SEPTEMBER 2018 | VOLUME 36 | ISSUE 9 A MONTHLY PUBLICATION FROM THE NOBLE RESEARCH INSTITUTE


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NOBLE NEWS & VIEWS

EDUCATION

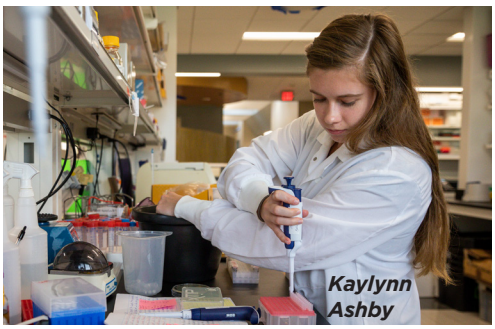
One Noble Summer: About the Lloyd Noble Scholars Program

By Amy E. Hays, adult education manager | aehays@noble.org
Frank Hardin, Ph.D., youth education manager | cfhardin@noble.org

In May, 19 college students arrived at the Noble Research Institute to begin their summer as a carefully selected group from across the country. They would spend 10 weeks working alongside agriculture researchers and consultants to build the future of agriculture through directed work in the Southern Great Plains. The Lloyd Noble Scholars program is built on the idea that development of the next generation of great scientists, agriculture leaders, consultants and innovators begins with a committed investment of time and effort. There are two pathways for students participating in the scholars program. Lloyd Noble Scholars in Agriculture work with our agriculture professionals in core areas of expertise including animal science and livestock management (emphasis on forage-based ruminant systems), agricultural economics, agronomy, horticulture, range management, soils and crops, and wildlife and fisheries. Lloyd Noble Scholars in Plant Science conduct plant science in a real-world laboratory setting with a scientist to bring innovation and science solutions together. Both pathways provide mentorship

Story continues on page 3

LLOYD NOBLE SCHOLARS IN PLANT SCIENCE



KAYLYNN ASHBY,
Utah State University
Final Project: SSP Smorgasbord: Investigating Plant Responses to Peptide Hormones

MADDIE BRIGHTBILL,
College of William and Mary
Final Project: Characterization of Lesion Mimic Phenotypes in *Medicago truncatula*

CHARLOTTE BURNS,
William Jewell College
Final Project: Analysis of Repeated Sequences and Annotation for Tetraploid Genome of *Medicago sativa*

MATTHEW CULLEN,
Clemson University
Final Project: Understanding Metabolic Flux between Lignin and Flavonoid Pathways – Impact on Disease Resistance and Nodulation

GRACE FLORJANCIC,
Virginia Tech University
Final Project: Dicarboxylate and Peptide Transporters of *Medicago truncatula*

CAMERON REED,
Southern Illinois University
Final Project: Functional Characterization of *Medicago truncatula* Plasma Membrane H+-ATPases

ERIC SHYU,
University of North Carolina-Chapel Hill
Final Project: Reannotation of the Arabidopsis Genome and Discovery of Small Genes

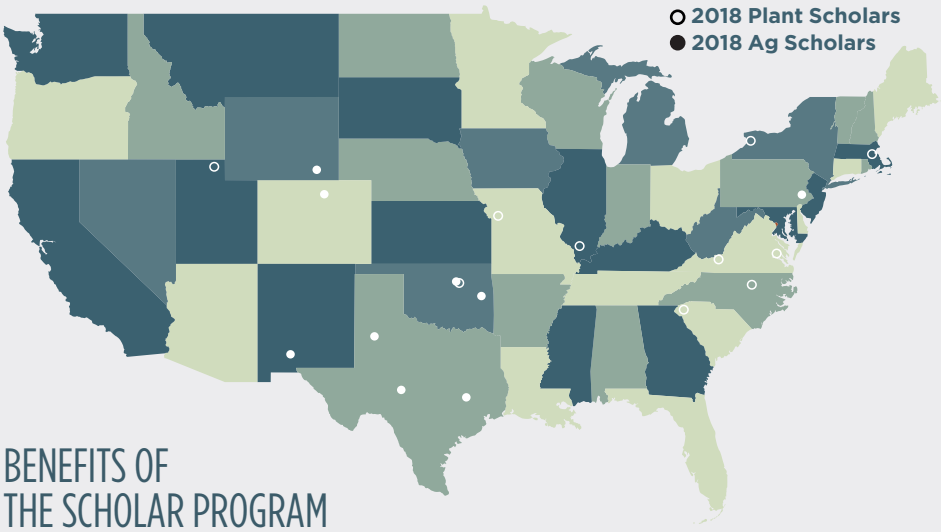
BRANDON TIDWELL,
Oklahoma State University
Final Project: Exploration and Analysis of *Arabidopsis thaliana* Root Hair Length in Different Natural Accessions

SYED UDDIN,
University of Buffalo
Final Project: Cellular and Molecular Characterization of a Chicken Feet Mutant in *Medicago truncatula*

KWAN YOON,
University of Massachusetts
Final Project: Dissecting the Role of Calmodulin in Agrobacterium-Mediated Plant Transformation

FROM ALL OVER THE COUNTRY

The 2018 Lloyd Noble Scholars in agriculture and plant science attend higher education institutions from the Midwest and beyond.



BENEFITS OF THE SCHOLAR PROGRAM

- TEN-WEEK PROGRAM
- HOUSING PROVIDED
- PAID INTERNSHIP
- TRANSPORTATION OFFERED
- REAL-WORLD EXPERIENCE

HOW TO APPLY FOR THE SCHOLAR PROGRAM

The best way to find out how their summer experience went is to read about it directly from them on the One Noble Summer blog at www.noble.org/news/One+Noble+Summer. Each year, students write about their experiences first-hand. If you know of a student with 60 or more hours of college coursework who would be a candidate for this program, you can direct them to the Lloyd Noble Scholars program website at www.noble.org/education/scholar-program. Applications for summer 2019 will open in October 2018.

LLOYD NOBLE SCHOLARS IN AGRICULTURE

MCKENZIE CARVALHO,
Oklahoma State University
Final Project: What Good is Ag Policy?

NATALIE GRAFF,
Texas A&M University
Final Project: What Good is Ag Policy?

CARISSA PICKARD,
Colorado State University
Final Project: Managed Grazing of Switchgrass Using High Stock Density

CHALI SIMPSON,
New Mexico State University
Final Project: Evaluating Vegetative Responses with Different Range Management Techniques

COLE FAGEN,
Angelo State University
Final Project: My Neat Noble Nature Walk

KELLY KOWIS,
Eastern Oklahoma State College
Final Project: Mob Grazing

NICHOLE SEDERSTROM,
University of Wyoming
Final Project: Mineral Management and Alternative Marketing Options for Beef Cattle

CRESTEN SLEDGE,
Texas Tech University
Final Project: Northern Bobwhite Quail Acoustics and White-tailed Deer Trends

BRENT WEISS,
Delaware Valley University
Final Project: Comparing Feed Efficiency to Igenity Trait Scores

and collaborative working environments that expose students to the world of opportunities that exist in agriculture sciences.

Each year, the program grows and becomes more competitive. This year was no exception. In 2018, more than 200 qualified individuals applied to work at the Noble Research Institute. What the 19 selected students took away from their time here will help build their future and perhaps bring some of them back to Noble.

This year's students made up an exceptional group. The majority were working on deciding future directions of their careers or college degrees. One of the program goals is to expose students to a working environment that can offer them opportunities they don't normally get from classroom experience. On the plant science side, many of the laboratory techniques and tools students get to work with are cutting-edge in their field and students get hands-on experiences using these in research settings. On the agriculture side, students get to work directly with agricultural producers through farm visits and applied research that take book-learning into real enterprise operations and settings. More importantly, they get to meet people who are passionate about what they do and care about helping the next generation of professionals find their place in the industry.

200

More than 200 qualified individuals applied for the scholar program in 2018 at the Noble Research Institute.

The summer is also full of opportunities for networking with other professionals and to explore some of the activities around the Southern Great Plains. Some of the group activities included catching a baseball game in Oklahoma City, mentor picnics and lunches, trips to the Botanical Research Institute of Texas, and attending conferences such as the Texoma Cattlemen's Conference and the Oklahoma Cattlemen's Association annual convention. Many of the scholars took time to experience community events such as the Okie Noodling Tournament in Pauls Valley, Oklahoma, and the Fort Worth Stockyards in Texas. Ten weeks goes by fast when the days are full.

Students Test Their Knowledge of Natural Resources

By Frank Hardin, Ph.D., youth education manager | cfhardin@noble.org
Will Moseley, wildlife and fisheries consultant | wamoseley@noble.org

The Oklahoma Envirothon is a team-based competition for high school students interested in learning about the fundamentals of natural resource management using science, technology, engineering and math (STEM). It is part of an established North American program and is a fun, exciting way for students to learn about the environment and issues facing current and future generations. The competition combines in-class curriculum with hands-on field experiences to test students' knowledge in five areas of study: aquatic ecology, forestry, soils and land use, wildlife, and a special topic (western rangelands in 2018).

ENVIROTHON 2019

For more information about the training workshops and the Oklahoma Envirothon, please visit www.oklaenvirothon.org.

The Oklahoma Envirothon competition had been around for years. While our youth education program had not yet been formalized, several of us here at the Noble Research Institute participated in the event as mentors and judges. In 2012, the Oklahoma Envirothon dissolved. We realized how well the competition aligned with our own youth education efforts, so we decided to host the competition in 2014 with help from the Natural Resources Conservation Service, Oklahoma Forestry Service, Oklahoma City University (OCU) and the Oklahoma Department of Wildlife Conservation. We hosted three teams and had a wonderful time. Since then, we have continued to host the competition. Participation has grown to 13 teams in 2018. The Noble Research Institute sponsors the state competition winners to travel to and compete in the North American competition, which is the last week of July. This year, the North American competition was held in Pocatello, Idaho.

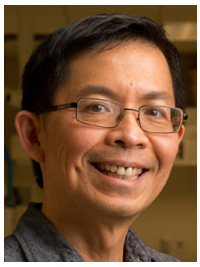
In an effort to continue to build participation and help teachers develop, mentor and maintain Envirothon teams, we host hands-on teacher workshops designed to train teachers about the tools, techniques and topics the students will face at the competition. During the workshops, teachers learn from industry professionals from the Oklahoma Forestry Service, Oklahoma Conservation Commission, OCU and the Noble Research Institute. They leave with a better understanding of how to prepare their students for the competition. Workshops are held each summer.

Envirothon is a great program for students to learn about the issues facing our natural resources in Oklahoma and North America, and we want to continue to foster a mindset that understands, respects, and stewards those resources for today's and future generations to enjoy.

RESEARCH

Noble Microscopes: Inspiring the Next Generation of Ag Scientists

Jin Nakashima, Ph.D., cellular imaging core facility manager, interacts with students as part of the 2014 Oklahoma Ugly Bug Contest award ceremonies at Central High Elementary School in Marlow, Oklahoma. During the contest, each participating school submits an "ugly bug" specimen, which is imaged by Oklahoma Microscopy Society members. After voting on the "ugliest bugs," members travel to the winning schools to award them new microscopes and to lead them in fun, educational activities.



By Elison Blancaflor, Ph.D., plant cell biology professor | eblancaflor@noble.org
Jin Nakashima, Ph.D., cellular imaging core facility manager | jnakashima@noble.org
Jaydeep Kolape, cellular imaging core research associate | jkolape@noble.org

Noble Research Institute scientists seek to better understand how plants grow and how they respond to various environmental stresses such as drought, low nutrients, hot and cold temperatures, and microbial pathogens. We expect the knowledge gained from such research could eventually be applied toward assisting farmers and ranchers in navigating the challenges they often face when growing crops in the harsh environments of the Southern Great Plains. The microscope is an important component of a scientist's tool kit. Modern high-powered and advanced microscopes enable scientists to see into the secret lives of plants down to the cellular and molecular levels. Intricate details about plants uncovered by these microscopes provide blueprints

Oklahoma Microscopy Society member Ben Smith, Ph.D., talks about gadgets and gizmos to students from Oak Hall Episcopal School in Ardmore, Oklahoma, during Kids Night with a Microscope, which is hosted at the Noble Research Institute.

to guide Noble scientists in developing new crop cultivars more adapted to life in the Southern Great Plains.

THE MOST BEAUTIFUL UGLY BUGS

In addition to research, microscopes have become an integral component of youth education programs within the Noble Research Institute and throughout Oklahoma. As members of the Oklahoma Microscopy Society (OMS), we have been actively involved in efforts to inspire Oklahoma students to consider pursuing careers in the science, technology, engineering and mathematics (STEM) fields. There are two OMS youth outreach programs worth highlighting in this article.

First is the Oklahoma Ugly Bug Contest that was started by the OMS in 1997 to generate interest in the science of microscopy, particularly in Oklahoma students from kindergarten to sixth grade. In this contest, students from participating schools collect native Oklahoma insects and mail one specimen they consider the "ugliest bug" to microscopy labs of OMS members located at the University of Oklahoma and Oklahoma State University. The mailed insects are processed by OMS members for imaging with a scanning electron microscope (SEM), a type of microscope that enables scientists to examine surface details of a sample. Images of the most beautiful "ugly bugs" are judged by OMS members online or through one of their biannual meetings.

MORE INFORMATION

For more information about ongoing OMS youth programs, visit: www.uglybug.org

For simply mailing an insect specimen, the winning schools are awarded a brand new stereomicroscope for use in their science classes. As OMS members, we travel to the winning Oklahoma schools for the award ceremonies. We bring the new stereomicroscope prize along with posters of all the winning bugs for distribution, and we organize other fun activities with various microscopes and scientific gadgets. Each year, about eight to 10 Oklahoma schools are awarded from more than 70 entries statewide. For more than 20 years, OMS (through the Ugly Bug Contest) has inspired students from more than 600 Oklahoma schools and distributed more than 100 new stereomicroscopes in an effort to spark interest in science education among Oklahoma youth.

AN EVENING WITH MICROSCOPES

We are also involved in the annual "Kids Night with a Microscope" event. This event is typically held the night before the OMS spring workshop. During the event, we host local elementary or middle school students and their parents for an evening of fun activities with a wide variety of microscopes. In 2012 and 2014, this event was held at the Noble Research Institute. Local students got the chance to operate tabletop SEMs, instruments similar to those used for the ugly bug contest. While rotating through different workstations, students experienced how a laser from a confocal microscope is used to reconstruct a three dimensional (3D) image of a plant and how specific parts of a plant cell move. At other workstations, students used a microscope with a powerful laser to carve their names and draw on the surface of special slide glasses.

We hope our continued efforts to expose Oklahoma students to state-of-the-art research tools through these events will encourage some of them to become our state's next generation of agricultural scientists.

WILDLIFE

Youth Hunts Provide Memories, Opportunities

By Josh Gaskamp, wildlife and range consultant | jagaskamp@noble.org
Will Moseley, wildlife and fisheries consultant | wamoseley@noble.org

Oklahoma's youth are jumping at opportunities to hunt. Many Oklahomans do not have access to private property, so the Oklahoma Department of Wildlife Conservation's (ODWC) Land Access Program (OLAP) and Private Lands Youth Hunt Program have become extremely popular. The Private Lands Youth Hunt Program has been a good opportunity for kids to learn about hunting, wildlife and conservation while they develop the spark that makes them want to continue the sport. The experience the youth have with their guardian is not something they will soon forget.

Oklahoma landowners are able to help develop the next generation of hunters through the youth hunt program. Private landowners, in partnership with ODWC, currently offer turkey and deer hunting opportunities each year to youth ages 12 to 17 selected through random drawings that take place in March and

August, respectively. But the program does not limit opportunities to these species. Upland birds, waterfowl and even fishing opportunities may be offered in the future by landowners who want to support this worthy cause. The Noble Research Institute and the Walnut Bayou Deer Management Association has been a part of this program since 2013, and it has become one of our favorite events during the year.

Landowners who offer these opportunities are gifting memories to each of the young hunters selected. Jackson Adams, 12 years old at the time of his hunt, shares his experience hunting with his father and the accompanying Noble Research Institute guide.

"Out of all the times that I have been hunting, I definitely have a favorite; it was a hunt with the Noble Research Institute. Our guide took us to a spot that he had been scouting for a while. He had the deer patterned and knew exactly where to put me. I was able to shoot my first deer thanks to this hunt and the generosity of the Noble Research Institute and neighboring private landowners for the access to the land."
Jackson Adams, 2014 youth hunter

"I was able to shoot my first deer thanks to this hunt and the generosity of the Noble Research Institute and neighboring private landowners."

Jackson Adams, 2014 youth hunter (pictured below)

"As the father of a son drawn for this hunt, I can't say thank you enough to the Noble Research Institute, private neighboring landowners and our guide. This hunt created memories that we still talk about to this day. We relive those days of the hunt many times over as we prepare for upcoming seasons. We know how fortunate we were, especially now, to have been drawn. Our experience couldn't have happened without many people providing the time, effort and resources, and for that we will forever be thankful. I hope that everyone involved knows what an impact they had."
Chad Adams, father of youth hunter

Collectively, Oklahoma landowners are making deer hunting possible for 56 youths through this program in 2018 (ODWC regularly receives more than 200 applicants for the deer hunts). In April 2017, the Noble Research Institute offered the first private land youth turkey hunt in ODWC's program. The hunt attracted 175 applicants for 10 spots. Following its success, Noble added five hunters in 2018, which attracted 340 youth applicants for 15 spots. Program awareness will likely continue to grow, leaving a significant amount of youth out each year.

PRIVATE LANDS YOUTH HUNT PROGRAM

Landowners interested in providing additional opportunities for youth to hunt through the Private Lands Youth Hunt Program should contact ODWC's Kyle Johnson at 405-590-2584. Recreationists looking for a place to take a young, novice hunter to the woods should take advantage of this opportunity. Look for more information at www.wildlifedepartment.com. It is exciting to see so many youth interested in hunting, and it's unfortunate there aren't enough opportunities for every one of them to experience the outdoors.

NOBLE RESEARCH INSTITUTE

THE GREAT PLAINS FIRE SUMMIT

The Noble Research Institute, Oklahoma State University and the Texas A&M Natural Resources Institute are partnering to bring the 2nd Biennial Great Plains Fire Summit to Ardmore, Oklahoma, on Oct. 1-3, 2018. The purpose of the Summit is to promote the use of prescribed fire by creating an opportunity for landowners, agencies and nongovernmental organizations to network and discuss the benefits and effectiveness of prescribed burning.

Find out more about the Fire Summit online at bit.ly/gp-fire-summit and register for the event at noble.org/events

1 p.m., Oct. 1 - noon, Oct. 3
Ardmore Convention Center
Summit registration cost:
Producer: $50
Professional: $100

EFFECTIVE STOCKMANSHIP AND CATTLE HANDLING:
ON THE GROUND AND ON THE HORSE SEMINAR

CURT PATE COMING TO ARDMORE SEPT. 19

The Noble Research Institute and the Oklahoma Beef Council would like to invite all cattle producers to a seminar featuring nationally recognized cattle handling expert Curt Pate. The seminar will offer ways to work cattle in an efficient, effective, low-stress manner to enhance cattle movement, performance and handler safety. The evening will include sessions on working cattle on horseback and on the ground. A free steak dinner will be served.

5:30-8:30 p.m.
Sept. 19, 2018
Hardy Murphy Coliseum
600 S. Lake Murray Drive
Ardmore, OK 73401
No registration fee

Pre-registration is requested online at noble.org/events

NOBLE RESEARCH INSTITUTE

OKLAHOMA BEEF COUNCIL BEEF

AG SYSTEMS

Noble's Graduate Education Experience

By Stephen L. Webb, Ph.D., agriculture systems technology manager | slwebb@noble.org

Noble Learning, the Noble Research Institute's centralized education program, focuses on youth and adult education. Youth education targets grades 6-12 through engagement and instruction as well as undergraduate and graduate students through educational opportunities that seek to prepare them to enter careers in agriculture or STEM fields (science, technology, engineering and mathematics). Undergraduate students have the opportunity to gain real-world, hands-on training through internships, more specifically the Lloyd Noble Scholars Program. The purpose of graduate education is to further train students for entering the work environment with critical thinking and reasoning skills, which come from intensive coursework; hands-on training; and design, analysis and presentation of rigorous scientific experimentation.

Many of Noble's graduate students also participate in adult education events such as workshops, presentations or field days that are targeted toward land managers and agricultural producers.

Graduate student fellowships are available in several forms. Students can work with Noble through internally funded fellowships or through more traditional routes like external granting. Collaboration is key. Noble partners with universities where students have academic mentors at the university and research mentors at Noble. These partnerships serve as a cornerstone to students who will form their own partnerships or collaborations throughout their career.

Many of Noble's graduate students also participate in adult education events such as workshops, presentations or field days that are targeted toward land managers and agricultural producers. Through this portion of Noble Learning, students learn to interact with the general public and those who will apply the information and tools developed from the students' graduate education. This may be one of the most important learning experiences for graduate students, who typically work and present in a scientific environment, because they must make their information accessible and understandable to those less familiar with scientific theory. Below are some graduate students who are working directly with Noble's applied agricultural systems research and technology researchers.

MEET OUR STUDENTS

ZACH JOHNSON

Institute: Texas A&M University
Degree: M.S. in Wildlife and Fisheries Sciences
Graduation: May 2019
Project Title: Effects of Grazing on Northern Bobwhite Populations Across North American Grasslands
Background: During the past century, grassland bird species have experienced substantial declines throughout North American grasslands. Researchers have speculated that much of these declines are a result of habitat loss due to changes in land uses and vegetation cover changes. Grazing is one of the most influential land-use practices impacting the structure and composition of North American grasslands. Therefore, it is important to understand how livestock grazing may influence grassland bird occupancy and distribution. A literature review will be conducted to synthesize studies that evaluate the effects of livestock grazing on northern bobwhite, a socially and economically important grassland bird, to determine relationships between grazing patterns and bird occupancy as well as relative abundance.

KELLY BOYER

Institute: Oklahoma State University
Degree: M.S. in Wildlife Ecology
Graduation: December 2018
Project Title: Damage and Resource Selection by Wild Pigs in an Agricultural Landscape
Background: Wild pigs, an exotic and invasive species, have caused great concern for ecological and economic impacts at a global scale, particularly within agricultural landscapes. Global positioning system (GPS) technology and geographic information systems (GIS) will be used to assess where (spatial) and when (temporal) wild pigs use agricultural and specialty crops such as pecans. Risk maps will be developed to identify the likelihood of wild pigs using the landscape, allowing areas to be prioritized for management intervention to reduce damage. The loss of pecans during harvest will also be quantified as a result of wild pig rooting activity, which can result if harvesting equipment is less efficient at collecting pecans in damaged areas.

STEVEN T. PEPER

Institute: The Institute of Environmental and Human Health, Texas Tech University
Degree: Ph.D. in Environmental Toxicology
Graduation: August 2018
Project Title: A Serological Disease Survey of Wild Pigs from South-Central Oklahoma
Background: Wild pigs are one of the greatest public health concerns in the United States. Wild pigs are capable of harboring and transmitting a variety of pathogens to human and livestock populations. This study focused on identifying the exposure of wild pigs to five infectious pathogens: brucellosis, tularemia, pseudorabies virus, porcine reproductive and respiratory syndrome virus (PRRSV), and Chagas disease. Exposure to *Brucella* species (brucellosis) was detected in 16 percent, tularemia in 8 percent, pseudorabies in 34 percent, PRRSV in 0.3 percent, and Chagas disease in 0 percent of the wild pigs tested from 2015 to 2017. These data highlight the need for continued disease surveillance and the control of wild pigs to minimize contacts with domestic livestock and native wildlife.

KATELYN HAYDETT

Institute: The Institute of Environmental and Human Health, Texas Tech University
Degree: M.S. in Environmental Toxicology
Graduation: August 2018
Project Title: Seroprevalence of *Neospora caninum* in a Wild Pig Population in Oklahoma
Background: The parasite, *Neospora caninum*, is a leading cause of cattle abortions and reproductive failure worldwide. Canid species, such as coyotes and dogs, are known as definitive hosts, meaning they are needed to complete the life-cycle of the parasite. However, other animals such as wild pigs and cattle can become infected when the cyst of the parasite is ingested from the environment. Contact between wild pigs and livestock is becoming inevitable, and the exact role that wild pigs play in transmission of this disease (commonly known as canine neosporosis) is unknown. This study assessed exposure of wild pigs to the parasite. It was found that 1.2 percent (1 of 84) of wild pigs tested positive for previous exposure. This data shows this parasite is present in south-central Oklahoma and signifies the importance of continued disease surveillance in wild pigs, cattle and other wildlife to better understand exposure to *N. caninum* in the environment.

JANE DENTINGER

Institute: Mississippi State University
Degree: M.S. in Wildlife, Fisheries and Aquaculture
Graduation: December 2018
Project Title: Using Remotely-Sensed Behavior to Study Wild Pig-Landscape Interactions
Background: Animals require resources to survive, and the availability of resources determines population size, growth and distribution. Most wildlife research focuses on the overlap of animals and resources to infer why an animal is where it is. However, the resources available to be used by an animal are not always obvious from spatial overlap alone. This study focused on wild pig behavior to understand not only where they occur but also what they are doing and why. Wild pigs are difficult to observe and study, so we used novel animal-borne sensors that measure fine-scale movement to remotely reconstruct behavior. Paired with GPS, this allowed us to predict hotspots of behavior, such as rooting, and construct predictive maps to prioritize control efforts and mitigate damage.

IRA PARSONS

Institute: Mississippi State University
Degree: Ph.D. in Forest Resources (Wildlife Concentration)
Graduation: May 2022
Project Title: Grazing Ecology and Energy Budgets of Cattle to Improve Animal Production Systems
Background: Livestock producers seek to maximize growth and performance of grazing cattle by balancing plant growth and quality with forage intake. Individual forage intake and grazing behavior are difficult to collect, so cattle will be outfitted with GPS collars, activity sensors and thermometers to monitor core body temperature. These tools will be coupled with remote cameras for behavioral monitoring as well as UAVs and other sensors for documenting available forage and offtake and remotely measured body mass. Models will be developed to better understand animal energy budgets and metabolic efficiency on pasture and how that translates into important performance traits such as body mass.

KARLA RASCON-GARCIA

Institute: University of California, Davis
Degree: Ph.D. in Epidemiology
Graduation: June 2021
Project Title: Spatial Epidemiological Disease Spread Models at the Wildlife-Livestock-Human Interface
Background: This project aims to contribute to the development and expansion of quantitative methods and novel modeling approaches to unravel diseases shared at the wildlife-livestock-human interface. We will use these models that evaluate animal movement patterns and linked disease information to better understand wild pig population dynamics and their potential contribution to disease transmission to livestock and human populations. We will use GPS data from wild pig, deer and livestock populations to investigate the risk of disease spread among species under various epidemiological scenarios. Additionally, predictive risk maps will be generated to better support the prioritization of control efforts, inform risk-based surveillance strategies, and mitigate both disease transmission and wild pig-human conflicts and damage.

EDUCATION

Chance Kay (foreground) works with mentor Jose Fonseca, Ph.D., postdoctoral fellow, (left) to conduct research in the molecular plant microbe laboratory led by Kiran Mysore, Ph.D., at the Noble Research Institute, in 2016. Kay is one of 105 students from Southern Tech's Biotechnology Academy who have completed internships at Noble since 2009. The partnership between Biotechnology Academy, which was started in 2006 by Fiona McAlister, Ph.D., (right), and Noble Learning provides students with hands-on experiences that prepare them for science careers.

Noble, Southern Tech Collaboration Heightens Students' Experience

Frank Hardin, Ph.D., youth education manager | cfhardin@noble.org

When we started the youth education program at the Noble Research Institute in 2012, we were looking to find our place in the education arena. While we knew what we wanted to do, we still needed to nail down how we were going to do it. In speaking with people about our program, Fiona McAlister, Ph.D., and Janie Herriot's names were mentioned more than once.

Although I knew both Fiona and Janie in passing, I knew little about their history with Noble or Southern Tech's Biotechnology Academy, which Fiona started in 2006 and both operate today. Turned out both Fiona and Janie are former Noble scientists, former public school science teachers, and are now educators that have built a biotechnology program for high school juniors and seniors that serves as the model biotech program for other technology centers throughout Oklahoma.

Fiona and Janie were the perfect starting point for our program considering our mission is to teach mid-

dle school and high school students about science and agriculture and to inspire them to pursue careers in both. So I called them up, and we met one day after class to discuss how we can spark student's interests in science and agriculture. Suddenly, our path was clear. That hour-and-a-half meeting helped shape what our program is today and fostered a remarkable relationship between our organizations.

CLASSROOM TO REAL-WORLD

Today our programs work closely together and complement each other nicely. Since many of our lessons are aimed at middle school and early high school science classes, we are able to engage students early and promote the Biotech Academy as an opportunity for when they get a little older. Students who go on to attend the Academy intern at Noble during their senior year. This allows them to work alongside our scientists, exposing them to real-life science aimed at solving agricultural challenges. This also gives Noble laboratories a pool of well-trained, highly capable students to hire from when looking for summer help. Since 2009, 105 students have participated in 10-week internships here at Noble culminating in 10,000 internship hours. Students have also been hired to complete 17,000 hours of summer employment.

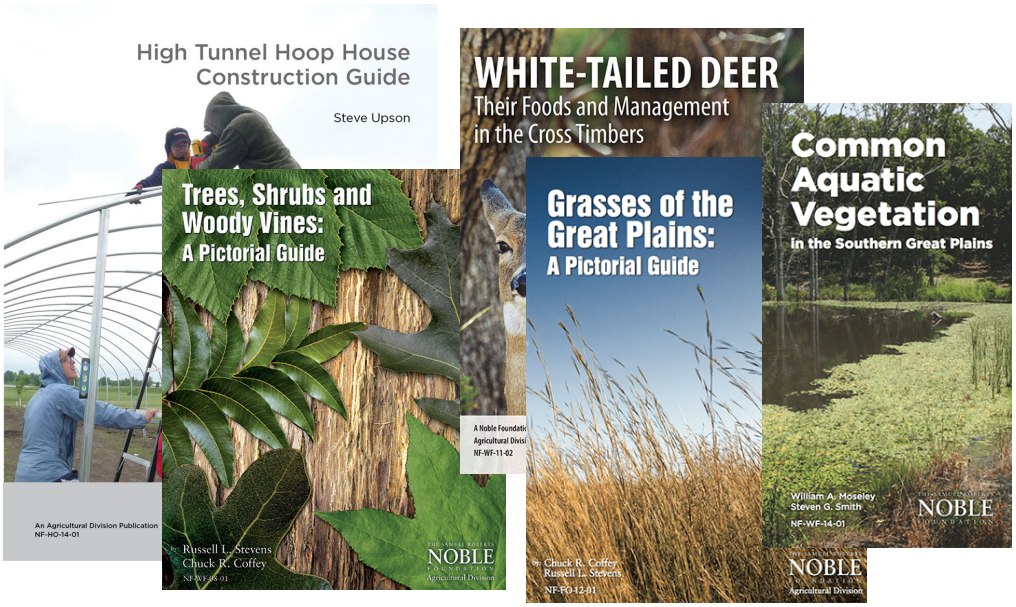
Since we started hosting the Oklahoma Envirothon competition, Fiona and Janie have helped us build the program by mentoring competitive teams. Each year, their teams have placed in the top three. They bring their students to Noble's campus for tours and workshops; they have served on our youth education curriculum writing team, which produces hands-on science lessons that serve as the foundation of the youth education program; and they help us host events like the Curriculum for Ag Science Education (CASE) Institute by generously allowing us to use their teaching laboratories.

A PARTNER IN EDUCATION

Needless to say, since the beginning of Noble Learning's youth education program, Fiona, Janie and the Biotechnology Academy have been there for us and with us. It is and has been a wonderful relationship. We are grateful to have them and their program, and we value all that they do.

It has been six years since that first meeting, and I still remember Fiona saying, "I hope you have good running shoes because you will be running nonstop once educators start hearing about Noble's youth education program." I must say, several pairs later, she was right.

RESOURCES



More News and Books Online

Keep up with the latest news and information from Noble Research Institute consultants at www.noble.org

You can also purchase more books about wildlife, plants and more at www.noble.org/store

noble.org

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pinterest.com/nobleresearchinstitute

instagram.com/nobleresearchinstitute

NOBLE
NEWS&VIEWS

IN THIS ISSUE

SEPT. 18

Introduction to Integrity Beef

4-9 p.m.
Noble Research Institute Pavilion
No Registration Fee, Dinner Provided

Connect with Noble Research Institute consultants and Integrity Beef Alliance members to learn more about the Integrity Beef Alliance terminal calf program and replacement heifer development program. Participants will learn about the importance of protocols and record-keeping, along with the advantages of being associated with a regionally and nationally recognized marketing program.

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UPCOMING EVENTS

For more information or to register, visit www.noble.org/events or call 580-223-5810. Preregistration is requested. For other agricultural questions, please call our Ag Helpline at 580-224-6500.

So You Want to Grow Series

Pecans | Sept. 4
Vegetables | Sept. 11
Fruits | Sept. 18

This series will cover various practices of site preparation, irrigation and variety selection for specialty crop production of pecans, vegetables and fruit.

6:30-8 p.m.
Noble Research Institute
Kruse Auditorium
No Registration Fee

SEPTEMBER 6

Backyard Farming: Intensive Small Space Food Systems

6-8 p.m.
Small-Scale Ag Demo Area
No Registration Fee

SEPTEMBER 25

Pecan 101 Workshop

9 a.m.-4 p.m.
Kruse Auditorium
$25, Includes Lunch

OCTOBER 4

Feral Hog Management Training

8:30 a.m.-noon
Pavilion
No Registration Fee

OCTOBER 18

Pecan Harvest Field Day

1:30-4 p.m.
Noble Research Institute
Red River Farm
No Registration Fee