Impact of the Internship Program

Although the Summer Internship program sponsored by the ACES Office of Research concluded in mid-August, the impacts provided to the students, faculty, extension staff, and surrounding communities continue today. For the first time, the 14 summer interns shared their findings with research center mentors, faculty advisors, project stakeholders, and perspective summer interns during a reception held on-campus at the beginning of the semester. To begin the program, Robert Hauser, Dean of the College of ACES, described how the internship program is a one-of-a-kind opportunity that is not available at other top agriculture schools. Neal Merchen, Associate Dean of Research, talked about the importance of providing hands-on learning opportunities to undergraduates. After the student’s presentations, Elvira de Mejia, Assistant Dean of Research, spoke about the transformation she observed from the first meeting to the last in the student’s maturity and ability to grasp and present research concepts. Many present were impressed with the team work displayed between the interns and their ability to engage in multidisciplinary research. Many students will continue their research on-campus during the fall semester and will present at the annual undergraduate research symposium in April. Take a look inside to see the research progress made over the summer and to hear directly from the summer interns about their life-changing experience. The Office of Research is currently accepting applications for next summer’s program. The deadline is Nov. 8th at 5PM.

Value-Added Products
Investigating methods to add value, while minimizing additional cost, to tomatoes, raspberries, and wheat.

Invasive Plant Species
Understanding the mechanism of invasion in order to design effective control strategies.

Improving Water Quality
Tracking nitrogen movement in corn fields to balance production optimization with protection of water resources.
Value-Added Products

Raspberry Jam

To expand the market for highly perishable raspberries, Karen Chen investigated the physical and sensory properties of raspberry jam made using different varieties and gelling agents. Karen determined that two productive varieties at Dixon Springs, Joan J and Joan Irene, did not vary in the amount of natural pectin present. Additionally, the jams made utilizing less expensive gelling agents had similar texture and were equally liked in a preliminary sensory study. The results could help raspberry growers find additional avenues for income.

Karen (left) and Ying (right) by the tomatoes grown in high tunnels at Dixon Springs.

In Karen’s Words

My experience this summer was largely positive. As a food science student, I spend most of my time studying the processing of raw materials and the summer allowed me to see not only the grower’s perspective, but the whole picture from plant to product. It has also shown me how the University gets involved with the general society and how effective, accessible, and useful our studies may be to the population outside of academia that applies this knowledge.

Tomato Processing

To augment income from tomatoes, Ying Meng determined the feasibility and economic benefits of building on-farm processing capabilities. In particular, she investigated the ability to match homemade ketchup to commercially available brands, such as Heinz and Hunts. Although to an untrained eye the 3 ketchups looked similar, Ying found that creating ketchup comparable to Heinz, who contains the majority of the market share, was quite difficult. Of the important physical properties of ketchup that Ying tried to mimic with homemade ketchup, the most difficult to match was color, which was highly dependent on the tomato variety. Jozef Kokini, Professor in Food Science and Human Nutrition and faculty advisor on the project, felt the work provided important information for farmers interested in creating products out of tomatoes, such as ketchup. In the end, creating tomato paste may be a more practical option.

In Ying’s Words

I spent a great summer in Dixon Springs learning the production side of food science. This experience shaped my perspective of food science because now I pay more attention to the source of food material, which has a crucial impact on the end food product. The ACES Summer Research program provided me with a valuable opportunity to see all the aspects of my field of study. It gives me the advantage of differentiating myself in the competitive food industry, since I now have a broader view and knowledge of food science.

Visual comparison of homemade vs. commercial ketchup.
Baked Goods

By taking wheat grown from the fields in Dixon Springs to the flour mill at the Siemer Milling Company in Teutopolis, IL, **Rachel Cote** was able to study the effect of optimizing yields on the milling and baking quality of wheat. Rachel found that the level of protein varied within the wheat she analyzed. The treatments with high protein levels demonstrated increased dough strength, which had negative effects on the baking quality. The cookies made with high protein dough were thicker and smaller in diameter. Rachel plans to correlate the results for baking quality with sensory perceptions of cookies and conduct additional physical tests during the fall semester. Dr. Kokini, faculty mentor on the project, mentioned the importance of determining how agronomic practices impact food quality.

**IN RACHEL’S WORDS**

My experience this summer was awesome. I learned so much that I will never get the opportunity to learn elsewhere. Also, Southern Illinois is beautiful and there are so many trails and outdoor activities. Something really important that I learned was what the lifestyle in rural areas is like. This experience has given me a competitive edge in that I have a deeper understanding of the entire chain of events of food processing.

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**Effects of Invasive Plants on Soil Quality**

To determine the effects of Japanese stiltgrass (*Microstegium vimineum*), an invasive plant species, on soil carbon and nitrogen cycles, **Scott Cinel** conducted carbon (dissolved sucrose) and nitrogen (ammonium sulfate) addition studies in both invaded and non-invaded sites. During the fall semester, Scott has been working to analyze carbon levels, nitrogen levels, and microbial activity for above ground biomass and soil cores collected over the summer from 54 plots. The study findings will help to elucidate how Japanese stiltgrass manipulates resources to overtake native plants and hopefully will provide insight for developing effective methods of controlling invasive species.

**IN SCOTT’S WORDS**

My experience this summer was insightful and greatly constructive for the development of my future career. From the research skills gained, including several soil chemistry techniques and improving my technical writing, to the field skills gained such as learning to always look down when setting up plots so as not to step on venomous snakes, I have greatly improved my overall research skills and the experience gained will most definitely lend itself to the graduate work I intend to begin next year. This program has instilled a passion for field research and ecology that will stay with me for the rest of my career and life.
Optimizing Cattle Reproduction and Welfare

Bull Fertility

To determine the effects of insecticide treatment on bull fertility, Sandra Jimenez treated bulls throughout the summer with common methods used by producers, including ear tags, pour-ons, fog sprays and premise sprays. Sandra did not observe any adverse effects due to the pyrethroid insecticide treatments, although she still plans to quantify the testosterone levels in collected blood samples. Clifford Shipley, Clinical Associate Professor and Interim Assistant Director of the Agricultural Animal Use and Care Program, noted that if the results hold Sandra's study will provide important knowledge to producers regarding best practices for safely controlling flies.

IN SANDRA’S WORDS
I had a wonderful experience full of new tasks that I have never before done. Everyone is very caring, open minded and willing to teach. I learned to draw blood, handle cattle, drive a bobcat, tear down and build fences, and ultrasound pregnant cattle. This experience has really changed the way I look at large animals. I went in thinking I would ideally become only a small animal veterinarian and at the end decided to pursue a mixed practice. Not to mention the strength and endurance one gains when having to feed 20 buckets of food everyday along with lifting large amounts of hay over the fences of bulls.

Bull Wellness

Over the summer, Erica Navis monitored 23 bulls exposed to weekly electroejaculation procedures for behavioral indicators (e.g., vocalization and movement) and physiological stress and pain indicators (e.g. cortisol and substance P). Although Erica still needs to evaluate the physiological indicators, she observed no adverse effects on the behavioral indicators related to bull wellness due to repeated electroejaculation procedures. Dr. Shipley mentioned the study will help address an important unanswered animal welfare question. The results will help inform animal management practices and provide information for the long-term impact of the procedure on bull wellness.

IN ERICA’S WORDS
The best part of this internship is being surrounded by amazing people, scenery, and opportunities. One of the amazing opportunities this internship has to offer is that the interns get the chance to facilitate their own research project in their field of interest with the help of mentors and faculty advisors for guidance and advice along the way. I can’t even begin to list the amount of people I have connected with through this internship. It is sad to think about how fast those eleven weeks went by but when I look back at it, all of the amazing memories come to mind and it brings a smile to my face.
Cattle Nutrition

To investigate methods of improving feed efficiency in cattle, Mary West continued an on-going study comparing the feed efficiency and health of cattle fed two varieties of fescue for different durations over the summer. In particular, she wanted to determine if a novel variety of fescue (Max Q) fed during the late summer could reduce the toxicity associated with a more common variety of fescue (Kentucky 31). Mary observed differences in average daily weight gain and other indicators when cattle were fed Max Q; however, only the improvement in respiration rates was statistically significant. In comparison to the study conducted during the summer of 2012, she found in her study cattle handled the treatment better and displayed less stress. The difference between the two summers could potentially be attributed to environmental conditions, since additional stress may have occurred due to the 2012 drought.

IN MARY’S WORDS

I am very happy to have worked at Dixon Springs Agricultural Center this past summer. I had never worked on a farm previously and so it was a good life experience. This opportunity emphasized starting from the ground up, instead of starting at a point further into a project. At this job, I personally walked through pastures collecting forage samples or herded calves through the shoots to be weighed. With so much hands-on experience, it made understanding come easily.

Bioenergy Crops

Biogas

Hoi Chun Ho investigated the suitability of Miscanthus for energy production using anaerobic digestion, a biological process that converts organic waste into biogas. To determine the potential for energy production, Hoi monitored methane production from fermented Miscanthus (M. x giganteus ‘Illinois’) over time. Although he originally planned to only monitor the samples for 30 days, Hoi’s results demonstrated that methane production was still occurring on day 50. He also discovered that Miscanthus harvested later in the season was able to produce more methane gas, which may help producers decide the best time to harvest. The results could provide a way to utilize the residual that remains after ethanol production. Erik Sacks, Professor in Crop Sciences and faculty advisor on the project, was impressed with the interdisciplinary nature of Hoi’s project requiring disciplines from crop sciences to engineering.

IN HOI’S WORDS

My dream of living in the country came true because of this internship. Living at the Dixon Springs Agricultural Center put me in the heart of Southern Illinois. I got to work day in and day out with researchers at Dixon Springs, live and hang out with all the interns, make very good friends, and learn a lot. This is definitely a unique, fun, interesting, and unforgettable experience that I do not know if I will have another opportunity to experience again.
Cattle Forage

To determine the ability of Miscanthus to serve as a dual crop within one season, Nicolas Reitz determined the forage quality and the post-cutting recovery of three Miscanthus varieties (M. x giganteus ‘Illinois’; M. sinensis ‘Emerald Shadow’; M. x giganteus ‘Blumel’). Nick observed similar forage quality between the three varieties. In general over the growing season, Nick found a reduction in the forage quality and the recovery ability of Miscanthus. Although Miscanthus can be used as a dual crop for forage, Nick discovered that Miscanthus has some undesirable forage characteristics that would need to be addressed through future studies. Dr. Sacks stated that many people had long wondered if Miscanthus could serve as cattle forage.

IN NICK’S WORDS

The Dixon Springs Summer Internship was an amazing experience. This one of a kind opportunity allowed me to get a feel for what agricultural research was like first hand and the support from experienced advisors and mentors made the lessons learned this summer even more impactful. I learned the importance of attention to detail in the lab setting. This has solidified my desire to go to graduate school. As a food science major working in the crop science and animal science departments, I was able to explore and learn about areas I would have never had the chance to see. This cross disciplinary work has inspired me to hopefully branch out in the future.

Water Quality and Conservation

Barge Traffic

Ferisca Putri monitored water quality during and after barge traffic along the Illinois River for a total of 8 barges. She collected her samples near the U.S. Geological Survey’s water gauge located in Florence, IL in order to determine the accuracy and sensitivity of the gauge to barge traffic. Ferisca observed no permanent sediment change due to barge traffic and determined any water quality changes during traffic were minor. Additionally, she found that the recording of the USGS sensor was accurate before, during and after the barge passed through.

IN FERISCA’S WORDS

This past summer has been one of the best times of my life. I learned how to plan the project from the scratch and finish it strong. However, it was the life experience that made the program so unique. Growing up in a big city, I have never known how simple and quiet living on a farm can be. I was excited that I had the opportunity to do some farming activities for the first time this summer. Furthermore, I loved the working environment at the Orr Center. Everyone is so friendly; I felt like they were my second family. At the end, it was really hard to say goodbye to all the people.
Nitrogen Profiling

To determine the factors that are important in nitrogen availability and loss during corn production, Amanda Eich compared nitrogen content in soil samples and leaves of corn across a variety of variables, including nitrogen rates, crop rotation, time of application (fall vs. spring), type of fertilizer (manure vs. ammonia), tillage, and the presence of residue. Although some of the results were inconclusive because of only having data available for one year, Amanda found that of the variables tested the rate of nitrogen applied had the most significant effect on nitrogen availability and loss. Accumulating similar results over several years will help farmers maximize crop yield and reduce fertilizer costs, while limiting the run-off of nitrogen into local waterways.

**IN AMANDA’S WORDS**

My experience this summer at the Orr Agricultural Research and Demonstration Center was eye-opening. I have literally never participated in such a unique adventure. Living on the farm provided the opportunity for learning all the small details of rural life that would go amiss otherwise. I know that in the future I will be able to relate back to this internship while working on projects of all shapes and sizes because of the skills I acquired this summer.

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Improving the Health and Well-Being of Children

**Lunch Stop Program**

Utilizing unobtrusive observations, Natasha Wilkins evaluated the success of the Chicago Public School Lunch Stop program, which places outdoor food carts at low income schools. Additionally, she correlated attendance with the methods used to improve participation, such as providing bilingual marketing materials, enlisting an outreach partner for advertising, and providing additional engagement activities near the cart. Natasha found that the acceptance and utilization of outdoor food vendors was strongly linked to cultural background. In particular the Hispanic community, given their familiarity with street vendors, more readily attended outside vendors regardless of the methods used to increase participation. Robin Jarrett, Professor in Human and Community Development and faculty advisor on the project, noted how using a mixed methods approach, particularly in new environments, allows researchers to observe important aspects that might otherwise be overlooked.

**IN NATASHA’S WORDS**

The internship experience this summer was unique in that I was able to pursue my interests and design my own experience. I really enjoyed learning to navigate the professional environment through working with Chicago Public Schools and getting to see how deep policy integration goes from the office to the school. Overall, I loved the opportunity to work in Chicago and experience the diversity of food programs and urban agriculture that exists in the city. This experience has solidified my resolve to go into policy as my future career path.
School Gardens

Jasmine Washington used a combination of unobtrusive observations and surveys to determine the barriers for developing successful school gardens. Direct observations of already existing school gardens indicated that successful implementation of school gardens involves a combination of teacher knowledge, student involvement, and parent participation. From an initial survey of teachers involved with school gardening in the area, Jasmine found that one of the biggest needs is for curriculum that will help integrate the garden into the classroom. She also found that teachers are likely to seek Cooperative Extension Services as a resource for information. Jennifer McCaffrey, Assistant Dean for Family and Consumer Sciences Extension, was excited that the social science aspect of ACES research had been integrated into the summer intern program. Dr. Jarrett mentioned that the initial survey conducted by Jasmine will be utilized to develop a survey for wider participation.

IN JASMINE’S WORDS

My experience this summer was very beneficial. I really appreciated the opportunity to learn from, and network with a variety of professionals, and I feel like I now have a better understanding of what the research process entails. This summer I learned more about the factors that affect school gardens, and ways that the gardens benefit children. This experience has made me consider doing further research on school gardens, whereas I previously hadn’t thought much about them. Overall, this was a wonderful experience, and I am honored that I was given the opportunity to participate.

Over the summer, Caroline Hoff developed a reference manual summarizing publically available lesson plans for school garden curriculum. She categorized the best lesson plans by topic, age group, time required, etc. and aggregated them into a single resource that will be available in print or through the web. Already her tool has generated a lot of interest and a link will be included on the national Farm-to-School website. Additionally, Caroline was able to test some of the curriculum at a summer garden camp held at Miles Davis Magnet Academy.

IN CAROLINE’S WORDS

The opportunity to live in Chicago while researching school learning gardens this summer was more than I could have asked for during my undergraduate education. Along with my research, I was able to design and teach a gardening camp at a Chicago Public School. Working in the school’s garden with students who have had little exposure to plants and agriculture was an extremely rewarding experience and a highlight of my summer. After spending the summer working with students and looking at gardening curriculum, I am planning to pursue teaching in the classroom at some point in the future. Without this internship I would have never learned how important teaching truly is to me.
Thank You!

The Office of Research would like to thank all of the advisors, mentors and stakeholders for their generous contributions to our Summer Internship Program past and present. This program is enriched because of you!

Sponsored by: The ACES Office of Research
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*Pictures contributed by the summer interns and Stephanie Henry

Contributors

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*Thank You!*