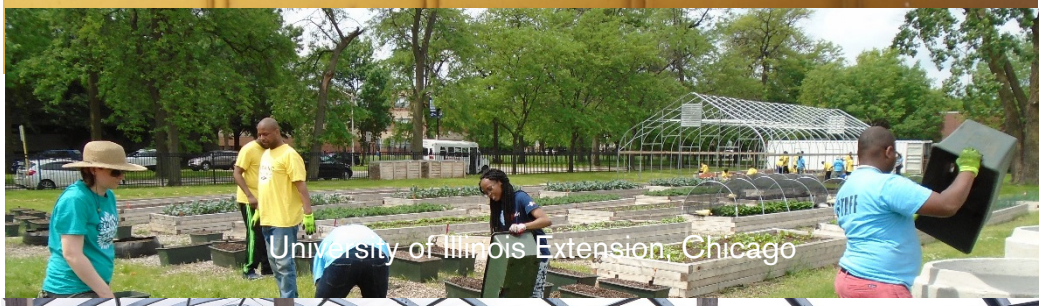

Dixon Springs Agricultural Center


Orr Agricultural Research and Demonstration Center


University of Illinois Extension, Chicago


St. Charles Horticulture Research Center


Benton Dairy Farm

Summer Internship Program – Class of 2015 (15 interns, 5 Locations)

Summer 2015

Another Successful Summer

Since 2008, the ACES Summer Intern Program has helped 85 undergraduates gain valuable research experience by enabling them to oversee a project from concept to completion. This summer 15 interns conducted research and also helped with daily activities at the Dixon Springs Agricultural Center, Orr Research and Education Center, University of Illinois Extension in Chicago, St. Charles Horticulture Research Center, and for the first time the Benton Dairy Farm. In just 11 weeks, the students made discoveries that will not only create new avenues for research, but will also directly benefit interested stakeholders across Illinois and beyond. This newsletter highlights those accomplishments and allows each intern to describe their experience in their own words.

Summer Internship Program Newsletter

University of Illinois

ACES College of Agricultural, Consumer and Environmental Sciences

Office of Research

SPOTLIGHT

Improving Garlic Production

Developing best practices for garlic production and comparing garlic varieties.

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Prescribed Forest Burns

Utilizing white oak saplings to study soil characteristics before and after burns.

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Sustaining Urban Gardens

Identifying the facilitators and barriers to successful school and community gardens.

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Improving Specialty Crop Production

Three interns completed studies at the St. Charles Horticulture Center, located in St. Charles, IL. The Center has approximately 100 acres to conduct research on the production of small specialty crops.

Guanying, Haena, and Jaqueline (L to R) at the St. Charles Horticulture Center.

Heirloom Tomatoes

Despite their increasing popularity, heirloom tomatoes are not typically found in grocery stores since they are more difficult to store and transport. This summer **Jaqueline Nadolny** studied of a variety of heirloom tomatoes (Pareso, Favorita, Sakura, Stupice, and Nyagous) grown in high tunnels under two different ripening conditions, those ripened for 4 days after early picking (at breakers stage) or those vine-ripened. She found that the ripening process did not substantially affect the chemical characteristics of the tomatoes. The heirloom tomatoes also had significantly better quality and antioxidant content than the control tomato types known for high quality (Big Beef) and antioxidant content (Health Kick). Jaqueline will share her findings that early harvesting can produce shippable heirloom tomatoes of comparable quality in Illinois Fruit and Vegetable News.

Jaqueline presents her findings to stakeholders at the St. Charles field day.

In Jaqueline's Words

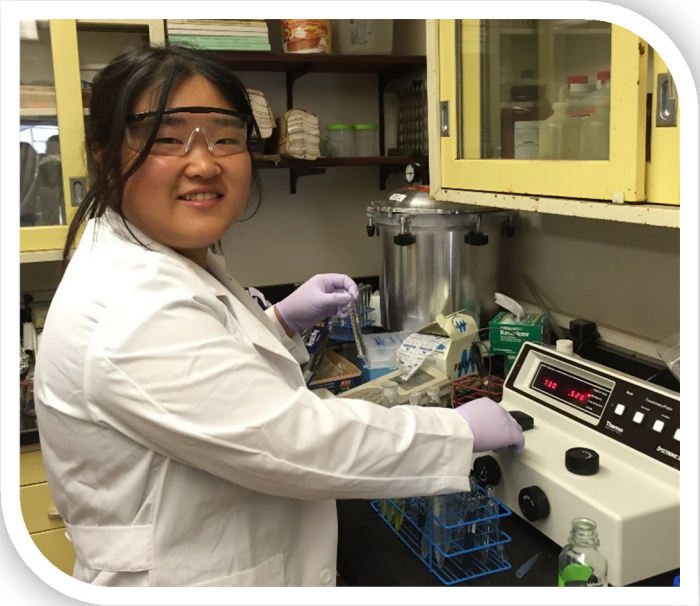
It was different from anything I have ever done before. I learned a lot about horticulture, which I did not learn through classes. I got to experience the growth of tomatoes from the seed to the mature fruit, which was very interesting since I analyzed something that I helped to grow. It was a great experience!

Chili Peppers

Although chili peppers have been established as a good source of antioxidants, relatively few studies have actually quantified how antioxidant levels vary over time and across varieties. **Guanying Xu** compared antioxidant levels by quantifying polyphenols in several chili pepper varieties (Mulato Isleno, Serrano, Giant Jalapeno, Finger, Yatzey, Red Monga Scorpion, and Habenero) grown in high tunnels. By comparing peppers before and after ripening, she found that antioxidant levels significantly increased after ripening. Guanying also discovered that red varieties had higher antioxidant content than green varieties. The peppers with the highest antioxidant content were Yatzey and Habenero.

In Guanying's Words

I learned a lot from my advisor, including how to think like a researcher, how to design an experiment, how to do block trials and minimize environmental factors that may influence my research results. I treasure my research experience and I can't wait to explore more.



Guanying determining polyphenol content in chili peppers.

Haena monitors the garlic field trial at St. Charles.

Garlic

Haena Yun investigated the best management practices for garlic production in northern Illinois. She compared the survivability, scape (flower stalk) production, weight, width, and polyphenol content of eight varieties, including Broadleaf Czech, Georgian Fire, German Extra Hardy, German Red, Kettle River Giant, Pskem River, Samarkand, and the industry standard Music. Haena found that mulching improved survivability, weed control, and bulb weight. The industry standard Music displayed the best performance overall, but Pskem River was best for scape production and Georgian Fire had the highest antioxidant content.

In Haena's Words

Not only have I learned about garlic, my research topic, but I had the privilege of learning about grapes and kiwis as well as other crops and how to care for them. Being part of the internship has shaped my views on where our food comes from and the work that goes in to growing it. Overall, the internship was so amazing and I would consider it one of my best summers.

Prescribed Forest Burns

This summer **Valarie Repp** continued a study that began last summer in the Shawnee National Forest, where white oak tree saplings were planted in unburned or burned plots. Since controlled burns increase light filtration and herbaceous growth, Valarie clipped some plots to determine the effect on white oak saplings. She found the saplings had better survival and growth rates in burned plots. Prior to the study Valarie expected that the presence of herbaceous plants would change the soil characteristics and make it more difficult for the saplings to grow; however, she observed that the highest rate of growth was in unclipped plots when herbaceous plants were present. Studies during the fall on the soil characteristics will help to validate and explain her findings. Overall, the results will help inform future forest land management practices.

In Valarie's Words

I loved the fact that I got to independently go out and work on my own project and see the results of that project first hand. I was happy that I got to learn more about the area that I'm from. Plus, I love being outside, which I definitely got to do a lot of this summer! I also learned that I am highly interested in forest systems rather than other ecosystems. This summer has definitely shined a light on what possible career paths I could take.

Jennifer Woodyard conducted a greenhouse study with the white oak saplings in order to study the impact of soil characteristics on survival and growth. In particular, she was interested in comparing the influence of two types of mycorrhizal fungi that help plants absorb water and nutrients – ectomyorrhizal (EM) fungi commonly associated with white oaks and arbuscular mycorrhizal (AM) fungi associated with herbaceous growth after prescribed burns. Jennifer compared the saplings resilience to stress induced by drought grown in four soil types (control, AM, EM, and AM+EM). Although the drought conditions caused a significant reduction in soil moisture, the survival rates for all the treatment groups were high potentially indicating more time was needed to impact plant survival. Interestingly, the highest rate of growth was observed in saplings grown with both types of fungi (AM+EM) under drought conditions.

Jennifer and Valarie learned chainsaw safety and helped remove invasive species from the forest over the summer.

In Jennifer's Words

I never thought I would get the opportunity to live and work in a beautiful place like Shawnee National Forest. It is extremely peaceful to be constantly surrounded by nature, especially after a hectic school year. When investigating graduate schools, a professor at Purdue was impressed by my knowledge of measuring different soil properties in the lab, which I gained a lot of experience with this summer. Valarie and I worked hard, but had fun doing it and really learned a lot about designing and implementing an experiment!

Cattle Health, Nutrition and Reproduction

Eight students from Animal Sciences conducted a variety of research related to cattle health, nutrition and reproduction at the Dixon Springs Agricultural Center (4 students), the Orr Research and Demonstration Center (2 students), and for the first time the Benton Dairy Farm (2 students).

Sara prepares samples for analysis on campus.

Forage Supplements

The ability to be flexible with feedstuffs and minimize feed costs, especially during the winter, is critical to maximizing producer profits. At the Orr Center, **Sara Tondini** investigated the ability to improve the digestibility of corn stalks, a poor quality forage, using the combination of six available nutritional technologies. The technologies included binders for bacteria and mycotoxins (Bio-Mos and Integral A+), a fiber enzyme (Fibrozyme), a source of omega-3 fatty acids (Algae), and several trace minerals (Sel-Plex and Bioplex organic trace minerals). Sara observed a 7% increase in total tract digestibility of corn stalks supplemented with the nutritional technologies at an added cost of $600 per ton. The results can give producers the information they need to estimate the return on investment of supplementing a low quality feedstuff in contrast to purchasing high quality forage directly.

In Sara's Words

This summer I gained knowledge, worked hard, experienced new things, and made great friends. I received a lot of hands on experience with the cattle, learning how to work them through the chutes, vaccinate, fly tag, artificially inseminate, and ultrasound. Seeing the ins and outs of a beef cattle research farm made me more knowledgeable about all the work it takes to keep a farm running. The research aspects were my favorite parts of this internship. Working in the lab and seeing the statistical results of a project that I worked on for months was very satisfying.

Preventing Fescue Toxicity

This summer **Jessica Kordas** studied the ability of a long-term dewormer, called LongRange, to circumvent the toxicity associated with endophyte-infected fescue in grazing cattle at Dixon Springs. Jessica monitored the health of the control and treated cattle throughout the summer. Preliminary analysis indicates that the average daily weight gain was significantly improved for heifers treated with LongRange. However, outward symptoms of heat stress associated with fescue toxicity, such as respiration and hair coat condition, were not apparent. Jessica will evaluate blood prolactin levels, typically reduced by endophyte-infected fescue, to determine if the conditions led to fescue toxicosis. The ability to protect grazing cattle with a long-term dewormer would provide producers an affordable method to increase profitability without needing to modify their forage practices.

Jessica measuring respiration rates.

In Jessica's Words

Words cannot begin to describe my experience this summer working at Dixon Springs Agricultural Center. In three short months I grew and developed as a student, a researcher, worker, and as a person. My critical thinking skills were challenged on a daily basis and I was forced to think quickly when unexpected situations arose.

Fetal Programming

Last summer pregnant cows were fed two types of fescue, novel (MaxQ) or endophyte-infected (KY-31), to determine if the type of forage consumed during late gestation could impact fetal development. This summer **Lyndzi Miller** investigated the differences between those progeny, in particular their ability to tolerate endophyte-infected fescue. Lyndzi observed slightly better weight gain in calves that were exposed to the toxic, endophyte-infected fescue during development. Although the differences were not significant, Lyndzi will also look at blood prolactin levels to determine if the type of forage consumed during gestation can increase the tolerance and have a protective effect on calves.

Lyndzi measures fescue density using the rising plate method at Dixon Springs.

In Lyndzi's Words

Over the course of my 11-week internship, I had the opportunity to gain an extensive amount of hands on experience while also conducting a research project. I cannot imagine spending this past summer anywhere other than Dixon Springs, IL. I am extremely grateful for this internship experience, and for all of the influential people I met along the way.

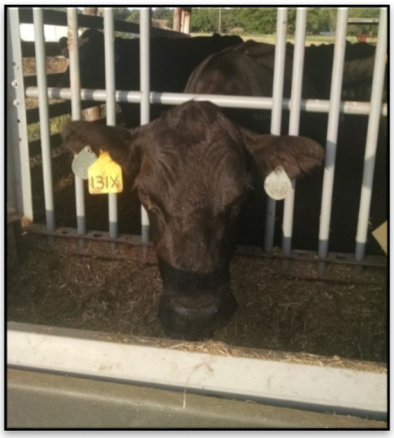
Abby working with cattle at the Orr Center.

Conception Rates

At the Orr Center, **Abby Ralph** studied the ability of a trace mineral injectable supplement, Multimin90, to improve the health and reproduction efficiency of first-calf heifers. Multimin90 contains four trace minerals (Selenium, Zinc, Manganese, and Copper) that are considered to be deficient in cattle and are linked to improved fertility, disease resistance, and other health benefits. Abby found that body condition and weight were similar between control and treated heifers. While the conception rate after artificial insemination in the Multimin90-treated group was improved by 10%, the difference was not statistically significant. Forage content is known to play an important role in conception rates, so Abby brought samples back to campus that she will analyze this fall.

In Abby's Words

My experience this summer was definitely something new and different unlike anything I've ever done before. Working on a research project for the first time ever was very challenging, yet very rewarding. I learned how challenging carrying out a research project can be and how many things you have to take into account. This was my first experience working with large animals and it really impacted my view of a future career path. After this internship I realized I would love to continue doing research in different fields.



Predicting Feed Efficiency

To investigate how cattle feed efficiency changes over the lifespan in particular before and during pregnancy, **Caitlin Sanders** and **Katherine Johnson** compared the feeding behavior and weight gain of pregnant cows this summer to the same group of animals 4 years ago when they were heifers. Caitlin and Katherine utilized the GrowSafe system for their experiment, which automatically measures feed intake, meal frequency, meal duration, meal size, and eating rate for each individual animal. Interestingly, the feed efficiency of the same animals as heifers did not correlate to their feed efficiency as pregnant cows. This is important information for producers to know when determining which heifers will become efficient cows. Other factors that contribute to feed efficiency during development will need to be investigated in order to develop a predictive model of feed efficiency over time in the future.

In Caitlin's Words

I wish I could work in this internship every summer! It was definitely hard work, but I enjoyed spending time with both the farm employees and the other interns. Having the opportunity to develop, conduct, and share my own research project was an incredibly fulfilling experience, especially because we were able to share our results and conclusions with the public to see the practical applications of our work. I also learned a lot about working with other people. I definitely will not forget that when moving ahead in my career: teamwork and positive attitudes go a long way!

The Animal Science interns at Dixon Springs with their mentor Frank Ireland and stakeholders David Bremer and Dr. Steve Cerny. In order (L to R), Frank Ireland, Katherine Johnson, Caitlin Sanders, David Bremer, Steve Cerny, Lyndzi Miller, and Jessica Kordas.

In Katherine's Words

The amount of hands-on animal experience we got was outstanding. We did everything from taking blood to ear-tagging the cattle. I learned so much about what I was capable of and my self-confidence has increased dramatically as a result of my experience. It helped solidify my plan to go into large animal medicine; I loved working with the cattle.

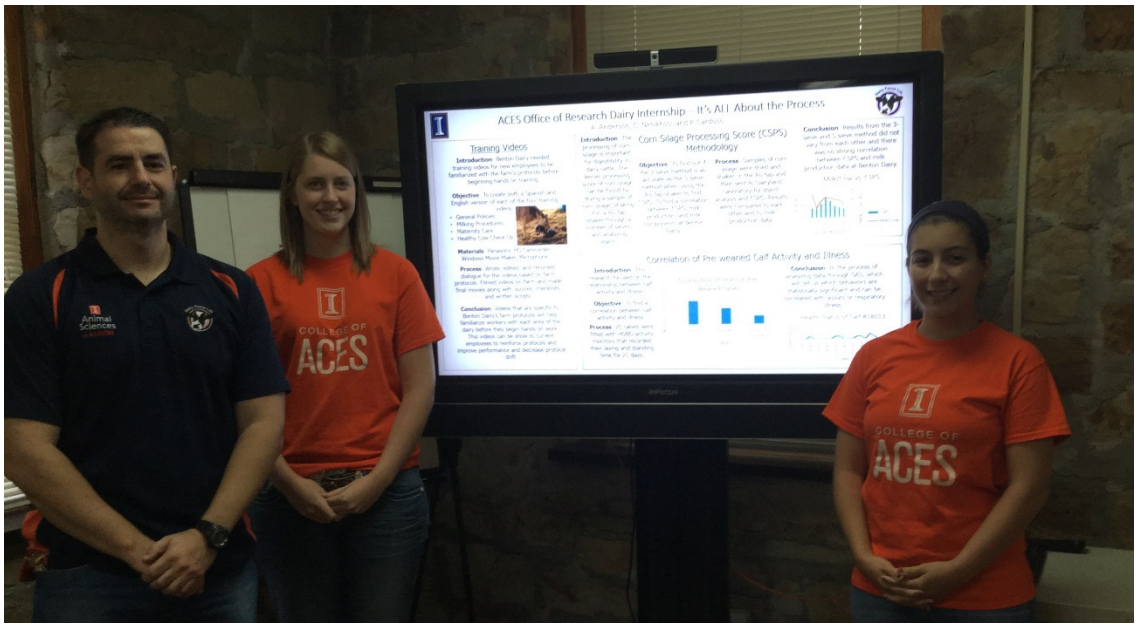
Improving Diary Farm Processes

Ashley Anderson and **Claire Nkhikhssi** conducted research at the Benton Dairy in Indiana. The Benton Dairy houses 3,500 Holstein dairy cows and faces a variety of challenges that the interns investigated over the summer. To investigate if activity can be used as an indicator for sickness in pre-weaned calves, the girls attached a HOBO activity monitor on the ankle of each calf. The activity and health of each calf was monitored for three weeks. Ashley and Claire determined that calves that presented with scours were more restless (i.e., stood up and down more frequently) than healthy calves. Activity monitors could be a very inexpensive and useful tool for monitoring dairy calf health. Additionally, Ashley and Claire developed safety training videos for the farm in English and Spanish about maternity, milking procedures, and healthy farm check-up.

Calf wearing an activity monitor.

In Ashley's Words

I gained valuable information that I would have never learned elsewhere. I learned a lot about how a large dairy farm operates. I learned important protocols that can be utilized on any dairy farm. I also learned the importance of asking questions and clarifying information.



Ashley and Claire appear with their advisor Phil Cardoso after their summer mid-term presentation.

In Claire's Words

Thanks to the ACES Office of Research Internship Program, I was able to gain valuable experience that is applicable to real-life situations. Working at Benton Dairy helped improve my critical thinking, interpersonal, and leadership skills. Even if you have a plan, it can easily be derailed and you must adapt to the situation accordingly. It was interesting to see why research is important to dairy farms and how research can make a positive impact on the day-to-day practices.

Sustaining Urban Gardens

Although the benefits of urban gardens are well documented, the best practices for maintaining and sustaining these gardens needs to be compiled to ensure their continued success. This summer **Jasmine Brown** and **Abigail Peterson** determined the facilitators and barriers to successful school and community gardens in the Chicago area. For their research they investigated approximately 40 urban gardens (~20 each) through qualitative interviews of garden leaders and documentation of visual observations at garden sites. Although funding is important, it was not the top identified facilitator by interviewed participants. For school gardens the ability to integrate the garden into school curriculum was considered the key facilitator. Community involvement and participation were considered important for both types of urban gardens. More details about Jasmine and Abigail's experiences over the summer can be found in their blog called "Suddenly I Seed!" (http://web.extension.illinois.edu/cook/eb369).

In Jasmine's Words

Through my time in Chicago, I learned that you have to be patient and know how to adjust to different situations. Many things did not go as we would have hoped but it all worked out in the end. I think that this internship has taught me how rewarding research can be. It has inspired me even more to continue doing research in my future career.

Abigail and Jasmine (L to R) work at the Community Youth Development Institute High School Garden (right) and pose with their mentors Ron Wolford and Jennifer McCaffrey (below).

In Abigail's Words

My experience this summer was excellent. Not very many people can say that they designed and conducted an independent research project as an undergraduate. Living in Chicago was a very new experience for me, but after embracing the big city, I realized that it has a lot of opportunities to offer. Additionally, working with the people in community gardens was remarkable. They are such an amazing group of individuals with great values and initiatives.

Contributors

Summer Interns	Department	Faculty Advisors	REC Mentors	Stakeholders
Ashley Anderson	Animal Science	Phil Cardoso	John Boerman	Keith Hoeing Rod Fedie
Jasmine Brown	Human Development & Family Studies	Robin Jarrett	Jennifer McCaffrey Ron Wolford	University of Illinois Extension
Katherine Johnson	Animal Sciences	Dan Shike Tara Felix	Frank Ireland	Dr. Stephen Cerny, DVM David Bremer
Jessica Kordas	Animal Sciences	Dan Shike Tara Felix	Frank Ireland	Dr. Stephen Cerny, DVM David Bremer
Lyndzi Miller	Animal Sciences	Dan Shike Tara Felix	Frank Ireland	Dr. Stephen Cerny, DVM David Bremer
Jaqueline Nadolny	Food Science & Human Nutrition	Nicki Engeseth	Shelby Henning	Illinois Vegetable Growers Association
Claire Nkhikhssi	Animal Sciences	Phil Cardoso	John Boerman	Keith Hoeing Rod Fedie
Abigail Petersen	Natural Resources & Environmental Sciences	Robin Jarrett	Jennifer McCaffrey Ron Wolford	University of Illinois Extension
Abby Ralph	Animal Sciences	Dan Shike Tara Felix	Wesley Chapple	Dr. Stephen Cerny, DVM Mike Tenhouse, Tom Saxe, Terry Mefford
Valerie Repp	Natural Resources & Environmental Sciences	Jennifer Fraterrigo	Jim Kirkland	USDA Forest Service
Caitlin Sanders	Animal Sciences	Dan Shike Tara Felix	Frank Ireland	Dr. Stephen Cerny, DVM David Bremer
Sara Tondini	Animal Sciences	Dan Shike Tara Felix	Wesley Chapple	Dr. Stephen Cerny, DVM Mike Tenhouse, Tom Saxe, Terry Mefford
Jennifer Woodyard	Natural Resources & Environmental Sciences	Jennifer Fraterrigo	Jim Kirkland	USDA Forest Service
Guanying Xu	Food Science & Human Nutrition	Nicki Engeseth	Shelby Henning	Illinois Vegetable Growers Association
Haena Yun	Food Science & Human Nutrition	Nicki Engeseth	Shelby Henning	Illinois Vegetable Growers Association

Thank You!

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*Pictures contributed by the summer interns