



FOOD AND AGRICULTURE IS STEM

The logo for STEM connector, featuring the word "STEM" in a blue hexagonal frame with a white outline, and "connector" in a smaller blue sans-serif font below it.



FEEDING THE WORLD WITH STEM



When you discover what it takes to feed the world, you may be surprised at the numerous and diverse roles required to get food from field to table. From digital agriculture to drones, the food industry is more than farming and largely fueled by science, technology, engineering, and math (STEM).

An education in STEM opens a world of opportunities in this rapidly growing, high-tech industry where opportunities abound for future STEM generations to make a profound difference in the world. In this ebook we explore STEM's role in food and agriculture, highlighting the technology, careers, and pathways for the next generation of STEM talent to enter the workforce.

If you are interested in pursuing a meaningful career that makes an impact, consider the challenge of feeding every human being on the planet. And read on.

-Team STEMconnector



The Food and Agriculture industry is increasingly a STEM industry. Our industry hires for data analytics, genomics, soil science, agronomy, cyber security, venture capital, biomedicine, engineering and much more. Many of the solutions that will help us produce food, mitigate for climate impacts, grow plants in a world with less water, and increase yields with less land are innovations that will be created by today's young people. Maybe you will be the future scientist, entrepreneur, engineer, or innovator that will help us feed the future."

Kristin Kirkpatrick,

Executive Director, Together We Grow

1 US FARM
**FEEDS
166
PEOPLE**

THERE ARE
**2M
F FARMS
MS IN THE US**

AGRICULTURE CONTRIBUTES
**OVER
\$100
BILLION
ANNUALLY
TO THE US
ECONOMY**

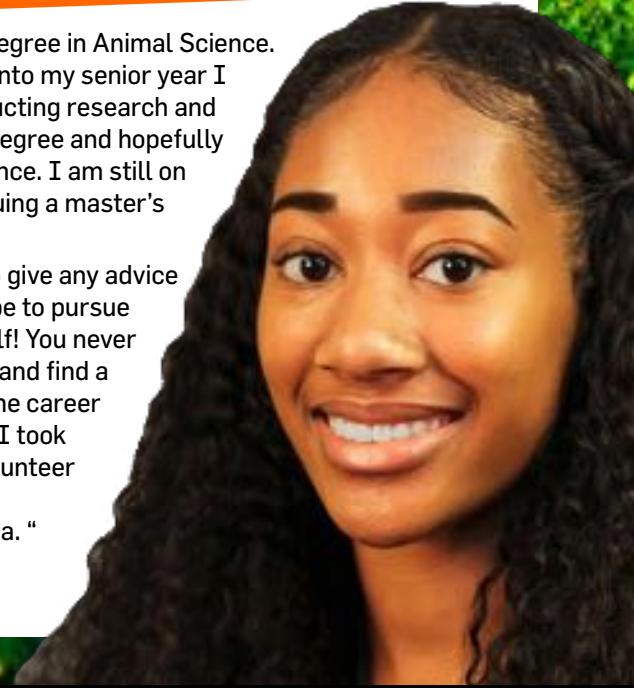
**OVER
50,000
JOBS**
IN AGRICULTURE ARE AVAILABLE PER YEAR IN THE US, YET THERE AREN'T ENOUGH QUALIFIED GRADUATES TO FILL THE SPOTS.

Jessica Johnson

Research Assistant at STEMconnector

I have a Bachelor of Science degree in Animal Science. After a few internships, going into my senior year I realized that I preferred conducting research and decided to pursue a master's degree and hopefully one day, a Ph.D. in Animal Science. I am still on my STEM path, currently pursuing a master's degree in animal science.

Jessica's Advice: "If I were to give any advice to younger students, it would be to pursue all options! Do not limit yourself! You never know what you'll stumble into and find a passion for. Before I decided the career emphasis I wanted to pursue, I took many internships, jobs, and volunteer opportunities so I could get an honest perspective of each area."



REAL PROBLEMS TO SOLVE



There is a global food shortage. The population continues to grow at a rapid rate, while land becomes more and more scarce and unfavorable environmental conditions like drought, wildfires, floods and diseases take a toll on existing farmland. Some estimates project we must produce 50% to 100% more food than we are currently producing to meet demand. These are our real-world challenges for food and agriculture. The solutions will come from STEM.

FOOD WASTE

The United States is the leader in food waste. The majority of food waste in this country ends up in landfills making it the number 1 material in American landfills, accounting for over 24% of all municipal solid waste, according to the EPA. Food waste is more than food that does not get eaten. Food waste depletes natural resources, harms the environment and wastes food that more than millions of food insecure people could benefit from.



FOOD JUSTICE

Food justice specifically recognizes that the food system is significantly influenced by race and socioeconomic factors that lead to devastating injustices including food deserts and food insecurity that often target low-income families and minority communities. There are many efforts across the US to end food injustice including Soul Fire Farm, Black and LatinX Farmers Immersion, Food Chain Workers Alliance and The Restaurant Opportunities Center.

FOOD DESERTS

Food deserts are geographic locations where residents' access to nutritious, affordable food options are significantly limited or completely unavailable. Despite the greater concentration of grocery stores in urban areas, many have been pushed out of cities due to economic struggles causing a further decrease in healthy, affordable food availability. According to a report compiled by the Economic Research Service of the US Department of Agriculture, 2.3 million Americans live more than one mile away from a grocery store and do not own a car. Wealthy areas contain three times as many grocery stores than poorer ones and characteristically white neighborhoods contain an average of four times as many grocery stores with greater selection than predominantly African American neighborhoods.





SUSTAINABILITY

Food sustainability is about finding ways to produce enough food for the entire population in a responsible way. This includes maintaining environmental quality and natural resources upon which the agriculture industry depends as the demand for food increases globally. A career in sustainable agriculture could be pursued through many paths including local/regional farming, marketing, technology, advocacy and teaching.



FARMERS MARKETS

Local farmers markets are a beneficial way to provide access to fresh, healthy food for everyone and support local growers. Local markets provide a shorter supply chain with less food handling than commercial grocers. And, despite common perception, locally grown produce is often sold at lower or comparable prices to supermarkets. The majority of the money spent at a local farmers market stays within the community supporting the local economy. There is still much work to be done however, to bring more farmers markets to low-income neighborhoods and to educate not only on the benefits of healthy eating but meal preparation as well. Things are trending in the right direction with the USDA reporting the number of SNAP (supplemental nutrition assistance program) households shopping at farmers markets on the rise, increasing 35% between 2012 and 2017, and the development of USDA programs for nutrition education.

URBAN GARDENS

As populations in urban areas continue to grow, so does the need for food. Urban gardens are a way to incorporate agriculture within cities to address food insecurity, freshness and also create employment, while using fewer natural resources. Garden plots can be extremely productive, providing 20 kg of food per year for each square meter. Urban agriculture has been shown to reduce temperatures in cities due to plants' absorption of carbon dioxide, the greenhouse gas that largely exacerbates global warming. Compared to the US, other countries utilize urban agriculture to feed a remarkable amount of their populations, decreasing food insecurity.



THE STEM-FUELED FUTURE OF AGRICULTURE



By 2050 there are expected to be 10 billion people on the planet. How to feed everyone is a real and ongoing challenge for the entire world. The effects of climate change, extreme weather and water shortage are driving the need for sustainability and innovative solutions.

Using our natural resources more responsibly and efficiently is the driving force behind many technology and innovative advancements in agriculture. Today, one U.S. farm feeds 166 people annually in the U.S. and abroad. The global population is expected to increase by 2.2 billion in the next 30 years, which means the world's farmers will have to grow about 70% more food than what is now produced.

Agriculture production has tripled but cannot keep up with demand without the use of artificial intelligence. Technology is the modern-day farmhand and from pesticides to smart harvesting and creating farmland in land-locked areas, AI is plowing the way towards a new future for farming. Tackling the agricultural labor shortage, the lack of available land, and curbing a global food shortage are daunting endeavors but just some of the ways AI is making an immediate and game-changing mark on agriculture.

AUTONOMOUS TRACTORS

Autonomous tractors are being used to help farmers perform operations in a less demanding and more efficient way. Autonomous tractors use high-tech sensors to plant and harvest crops without the presence of the farmer. The use of autonomous tractors enhances accuracy in farming, collects data for farmers and allows for effective land management.



ROBOTS

On the ground, robots seed, pick fruit, pull weeds, and fertilize. From the air, drones gather images to assess the health of crops. This high-tech tag-team reduces labor costs and allows farms to flourish in urban areas. Robot assisted greenhouses are helping big cities become

America's new farmland, bringing fresh produce to urban areas. Robots are specially designed to pick only the ripe fruit and to harvest gently and efficiently. Agricultural robots, known as agribots, are predicted to greatly influence agriculture trends and help end the growing global shortage of food and labor.

GPS

Global positioning systems (GPS) and geographic information systems (GIS) are used to monitor crops and trace the journey of their development.

These technologies provide extensive data that allows farmers to make adjustments when needed. This process allows farmers to optimize the production and cultivation of products while considering economic and environmental factors.

DRONES

Drones offer increased efficiency and sustainability in farming. These unmanned aerial vehicles (UAVs) provide high-resolution data to help farmers make educated decisions and oversee large areas of land. UAVs guide farmers toward sustainable application of fertilizer, waste reduction and more efficient irrigation systems. UAVs help farmers customize the needs of their crops to maximize productivity and profitability.



soil conditions, pests, and crop health to make the best real-time decisions. This saves valuable time and money on labor costs and minimizes waste.

BIO GENETICS

With the help of biotechnological tools and biogenetics, we have access to a new crop gene pool which will ultimately produce crops that are more affordable and nutritionally balanced. Science allows farmers to pick the genes that yield the best crops, saving time and money, allowing the best harvest possible. While this field of science is still in development, it shows tremendous promise for a looming problem of global significance.



ARTIFICIAL INTELLIGENCE (AI)

Thanks to AI, farmers can best manage weather conditions, water usage,

VERTICAL GARDENS

Vertical gardens continue to become increasingly popular as they take up minimal space and mitigate global warming. Just one square meter of a vertical garden can convert 2.3 kilograms of carbon dioxide into oxygen, allowing for a mitigating effect on global warming by decreasing the release of greenhouse gases into the atmosphere. Because plants absorb 50% of sunlight they come in contact with, vertical gardens create cooler indoor environments and can decrease the use of air conditioning by about 33% subsequently increasing energy efficiency. With urban agriculture growing in popularity, vertical gardening has become a way for city dwellers to garden in locations with limited space.

STEM FUELED COMPANIES & CAREERS



Ronda Hamm, Ph.D.

Global Academic Relations Leader

Corteva Agriscience

“ If you are interested in science, technology, engineering or math and want to have an impact on the lives of people and animals or work on solutions for some of the biggest global challenges then food and agriculture is the place for you. Food is fundamental to support families and communities. It's a solution to prevent hunger, wars and to improve climate resilience. **”**



Corteva Agriscience offers multiple ways to get involved and gain experience. Learn more about internships, co-ops, summer jobs and early career opportunities [here](#).

“ My experience with Corteva allowed me to work with team members who are doing exactly the type of work that aligns with my passion and skill set. Receiving validation my dreams and goals are attainable was an incredibly valuable experience that left me energized and excited to begin my career with Corteva Agriscience. **”**

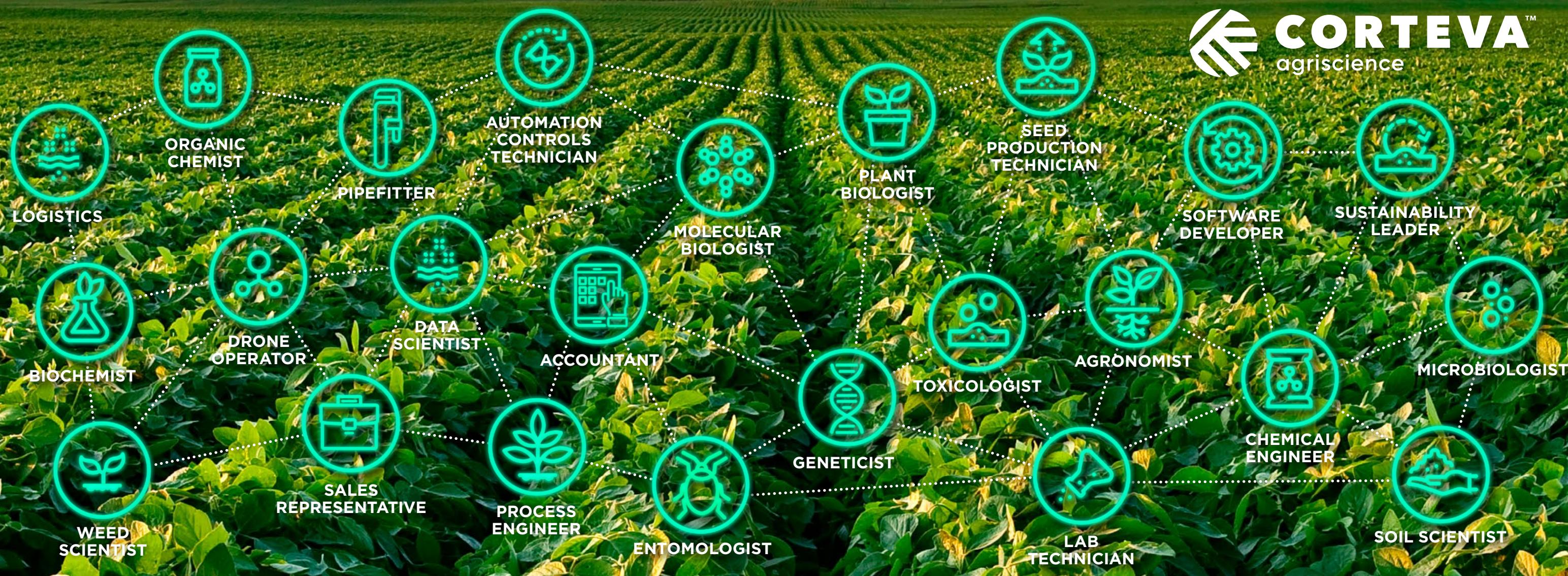
– Corteva Marketing and Communications Intern

BOLD THINKERS FEARLESS DOERS



Calling all bold thinkers and fearless leaders. Science, technology, engineering and math are integrated throughout the production of food. STEM skills are incorporated into many of our products and activities, from the genetics in the seeds and the drone technology used to look for problems that might be occurring in the field to the chemistry used to solve those problems when they are detected. STEM will help us feed the growing global population, improve climate resilience, and become more sustainable.

Corteva Agriscience is STEM-fueled and actively recruits individuals with STEM talent to be the food and agriculture leaders of tomorrow. A career at Corteva Agriscience™ includes dedicated resources to help grow professional skills, industry expertise, and personal perspectives. Whether you are in the lab or in the field, teaching classes or crafting code, Corteva Agriscience needs bold thinkers and fearless doers to bring their best.



STEM FUELED COMPANIES & CAREERS



STEMconnector had an opportunity to chat with Christine Daugherty, VP Global Sustainable Agriculture & Responsible Sourcing, at PepsiCo. Here's what she had to say about the importance of STEM talent in the food and beverage industry.

Q How does STEM fuel PepsiCo's business and how has the use of STEM helped your industry?

A STEM career in the food and beverage industry, to some, seems counterintuitive.

After all, at a company like PepsiCo, we make food—not rockets, semiconductors, or medical vaccines. And most people associate foods and beverages with kitchens and restaurants, where a PhD is not required to prepare breakfast. What they don't realize, though, is that growing, sourcing, manufacturing, packaging and shipping food on a mass scale—food that will be consumed by someone, somewhere more than one billion times per day—requires serious STEM proficiency. STEM acumen is crucial to cultivating a bountiful, sustainable, nutritious, safe, affordable and available global food supply.

Christine Daugherty
VP Global Sustainable Agriculture & Responsible Sourcing, at PepsiCo.



Q What STEM powered careers/ jobs does your company offer?

A We rely heavily on STEM talent to feed people in the 200+ countries and territories where our products are sold. We rely on experts in areas such as agronomy, exercise physiology, endocrinology, metabolomics, proteomics and rheology, computational analysis, nutrition science, and food chemistry to design food products and ensure their safety. We have more than four hundred consumer insights-gatherers scattered across the globe, who deploy digital technologies to identify and quantify consumer preferences, habits and trends. We need engineers to actually make the food on a global scale, across multiple continents. In recent years, we've added thousands of STEM jobs (like mine) to help ensure that our products are made sustainably: Ag experts

who are focused on helping our growing partners increase crop yields while using less water and soil; chemists and others are helping us developing lightweight, compostable packaging; and STEM experts deployed to help us reduce our carbon footprint. We also rely heavily on STEM expertise to help us manage and operate a Fortune 50 global corporation: economists, mathematicians and other financial wizards

who project next quarter's dividend, formulate pricing models and profit margins, and study international currency fluctuations..

Q What internships or STEM pathway programs does your company offer?

A PepsiCo is striving to advance STEM education and access to STEM careers in four ways:

1. We're igniting passion in STEM. We are enthusiastic, longstanding supporters of Million Women Mentors; and we're a member of the STEM Global Alliance, a coalition of 250 organizations striving to increase the number and diversity of students in STEM.

2. We're connecting students to STEM careers. Annually, PepsiCo offers young people hands-on job shadowing opportunities at PepsiCo locations in the U.S. and Mexico; we have an amazing college internship program, and we support STEM ambassadors to numerous international programs.

3. We're challenging students to innovate. PepsiCo has partnered with the Society of Women Engineers to host an annual Student Engineering Challenge, which encourages female undergraduate students to develop solutions to real-life operations problems. Thus far, 27 young women have received cash prizes and trips to the conference.

4. Finally, we're fortifying our STEM capabilities within PepsiCo. Our Global Talent Rotation program allows our colleagues

with STEM experience to take short-term assignments around the world; the PepsiCo STEM Council works to translate ambitious ideas into actions that deliver measurable results; the PepsiCo Global R&D Fellows Program encourages a select number of Research & Development colleagues to "go deep" into research topic areas that fascinate them—and have the potential to generate game-changing results for consumers, our company, and our industry; bi-annually, we hold an Academy of Sciences Awards ceremony, PepsiCo R&D's version of the Nobel Prize for outstanding achievement in food and beverage science.

Q What would you say to someone considering a STEM career in Food and Agriculture?

A The global population will expand from 7 to 9.5 billion people by 2050. Let me underscore this last part: We're talking about an additional 2.5 billion mouths to feed in just 30 years. This will occur in lifetime of most of students preparing for a STEM career today. I would invite them to join me and my colleagues at PepsiCo as we try to figure out how to sustain human life on this planet—sustainably. To me, that's as noble career calling as one can get.



U.S. DEPARTMENT OF AGRICULTURE

The U.S. Department of Agriculture (USDA) provides leadership on almost all things food and agriculture.

The vision of the USDA is to provide economic opportunity through innovation, helping rural America to thrive; to promote agriculture production that better nourishes Americans while also helping feed others throughout the world; and to preserve the Nation's natural resources through conservation, restored forests, improved watersheds, and healthy private working lands.

A major STEM-fueled organization, the USDA has a wealth of resources and programs for anyone who is interested in pursuing a path to food and agriculture, including pathway programs for students.



Sylvia Guizar

Mathematical Statistician

USDA National Agricultural Statistics Service - Methodology Division



Sylvia Guizar works for USDA's National Agricultural Statistics Service (NASS) to conduct research to advance statistical science for data users. Guizar collaborates with different agencies within USDA to support the dissemination of data in the methodology division. Guizar joined the USDA because she had a mentor in college who introduced her to the USDA's Pathways Internship Program.

I think mentorship is very important and gives you the opportunity to really get to know people in a different way.

STEM PATHWAYS PROGRAMS

The U.S. Department of Agriculture offers different pathway opportunities for students and recent graduates to work in the agricultural, science, technology, math, environmental, management, business and many other fields. USDA offers internships to students and recent graduates to help them to excel in their chosen fields.

ONEUSDA INTERNSHIP PROGRAM

The OneUSDA Internship Program offers paid, federal internships at USDA agencies and offices around the country for professional development opportunities in agriculture, natural resources, rural development, and other career fields.

The program is available to high school to graduate students who are currently enrolled in

qualifying educational programs or institutions. OneUSDA internships offer on-the-job experience, mentorship, and training tailored to each student's education, experience, and interests. Students gain valuable experience to enhance their educational goals and help shape their career choices.



USDA RECENT GRADUATES PROGRAM

The USDA Recent Graduates Program provides individuals who have recently graduated from qualifying educational institutions or programs with developmental experiences in the Federal Government intended to promote possible careers in the civil service. Participants must have obtained a degree or completed a qualifying career or technical education program within the preceding 2 years. Veterans are eligible to participate in the program within 6 years of obtaining a degree or graduating qualifying program.

USDA ARS AGLAB

The Agricultural Research Service (ARS) is the U.S. Department of Agriculture's chief scientific in-house research agency. The recently launched AgLab offers a variety of content to promote a greater understanding of how agricultural research is helping

meet the food, fiber, feed and fuel needs of a growing world population while also safeguarding our environment and natural resources. Students can access a wealth of content on the AgLab website including videos, games, contests, experiments and recipes.

AGDISCOVERY PROGRAM

AgDiscovery is a unique opportunity for students to explore agricultural sciences, and gain knowledge about careers in animal and plant disciplines, wildlife management, veterinary medicine, biotechnology, entomology, food safety, food production, agribusiness, forestry, and more! Students experience hands-on learning workshops, behind-the-scenes tours, laboratory and field exercises, in addition to a variety of cultural and team building activities.

The STEM in Pizza

Next time you eat pizza, be thankful for food science, the USDA and Agricultural Research Service (ARS).

The oblong-shaped Roma (or "plum") tomato was developed in 1955 in Beltsville, MD, by ARS scientist William Porte. It was bred from the San Marzano and Red Top varieties to resist wilt and pests and grow well in different climates. But it also has a heavy, fleshy outer wall that makes it perfect for making sauces for pizza and spaghetti. And it contains lycopene, a nutrient with anticancer properties.

Mozzarella cheese is gooey and tasty topping for pizza, but it adds fat. ARS scientists in Wyndmoor, PA, invented a technology for making lower-fat mozzarella cheese that retains its stretchy, meltable texture and delicious flavor. They did this by modifying the network of the milk protein casein. The cheese has been widely used in school lunch programs since 1995.

Roylene (Rides at the Door) Comes At Night

Deputy Equal Opportunity Officer



WA State Conservationist for USDA Natural Resource Conservation Service, Roylene is the first American Indian female state conservationist for the Natural Resource Conservation Service (NRCS). She is also the first American Indian female to represent the American Indian Science and Engineering Society (AISES) at the International Science Fair since she was in high school.

Live your culture and your heritage. Don't be afraid to share that. Be proud of where you come from because I believe the strength of USDA is its diversity.



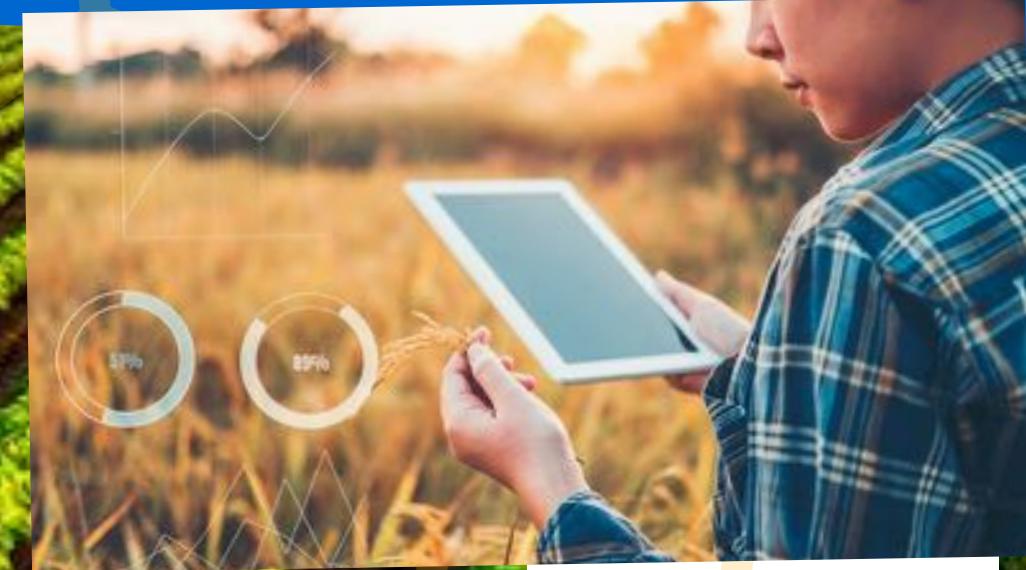
EDUCATION UCDAVIS PATHWAYS



UC DAVIS STUDENT FARM

UC Davis has numerous animal facilities and a student farm that trains hundreds of students each year on agricultural practices, including operation of a Community Supported Agriculture (CSA). The 23-acre farm is a community where students create, maintain and explore sustainable food systems. At the farm, students grow in many ways, learning from seasoned field-based educators, from their peers, and from themselves. They come to understand sustainability through the soils, crops, climate and community in which they work. In the process, they gain the systems-based thinking and doing skills needed to make a positive difference in today's world.

The Student Farm hosts a number of different programs that offer opportunities in market-scale farm production, food access and security,



diversified fruit, vegetable, and herb cultivation, garden-based education, commodity crop breeding, and pollination habitat establishment and restoration.

UC DAVIS SMARTFARM

SmartFarm is a concept for the farm of the future that will develop new innovative smart machines, smart sensing of the environment, smart plants and smart farming methods. SmartFarm will lead the way forward for world food security

The University of California Davis enrolls over 7000 students in the College of Agricultural and Environmental Sciences providing numerous experiential learning opportunities for students to gain hands-on experiences, including laboratory, field, and studio classes, on-campus internships and connections to leading employers from around the world. The College of Agricultural and Environmental Sciences has 28 majors in the fields of agriculture, environment, human needs, and social sciences.

The college has approximately 2300 acres dedicated to agricultural research and teaching as well as facilities, centers and institutes dedicated to seed biotechnology, wine and food science, sustainable energy, and coastal ecosystem research, and more.

and the environmental, economic and social sustainability of the food production system by the year 2050.

INDOOR AGRICULTURE

New partnerships focused on indoor nutritious food available anywhere, including in urban areas, also provide students from many STEM disciplines the opportunity to apply knowledge to enhance the sustainability of food production.

EDUCATION PATHWAYS

FIU

From top-ranked academic programs to top-tier research designation, FIU is a South Florida anchor institution and a solutions center for the world's toughest challenges. From STEM to Food Innovation, FIU offers over 190 different degrees.

Nation-wide, the food industry is thriving with 60,000 job openings annually (IFT Salary Survey, 2015-2020), resulting in an upward trend in enrollment in food science programs. In 2018, the STEM Food & Ag Council concluded enrollment in food science and technology to be the fastest-growing (+61%) out of six disciplines researched (viz, Agricultural Economics, Agricultural Business and Management, Agricultural Mechanization and Engineering, Animal Sciences, Plant and Soil Science, and Food Science and Technology).



FOOD INNOVATION AND ENTREPRENEURSHIP PROGRAM (FIE)

FIU will be launching a new Food Innovation and Entrepreneurship program in the Fall of 2021. This fully online and innovative major provides tools, concepts, framework, and practical aspects of a food business. It is designed to provide students with practical industrial food processing knowledge in an online education format, with courses on culinary innovation management and entrepreneurship.

Career opportunities include Director of R&D, Research and Development Scientist, Food Product Development Manager, Food Safety Team Leader, Food Innovation and Research Scientist, etc. Graduates with two years of experience in the food industry are eligible for the Certified Food Scientist examination from the Institute of Food Technologists (IFT), further expanding employment opportunities.

FOOD NETWORK & COOKING CHANNEL SOUTH BEACH WINE & FOOD FESTIVAL

One of the country's most prestigious gourmet gatherings, the Food Network & Cooking Channel South Beach Wine & Food Festival provides real-world opportunities for students to gain hands-on experience in hospitality, including staffing the star-studded events and working alongside the world's best culinary talent and food

and beverage industry leaders. Additionally, it has raised more than \$28 million since 2002 in support of the school, including student scholarships, construction of state-of-the-art facilities, faculty advancement, and education innovation in the fields of hospitality and tourism management.

FIU STUDENT DIVERSITY

61% Hispanic
15% White Non-Hispanic
13% Black
4% Asian or Pacific Islander
7% other minority groups

FIU STUDENTS MAKING AN IMPACT

Thousands of food-insecure South Floridians got some valuable nutrition thanks to the Super Bowl LIV tailgate and party food rescued by Chaplin School professor, Dr. John Buschman and his students. The numbers are staggering; 18,400 pounds of high-quality food was saved that would have gone to waste. That week alone, 14,720 meals were served at local homeless shelters that were made from rescued food.

The stadium food-salvage operation was a group effort, involving FIU students in partnership with non-profits such as Food Rescue US and FoodEASE, a host of contracted catering operators, including stadium concessionaire Centerplate, and NFL Green, the NFL's sustainability program.

EDUCATION PATHWAYS

AGRITREK SUMMER INSTITUTE
AgriTREK Summer Institute is a two-week program sponsored by the USDA/NIFA and created to expose 9th-12th grade students and teachers from counties in Alabama's Black Belt to the latest developments in AgriScience and related disciplines. Today, the program provides 9th-12th grade students an opportunity to gain leadership and research training in agriculture and related disciplines. To date, over 300 high school students have participated in the program, many of whom have obtained or are currently pursuing careers in agriculture and related sciences at universities and colleges across the U.S. You can learn more about the AgriTREK program [here](#).



Tuskegee University's College of Agriculture, Environment and Nutrition Sciences (CAENS) offers an education that prepares future professionals and leaders in the agricultural, environmental, and nutritional sciences, as well as veterinary medicine through course work along with internships, research and outreach activities related to their chosen majors.

Tuskegee University is the only historically black college or university (HBCU) with a fully accredited College of Veterinary Medicine that offers the Doctoral Degree and produces over 70% of the African American veterinarians in the world.



COLLEGE OF AGRICULTURE, ENVIRONMENT AND NUTRITION SCIENCES

The overall mission of the College of Agriculture, Environment and Nutrition Sciences is to develop students with skills in critical and systematic thinking, intellectual curiosity, a desire for lifelong learning, and to prepare them for leadership and service in the basic and applied sciences. The college prepares students who ultimately will become professionals in areas that include agricultural sciences, food and nutritional sciences, biological and biomedical sciences, chemical and biochemical sciences, human and veterinary medicine and other health-related fields, environmental sciences, environmental policy and natural resource management, and rural development at local, regional, and international levels.

AGDISCOVERY AT TUSKEGEE UNIVERSITY

Similar to the AgriTREK Summer Institute, AgDiscovery is an outreach program funded by USDA-APHIS, to help students learn about careers in animal science, veterinary medicine, agribusiness and plant pathology. This 2-3-week program allows participants to live on a college campus and learn about Agricultural science from university professors, practicing veterinarians and professionals working for the U.S. Government. Students chosen to participate in AgDiscovery will gain experience through hands-on labs, workshops, field trips and other group and team building activities. You can learn more about AgDiscovery program [here](#).

What is an HBCU?

Historically black colleges and universities (HBCUs) are institutions of higher education in the United States that were established before the Civil Rights Act of 1964 with the intention of primarily serving the African-American community. HBCUs offer all students, regardless of race, an opportunity to develop their skills and talents.

HBCUs offering Agriculture Programs:

Tuskegee University

Florida Agricultural and Mechanical University

North Carolina A&T State University

Delaware State University

University of Maryland Eastern Shore

University of Arkansas Pine Bluff

Full list of 1890 land-grant universities

MANRRS

NATIONAL SOCIETY FOR MINORITIES IN AGRICULTURE
NATURAL RESOURCES AND RELATED SCIENCES

"At MANRRS, we are changing the face of agriculture, natural resources and related sciences by supplying the industry with a diverse pool of talented leaders."

THE JR. MANRRS PROGRAM

Jr. MANRRS connects high school students through networking and service to grow the next generation of leaders. It is the most prominent, active youth minority organization focused on agriculture, natural resources and related fields in the United States. Committed to facilitating the personal growth and professional development of high school students through competition, innovative academic experiences, service and civic engagement. The program offers

several benefits to students interested in pursuing a career in food and agriculture, including:

- Providing students with access to more than 60 chapters at colleges and universities that provide agricultural and related sciences majors.
- Providing leadership and professional development skills, such as dressing for success, interviewing skills, writing resumes, learning

proper dinner etiquette, completing college applications and essays, and networking opportunities.

- College Admissions Preparation: Obtain materials to prepare you for the SAT and ACT.
- College application information, including how to get into college, financial aid information, etc.
- Opportunities to be mentored and/or tutored by college students or professionals currently working in a STEAM field.
- Scholarships and Awards: Awarded to Jr. MANRRS members in high school who have excelled academically and expressed an interest in pursuing a career in agriculture and related fields.
- Leadership Development: Develop your leadership skills by serving in many chapters and some regional leadership roles.

Shedra Rakestraw

Project Manager at Bureau of Land Management



Chantel Simpson

Assistant Professor of Agriscience Education

North Carolina A&T State University and MANRRS Advisor

"The advice I would give to someone interested in pursuing my career is to seek mentorship opportunities and get involved early. Agriculture is a large field with numerous opportunities, by seeking mentorship and becoming involved with professional organizations in the early stages of your college or career journey, you expose yourself to more opportunities for networking and employment."



RESOURCES

COLLEGES/UNIVERSITIES THAT OFFER AG DEGREES

[2021 Best Colleges for Agricultural Sciences in America](#)

- [1. Cornell University](#)
- [2. University of Georgia](#)
- [3. University of Florida](#)
- [4. Texas A&M University](#)
- [5. University of California Davis](#)

COLLEGES/UNIVERSITIES THAT OFFER FOOD/FOOD SCIENCE DEGREES

[2021 Best Colleges for Agricultural Sciences in America](#)

TOP FOOD SCIENCE PROGRAMS:

- [1. Cornell University](#)
- [2. Virginia Tech](#)
- [3. North Carolina State University](#)
- [4. Purdue University](#)
- [5. University of Florida](#)

[HBCU's with Ag Programs](#)
[HBCU's offering Ag Programs](#)

TOP HBCU'S WITH AG PROGRAMS:

- [1. Florida Agricultural and Mechanical University](#)
- [2. North Carolina A&T State University](#)
- [3. University of Arkansas Pine Bluff](#)
- [4. Delaware State University](#)
- [5. University of Maryland Eastern Shore](#)
- [6. Tuskegee University](#)

AG INTERNSHIPS/YOUTH PROGRAMS

[USDA: Youth and Agriculture Internships and Career Opportunities](#)

[4-H STEM and Agriculture Programs](#)

[Intern Abroad HQ – Agriculture Internships](#)

AG CAREER SITES

[agcareers.com](#)

[aghires.com](#)

[agri-search.com](#)

[agriculturalcrossing.com](#)

[aggrad.com](#)

MORE RESOURCES FROM USDA AND MANRRS

USDA

[For Educators and Community Members](#)

[For Students](#)

[Empowering Young Leaders](#)

[Internships and Career Opportunities](#)

MANRRS

Programs

National Conference

Student Competitions

Regional Meetings (5-6 Per Year)

[AgDiscovery Research Programs](#) – Tuskegee University

[AgriTREK/SciTREK Summer Institute](#)

[AgDiscovery Summer Program](#)

[Jr. MANRRS Leadership Institutes](#)

[Scholarships](#)

GROUPS/ORGANIZATIONS PROFESSIONAL

[National Black Farmers Association](#)

[National Women in Agriculture](#)

[American Farm Bureau Federation](#)

[National Farmers Union](#)

YOUTH

[Future Farmers Association \(FFA\)](#)

[Food and Agriculture Organization of the United Nations](#)

[Agriculture Future of America](#)

STEM CAREERS IN AGRICULTURE

Best Ag Careers

Agricultural Engineers

“Design systems, machines, and equipment to support agricultural processes and solve problems.”

Agricultural and Food Scientists

“Investigate ways to improve the productivity, quality, and safety of field crops and farm animals. They create new food products and modify existing products.”

Hydrologists

“Study the structure of water supplies.”

Veterinarian Technicians

“Supporting veterinarians as they examine animals.”

Soil and Plant Scientists

“Study and research crop production.”

Veterinarians

“Working to ensure that animals are healthy”

AGRICULTURAL MECHANICS PATHWAY

[Automation Coordinator / Technician](#)

[Design Engineer](#)

[Electrical Engineer](#)

[Hydraulics Technician](#)

[Mechanical Engineer](#)

[Welder](#)

ANIMAL SCIENCE PATHWAY

[Animal Biotechnologist](#)

[Animal Geneticist](#)

[Animal Physical Therapist](#)

[Apiary Worker / Beekeeper](#)

[Herd Nutritionist](#)

[Zoologist](#)

ENVIRONMENTAL SERVICES PATHWAY

[Climate Change Analyst](#)

[Ecologist](#)

[Environmental Engineer](#)

[Marine Biologist](#)

[Mine Engineer](#)

[Toxicologist](#)

FOOD AND SCIENCE PATHWAY

[Flavor Technologist](#)

[Food Technologist](#)

[Nutritionist / Dietician](#)

[Packaging Engineer](#)

[Process Engineer](#)

[Product Development Food Scientist](#)

NATURAL RESOURCES PATHWAY

[Aquaculturist](#)

[Conservationist](#)

[Forester](#)

[Geologist](#)

[Hydrologist](#)

PLANT SCIENCE PATHWAY

[Aerial Applicator / Ag Pilot](#)

[Agronomist](#)

[Landscape Technician](#)

[Soil Scientist](#)

[Viticulturist](#)

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