scale tractor team applied the skills I learned in class. I was an officer on the team, and I'm proud of our achievements. I'm especially proud of the underclassman who step up every year to keep our team going.

Professional organizations (such as ASABE, SAE, and AST) are also useful. And get involved with students in different degree programs, because one day you will be working with them! 

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HEIDI PHELPS

“If you have a chance to take an internship or study abroad, do it! Take the leap out of your comfort zone.”



Growing up on my family's farm in western New York State, I developed a love for agriculture and for the people who work in this industry. The community where I was raised showed me how dedicated farmers are to their work. A quote from the late Paul Harvey really resonates with me:

"God said, 'I need somebody strong enough to clear trees and heave bales, yet gentle enough to tame lambs and wean pigs and tend the pink-combed pullets, who will stop his mower for an hour to splint the broken leg of a meadowlark....' So God made a farmer."

Regardless of your religious beliefs, that description of a farmer is spot on. Farmers are some of the most hard-working and environmentally conscious people in the world, and they are essential to feeding the world's people. That's what pushed me to be a part of this amazing industry.

I visited several schools before deciding on Purdue. However, Purdue was always at the top of my list because of its agriculture programs, especially the Department of Agricultural and Biological Engineering. When I visited Purdue, it felt like the right place for me, with great people, many campus activities, opportunities for research and internships, and high job placement after graduation.

At Purdue, I got involved in the Agricultural and Biological Engineering Ambassadors, which I really enjoyed

Age: 22

Hometown: Groveland, New York

Job title: Grain leadership trainee at Consolidated Grain and Barge

Purdue University, BS in Agricultural Systems Management/Agribusiness Management, May 2023

Likes: Hiking, skiing, horseback riding, and spending time with family and friends

Favorite class: Electric power and controls

because it allowed me to do outreach work and show other students what Agricultural Systems Management has to offer. The ABE Ambassadors taught me how to network with professors and students in different majors.

In January 2022, I had the opportunity to study abroad at University College in Dublin, Ireland. In Dublin, I continued my ASM studies (including a class in agricultural building design), I joined the University College Equestrian Club and played polocrosse (a sport that combines polo and lacrosse), and I traveled around Ireland, Scotland, France, and Greece.

During two summers, in 2021 and 2022, I worked for Cargill as an operations management intern. My 2021 internship took me to Cargill's grain elevator facility in Pipestone, Minnesota, where I gained an understanding of the process flow and functions by actively participating in everyday operations. In 2022, I interned at Cargill's facility in Reserve, Louisiana. During that internship, I enhanced performance measurement by using PI ProcessBook to adjust the efficiency evaluation program.

Throughout my college years, I was able to experience so much and meet so many people by taking a leap out of my comfort zone, whether that meant working on an internship that was far from home or spending a semester in another country and learning about agricultural technology in a different culture.



GRANT GOOD

Age: 39

Hometown: Olsburg, Kansas

Live in: Moundridge, Kansas

Job title: Director of Global Smart Ag Engineering and Autonomy Initiative Lead, AGCO Corporation

Kansas State University, BS in Agricultural Technology Management, 2007, and MS in Agribusiness, 2013

Likes: Helping on the family farm, cooking, and traveling

Favorite class: BAE 350: Off-Road Machinery Systems

I grew up on a farm near Kansas State University, and I was fortunate to have a solid legacy there through my parents as well as my grandfather, who was head of KSU's Animal Science Department for many years.

At KSU, I knew that I wanted to work in ag technology, but I was torn between an ag engineering degree and Agricultural Technology Management. I chose ATM because of the practical application of the courses and the opportunity to take classes in agronomy, animal science, business, and communications, in addition to the technology classes.

During my undergrad years, I worked in the environmental physics group in KSU's Agronomy Department, installing and monitoring environmental research equipment. I had some great mentors there who really helped me. Based on that experience, I got an internship in the test lab at AGCO in Hesston, Kansas, which led to my career at AGCO.

My undergraduate work created an excellent foundation for my career. The knowledge I gained in the ATM curriculum opened a lot of doors, as did my work experience on campus. A few key decisions and experiences, which may not feel so big at the time, can lead to some really big opportunities!

After a few years at AGCO, I completed a master's degree, which enhanced my knowledge of business and management. That business knowledge, combined with the strong foundation from my undergraduate work, has really helped my career.



I was honored to be on a panel discussion around the "future of food" at an AEM annual conference.

I'm grateful for AGCO's support in developing my abilities and leadership skills. My employer continually entrusts me with new challenges and responsibilities. AGCO gave me the time and resources necessary to pursue my master's degree, as well as other leadership programs. AGCO has also given me countless opportunities to stretch my skills in different cultures, geographies, and roles.

Every day, I'm involved with a huge variety of projects that bring value to farm operations. A typical day involves coordinating with colleagues across multiple continents and corporate functions to facilitate my teams' delivery of solutions that address farmers' needs.

We're currently involved with two exciting challenges: to create a new start-up venture within AGCO, and to lead the advancement of our autonomous machinery solutions.

Honestly, this job is beyond my dreams. Although I aspired to do something like this, I never imagined that I would have the opportunity to lead such amazing people and to deliver technologies that will advance agriculture for years to come.



AG SYSTEMS

ASM allows you to be more hands-on than most any other degree while also learning the business, agronomy, and more classroom learning side of agriculture. It is the best of both worlds and provides/develops a really unique and valued skillset for a future career.
Heidi Phelps

Don't feel that an AST/ASM degree is any less than an engineer. Highly skilled technicians are just as important as engineers. One of the ways that I describe AST/ASM is that I take the bright ideas of engineers and I make them work and bring them to life.
Tristan Thier

An ASM degree can be extremely powerful if you make the most of your course selection. Most ASM degrees offer a great deal of flexibility and provide a unique opportunity to build a breadth of knowledge across agricultural systems and business, which provides a great foundation to build a career or business upon. Challenge yourself with the courses you select—one day you will be happy you did.
Grant Good

If you are someone who is interested in machines, design, or just figuring out how things work this is a great degree for you. It allows you to put these principles into an engaging and useful education that you get a ton of value out of.
Kellen Smith



ADVICE



Take as many college credits as possible through your high school to get the general eds out of the way. That way you can focus more on the classes you are passionate about when you get to college.

Melanie Hansen-Wright

One of my professors told me to find or create the exceptional team and when you have it, treasure it. Teams are very important in my day-to day and being part of a wonderful team makes the difference for me every day.

Faith Kibuye

Don't be afraid to take risks and try new things, and above all don't be afraid to fail at something.

Joshua Jantz

I would tell a high school student considering an ASM degree to absolutely explore that further. Prior to my freshman orientation, I never toured the department or connected with any current students or faculty. Looking back, I wish I did an experience like that to ease some of the nerves of freshman year and to get a better understanding of the classes I would be taking.

Shelby Orton

JOSHUA JANTZ

I've always had an interest in production agriculture, and the Agricultural Operations Management (AOM) degree at the University of Florida helped me explore that interest with a lot of flexibility by offering focuses that range from equipment management to business principles and psychology.

The AOM curriculum, which is split between lecture-based learning and hands-on labs, was the first sign that I had chosen the right path. The combination of lectures and labs gives students useful skills for real-world jobs. In addition to my courses, I worked as a student assistant for a university research farm. That experience helped me see how applicable the AOM program would be on the job.

During my junior year, I looked for an internship that would help me decide if I wanted to pursue a career in animal production or row crop production. When U.S. Sugar advertised at a farm bureau meeting, I applied to their internship program, and I got accepted.

That internship gave me a comprehensive view of everything that goes into managing 245,000 acres of sugarcane. I loved the large-scale production, with its emphasis on precision agriculture and sustainability, and I respected the people I worked with and the company's values. I interned twice with U.S. Sugar and was offered full-time employment after graduation.

My biggest job responsibility is overseeing the fertilizer program during planting and harvest. This involves coordinating fertilizer deliveries, ensuring that the trailers arrive on time at the right locations, scheduling operations to apply fertilizer ahead of the planting crews, and dealing with any equipment or technology issues that arise. This work involves large-scale coordinated



I interned under Bryce Lawson (left) at U.S. Sugar Corp. Bryce is also a University of Florida graduate, with a BS in Food & Resource Economics.

teamwork, and I can see the results as the crop matures from seed to harvest. In addition, the company is constantly investing in research and innovations to become more efficient and more sustainable. That's good for business and good for the Earth.

Through my interest in production agriculture, my dream is to help farmers overcome challenges, and my

position with U.S. Sugar lets me pursue that dream. I'm looking forward to the solutions that we will develop in the future to benefit the ag industry and help farmers feed a growing population.

If you're looking for an internship, my advice is to look for opportunities where you can test your fit with prospective employers before you graduate. With that head

start, you will be off and running in your career.

Age: 23

Hometown: Avon Park, Florida

Job title: Production Supervisor, U.S. Sugar Corporation

University of Florida, BS in Agricultural Operations Management (livestock production concentration) and Animal Sciences (food animal specialization), Spring 2022

University of Florida, MAB in Agribusiness, projected graduation Spring 2025

Likes: Freshwater and saltwater fishing, automotive repair and modification, automotive detailing

Favorite class: AEB-4085: Agricultural Risk Management and the Law

Agricultural Operations Management

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Agricultural & BioRenewable Systems Management

Department of Agricultural and Biological Engineering

ABSM is at the forefront of advanced machinery, precision agriculture, energy, plant-based sustainable materials, and products. This unique program is an applied major that intertwines the study of engineering technology, natural resources, and agriculture with fundamentals of sustainability, business operations, and management. This learning-by-doing course of study prepares students to enter industry careers. Become a future leader in ag production system technologies and biobased products, apply engineering principles, and gain useful skills that will benefit agriculture and our environment.

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Academic Tracks are:

- Agricultural Technologies
- Bioproduct Technologies
- Sustainable Production

Program Minors are:

- Agricultural Systems Management, for non-ABSM students
- Off-Road Equipment, for all students

Penn State is committed to affirmative action, equal opportunity, and the diversity of its workforce.

FAITH KIBUYE



I always enjoyed science in school, and I was curious about natural systems from a young age. As an undergraduate, I had a wonderful opportunity with my advisor to be involved in water treatment research. We experimented with biochar for the removal of heavy metals in water. That experience really got me interested in water resources research and management.

As I neared graduation, I wanted to continue doing research, so I pursued graduate studies. Penn State is one of the top universities in the water resources field, so I was

Age: 30
Hometown: Kisumu, Kenya
Job title: Extension Specialist with Penn State Extension Agronomy and Natural Resources Unit
Benedict College, Columbia, South Carolina, BS in Environmental Health Science, and **Penn State University**, PhD in BioRenewable Systems
Likes: Spending time in the outdoors and reading a good book
Favorite class: Environmental science classes

water and wastewater utilities and monitoring surface water quality. That graduate experience broadened my knowledge

and my interests. I also had wonderful opportunities to network with industry and academic professionals.

After getting my doctorate, I worked as a post-doctoral researcher at a water treatment utility, after which I worked for a water and wastewater treatment consulting firm before ending up at Penn State as an Extension Specialist.

My current job brings together all of my experiences and interests in water resources. I work closely with Extension educators, various stakeholders in Pennsylvania, as well as university faculty. I conduct Extension-focused field research on drinking water quality and research to develop educational programs that support Extension activities across the state.

A typical day includes talking with community members to address the water quality issues they are facing, field work for ongoing research projects, as well as preparing journal articles and presentations. I learn about different water quality issues every day, and I enjoy the process of figuring out research methods that can provide solutions for our stakeholders.

Getting a wide range of experiences can help you identify what you are passionate about. When you are passionate about a field of study, and you see yourself enjoying the career options, pursue it!



“When you are passionate about a field of study, and you see yourself enjoying the career options, pursue it!”

delighted when I was accepted to the BioRenewable Systems graduate program in Penn State’s ABE department.

As an undergraduate, I had an internship at the Oak Ridge National Laboratory, where I worked with a post-doctoral student on a laboratory study that investigated biogeochemical transport of mercury. That internship opened my eyes to the vast environmental and water quality issues that require scientific research to find solutions.

During my undergraduate research experience and my internship, I learned a lot about laboratory methods. As a graduate student, my research extended to field work with

KELLEN SMITH

Age: 22

Hometown: Columbia, Missouri

Job: Marketing representative for John Deere
Oklahoma State University, BS in Agriculture Systems Technology with a minor in Ag Business and Economics, Spring 2023

Likes: Traveling, skeet shooting, and tinkering with things

Favorite class: AST 4303: Automation, Sensors, and Controls. That class took a deep dive into the principles of precision agriculture. At the end of the class, we created and coded, from scratch, a spray nozzle test station with pulse width modulation.



Growing up in Missouri, I was fascinated by agricultural machinery, and I always wanted to figure out how things worked. I had a chance to pursue that interest through my family, 4H, and FFA, where I served on the ag mechanics team for several years. Those experiences helped me realize what I wanted to do for a living.

When I toured Oklahoma State University (OSU), I learned about a new degree program called Agriculture Systems Technology (AST). It sounded like a perfect fit, so I enrolled at OSU.


During the summer of 2022, I worked as an intern for Sydenstricker Nobbe Partners (SNP), a full-service John Deere dealer network with locations throughout Missouri and Illinois. I rotated around their organization and saw how it operated. I also worked closely with their precision ag team to help solve whatever problems the customers had. That internship opened my eyes to the other side of the parts counter and helped me understand people's perspectives on both sides.

I found my current position through the career fair sponsored by OSU's College of Agriculture. Many great companies were represented at the career fair, and John Deere was one of them. The John Deere representatives encouraged me to apply to their marketing representative program. I got an interview the next day. I was a big fan of their corporate values, and I knew that I could make a career with John Deere.

When I started with John Deere, the sense of community surprised me. For a corporation with more than 75,000 employees, it has a real small-town feel. Everyone is willing

to help, and we all work together toward the shared goal of making our products and services better.

My work at John Deere also offers a lot of variety. One week, I'm out in the field working with equipment, and the next week I'm working on a new product, or developing training, or going to a conference to learn new things. That variety keeps the work fresh and interesting.

The undergraduate work I did at OSU was spot on for preparing me for employment. The classes for my AST degree were full of useful and practical information that I apply every day at work. 



Kellen (left) at a SNP hay day event.

SHELBY ORTON

I grew up in a rural part of New Mexico that is strongly dependent on agriculture, primarily ranching. My family had horses, cows, chickens, dogs, and cats. My father is a large-animal veterinarian, and I went on calls with him every chance I could to visit other farms and ranches.

While I grew up in New Mexico, my family took summer trips to North Carolina to visit my mother's family. When I was in middle school, I moved to North Carolina with my mom and my sister.

In high school, I particularly enjoyed science and history classes. During my junior and senior years, I was enrolled in the North Carolina School of Science and Mathematics (NCSSM) online program. In addition to my regular high school classes, I completed rigorous online classes in genetics, engineering, modeling, and mathematics.

When I attended freshman orientation at North Carolina State University, the new students were grouped by major. I was the only girl in Biological and Agricultural Engineering Technology (BAET)! I was terrified at first, but those fears subsided as I got to know the other BAET students. When I moved to campus and started classes, I saw the same faces that I'd seen at orientation, and those guys became some of my closest friends.

If your university has a student chapter of ASABE, get involved with it. I joined the NC State student chapter during my freshman year, and that allowed me to connect with other students, faculty members, and industry professionals. I also served as the 2022-2023 president for the NC State student chapter. The leadership skills I got from that experience have been useful in many areas of my life, such as other clubs, internships, and now my full-time job.

Age: 22

Hometown: Fort Sumner, New Mexico, and Hickory, North Carolina

Job title: Professional Development Program, BASF Agricultural Solutions

North Carolina State University, BS in Biological and Agricultural Engineering Technology with a concentration in Environmental Systems Management and minor in Agricultural Business Management, May 2023

Likes: Hiking, canoeing, kayaking, fly fishing, and backpacking, as well as reading, watching sports, and visiting museums

Favorite classes: Shop Processes and Management, and Water Management

ASABE member



I also got involved with Agriculture Future of America (AFA) during my freshman year, and I remained active with AFA all four years. AFA also helped develop my leadership skills, build a personal network of agricultural professionals, and explore different career paths in the ag industry. If you're interested in a career in agriculture, be sure to check out ASABE and AFA.

Involvement in on-campus activities will provide opportunities that build your teamwork, leadership, and communication skills. You will also meet people from other departments at your school, from other schools across the country, and even from other countries. That experience will broaden your horizons, which is always a good thing.



Undergraduate Degrees

- B.S. Biological Engineering
 Four concentration areas:
 - Agricultural Engineering
 - Bioprocess Engineering
 - Ecological Engineering
 - Environmental Engineering
- B.S. Biological and Agricultural Engineering Technology
 Two concentration areas:
 - Agricultural / Machinery Systems
 - Environmental Systems

Research Degrees (stipends available)

- MS in Biological and Agricultural Engineering
- Ph.D. in Biological and Agricultural Engineering

Professional Masters (available online)

- Master of Biological and Agricultural Engineering

Graduate Certificates (available online)

- Design and Analysis of Environmental Systems: Watershed Assessment and Restoration
- Agricultural Data Science



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BIOLOGICAL & AGRICULTURAL TECHNOLOGY MANAGEMENT MAJOR The Department of Biosystems Engineering



Established in 2019, the Auburn University Biological & Agricultural Technology Management (BATM) major produces graduates who use technology to solve challenges faced in modern agricultural and biological systems. Students take a variety of courses in technology, science, and business management that help them become proficient in developing solutions to these challenges. Our first graduating class completed their capstone project in 2022 by using modeling software and 3D printing to develop and manufacture a ceiling mounted electrical light box. This light box supports key-less socket and light bulbs to prevent electrical and fire liability that often take place in commercial poultry houses. In 2023, three teams worked closely with an agricultural consulting company to provide a feasibility study on the adoption of new spreader technology that can minimize overapplication of fertilizer and reduce in-field overlap. To learn more about the BATM major and Biosystems Engineering, scan the QR code.

Connect with us



AUBURN UNIVERSITY
 College of Agriculture
 Biosystems Engineering

ADAM LENHARD

I was born and raised in Marietta, Georgia, along with an older brother and sister, and plenty of dogs. Growing up, my family's favorite activities were hiking in the North Georgia Mountains and visiting national parks. Ever since I can remember, I've loved the outdoors and music.

When I graduated from high school, I had been busking at the local farmers' market with my ukulele and guitar. I always loved performing and spreading musical joy. I also loved living in the South and being near my family. Because of all that, I wanted to attend a college that was close to home.

I started at Auburn with a major in civil engineering, transferred to environmental engineering, and then to biosystems engineering. I didn't feel at home in those engineering programs though.

During my sophomore year, my adviser told me about Auburn's new BATMan program, and I was hooked. The courses sounded interesting, and the career possibilities intrigued me.

Because I was part of Auburn's first-ever BATMan class, I could choose from a wide variety of courses that would count toward the major. Another benefit was that the major-specific classes were small, which allowed more interaction and better learning opportunities.

Most important, with climate change threatening the Earth's food supply and freshwater resources, I wanted a degree that could help solve this global challenge. With a name like BATMan, could there be a better path to saving the world?

Music was also a big part of my college experience. During my senior year, I was a radio DJ, and I performed live music on the air. I

Age: 23

Hometown: Marietta, Georgia

Lives in: Ventura, California

Job title: Musician

Auburn University, BS in Biological and Agricultural Technology Management (BATMan), May 2022

Likes: Reading, surfing, hiking at National Parks or just around town, listening to vinyl records, and making music.

Favorite class: Electronics and Controls, which I took in my senior year. That class was the culmination of everything I learned in the BATMan program at Auburn.

Watch online:

<https://www.youtube.com/watch?feature=shared&v=cy6hx4vDPMg>



released my first album on April 22, 2022 (Earth Day), and I performed live on campus as part of Auburn's Concerts on Campus series.

My first job after college was with Bonnie Plants at their huge greenhouse facility in Oxnard, California. Soon after moving to California, my interest in music began to reignite. At Auburn, I had learned how to balance work and music. During the day, I went to work at Bonnie Plants and learned all I could about the ag business. After work, I went into the city, looking for music.

While I loved my job, I gradually transitioned to working full-time in the music business. I now manage about 50 artists, scheduling them for various venues and making sure they are set up to provide an enjoyable performance. Setting up the complicated sound equipment is a perfect application of the electrical skills I learned in the BATMan program.

And whenever I perform, I try to share with the audience what I learned at Auburn. Sharing my knowledge about the beauty of the Earth, and how we can all protect it, is the most rewarding aspect of my job.



CODY ROEBKE



Age: 25

Hometown: West Fork, Arkansas

Job title: Service Business Development Manager, Great Plains Kubota

University of Arkansas, BS in Agriculture, Food, and Life Sciences with double majors in Agricultural Systems Technology Management and Agricultural Business, May 2020

Likes: Camping, hiking, kayaking, landscaping, riding side-by-sides (SxS), and working on my vehicles

Favorite class: Electricity in Agriculture

I grew up surrounded by agriculture. I joined 4-H at the age of ten, and my sister and I raised chickens, turkeys, pigs, sheep, and cows to show at the fair every year. From a young age, I was also involved in my family's livestock businesses. I helped one set of grandparents with their sheep farm, and I helped my other grandparents with their cow-calf operation.

During high school, I was in a program called Upward Bound. As part of that program, I spent summers taking classes at the University of Arkansas to prepare for the next school year. I liked the campus and it was close to home, so I could go home on the weekends to help on the family farms.

In addition, one of the leaders of our 4-H program taught at the University of Arkansas, and she told me about the ag systems degree program. She thought the degree would be a good fit for me because it includes hands-on training as well as the business management side of the ag industry.

With that experience and advice, my college decision was easy. The ag systems program taught me hands-on skills, such as welding, electricity, surveying, and leadership, that I would not have learned in any other four-year degree program.

I also liked that the program required students to complete an internship that provided real-world job training. During

my college summers, I worked at the local New Holland dealership, and I spent one summer completing an internship at Kubota Tractor in Fort Worth, Texas.

That internship led to a job after graduation. I started working as a division service rep for Kubota Tractor in Fort Worth, and I was soon promoted to field service manager in Oklahoma, where my wife Taylor and I bought our first house.

My wife and I met during our freshman year at the University of Arkansas, and we got married after graduation. We moved to Oklahoma and started exploring this new state in our fifth wheel. So far, we've been to 15 of Oklahoma's 32 state parks.



While Oklahoma has some surprisingly beautiful areas, my wife Taylor and I traveled to Pikes Peak in Colorado with our dog, Fay, for these views!

Right now I work for Great Plains Kubota as a service business development manager (BDM). In my role as a BDM, I provide internal support for nine service managers and 30 technicians throughout the company. I ensure customer satisfaction, create new processes that help drive profitability, and aid in strategic planning for the service department.

Here's an important lesson that I learned along the way: Education doesn't stop at graduation, and a strong work ethic can be just as valuable as knowledge. Employers are looking for people who are willing to learn new skills, and not just do things the way they've always been done. My ag systems degree taught me how to be that kind of person.





START YOUR SEARCH TODAY!

These schools have programs in agricultural systems and technology. Contact them directly for more information. Many of these programs are administered by Agricultural and Biological Engineering Departments.

ARKANSAS

University of Arkansas

Agricultural Education, Communication and Technology
agricultural-education-communications-and-technology.uark.edu/

CALIFORNIA

California Polytechnic State University

BioResource and Agricultural Engineering Department
www.calpoly.edu/major/bioresource-and-agricultural-engineering

Fresno State University

Industrial Technology – Agricultural Systems Management
catalog.fresnostate.edu/preview_program.php?catoid=3&poid=1713&returnto=90

Modesto Junior College

Agricultural Mechanics
www.mjc.edu/instruction/agens/ag_mechanics.php

FLORIDA

University of Florida

Agricultural Operations Management
catalog.ufl.edu/UGRD/colleges-schools/UGAGL/AOM_BS/

GEORGIA

Abraham Baldwin Agricultural College

Agricultural Technology Management
www.abac.edu/department/ag-natural-resources/agriculture/#Agricultural-Technology-Management-B-S-

Fort Valley State University

Agricultural Engineering Technology
www.fvsu.edu/agricultural-engineering-technology/

IDAHO

University of Idaho

Agriculture Systems Management
www.uidaho.edu/cals/soil-and-water-systems/bs-ag-systems-management

ILLINOIS

Southern Illinois University

Agricultural Systems and Education
academics.siu.edu/agriculture/ag-system-education/bachelors.php



UNIVERSITY OF ILLINOIS

Engineering Technology and Management for Agricultural Systems
academics.siu.edu/agriculture/ag-system-education/bachelors.php

INDIANA

Purdue University

Agricultural Systems Management
engineering.purdue.edu/ABE/academics/undergraduate/asm.html



IOWA

Iowa State University

Agricultural Systems Technology
www.abe.iastate.edu/undergraduate-students/agricultural-systems-technology/

KANSAS

Kansas State University

Agricultural Technology Management
engg.k-state.edu/academics/undergraduate/agricultural-technology-management/

MINNESOTA

University of Minnesota Crookston

Agricultural Systems Management
crk.umn.edu/

MISSISSIPPI

Mississippi State University

Agricultural Engineering Technology and Business
www.cals.msstate.edu/students/majors/agricultural-engineering-technology-business.php

MISSOURI

University of Missouri

Agricultural Systems Technology
ast.missouri.edu/

NEBRASKA

University of Nebraska-Lincoln

Agricultural Systems Technology
bse.unl.edu/agst
Mechanized Systems Management
msym.unl.edu/

NEW YORK

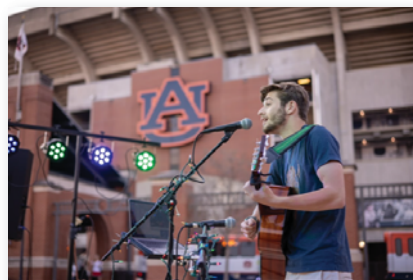
State University of New York, Cobleskill

Agricultural Equipment Technology
www.cobleskill.edu/academics/programs/agricultural-engineering/agricultural-equipment-technology-bt.aspx

NORTH CAROLINA

North Carolina State University

Biological and Agricultural Engineering Technology
catalog.ncsu.edu/undergraduate/agriculture-life-sciences/biological-agricultural-engineering/biological-agricultural-engineering-technology-bs/



NORTH DAKOTA

North Dakota State University

Agricultural Systems Management
www.ndsu.edu/programs/undergraduate/agricultural-systems-management

OHIO

Ohio State University

Agricultural Operations
agoperations.cfaes.ohio-state.edu/

PENNSYLVANIA

Pennsylvania State University

Agricultural Systems Management
agsci.psu.edu/academics/undergraduate/minors/agricultural-systems-management

SOUTH CAROLINA

Clemson University

Agricultural Sciences
www.clemson.edu/cafls/agricultural-sciences/index.html

SOUTH DAKOTA

South Dakota State University

Agricultural Systems Technology
www.sdstate.edu/programs/undergraduate/agricultural-systems-technology-bs

TENNESSEE

Tennessee Technological University

Agricultural Engineering Technology
www.tntech.edu/cahe/ag/areas-of-study/ag-engineering-technology.php

University of Tennessee at Martin

Agriculture Engineering Technology
www.utm.edu/academics/majors-and-programs/agriculture-engineering-technology

TEXAS

Texas A&M University

Agricultural Systems Management
catalog.tamu.edu/undergraduate/agriculture-life-sciences/biological-agricultural-engineering/agricultural-systems-management-bs/

UTAH

Utah State University

Agricultural Systems Technology
www.usu.edu/degrees-majors/agricultural-systems-technology-bs

WASHINGTON

Washington State University

Agricultural Technology and Production Management
afs.wsu.edu/ag-technology-and-production-management/

WISCONSIN

University of Wisconsin-River Falls

Agricultural Engineering Technology
www.uwrf.edu/ENGTECH/

CANADA

Université Laval

Soil and Agri-Food Engineering Department
www.fsaa.ulaval.ca/en/faculty/departments-school/soil-and-agri-food-engineering-department

IRELAND

University College Dublin

Agricultural Systems Technology
hub.ucd.ie/uisis/!W_HU_MENU.P_PU_BLISH?p_tag=MAJR&MAJR=ETS2



ADVICE FOR LIFE

“ A strong work ethic can be just as valuable as knowledge. Many employers are looking for employees that are willing to work hard at learning new skills and traits and not just do things the way they have always been done before.
Cody Roebke

“ Seek out happiness. We work to live, we do not live to work. Nothing is more important than your own enjoyment of this one life we all get to live, so try not to stress when things seem uneasy or not going your way. A career is your own path to walk, and, unlike school, no one is going to tell you how you should walk it
Adam Lenhard

“ Be open minded to all job opportunities thrown your way. Get ahead of the game and start networking and reaching out to people now. Don't limit yourself and know your worth knowing that you have prepared for this moment.
Blade Hodges

“ Do not be afraid to dive headfirst. Adulthood is intimidating but you should walk into it open-minded and ready to absorb what you learn like a sponge. It's almost like school without grades, you can learn and grow in the industry from real professionals which adds value to the experience with your career. Ask a lot of questions!
Kaitlyne Diaz



WHAT CAN I DO?

You've got your degree, what's next? Which way do you go? What are your job options? Where should you apply?

Ag Systems graduates are in high demand. Depending on qualifications and experience, starting salaries for ASM graduates range from \$38,000 to \$67,000 according to Iowa State University. Starting salaries depend on a candidate's skills, previous work experience, internships, and other factors determined by various employers. For more information, check with individual schools regarding their placement records (see page 26.)

So, what would you like to do? What company could you work for? Here are some ideas!



Possible jobs

Ag Imports Inspector
Ag Structures Manager
Assembly Technician
Automation Technician
Bank Field Representative
CAD Programmer
Control Systems Manager
Construction Supervisor
Cooperative Ext Specialist
Crop Adjuster
Crop Systems Specialist
Customer Support Technician
Dairy Equipment Specialist
Design Technician
District Sales Manager
Elevator Manager
Engineering Technician
Energy Advisor
Environmental Consultant
Experimental Mechanic
Facilities Manager
Farmer/Owner/Operator
Farm Appraiser
Farm Business Manager
Farm Equipment Dealer
Farm Facilities Manager
Field Agronomist
Field Representative
Food Production Supervisor
Golf Course Manager
Grove Management
Integration Manager
Intl Ag Development
Irrigation Management
Irrigation Salesperson
Irrigation Specialist
Loan Appraiser

Maintenance Supervisor
Marketing Supervisor
Management Specialist
Management/Waste Network Engineer
Operations Manager
Parts Operations Supervisor
Precision Ag Specialist
Petroleum Sales
Plant Production Supervisor
Precision Ag Specialist
Product Testing
Production Supervisor
Program Technician
Professor
Quality Control Manager
Reclamation Inspector
Research Technician
Sales Representative
Safety Specialist
Service Representative
Shift/Production Supervisor
Site Superintendent
Soil Conservationist
Soil Scientist
Structures Sales Rep
Structures Specialist
Technical Service Rep
Territory Sales Manager
Territory Service Manager
Test Technician
Ventilation System Designer
Veterinary Technician
Vo-Ag Teacher (w/certification)
Water Management Specialist
Water Quality Specialist
Water Treatment Technician

Possible employers

Aerotech
Ag Reliant
Allen Bradley
AGCO
Ag Leader Technology
Ag Processing, Inc.
Agrilience LLC
Agrivision LLC
Almaco
Ag-Chem Equipment Co.
Archer Daniels Midland
Banner Engineering
Blue Bell Creameries, Inc.
Bobcat
Bunge Corp.
Cargill
CNH Industrial
Caterpillar
Cenex-Land-O-Lakes
CLAAS
ConAgra
Cummins Engine
Dairyland Seeds
Deere & Company
DeKalb-Pfizer Genetics
Detroit Diesel
Dole Fresh Vegetables
Dow AgroSciences
DuPont/Pioneer
Eaton Corp.
Eli Lilly
EPA
FM.S.
Farm Credit Service
FieldStar
Frito-Lay

Gavilon
Gehl
General Electric
General Mills, Inc.
Gilardi's Frozen Foods
Government agencies
Growmark, Inc.
Helena Chemical
Hershey Foods
Hog Slat, Inc.
Holt Agribusiness
Hormel Foods Corp.
IBM
Ingersoll Rand
John Deere
Kinze Mfg. Co.
Koehler
Kraft Foods
Kubota Tractor Corp.
Landoll Corp.
Monsanto
Morton Buildings
Mustang Tractor
National Instruments
NGL Energy Partners
Parker Hannifin
Peace Corps
Pinnacle Food Group
Pioneer Hi-Bred International
Puck Custom Enterprises
River Valley Forest Services
Sage Ag
Seneca Foods Corporation
Sukup Manufacturing Co.
Syngenta
Trackside Solutions
Van Wall Group
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professional listings



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