

2019

UF/IFAS Briefing Book

UNIVERSITY OF FLORIDA INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES



UF|IFAS
UNIVERSITY of FLORIDA

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The University of Florida is one of the nation's leading public land-grant institutions, and the Institute of Food and Agricultural Sciences (UF/IFAS) is the UF enterprise dedicated to agriculture and natural resources.

UF/IFAS has three main units, focused on teaching, research and Extension.

Altogether, UF/IFAS is a large and complex entity. This publication was created to inform visitors, stakeholders, elected officials, industry personnel, supporters and current or prospective faculty members. It provides a quick overview of the entire UF/IFAS enterprise, our programs and examples of our many success stories.



A WELCOME MESSAGE FROM JACK PAYNE

UF/IFAS science builds a better world, and it helps preserve the things we already love.



It starts with the economy. UF/IFAS science developed varieties of blueberries that made Florida a major producer — and employer — in a crop previously dominated by northern states.

UF/IFAS has achieved similar results with

strawberries. Now it has experts focused on finding the building blocks for new industries in peaches, pomegranates, olives and even hops.

At the same time, we don't want to leave behind the things that already make Florida special. UF/IFAS science is the leading hope for the salvation of Florida orange juice.

A village of unemployed gill-net fishermen facing economic ruin turned to UF/IFAS science in 1994 and became one of the Eastern U.S.'s leading clam farming communities.

Florida manatees continue their slow climb back from the brink of extinction with help from scientists who study everything from their biology to the way humans interact with them.

Farmers, who grow 300 different crops in the state, tell us: "If it weren't for IFAS, I wouldn't be in business."

We play a central role in the development of one of the most important of crops — future leaders. Our 4-H programs serve more than 200,000 children. When those children grow up, we open the gates of the university as wide as we can through scholarships, online courses, satellite locations and graduate-level field and lab work at our research and education centers throughout the state.

In Fall 2018, 91 percent of UF/IFAS CALS undergraduates were Florida residents — part of our commitment to ensure that as UF/IFAS progresses, our state's families will reap the benefits.

UF/IFAS is positioning Florida as a leader in efforts to feed the world, as we set up livestock innovation labs in eight nations in collaboration with international teams to pursue more sustainable operations. We're even working on growing plants in space.

UF/IFAS can accomplish all of these things and more, because we operate on the land-grant model of partnership among government, academia and industry.

This partnership helps UF/IFAS address complex challenges effectively and find science-based solutions. We do that by attracting outstanding faculty members whom we provide with the resources needed to do their best

work, and with incentives to collaborate on teams that bring multiple perspectives to the search for solutions.

Those teams often include colleagues from across the globe. But they also include experts from across campus, because UF/IFAS enjoys the in-house expertise that comes from UF being one of only six public land-grant universities in the nation with colleges of agriculture, engineering, law, medicine and veterinary medicine all on one central campus.

You'll find stories of UF/IFAS solutions in these pages. If you face a challenge that isn't addressed in these pages, let us know.

A handwritten signature in black ink that reads "Jack M. Payne".

Jack M. Payne
UF Senior Vice President
Agriculture and Natural Resources

**In
Fall 2018, 91
percent of UF/IFAS
CALS undergraduates
were Florida residents —
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to ensure that as UF/IFAS
progresses, our state's
families will reap
the benefits.**

ABOUT UF/IFAS

The mission of the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) is to develop knowledge relevant to agricultural, human and natural resources; and to make that knowledge accessible to sustain and enhance the quality of human life.

UF/IFAS is the largest and most comprehensive agriculture and natural resources enterprise found among Florida's public universities. This emphasis comes about because UF is one of the state's two land-grant institutions, along with Florida A&M University. As a land-grant institution, UF receives federal support and operates with a federal mandate to improve the state's agricultural and natural resources industries.

The full history of UF/IFAS dates to the 1880s, but the name "Institute of Food and Agricultural Sciences" only dates to 1964 — it was created to inaugurate a new administrative structure established that year, and is still in place today.

The UF/IFAS enterprise is based in Gainesville on the UF main campus, and encompasses 14 academic departments and two schools. The entire enterprise is led by the UF senior vice president for agriculture and natural resources.

As the agriculture and natural resources enterprise in a land-grant institution, UF/IFAS has three main units, focused on teaching, research and Extension. These are,

respectively, the UF/IFAS College of Agricultural and Life Sciences (UF/IFAS CALS), UF/IFAS Research, conducted under the auspices of the Florida Agricultural Experiment Station, and UF/IFAS Extension, with offices in all 67 Florida counties.

UF/IFAS CALS offers undergraduate and graduate degree programs in more than 20 disciplines. Nationwide, UF/IFAS CALS is one of the largest and most comprehensive colleges of its type.

UF/IFAS Research facilitates all research activities conducted by UF/IFAS faculty and students, on the UF main campus and at 17 off-campus locations.

UF/IFAS Extension operates offices and other facilities statewide and includes faculty at the state, regional and county levels. UF/IFAS Extension also administers the Florida 4-H Youth Development Program and other statewide programs open to the public.

In addition, UF/IFAS supports the Florida Sea Grant program, facilitates international collaborations, and, along with UF Health, administers the UF College of Veterinary Medicine.

UF is Florida's
1st
land-grant
institution.

The name "UF
Institute of Food
and Agricultural
Sciences"
debuted in
1964.

UF/IFAS history
reaches back to the
1880s.

UF/IFAS has
17
off-campus
research
locations.

UF/IFAS Extension
administers 4-H activities for
200,000
Florida youth.

The 3 main UF/IFAS enterprises are

teaching, research and Extension.





ABOUT FLORIDA'S AGRICULTURAL AND NATURAL RESOURCES SECTOR

The agricultural and natural resources sector represents Florida's second-largest industry.

The state's warm, sunny climate and abundant rainfall enable producers to grow crops quickly and potentially take them to market sooner than competitors in colder areas.

Florida is home to about 47,000 commercial farms, which average 200 acres and collectively account for about 9.5 million acres. In addition, there are about 4.6 million acres of planted timberland in Florida.

In calendar year 2016, the most recent year assessed, sales revenues from Florida's agriculture, natural resources, and food industries totaled \$165.5 billion and directly supported 1.7 million full-time and part-time jobs, representing 14.6 percent of total state employment.

Regarding agriculture, Florida produces only small amounts of commodity crops such as wheat and soy. Instead, Florida is known as a specialty crop state, producing about 300 items that come from fields, groves, greenhouses and aquatic sources. Many of these can only be produced in specific geographical areas.

Citrus remains the state's signature crop, with a multi-billion dollar economic contribution. In 2017, Florida ranked first among U.S. states for value of production of cut cultivated greens, fresh-market tomatoes, grapefruit, oranges, cucumbers, snap beans, squash, sugarcane and tropical foliage plants.

Florida is also the nation's second-largest producer of bell peppers, fresh-market sweet corn, fresh-market cabbage, fresh-market vegetables overall, strawberries, watermelons and tangerines. Other noteworthy Florida

food industries include beef cattle, dairy products, honey and seafood.

In addition, Florida produces many non-food commodities associated with natural resources. In 2016, Florida's forest products industry collected a total of \$12.6 billion in revenues, primarily from planted pine. The state is also home to the nation's second-largest environmental horticulture industry, which in 2015 generated an estimated \$10.7 billion in revenues from greenhouse, nursery and floriculture crops.

Other natural resource-based state industries include honey bee contract pollination services; natural gas and petroleum extraction for fuels and manufacturing; phosphate mining for fertilizers and detergents; sand, gravel and stone mining for construction; and pumping of potable water for bottling.

Although Florida offers ideal growing conditions for many crops, its warm climate is also suitable for numerous pests and pathogens, which pose constant challenges. Some of these organisms are native but many reach Florida from other parts of the world via the state's robust international trade and tourism activities.

Similarly, environmental issues have impacted producers. Concerns over water quality and availability have prompted many producers to seek ways of increasing the efficiency of their operations, to reduce environmental impact and save money on inputs.

Within UF/IFAS, our teaching, research and Extension efforts are always guided by the needs of Florida's agriculture, natural resources, and food industries; its residents and its communities.

UF/IFAS COLLEGE OF AGRICULTURAL AND LIFE SCIENCES

The UF/IFAS education mission is fulfilled by the UF/IFAS College of Agricultural and Life Sciences, also known as UF/IFAS CALS. The college seeks to deliver unsurpassed educational programs that prepare students to face critical challenges related to agriculture, food systems, human well-being, natural resources and sustainable communities.

Website: <https://cals.ufl.edu>

Social Media: <https://ifas.ufl.edu/social-media>

WHO WE ARE

As of fall semester 2018, UF/IFAS CALS has 4,340 undergraduates, 1,643 graduate students and 383 teaching faculty members representing 14 departments and two schools. UF/IFAS CALS is one of the nation's largest agricultural colleges and is known for its accomplished faculty and diverse student body.

The college values teaching excellence. UF/IFAS CALS has had more faculty members recognized by the U.S. Department of Agriculture with teaching awards than any other land-grant institution. Administrators have established collegewide hubs for educational advancement: the CALS Teaching Resource Center and the Center for Online Learning and Technology (COLT).

To support faculty development in teaching and learning, UF/IFAS CALS holds a teacher's college and a teaching enhancement symposium every fall, and supports a teaching retreat and a teaching and advising awards program each spring.

During the fall 2018 semester, about 66 percent of current UF/IFAS CALS undergraduates and 59 percent of UF/IFAS CALS graduate students were women. Minority students represented about 28 percent of UF/IFAS CALS undergraduates and 14 percent of graduate students; international students represented 6 percent of UF/IFAS CALS undergraduates and 35 percent of graduate students.

WHAT WE DO

Today, UF/IFAS CALS offers 23 undergraduate degree programs and 22 graduate majors at the UF main campus in Gainesville, with several undergraduate majors offered at five locations outside Gainesville, and eight master's programs and two bachelor's programs available online.

Many UF/IFAS CALS graduates go on to enter professional programs in fields such as medicine, pharmacy, law, dentistry and veterinary medicine. Some earn advanced degrees in agricultural and natural resources disciplines and secure positions in academia or the private sector. Others enter the workforce

immediately after earning an undergraduate degree, pursuing careers as research scientists, crop managers, economists, industry executives, Extension agents, teachers, entrepreneurs and more.

Many of the state's leading business, political and scientific figures are UF/IFAS CALS graduates. Notable alumni include former Florida Commissioner of Agriculture Adam Putnam, professional athlete and sportscaster Tim Tebow, food technologist Charles A. Becker, former state senator J.D. Alexander, and two of the three co-developers of frozen concentrated orange juice.





STATISTICS*

91%

of UF/IFAS CALS undergraduates are Florida residents.

International students represent about

35%

of UF/IFAS CALS graduate enrollment.

Worldwide, there are about

37,000

living UF/IFAS CALS alumni.

4th

largest college of agriculture and related sciences in the U.S.

4th

largest college at UF.

\$569,875

in student scholarships awarded in the 2018-19 academic year.

353

on-campus faculty CY 2018.

30

off-campus faculty CY 2018.

=

383

total faculty with teaching appointments of at least 10 percent.

*Data collected fall 2018 unless otherwise noted.

SUCCESS STORY - BERNIE AND AVERY LEFILS



Bernie LeFils and Avery (Sams) LeFils of Lake Helen, Fla., came to the UF/IFAS College of Agricultural and Life Sciences eager to learn and contribute to Florida's agricultural industries. As UF/IFAS CALS undergraduates, Bernie majored in food and resource economics while Avery majored in agricultural education and communication. Both served as CALS Ambassadors during their

time at UF, and were active in professional organizations and extracurricular activities.

After the two married in 2012, Avery joined the CALS Alumni and Friends board of directors. In 2015, Bernie

and Avery became the youngest members of the CALS Dean's Circle giving society. The couple has contributed to several UF/IFAS CALS endowments supporting student scholarships, travel and senior awards.

Currently, Bernie works as a certified public accountant at his family's company while serving as the Volusia County Cattlemen's Association president. He was selected as a member of the inaugural class of the Florida Cattlemen's Association Leadership Academy. Avery is the marketing coordinator for Village Farms International, a leading North American producer of greenhouse-grown hydroponic vegetables. Previously, she worked in communications for the Florida Fruit & Vegetable Association. Both Bernie and Avery continue to give back to UF/IFAS CALS by facilitating workshops for industry organizations and their college departments.

2015-2020 GOALS

1. Enhance the quality of admitted graduate students through investment in recruiting.
2. Enhance existing and develop new partnerships to broaden the recruiting base for undergraduate students.
3. Develop a lower-division college-wide course on current issues in agriculture, natural resources and related sciences.
4. Invest in assistance for faculty in design/re-design of face-to-face courses to enhance student engagement and learning.
5. Develop new mechanisms for recognizing excellence in teaching.
6. Increase student participation in experiential learning opportunities.
7. Create new opportunities for alumni and professionals to connect to UF/IFAS CALS students.

UF/IFAS RESEARCH

The UF/IFAS Research enterprise, conducted under the auspices of the Florida Agricultural Experiment Station, fulfills its research mission to discover new knowledge, encourage innovative study and create applications based on sound science that address challenges facing agriculture, natural resources and interrelated human systems in Florida, our country and our world.

Website: <http://research.ifas.ufl.edu>

Social Media: <https://ifas.ufl.edu/social-media>

WHO WE ARE

The UF/IFAS Research enterprise represents the work of 558 faculty members with research appointments, hailing from every academic department and discipline within UF/IFAS. Their studies address significant issues confronting Florida industries, communities and individuals. Many UF/IFAS researchers are internationally renowned for their expertise and scientific achievements, and routinely garner honors and awards.

Research projects are conducted at the UF main campus in Gainesville and at off-campus locations throughout

the state, including 12 research and education centers, five research and demonstration sites, beef cattle units, a demonstration forest and a dairy farm.

Funding for UF/IFAS research activity comes from a variety of sources including federal grants, state appropriations, support from producers, contracts and grants, donations, and licensing revenues from crop cultivars and technologies developed by UF/IFAS personnel.

WHAT WE DO

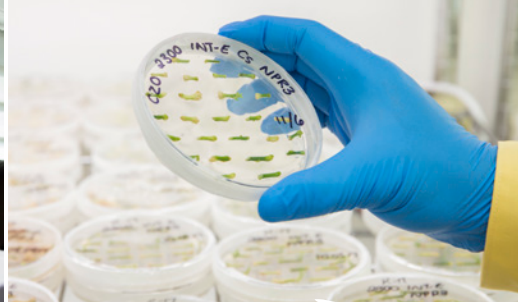
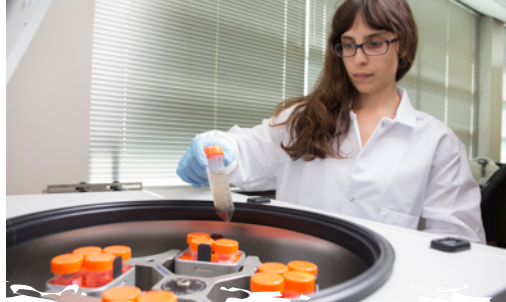
The UF/IFAS Dean for Research Office provides the leadership and financial support needed to build and maintain impactful research programs, helps enrich graduate and undergraduate research experiences, promotes training and recognition for research personnel, and fosters collaborative interactions between business, agencies and faculty.

Agricultural topics researched at UF/IFAS include pest and disease management, nutrient management, improved crop varieties, biotechnology, livestock reproduction and health, irrigation and food safety. Natural resources topics under study include climate variability, water quality and conservation, energy conservation, land-use issues, wildlife, invasive species,

fisheries, forest science, ecotourism, ecology and ecosystem services. In human systems, studies by UF/IFAS researchers investigate global competitiveness, labor-saving technologies, marketing, consumer behavior, financial management, child and family development, human nutrition, agricultural education, sustainable development, communities and economics.

Each spring, the Florida Agricultural Experiment Station Research Awards Ceremony acknowledges outstanding student, faculty and staff achievements including graduate student awards, high impact publications, an outstanding new faculty member award, plant and utility patent recognitions, and a research service award.





STATISTICS

Every \$1 invested
in agricultural research and development
returns \$20 in benefits
from increased agricultural productivity.*

Every year since FY 2000-01,
UF/IFAS has ranked

1st or 2nd

among U.S. universities in
agricultural research and
development expenditures.

Our researchers published

1,460

papers in refereed
journals in CY 2017.

UF/IFAS Research garnered

\$166.2 million

in sponsored projects in FY 2017-18, an all-time record and a
54.7 percent increase over FY 2017-16.

UF/IFAS plant breeders
received

8

plant patents in FY
2017-18.

In CY 2018, the UF/IFAS
Research enterprise included

558

UF/IFAS faculty members with
research appointments.

*Alston, J.M., Andersen, M.A., James, J.S., and Pardey, P.G., 2010. Persistence Pays: U.S. Agricultural Productivity Growth and the Benefits From Public R&D Spending. New York: Springer.

SUCCESS STORY - CARINATA

Although it's a member of the mustard family, *Brassica carinata* isn't found on supermarket shelves. Instead, this plant produces oil-rich seeds suitable for making aviation fuel and high-protein livestock feeds.

Since 2011, UF/IFAS researchers have led a multi-institution effort to develop and promote carinata as a winter cash crop providing cover-crop benefits for the South. One key initial accomplishment was forming a partnership with the Canadian biofuels company Agrisoma Biosciences, Inc. In fall 2017, the USDA National Institute of Food and Agriculture awarded the UF/IFAS effort a five-year, \$15 million grant and designation as a Coordinated Agricultural Project vital to developing the nation's energy self-sufficiency.

The project, called the Southeast Partnership for Advanced Renewables from Carinata (SPARC), is led by

agronomist David Wright, a professor at the UF/IFAS North Florida Research and Education Center in Quincy. The team has already made progress on numerous fronts, which include helping Agrisoma identify carinata varieties suited to southeastern growing conditions, assessing the nutritional value of carinata seed meal as livestock feed, and developing best management practices for southeastern carinata production.

"In research trials, SPARC collaborators in Florida, Georgia and Alabama routinely produce 50 to 60 bushels of carinata per acre, which translates into a potential net profit of \$150 to \$300 per acre," Wright said. "On top of that, you have the cover-crop benefits, so we are extremely optimistic about carinata's future in the Southeast, with current growers often averaging 30 to 45 bushels per acre."

GOALS

» Research Programs

Expand our global leadership in transformational basic and applied research by developing "seed" programs to support strategic research initiatives, increasing awareness of funding opportunities, and funding targeted investments in equipment and infrastructure.

» Research Culture

Strengthen innovation and discovery by encouraging the recruitment and retention of diverse, top-performing faculty and staff, developing and improving student research experiences, and promoting synergies between the land-grant missions.

» Research People

Build satisfaction and quality of life on the job for faculty and staff by facilitating professional development, fostering an inclusive and collegial environment, promoting staff achievements, and recognizing distinction in disciplinary and interdisciplinary research.

UF/IFAS EXTENSION

UF/IFAS Extension is a statewide network of experts that fulfills the UF/IFAS outreach mission by partnering with communities to provide high-quality, relevant education and research-based expertise to foster healthy people, healthy environments and healthy communities.

Website: <https://sfyl.ifas.ufl.edu>

Social Media: <https://ifas.ufl.edu/social-media>

WHO WE ARE

As a land-grant institution, UF needs a statewide presence to serve citizens in every part of Florida. UF/IFAS Extension meets this need, providing science-based information to residents and producers, and relaying concerns and questions to UF/IFAS researchers when appropriate.

Besides operating offices in all 67 Florida counties, UF/IFAS Extension employs state specialists who are appointed to UF/IFAS' 14 academic departments and two schools, and who are stationed at the UF main campus and 17 off-campus locations. Furthermore, UF/IFAS Extension reaches clients in Florida and beyond via print and online resources, video and social media.

UF/IFAS Extension agents form the backbone of the program; 362 are employed statewide as of fall 2018.

Most agents have positions that are dedicated to one or more broad topics, such as horticultural crops, commercial agriculture, 4-H youth development, family and consumer sciences, Sea Grant or natural resources.

In addition, UF/IFAS Extension employs 279 statewide specialists, who provide insightful guidance to producers dealing with high-value crops and other concerns. These specialists address citrus production, livestock, seafood, aquaculture, urban horticulture, family resources, youth development and more.

UF/IFAS Extension is funded by federal, state and county sources and we have faculty working in every Florida county. This situation has the effect of keeping UF/IFAS Extension personnel in close contact with local leaders, focusing on local concerns via grassroots engagement.

WHAT WE DO

All UF/IFAS Extension offices disseminate science-based information to clients, helping them solve problems related to agriculture, horticulture, natural resources, water, energy, youth, families and community issues. To accomplish their objectives, UF/IFAS Extension personnel conduct educational events, distribute educational materials and answer questions from callers and visitors.

Many agents travel to producers' operations to provide on-site advice and perform another important function

by relaying producers' needs and concerns back to UF/IFAS research faculty for assessment and action.

Additionally, UF/IFAS Extension offers training and professional development opportunities to personnel in agriculture and related industries, administers the Florida 4-H Youth Development Program, the Florida Master Naturalist Program and the Florida Master Gardener Program, and maintains a massive online Extension document library, the Electronic Data Information Source (EDIS).





STATISTICS*

362

UF/IFAS Extension agents.

279

Academic faculty with UF/IFAS Extension appointments.

28,661

volunteers, who gave 1.3 million hours.

30.2 million

client connections made.

76%

of clients surveyed said UF/IFAS Extension solved their problem.

UF/IFAS Extension received

\$117.6 million

in funding in FY 2016-17.

Of that funding, **4.1%** came from federal sources,

39.5% from state sources, **27.2%** from county sources and

29.3% from contracts and grants.

*All data collected CY 2017 unless otherwise noted.

SUCCESS STORY - JUANITA POPENOE

Juanita Popenoe is a UF/IFAS Extension agent in Lake, Marion and Orange counties, specializing in commercial fruit production. Her daily work brings her into close contact with Central Florida citrus growers whose groves have been devastated by citrus greening disease. While UF/IFAS researchers work on ways to reduce the impacts

of greening, Popenoe consults with growers to help them find alternative crops to diversify their operations or grow cover crops to improve soil fertility. "I love it when I am able to make a connection for people that will help them with their business," she says. "I really enjoy helping people succeed at fruit production."

GOALS

1. Increasing the sustainability, profitability and competitiveness of Florida's agricultural and natural resources industries.
2. Enhancing and protecting water and supply.
3. Enhancing and conserving Florida's natural resources and environmental quality.
4. Producing and conserving traditional and alternative forms of energy.
5. Empowering individuals and families to lead healthy, successful lives.
6. Strengthening urban and rural communities.
7. Preparing youth to be responsible, successful adults.

UF/IFAS POINTS OF PRIDE

For more than a century, University of Florida agricultural and natural resources experts have served the state

by educating future producers, professionals, leaders and scientists; by conducting innovative research to address the most promising opportunities and serious production challenges facing Florida; and by conducting Extension programs to bring the latest science-based information to producers and communicate their needs back to researchers. In recent decades, the licensing of technology and crop cultivars has become a noteworthy activity as well, bringing UF/IFAS innovations to the marketplace.

Some of the most important UF/IFAS achievements in teaching, research, Extension and technology transfer include:

TEACHING

- Among all U.S. universities, UF/IFAS CALS has received the largest total number (national and regional combined) of USDA teaching awards.
- To engage high school students, UF/IFAS CALS co-sponsors the Florida Youth Institute, a week-long summer residential program that engages youth with current agricultural and natural resources issues.
- Lassie Goodbread Black, the first woman enrolled full-time at UF, was admitted in 1925 to the College of Agriculture, predecessor of today's UF/IFAS CALS.
- The Challenge 2050 Project enables UF students to develop leadership abilities while seeking interdisciplinary solutions to the challenges posed by global population increases.
- In fall 2006, UF/IFAS CALS began offering one of the nation's first undergraduate degree programs in organic agriculture.
- To help faculty harness digital technology for teaching, UF/IFAS CALS launched the Center for Online Learning and Technology (COLT), which assists with online programs and courses.
- In 1970, Carlton Davis became an assistant professor with the Food and Resource Economics Department; he was one of UF's first African-American faculty members.
- In 1999, UF/IFAS established the nation's first Doctor of Plant Medicine program, an interdisciplinary professional doctorate focused on plant health.

RESEARCH

- During the past 10 years, UF/IFAS plant breeders have released 283 new varieties for commercialization as landscape ornamentals, groundcovers, forages and food crops.
- Entomologist Nan-Yao Su and Dow AgroSciences experts developed the Sentricon® subterranean termite colony elimination system, which exploits the insects' feeding behavior.
- UF/IFAS food scientists determined the folic acid requirements for pregnant women, a discovery that led to food fortification and marketing of new supplements to prevent birth defects associated with folic acid deficiencies.
- UF/IFAS entomologists conducted the first comprehensive studies of mosquito feeding patterns in the Southeast, leading to improved mosquito control programs statewide.
- The UF/IFAS Office of the Dean for Research administers the Ordway-Swisher Biological Station, a 9,500-acre living laboratory located 30 minutes from the UF main campus. More than 40 government agencies, universities and NGOs have conducted projects in the Station's unspoiled ecosystems.
- UF/IFAS agricultural engineers developed the raised-bed plastic mulch system, which is used extensively worldwide to conserve resources and protect crops from weeds, pests and soilborne diseases.
- UF/IFAS researchers developed a decision-support tool that helps the Florida Fish and Wildlife Conservation Commission analyze boat traffic in Florida's waterways. The resulting data are used in evaluating requests to establish no-wake zones and other safety measures. The tool saves taxpayers \$1.5 million annually.



EXTENSION

- The South Florida Beef Forage Program works with livestock producers to develop practices that can improve cattle reproductive efficiency by up to 20 percent.
- EDIS, the UF/IFAS Extension online library, is the largest free resource of its type, with about 6,500 peer-reviewed publications available on demand.
- In 2017, the Florida-Friendly Landscaping™ Program helped Floridians save an estimated 176 million gallons of water and \$584,000 in utilities costs.
- Volunteer water-monitoring programs such as Florida LAKEWATCH and Biscayne Bay Water Watch test for early signs of red tide, algal blooms and other forms of water impairment.
- UF/IFAS Extension administers the Florida 4-H Youth Development Program, which serves about 200,000 young people annually.
- In 2017, the Family Nutrition Program helped procure more than 76,000 pounds of fresh produce for school cafeterias, and installed 278 vegetable gardens at schools and community centers.
- UF/IFAS Extension pesticide applicator training programs resulted in 2,807 new and renewed licenses in 2017, contributing an estimated \$66 million in business activity to the state's economy.
- UF/IFAS Extension works with federal, state and county governments; as well as residents, businesses and relief agencies; to help Floridians prepare for disasters and assist with recovery.

TECHNOLOGY TRANSFER

- Virtually all of Florida's 4 million acres of planted pine use cultivars developed by UF/IFAS breeders and their collaborators.
- The UF/IFAS coleus breeding program has released 71 cultivars that collectively represent about 25 million plants sold from 2016-18.
- Florida's \$82.1 million blueberry industry was built almost entirely on UF/IFAS cultivars.
- The Florunner peanut, released in 1969, dominated Southeastern peanut production for two decades.
- Released in 1973, 'Floritam' St. Augustinegrass is still in wide use and remains Florida sod producers' No. 1 choice.
- Limpograss is a warm season perennial forage and in 1984, UF/IFAS released the 'Floralta' cultivar, which revolutionized winter feeding/grazing programs for many large ranches by eliminating the need for stored hay.
- In 1980, UF/IFAS released the disease-resistant 'Centennial' soybean; it became the region's most popular soybean cultivar.
- To promote U.S. energy independence, UF/IFAS microbiologist Lonnie Ingram and colleagues developed a genetically modified *E. coli* bacterium capable of breaking down complex sugars found in biomass, yielding glucose used to produce fuel ethanol.
- Since the early 1990s, UF/IFAS has released more than 25 annual ryegrass cultivars; collectively, they dominate proprietary annual ryegrass seed sales in the Southeast.
- About 90 percent of the commercial strawberry plants grown in Florida are UF/IFAS varieties.
- In 2006, longtime UF/IFAS tomato breeder Jay Scott released the Tasti-Lee® variety, a traditionally bred premium tomato now sold worldwide.
- The first UF/IFAS citrus scion release, Sugar Belle®, reached the market in 2009 and proved to be the most HLB-tolerant citrus variety grown in Florida.
- Since 2013, UF/IFAS faculty members have released six "Smart Irrigation" apps to help Southeastern producers conserve water; three more are in development.

FLORIDA SEA GRANT

Supported by UF/IFAS, Florida Sea Grant is one of 33 university-based programs that form the National Sea Grant College Program,

a partnership between state university systems and the National Oceanic and Atmospheric Administration. Like its counterparts in other coastal states, Florida Sea Grant supports specialized academic and Extension faculty positions that advance UF/IFAS' broad missions. Florida Sea Grant funds competitive research and supports graduate student education at 17 Florida universities. Furthermore, Florida Sea Grant conducts UF/IFAS Extension programs concerning marine fisheries, aquaculture, healthy coastal habitats, and disaster resilience for coastal communities. Issues of special concern to the program include harmful algal blooms, sustainable fisheries and sea-level rise.



Success story

When Hurricane Irma struck the Florida Keys, storm surge scattered more than 150,000 submerged spiny lobster traps. Florida Sea Grant helped lobstermen get back to business by contributing funds to hire spotter planes equipped with cameras and GPS systems, to locate traps below the water's surface. The rapid response led to recovery of 60,000 traps and saved the industry nearly \$4 million in expenses and lost fishing days.

Photo by Pamela Gruver, Florida FWCC

COLLEGE OF VETERINARY MEDICINE

Supported jointly by UF/IFAS and UF Health, the College of Veterinary Medicine

opened its doors in 1976 and remains the only veterinary medical degree program in Florida. The college includes the UF Veterinary Hospitals, which offer state-of-the-art health care to large and small animals from cattle and horses to pets and exotic species. Extension and food-animal services provide crucial resources to local cattle ranches, dairy farms, horse enthusiasts and wildlife managers.

Veterinary medical school faculty members with UF/IFAS appointments have made many contributions to animal health care, notably the Master Hoof Care Program for dairy cattle. This instructional program teaches dairy workers proper hoof-trimming practices to prevent foot disorders; it has been adopted worldwide.



Success story

Florida is home to about 125,000 dairy cows, and their well-being is a top concern for Dr. Ricardo Chebel, an associate professor with the UF College of Veterinary Medicine. In 2016, he co-founded the nationwide non-profit Dairy Cattle Welfare Council with a colleague from The Ohio State University. The council includes scientists, veterinarians, industry figures and dairy producers among its members, and promotes animal welfare.

INTERNATIONAL ACTIVITIES



Photo by Sarah McKune, UF

In an era when people are more connected than ever, UF/IFAS is working to address challenges confronting the world's food supplies, natural resources and environments.

Our faculty and students can be found across the world — studying a virus that infects spiny lobster in the Caribbean Sea, working to diagnose the disease plaguing Haiti's plantain and banana crops, improving food safety practices in Ethiopia, and helping African farmers combat fall armyworm, an insect pest compromising the continent's maize production.

UF/IFAS faculty lead collaborations in about 40 countries, supported by more than 100 MOUs. We are also home to more visiting scholars and international students than any other UF unit, with nearly 600 visiting scientists at UF/IFAS locations statewide, and 1,087 international students enrolled in the UF/IFAS College of Agricultural and Life Sciences, as of fall semester 2018.

By leveraging its experience, expertise and connections, UF/IFAS conducts activities ranging from our large-scale Feed the Future Innovation Lab for Livestock Systems in eight countries across Africa and Asia, to small single-investigator projects, such as a partnership with a Madagascar university and the Madagascar National Parks organization to support local capacity in biodiversity conservation priority areas.

The Gator Nation and UF/IFAS truly are everywhere!

TECHNOLOGY TRANSFER



Since 1985, UF Innovate | Tech Licensing has managed the University of Florida's intellectual property and

helped UF build an impressive record for commercializing discoveries and inventions developed on campus. Throughout its existence, the Tech Licensing program has helped launch nearly 200 startup companies, generating more than \$1 billion in private investment.

For UF/IFAS personnel, Tech Licensing is a valuable ally in their efforts to bring scientific advances to the marketplace, a process known as technology transfer. The process starts when a UF/IFAS employee develops a new technology during the normal course of business. When the employee contacts Tech Licensing to formally announce the technology, licensing officers can help the employee complete required paperwork, file patent applications and make market assessments to gauge the technology's commercial potential. When appropriate, the officers assist UF/IFAS employees in evaluating business opportunities relevant to their discoveries.

The most successful technology associated with UF/IFAS is the Sentricon® subterranean termite colony elimination system, developed by UF/IFAS entomologist Nan-Yao Su and colleagues with Dow Agrosciences. Since reaching the market in 1995, Sentricon® has generated more than \$47 million in royalties for UF, making it the third-most valuable technology developed at UF.

UF/IFAS FUNDING

The annual budget for UF/IFAS totals more than \$416 million.

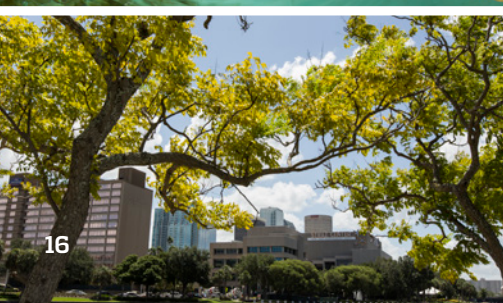
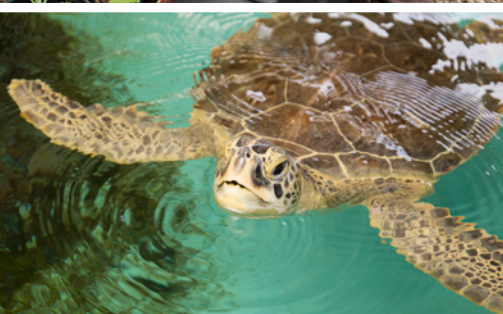
This funding supports faculty and staff salaries, new construction, facilities operations and maintenance, temporary personnel, equipment and supplies, Extension activities and many other expenses.

Although UF is a public university, funding for UF/IFAS comes from numerous public and private sources, including federal and state agencies, state appropriations, county governments, grants and contracts, proceeds from the Florida lottery and gifts.

State funding, allocated by the Florida Legislature, annually provides about half the funding needed for the UF/IFAS annual budget, and includes proceeds from student tuition. Some of the monies are earmarked for specific purposes, such as construction projects or new faculty hires, but most support our ongoing teaching, research and Extension missions.

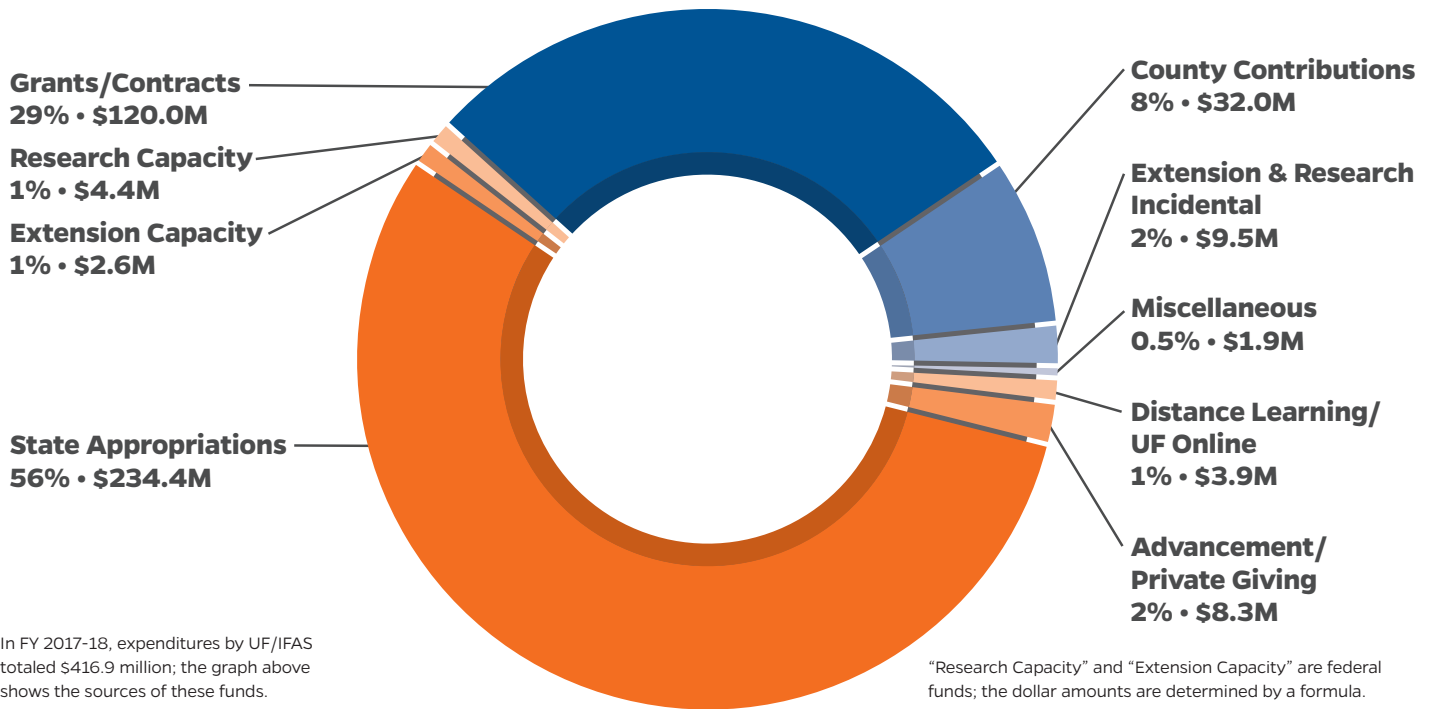
Grants and contracts are the second-largest source of funding, and accounted for about \$120 million in FY 2017-18. Grants are secured by individual faculty members or teams of faculty, who are funded by various public and private entities, including the National Science Foundation and the U.S. Department of Agriculture. Contracts often come from industry or non-profit organizations and support specific research studies requested by the funding sources.

We are proud to partner with Florida county governments, which provide more than \$30 million in funding each year, primarily for support of UF/IFAS Extension county offices. This arrangement helps keep UF/IFAS Extension operating in all 67 Florida counties, benefiting citizens across the entire state.



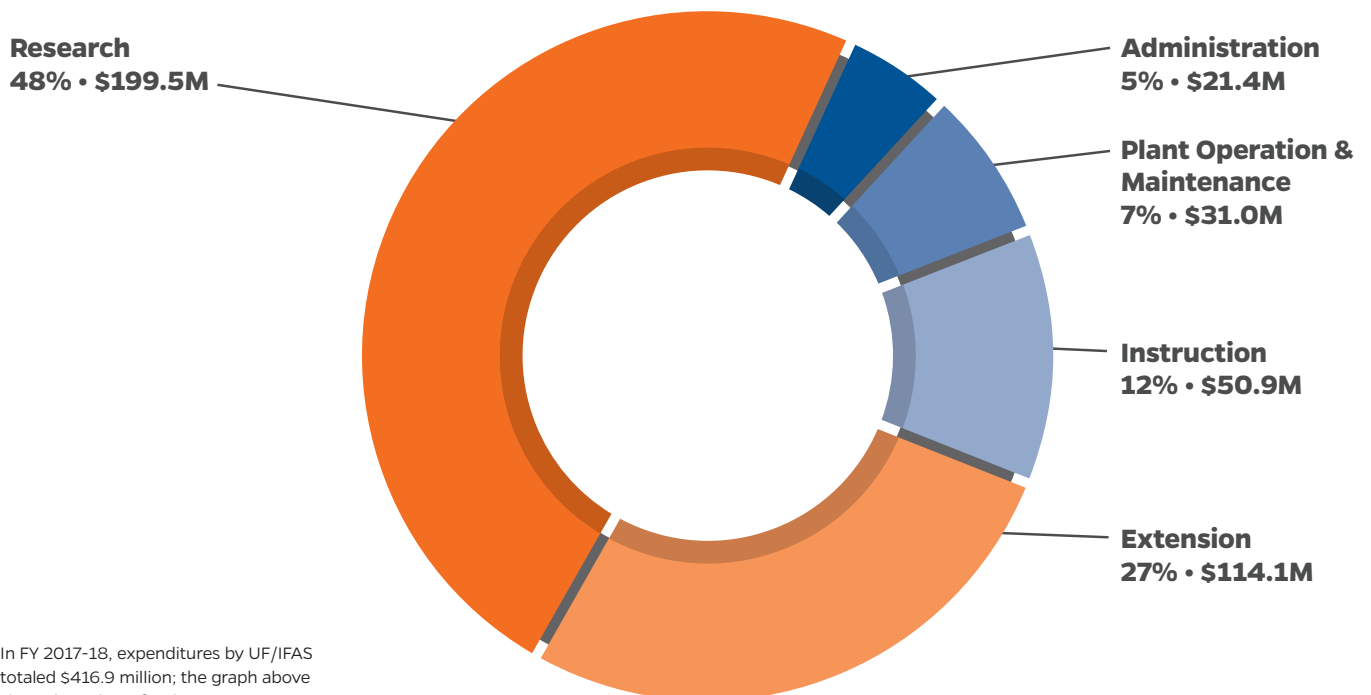
UF/IFAS FY 2017-18 Expenditures by Revenue Source

aka "How Was the UF/IFAS Budget for FY 2017-18 Funded?"
\$416.9 million (M)



UF/IFAS FY 2017-18 Expenditures by Category

aka "How Was the UF/IFAS Budget for FY 2017-18 Spent?"
\$416.9 million (M)



UF/IFAS PARTNERSHIPS

Although the University of Florida Institute of Food and Agricultural Sciences is a vast and complex entity, it does not operate in isolation.

Quite the contrary, partnerships are crucial to UF/IFAS operations at every level. Our personnel interact constantly with producers, elected officials and representatives of academia, government agencies and non-profit organizations.

Virtually every commodity group in Florida maintains contact with UF/IFAS personnel who focus on their respective industries. Producers often participate in studies by allowing experiments on their acreage, and by providing data and anecdotal observations that help scientists assess challenges and potential solutions.

Elected officials at the county, state and federal levels help UF/IFAS secure needed funding as well. The Florida Legislature provides about half the UF/IFAS operating budget each year, which includes proceeds from student tuition. Florida's county governments provide more than \$30 million each year in total financial support for UF/IFAS Extension. The federal Farm Bill, renewed approximately every five years, provides "specialty crops" research funding crucial to Florida, as well as other funding for research and Extension.

In academia, UF/IFAS faculty members often collaborate with colleagues at other public and private universities, including Florida A&M, the state's other land-grant institution. These collaborations often result in new insights, published papers and patentable discoveries.

Within Florida, state agencies that regularly engage in collaborations and other activities supporting UF/IFAS include the Florida Department of Agriculture and Consumer Services, the state's five water management districts, the Florida Fish and Wildlife Conservation Commission and the state Department of Environmental Protection. At the federal level, UF/IFAS projects often receive financial support from the U.S. Department of Agriculture, particularly its National Institute of Food and Agriculture, the U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Department of Energy, U.S. Department of Commerce and the U.S. Forest Service.

Non-profit organizations also support funding initiatives, often in connection with specific commodities or industries, health care, veterinary medicine, natural resources and wildlife issues.

GIVING TO UF/IFAS

Philanthropy helps UF/IFAS reach new heights of excellence.

The UF/IFAS Office of Advancement, in collaboration with the University of Florida Foundation, fosters essential relationships and secures private support to advance the UF/IFAS land-grant mission.

The UF/IFAS Office of Advancement has roots extending back a half-century, and was originally known as Special Help for Agricultural Research and Education (SHARE). This was one of the first fundraising programs on campus and benefited UF/IFAS by facilitating gifts supporting initiatives ranging from student scholarships to new scientific instruments to additional Extension personnel.

Altogether, gifts and pledges to UF/IFAS accounted for more than \$47 million in FY 2017-18. Additionally, UF/IFAS has an endowment portfolio topping \$139 million, which provides ongoing support for important administrative and faculty positions.

Charitable giving has special meaning for UF/IFAS, because so many of our donors are alumni and current or former UF/IFAS employees who have chosen to give back to help UF/IFAS achieve its many goals.

Donors can choose to support UF/IFAS in several ways, including gifts of cash, real estate, securities, life income gifts and charitable bequests.

UF/IFAS has embarked on its greatest challenge to date — a \$200 million goal as part of the University of Florida Capital Campaign. These gifts will enable UF/IFAS to improve access to education through scholarships, support world-class faculty and continue finding solutions to global challenges.

For more information about making charitable gifts to UF/IFAS, please visit <https://give.ifas.ufl.edu>.

UF/IFAS FACILITIES

Because the UF/IFAS enterprise serves the entire state of Florida, UF/IFAS operates facilities at locations statewide, enabling our personnel to support local communities more effectively.

As of May 2018, UF/IFAS has operations active on 25,715 acres statewide. The UF/IFAS facilities on that acreage include 1,294 buildings totaling 3,915,000 gross square feet of space. Roughly three-quarters of UF/IFAS buildings and total building space are located across the state and not on the UF main campus in Gainesville.

Despite tight budgeting, in recent years UF/IFAS has secured funding for several important new building initiatives from the Florida Legislature and private donors, with advocacy from agricultural industry groups.

For example, summer 2018 saw the completion and grand opening of the UF/IFAS Honey Bee Research and Extension Laboratory, a three-building complex on UF

main campus grounds that was funded with help from the Florida State Beekeepers Association. Similarly, the Florida Cattlemen's Association helped secure funding to build new classrooms and dormitories at the UF/IFAS Beef Teaching Unit in Gainesville, and supporters of the UF/IFAS Southwest Florida Research and Education Center in Immokalee obtained funding for expansions and upgrades that added 7,000 square feet of building space to the 320-acre operation.

In the immediate future, private support will be especially important to construction projects at all UF/IFAS locations, due to diminished availability of funding from other sources.



NATIONAL & REGIONAL AWARDS

In recognition of their outstanding scientific expertise and academic performance, UF/IFAS faculty members frequently receive awards and honors for their teaching, research and Extension efforts, as individuals or as members of project teams.

The following is a selection of prestigious national and regional recognitions received by UF/IFAS personnel since 2013.

UF/IFAS CALS

In November 2018, two UF/IFAS College of Agricultural and Life Sciences faculty members were honored by the Association of Public & Land-grant Universities (APLU) as recipients of U.S. Department of Agriculture (USDA) 2018 Excellence in College and University Teaching Awards for Food and Agricultural Sciences.

The awards program is conducted nationwide each year; awards are presented during the APLU annual meeting. The program celebrates faculty members for their teaching abilities, service, scholarship and use of innovative teaching methods.

Monika Oli, a senior lecturer with the UF/IFAS microbiology and cell science department, received the Teaching and Student Engagement Award. Kim Moore, an environmental horticulture professor at the UF/IFAS Fort Lauderdale Research and Education Center, received one of six Regional Teaching Awards presented.

Nationwide, this program recognizes up to 12 faculty members per year. Along with Oli and Moore, 16 other UF/IFAS CALS faculty members have received these awards since 1992.

UF/IFAS RESEARCH

Since 2007, the USDA, through its National Institute of Food and Agriculture (NIFA), has sponsored the prestigious NIFA Partnership Awards Program, which honors exceptional university-based research efforts.

Teams led by UF/IFAS personnel have received NIFA Partnership Awards several times recently.

2017 – The Corn Heat-Stress Adaptation Team sought to boost field corn yields in hotter climates and received a NIFA Partnership Award for multistate efforts.

2016 – The Pine Integrated Network: Education, Mitigation, and Adaptation Project, also known as PINEMAP, received a NIFA Partnership Award for outstanding performance integrating and fulfilling the

land-grant teaching, research and Extension missions while helping secure the future of the Southeastern planted-pine industry.

2014 – The Southeast Climate Extension project received a NIFA Partnership Award recognizing it as an outstanding multistate effort. The project provides Southeastern farmers with decision-making tools related to weather and climate.

2013 – The Beef Reproduction Task Force received a NIFA Partnership Award as an outstanding multistate effort. The Task Force focuses on improving calving rates, a factor critical to the success of beef cattle operations; seven universities are involved.

UF/IFAS EXTENSION

In July 2017, two UF/IFAS faculty members well-known for their UF/IFAS Extension irrigation programming received national honors for their efforts, at the annual meeting of the American Society of Agricultural and Biological Engineers (ASABE) in Spokane, Wash.

Kati Migliaccio, a professor and chair of the UF/IFAS agricultural and biological engineering department, received the 2017 G.B. Gunlogson Countryside Engineering Award. The award recognized Migliaccio's superior research and Extension programs fostering

water conservation by irrigators in the eastern United States, which have resulted in positive environmental impacts.

Michael Dukes was one of 13 academics inducted as ASABE Fellows at the meeting. A professor with the agricultural and biological engineering department as well as director of the UF/IFAS Center for Landscape Conservation & Ecology, Dukes was selected in part for his impactful research and Extension programs in water conservation of irrigated systems.

NAS MEMBERS & AAAS FELLOWS

Two of the highest honors a scientist can receive are election to the National Academy of Sciences (NAS) and election as a Fellow of the American Association for the Advancement of Science (AAAS).

Both of these non-profit organizations promote scholarship and recognize outstanding scientific achievement.

The National Academy of Sciences (NAS) was created by legislation that President Abraham Lincoln signed in 1863, less than one year after he signed the Morrill Act to create the land-grant university system. Total membership in NAS is approximately 2,380 and a maximum of 100 new members are elected annually; candidates may only be nominated by current members and are evaluated on the basis of significant, sustained research achievement.

Among UF/IFAS faculty members, including retired faculty, those elected to NAS include:

Linda Bartoshuk

Food Science and Human Nutrition
Elected 2003

Robert Cousins

Food Science and Human Nutrition
Elected 2000

Roy Curtiss, III

Infectious Diseases and Immunology
UF College of Veterinary Medicine
Elected 2001

Lonnie Ingram

Microbiology and Cell Science
Elected 2001

James Jones

Agricultural and Biological Engineering
Elected 2012 (National Academy of Engineering)

Harry Klee

Horticultural Sciences
Elected 2012

Pedro Sanchez

Soil and Water Sciences
Elected 2012

Formed in 1848, the American Association for the Advancement of Science (AAAS) is the world's largest general scientific society. Fellows are nominated and elected by the AAAS general membership; approximately 400 Fellows are elected each year.

Among UF/IFAS faculty members, including retired faculty, those elected AAAS Fellows include:

Bryony Bonning

Entomology and
Nematology
Elected 2010

Ken Boote

Agronomy
Elected 2010

Robert Cousins

Food Science and
Human Nutrition
Elected 2014

Roy Curtiss, III

Infectious Diseases and
Immunology
UF College of
Veterinary Medicine
Elected 1990

Robert Ferl

Horticultural Sciences
Elected 2018

Peter Hansen

Animal Sciences
Elected 2007

Andrew Hanson

Horticultural Sciences
Elected 2014

Marjorie Hoy

Entomology and
Nematology
Elected 1990

James Jones

Agricultural and Biological
Engineering
Elected 2012

Jeffrey Jones

Plant Pathology
Elected 2018

Roger Kjelgren

Environmental Horticulture
Elected 2018

Harry Klee

Horticultural Sciences
Elected 2009

Karen Koch

Horticultural Sciences
Elected 2012

Lena Ma

Soil and Water Sciences
Elected 2011

P.K. Nair

School of Forest Resources
and Conservation
Elected 2002

Daryl Pring

Plant Pathology
Elected 2008

Ramesh Reddy

Soil and Water Sciences
Elected 2001

Pedro Sanchez

Soil and Water Sciences
Elected 2005

Thomas Walker

Entomology and
Nematology
Elected 1964

Frank White

Plant Pathology
Elected 2015

STEWARDSHIP

When UF/IFAS personnel extol the virtues of good stewardship to the producers and Florida residents we serve, we're speaking from experience.

The University of Florida is a land-grant institution, supported with taxpayers' dollars. So at UF/IFAS, we make every effort to use our funding efficiently. What's more, we're constantly seeking ways to improve.

One of our most significant stewardship accomplishments in recent years is, we've managed to reduce UF/IFAS energy and water costs, even as our physical footprint has grown. For example, in 2018, UF/IFAS has about 3.9 million gross square feet of building space, an increase of almost 700,000 square feet from 2008. Nonetheless, in FY 2017-18, UF/IFAS spent about \$1 million *less* on utilities than we did back in FY 2007-08. These savings came about thanks to factors that include technological improvements, strategic replacement of HVAC systems and roofs, and efforts to reduce waste.

Another strategy we use to save money is to encourage shared use of specialized, expensive equipment. This approach eliminates the need for duplicate purchases around the state. So, to reduce expenses associated with the rental, lease or purchase of construction equipment and vehicles needed for UF/IFAS projects, we established the Heavy Equipment Program.

This program makes UF-owned equipment available to UF personnel upon request. The program and most

of the equipment are housed at the centrally located UF/IFAS Plant Science Research and Education Unit (PSREU) in Citra, about 30 minutes south of the UF main campus. Items available include bulldozers, skid loaders, back hoes, cranes, dump trucks, graders, trenchers and pavers, as well as smaller, Bobcat-type vehicles and trailers for hauling materials. Furthermore, PSREU has a full complement of trained, experienced operators available.

In times of crisis, the Heavy Equipment Program is also responsible for providing assistance to UF/IFAS and UF operations around the state, by taking appropriate machinery to disaster locations to supplement efforts by first responders and other government agencies. This added measure of security proved beneficial during recent hurricane seasons. For example, after Hurricane Irma devastated Florida in September 2017, the program deployed equipment from PSREU to nearly every off-campus UF/IFAS location in Florida.

A related initiative, the Federal Excess Property Program, enables UF/IFAS to borrow supplies, vehicles and heavy equipment owned by the federal government and available for loan through the U.S. Department of Agriculture.





UF/IFAS CENTERS & INSTITUTES

Some scientific challenges are too large and complex to be addressed effectively by one person.

These challenges require teams of experts who work together to seek solutions.

To foster such collaborations, within a single discipline or across multiple disciplines, UF encourages the formation of specialized units known as centers and institutes.

Centers are college-wide or university-wide units that provide services to a particular population; they are often based in a single academic department.

Institutes provide services to a more broadly defined population and involve two or more academic units; for this reason, institutes are likely to involve larger numbers of faculty than centers do.

The centers and institutes within UF/IFAS afford our faculty and our collaborators new opportunities to assess issues from all angles and develop practical solutions built on consensus.

UNIVERSITY-WIDE INSTITUTES LED BY UF/IFAS

Florida Climate Institute

UF Water Institute

INSTITUTE SERVING UF/IFAS

UF/IFAS Institute for Sustainable Food Systems

CENTERS SERVING UF/IFAS

Center for Agricultural and Natural Resource Law

Center for Aquatic and Invasive Plants

Center for Arthropod Management Technologies

Center for Landscape Conservation and Ecology

Center for Nutritional Sciences

Center for Public Issues Education in Agriculture and Natural Resources

Center for Remote Sensing

Center for Stress Resilient Agriculture

Center for Sustainable and Organic Food Systems

Florida Center for Renewable Chemicals and Fuels

One Health Center of Excellence

The UF/IFAS Plant Innovation Center

UF Marine Laboratory at Seahorse Key

UF/IFAS STATEWIDE OPERATIONS

The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) is a proud part of the nation's land-grant university system, which was created in 1862 to provide access to higher education for people of average means.

As part of its land-grant mission, UF/IFAS operates numerous locations throughout Florida, including 14 academic departments and two schools based at the UF main campus in Gainesville, 17 off-campus research centers and sites and UF/IFAS Extension offices in every county.

UF/IFAS Statewide Locations

