

UNDERGRADUATE RESEARCH

University of Florida undergraduates help address important scientific challenges through summer research internships offered through the Florida Agricultural Experiment Station. Most internships are conducted in Gainesville, but some are based at off-campus facilities, such as one of the 12 UF/IFAS Research and Education Centers or at various other locations in Florida and abroad.

The experience introduces students to career options available via the UF/IFAS College of Agricultural and Life Sciences' 14 academic departments and two schools. Internship projects are designed to complement the research goals of participating faculty members. For students, participation in university-level research can provide an advantage when they apply for jobs or graduate schools.

In 2015, 62 undergraduates were selected for the program. Depending on the project, the interns may have learned to design experiments, conduct field work, handle and store samples, record data, operate sophisticated instruments, and publish study results. Many students and faculty find the program so beneficial that they continue working together after the program concludes.

NATURAL
RESOURCES



AGRICULTURE



HUMAN
SYSTEMS



HORSE GENOMICS

One advantage of an undergraduate internship is the opportunity to learn about the subject matter behind a study, and why the research is being conducted. Students working with equine geneticist Samantha Brooks acquire a range of experience as they help conduct research on genetic factors that may contribute to the development of equine laminitis, a serious orthopedic disorder. Brooks, an assistant professor with the UF/IFAS Department of Animal Sciences, said that her interns' responsibilities include maintaining health records on study animals, processing materials for DNA samples, and conducting lab procedures to isolate and analyze specific genes. Undergraduate interns have helped Brooks pinpoint a mutation associated with a gene that controls skeletal growth and could provide additional insights about laminitis.



COVER CROPS

By assisting with experimental design, undergraduate research interns gain a better appreciation of the scientific method as they determine how to rigorously test a hypothesis without exceeding space, time and budget constraints. Carlene Chase, an associate professor with the UF/IFAS Horticultural Sciences Department, involved her intern in every step of a study aimed at developing improved cover-cropping techniques. The study is part of a large-scale project that Chase is leading on organic strawberry production, a sector that is experiencing rapid growth. After helping to plan the study, the intern followed through by planting seed, tracking cover crop growth, and assessing weed suppression provided by the cover crops. Through exposure to the realities of scientific research, interns supplement their classroom learning with valuable experience and practical skills, Chase said.



SEA TURTLE HEALTH

Some undergraduate research internships involve field work, providing a different experience from laboratory analysis. To assist Ikuko Fujisaki with a project focused on microscopic nematodes that colonize the shells of marine turtles and may cause harm their to health, interns joined U.S. Geological Survey (USGS) teams at sites along the Florida and Alabama Gulf Coast. They scouted beaches for nesting female turtles, scraped residue samples from the reptiles' shells, and helped USGS personnel draw blood samples and tag turtles for identification and tracking. Fujisaki, a research assistant professor with the UF/IFAS Fort Lauderdale Research and Education Center, said the internship taught students to work in a team, accurately record data, and then properly store, package and ship biological samples to ensure that they are preserved in good condition for analysis.



BOVINE MASTITIS

Intellectually, perhaps the most exciting aspect of an undergraduate research internship is the chance to make discoveries relevant to important issues. One student working with microbiologist Kelly Rice found herself on the cutting edge of genetic investigation concerning the pathogenic bacterium *Staphylococcus aureus*, responsible for numerous diseases including mastitis in dairy cows. To confirm the role of genes that were thought to influence production of nitric oxide, a compound that protects the bacterium from host immune responses, the student cultured and monitored several *S. aureus* genetic mutants under various environmental conditions. Rice, an assistant professor with the UF/IFAS Department of Microbiology and Cell Science, explains that this research may eventually lead to new therapies that impair the pathogen's ability to produce nitric oxide, rendering it more vulnerable to antibiotic treatments.



CATTLE REPRODUCTION

While assisting beef cattle expert Cliff Lamb, one undergraduate research intern discovered a potential new career path. The student helped assess the efficiency of reproduction-management programs and the effects of sub-optimal maternal nutrition on calf development *in utero*. Her responsibilities included comparing the post-partum development of calves conceived using various estrus synchronization methods, analyzing ultrasound images of unborn calves to assess their growth, and collecting samples of cattle feed, blood and fecal material. Lamb, a professor with the UF/IFAS North Florida Research and Education Center in Marianna, said it's common for students to seek internships to gain experience in a potential career field, but because the UF/IFAS internship program focuses on providing research experience, it may introduce students to unfamiliar scientific disciplines, occasionally with life-changing results.



MOSQUITO-BORNE ILLNESSES

Undergraduate interns with entomologist Chelsea Smartt investigate gene activity that determines whether female mosquitoes will become disease vectors after consuming blood containing pathogens such as West Nile virus or chikungunya. The interns isolate and copy RNA molecules from captive mosquitoes, identify target genes using computer-assisted bioinformatics analysis, then use a process called polymerase chain reaction to generate numerous copies of the target genes for further study. The interns have helped Smartt, an associate professor with the UF/IFAS Medical Entomology Laboratory in Vero Beach, identify three genes that significantly influence whether a mosquito's immune system will destroy recently consumed pathogens, or allow them to survive and reproduce. Smartt said the work has inspired some interns to take an interest in bioinformatics, a fast-developing scientific field with numerous job opportunities.

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