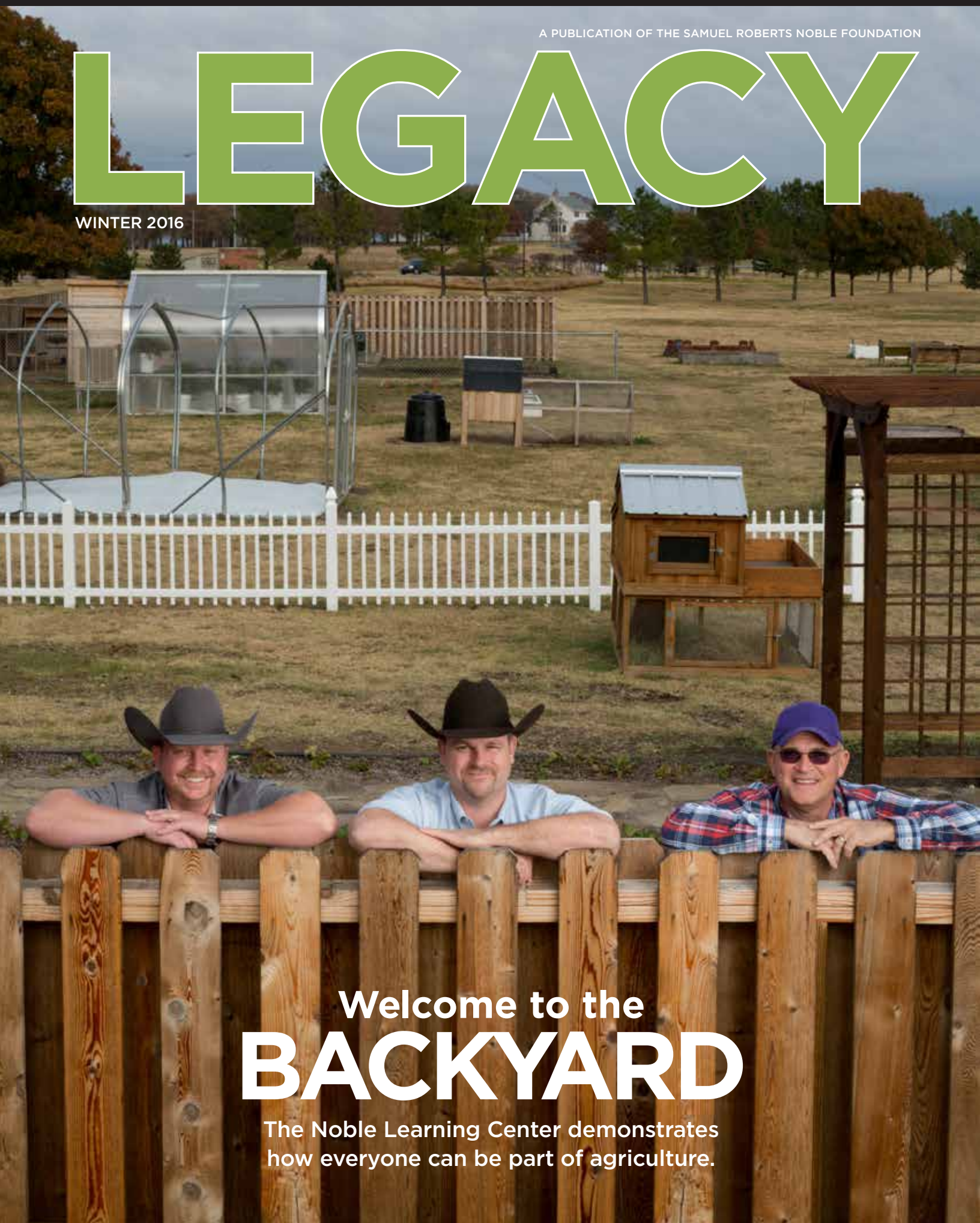
SPECIAL 70TH ANNIVERSARY EDITION

A PUBLICATION OF THE SAMUEL ROBERTS NOBLE FOUNDATION

LEGACY

WINTER 2016



Welcome to the BACKYARD

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THE SAMUEL ROBERTS
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Inside This Issue

Winter 2016 | Vol. 10, Issue 2

FEATURES

DEPARTMENTS

A red pepper grows in a Noble Learning Center backyard greenhouse.

Working for Tomorrow

TO OUR READERS,

Our founder Lloyd Noble was a visionary. At 24 years old, Noble launched an energy exploration company without a single day's experience. The untamed sector was littered with dry holes and broken dreams, but Noble saw potential. He pioneered new methods for drilling, used the latest tools and machinery, and – in two decades – forged a reputation as one of Oklahoma's most renowned oilmen.

Then, Noble experienced a challenge that defined his generation. The boiling clouds on the horizon did not bring rain but despair. The great Dust Bowl struck the region, devastating agriculture and grinding its economic engine to a halt. Most feared that life in the Southern Great Plains was lost forever.

Noble looked beyond the immense challenge, envisioned a tomorrow with productive soil and healthy fields, and offered a lasting solution through the establishment of the Noble Foundation.

However, one critical piece is often overshadowed by the grandeur of these bold visions – the work. Noble possessed great foresight, but he was also a man of action and grit. He understood – even relished – the daily diligence necessary to move ideas from conception to reality.

When he launched his businesses in the mid-1920s, Noble often escaped the rote daily life of the office to lend a little personal elbow grease to his creation. He'd ride the wagons with the mule drivers who hauled pipe between rigs. He learned from his employees, saying that everyone had something to teach. He often stayed at a drilling rig into the wee hours of the morning, sleeping in the doghouse (a shack on the floor of the drilling rig). He not only articulated a vision, he lived it.

Every day through small actions and persistent choices he created a future that first lived only within his mind. A year before his death in 1950, Noble said, "The only degree to which we can make real progress is the degree to which, when we have ideas, that we can get those ideas motived into action."

As we finalize of our 70th anniversary celebration, this issue of *Legacy* offers you a glimpse into the Noble Foundation's future as we attempt to answer the simplest and most profound of questions: Where are we going? These pages are filled with projects still in their early stages, but each possesses the potential to profoundly impact the organization and the entirety of the agriculture sector.

Our cover story centers on the Noble Learning Center, which will offer visitors an opportunity to see how they can contribute to agriculture in their own backyard. Other stories detail a new research project that brings scientists from multiple disciplines together (for the first time) to study pecans as well as the use of unmanned aerial vehicles in production agriculture and how the Noble Foundation provides a springboard for the next generation.

Each story is an example of how the men and women of this organization continue to fulfill Noble's grand vision for agriculture.

But the key, as we learned from our founder, is not just looking toward the horizon and finding the potential held within tomorrow. It is energizing those ideas with the hard work necessary to make them real.

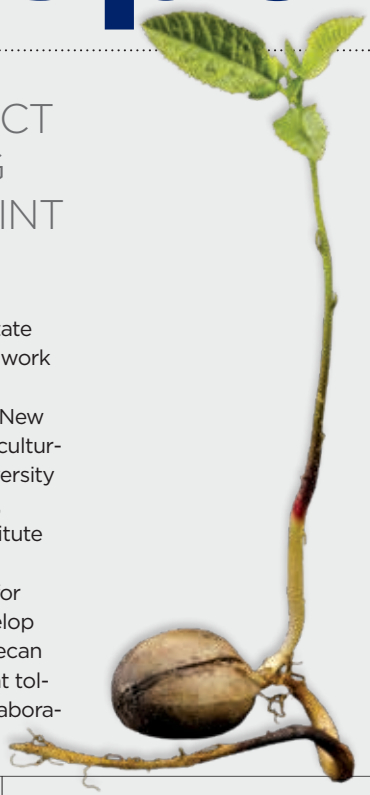
We strive every day, in every action, to contribute to a mission much larger than ourselves because the success we experience tomorrow only comes from the diligence and sacrifice of today.

Sincerely,

Bill Buckner
President and CEO

Noble Spotlight

NATIONAL RESEARCH PROJECT RECEIVES HISTORIC FUNDING TO ADVANCE DNA FINGERPRINT SYSTEM IN PECANS



Six national institutions have become host to the first multistate and multidisciplinary study to receive funding specifically to work on pecans.

Researchers at The Samuel Roberts Noble Foundation, New Mexico State University, U.S. Department of Agriculture Agricultural Research Service (USDA ARS), University of Georgia, University of Arizona and the HudsonAlpha Institute for Biotechnology, received a five-year, $4.3 million grant from the National Institute of Food and Agriculture (NIFA).

The potential outcomes of this research are significant for the pecan industry. The grant will enable researchers to develop resources that can be used to identify genetic elements in pecan that control various traits, such as disease resistance, drought tolerance and nut quality. This project shows the benefit of collaboration between research and organizations in the industry.

ROBERT SMITH RECEIVES LEONARD WYATT AWARD

The Samuel Roberts Noble Foundation presented Robert Smith with the 2016 Leonard Wyatt Memorial Outstanding Cooperator Award this fall. Smith was selected for the award because of his ability to manage his land and resources well while remaining profitable, his community service and his willingness to assist other producers. He is a small-scale producer who uses all the information and resources available to make informed decisions.

OKLAHOMA'S NEXTGEN UNDER 30 LIST SELECTS GASKAMP, KOMP

Noble Foundation Education Services Associate Brook Gaskamp and Noble Foundation Spatial Technology Services Supervisor Mike Komp were recently selected to Oklahoma's 2016 NextGen Under 30 list.

The NextGen Under 30 program is a statewide competition that recognizes the next generation of innovative, creative and inspiring leaders in Oklahoma.

INSIDE THIS ISSUE

LOCATE THE BLUE COW. WIN A PRIZE.
Hidden within each issue of *Legacy* magazine (after page 7) will be a blue cow. Find the blue cow and send us a message on social media with #ifoundthebluecow. The first five people will win a prize.

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LEGACY

Winter 2016 | Vol. 10, Issue 2

Bill Buckner
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Innovation

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EDITOR/WRITER

Sustainable
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Nimble
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WELLS RECEIVES OKLAHOMA BEEF QUALITY ASSURANCE AWARD

Noble Foundation Livestock Consultant Robert Wells, Ph.D., was selected as the 2016 Oklahoma Beef Quality Assurance (BQA) Educator of the Year. Wells has educated producers since 2008 and received the program's inaugural educator award in 2009.

The Oklahoma BQA program is designed to help maximize consumer confidence and acceptance of beef by focusing on producers' attention to daily production practices that influence the safety, wholesomeness, and quality of beef and beef products.

RESEARCHERS DEVELOP NEW WHITE CLOVER VARIETY

Researchers at The Samuel Roberts Noble Foundation and University of Georgia (UGA) have developed a new white clover variety called Renovation to help agricultural producers improve and maintain healthy, productive pastures. It is the first white clover released by the Noble Foundation and the first commercial product of the joint breeding effort. The goal for the Noble-UGA forage breeding program was to develop new white clover (a legume) varieties that could help restore perennial grass pastures throughout the southern United States.

OKLAHOMA AGRICULTURAL LEADERSHIP PROGRAM SELECTS MOEN, GASKAMP

Noble Foundation Director of Business Development Jeff Moen (right) and Wildlife and Range Consultant Josh Gaskamp (left) have been selected to participate in Oklahoma Agricultural Leadership Program (OALP) Class XVIII. The OALP mission is to develop leaders for Oklahoma agriculture. This program focuses on three specific objectives: to help potential leaders develop a deeper appreciation and understanding of people, to help them develop a better understanding of basic systems of economics and government, and to help them use this appreciation and understanding to solve problems and advance Oklahoma agriculture.

MATTUPALLI EARNS RECOGNITION FROM APS

Noble Foundation Postdoctoral Fellow Chakradhar Mattupalli, Ph.D., has been nominated as one of five American Phytopathological Society (APS) Schroth Faces of the Future. Mattupalli's research focuses on using aerial imaging techniques to evaluate how root rot spreads in alfalfa fields and the impact this can have on production.

What innovations do you believe your generation will contribute to society?

My generation will be faced with a number of challenges, such as food and water shortages, which are symptoms of a much larger issue. We will contribute a number of innovations to systematic land practices and global communication. With the aid of technological advances, we will not only cure the local symptoms, but we will also make headway in solving the much larger global problems.

Zach Johnson, Agriculture Scholar, Texas A&M University Wildlife and Fisheries Sciences Major from Wimberley, Texas

I believe that we will expand on health-monitoring technology. With the invention of Fitbit, smart watches and Bluetooth heart monitoring systems, health tracking has become a societal regularity. My generation will help improve the health of people and apply these technologies to the health of production animals.

Sarah Oliver, Research Scholar, Oklahoma State University Biochemistry Major from Ardmore, Oklahoma

With our faster computers and cheaper sequencing systems, my generation will change society in two big ways. First, we will have easy and efficient genetic editing. Second, we will have more data-focused genetic research. By identifying new genotypes through machine learning and data, we will have the capability to grow more efficient crops.

Michael Passalacqua, Research Scholar, Rice University Biological Sciences Major from New York City

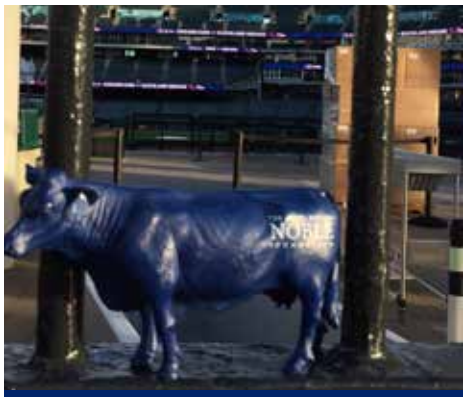
We will improve precision agriculture technology in order to feed a world with less resources. We will discover ways to increase efficiency while continuing to raise the standard for wholesome and safe food production. In order to do so, we must connect with a society that is generations removed from the farm and promote engagement with producers.

Kayla Mercer, Agriculture Scholar, University of Florida Animal Science Major from Gainesville, Florida

Where has your blue cow been?

Angel FIre, New Mexico

Belize Barrier Reef



World Series - Cleveland, Ohio

Cozumel, Mexico

Illinois

Sonoma Valley, California

Vanilla Ice - Oklahoma City, Oklahoma

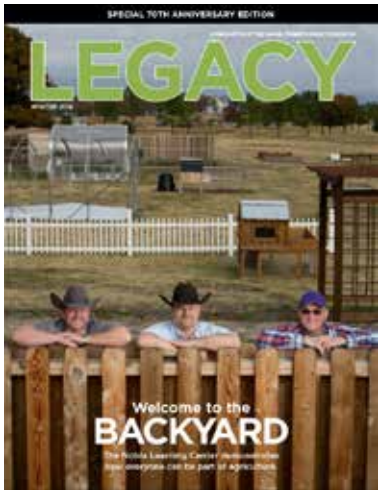
Willamette Valley, Oregon

Los Alamos, New Mexico

Vienna, Austria

Watoto - Uganda

Visit facebook.com/bluecow to see where the blue cow lands next, and read the messages from Noble Foundation friends.



ON THE COVER:

The winter 2016 issue of *Legacy* magazine represents the final in a three-part series dedicated to the Noble Foundation's 70th anniversary year.

Following a "then-now-next" theme, these three issues celebrate eras in the Noble Foundation's timeline, including its history (then – Winter 2015), current activities (now – Summer 2016) and future (next – Winter 2016).

This issue of *Legacy* focuses on the "next" – the future projects, people and programs that will shape and define the Noble Foundation's endless pursuit to advance agriculture in this generation and beyond. Included within these pages are stories about the use of unmanned aerial vehicles, groundbreaking research into pecans and programs that benefit college agriculture students.

Our cover story centers on the Noble Learning Center. This multifaceted educational center encompasses approximately 6 acres on the Noble Foundation's Ardmore, Oklahoma, campus and is led by the Center for Pecan and Specialty Agriculture, which covers approximately 80 acres. The Noble Learning Center provides visitors with hands-on experiences and demonstrations that illustrate how everyone can be involved in agriculture right in their own backyard.

On the cover, Noble Foundation photographer Rob Mattson brings together three of the driving forces behind the Center's first elements – Charles Rohla, Ph.D., Steve Upson and Will Chaney.

Jason Bradley joined the Noble Foundation as an agricultural economics consultant in spring 2016.

Jason Bradley: From Fighter Jets to Farm Finances

by Anna Grider

Jason Bradley is someone who understands the true meaning of the word "busy." In his early 30s, he is already a veteran of the U.S. Navy and a graduate of Oklahoma State University, where he recently completed his master's degree while simultaneously beginning a new job, buying a house and raising his first child.

Bradley is the Noble Foundation's newest economics consultant. He joined the Noble Foundation in spring 2016. In his new office, Bradley proudly displays his greatest accomplishments of the past year – his freshly earned master's degree hanging beside his first father's day card.

Below, Bradley discusses how his experiences and passions piloted him to his dream job at the Noble Foundation.

WHAT IS YOUR FAVORITE MEMORY OF BEING IN THE NAVY?

I worked on F-18 fighter jets so I spent some time on an aircraft carrier. The first time I was on the flight deck during the night flights was exhilarating. I was essentially working on a 4-acre floating airport with jets flying all around me in the dark.

IF YOU COULD LIVE ANYWHERE IN THE WORLD, WHERE WOULD YOU LIVE?

Honestly, location wouldn't matter as long as I'm doing something that I enjoy.

WHAT INSPIRES YOU?

Knowing that I have done the best I can to help someone by taking what I've learned and making it accessible to everyone.

WHAT MOTIVATED YOU TO GO INTO ECONOMICS?

I started in animal science; I was planning on becoming a veterinarian. Along with my science classes, I also took business classes and quickly discovered that I liked working with numbers. I enjoyed them more than I intended to, and I decided to change directions.

WHAT DREW YOU TO THE NOBLE FOUNDATION?

I wanted to take research directly to producers and teach good financial stewardship, so I started looking for consultant positions.

While I was working on my master's, a teacher connected me to Jon Biermacher, Ph.D., an economic researcher at the Noble Foundation. After talking with him, I knew this is what I wanted to do.

HOW DO YOU DESCRIBE YOUR WORK TO A STRANGER ON THE STREET?

Agriculture production is a business and in any business, economics is one of your primary driving factors. If you are not making a profit, you are not maintaining a business. We can help producers maintain their businesses when markets are tough. We ask questions, determine where to cut costs and then use our economic skill set to advise solutions.

HOW DOES THIS PLAY A KEY ROLE IN AGRICULTURE?

I've seen operations go under because of poor financial management. Producers might have great resources and perfect land, but they may not be good stewards of their money. I don't want to see someone's 100-year-old ranch broken up and sold because of one to two years of bad decisions, especially when I can help to prevent that.

WHAT IS YOUR FAVORITE PART OF THE JOB?

This is my dream job, and the best part is simply whenever I receive an email or a phone call from a producer that says, "thank you."

WHERE DO YOU SEE YOURSELF IN 20 YEARS?

Hopefully sitting right here, doing this. ■

GIS specialists Tresa Trammell (left) and Kushendra Shah use an unmanned aerial vehicle to gather images of a field at the Noble Foundation Pasture Demonstration Farm.

It's a bird. It's a plane.

IT'S THE FUTURE.

Unmanned aerial vehicles offer agricultural producers a new type of "boots on the ground" management tool.

by Robyn Peterson

Tresa Trammell and Kushendra Shah use an iPad to safely monitor an unmanned aerial vehicle's flight.

On a cold, but sunny October day, nearly 100 4-H students filed into the Ardmore Convention Center for their Southeast District Leadership Conference. What would be a day filled with leadership development exercises would also be a day they learned about the importance of technology in agriculture.

After the opening welcome, students broke into small groups for workshops. Frank Hardin, Ph.D., Noble Academy educational outreach manager, introduced himself and three other unmanned aerial vehicle (UAV) specialists who discussed the importance of UAV technology in agriculture.

"This technology has the potential to be a useful tool in agriculture," Hardin said. "We want to get students more interested in technology and how various tools can be applied to agriculture in the future."

Afterwards, Hardin and Mike Komp, Noble Foundation spatial technology services supervisor, led the students out to the parking lot for some hands-on demonstrations with the UAVs, also called drones. "They are fun to operate," Komp said. "It's also incredible what one can do and the data it provides."

Sky-high Possibilities

UAVs are a multidisciplinary research and operational tool. The Noble Foundation spatial technology services team use UAVs to assist researchers with various types of research projects. UAV imagery allows researchers to acquire higher quality data more often, and it is less expensive to use than other large-scale aerial imagery technology. UAVs collect thousands of images to help researchers analyze different eco-sites and changes.

"We are taking images that were once acquired from ground level or low frequency satellites at a more effective rate," Komp said. "This allows researchers, and ultimately producers, to make more timely decisions for less money."

The technology can also be used for operational resource management, such as taking inventory of equipment and forage, locating and counting cattle, and better control of prescribed burns.

"A cattle rancher could count actual hay bales by flying a UAV over the property," said Mike Proctor, Noble Foundation agriculture research associate. "The rancher could then look at future projections of hay needs by knowing how much was available in the beginning and how much is left over."

In turn, being able to evaluate forage quality and availability would help the rancher better manage the cattle's nutrition needs. "It's important for us to provide ways for producers to be good stewards of their resources," Proctor said.

Other metrics can be collected with UAVs such as identifying pecan trees from other vegetation. An aerial view of the tree tops allows researchers to analyze the treatment effects to develop a better disease and pest management plan.

Additional types of data can be acquired through sensors that are attached to UAVs. Different sensors capture various types of images that help researchers gather and analyze data. Currently, only a few sensors are available but these are already showing benefit by allowing landowners to collect rainfall

"A cattle rancher could count actual hay bales by flying a UAV over the property. The rancher could then look at future projections of hay needs by knowing how much was available in the beginning and how much is left over. In turn, being able to evaluate forage quality and availability would help the rancher better manage the cattle's nutrition needs. It's important for us to provide ways for producers to be good stewards of their resources."

Mike Proctor, Noble Foundation agricultural research associate

Unmanned aerial vehicles have improved researchers' ability to study cotton root rot in alfalfa fields. UAVs also hold potential for other agricultural applications.

> We wanted and needed to better understand how cotton root rot moves in the field. Aerial imagery on a large scale would help us better visualize the disease all at once instead of what we could only see with our bare eyes on the ground. We are able to put layers of images together to better track the disease. UAV imagery provides a different perspective on how cotton root rot spreads throughout a field."
>
> **Carolyn Young, Ph.D., Noble Foundation plant pathologist and mycologist**

amounts across a property or determine water profiles in a source.

"Collecting a pond's volume and surface area is normally a tedious procedure," Proctor said. "But with UAVs, we can directly measure the surface area; and along with lidar data, we can estimate pond volume easily and quickly."

Finding time to properly manage difficult-to-access properties can be a headache for land managers. With UAVs, they can remotely check on the property fences, cattle, vegetation, etc. without having to physically be on the property.

Another effective technique in land resource management is prescribed burning. Many landowners look past it because of the many unknowns that come with it. "It's hard to judge what the fire is actually doing and how much smoke is being emitted from our eyesight at ground level," Proctor said. "Flying a UAV above a prescribed burn allows us to see what is going on in the whole burn area. Aerial views let us look for any hot spots near our fire breaks after a burn, which is a huge benefit in itself."

Putting It to the Test

The Noble Foundation's use of large-scale aerial imagery began in 2014 with a cotton root rot study using very-large-scale aerial imagery (VLSA). The images and data collected with this technology allowed Carolyn Young, Ph.D., Noble Foundation plant pathologist and mycologist, to begin studies of the cotton root rot disease in alfalfa fields.

"We wanted and needed to better understand how cotton root rot moves in the field," Young said. "Aerial imagery on a large scale would help us better visualize the disease all at once instead of what we could only see with our bare eyes on the ground."

When UAVs entered the research market, the Noble Foundation acquired one to further the use in current and future research projects. The switch to UAV from VLSA data provides researchers with more data and images to analyze. In order for Young and her team to help agricultural producers manage cotton root rot, they need to see the disease in alfalfa fields from a bird's-eye view.

"We are able to put layers of images together to better track the disease," Young said. "We can differentiate between bare ground and alfalfa stands. It's hard to get efficient stand percentage just by standing in the field. UAV imagery provides a different perspective on how cotton root rot spreads throughout a field."

Cotton root rot is a soil-borne disease, meaning it is always in the soil. However, it is only active in the summer months. Different sensors on the UAVs allow Young to analyze various environmental conditions such as soil temperature and depth, and rainfall amount, to help determine the disease's peak time. "We have to understand all potential effects of the disease in order to get ahead of it and work on a control method," Young said. "We need all the pieces to fit together before we can provide a management prescription to agricultural producers."

In 2015, the Center for Advanced Agricultural Systems and Technology (CAAST) was created to bring together existing research programs that strive to answer producer questions through research related to the sustainability of agriculture production systems in the Southern Great Plains. Technology plays an integral role in improving agricultural systems. An important function of CAAST is developing and testing new and innovative technology, like UAVs.

"With CAAST, we have a special opportunity to incorporate UAVs into our research and operational efforts at the Noble Foundation," said Evan Whitley, Ph.D., CAAST manager. "Through projects conducted on our research farms, we are able to incorporate this technology and learn ways UAVs can benefit agricultural producers."

While new technologies can be excellent tools for agricultural producers, they can be expensive to adopt. Producers may not have the time or resources to comprehensively look into a specific new technology and how it might benefit their operation, especially since so many new technologies are constantly being developed. The Noble Foundation has the resources and capabilities to vet these new technologies and provide this information to producers.

"The research aspect is exciting," Whitley said. "I look forward to the day where we can access timely information from the office or desktop. Land and operation managers will be able to manage their resources more effectively and efficiently without exhausting human resources."

Continuing to Learn

Building off of the current research uses, the Noble Foundation is working to develop and incorporate new data-rich tools, such as UAV images, to help determine stocking rates and carrying capacities, and to support grazing program development for producers in the organization's consultation program. These tools will not take decision-making out of producers' hands. Instead, it will provide them with consistent data and information to make effective decisions quicker.

"It's exciting to see what opportunities this technology holds for rangelands," Komp said. "The row crop industry is already using UAVs, but rangelands are much more complex and diverse. UAVs will benefit more people and land as technology improves."

The Noble Foundation UAV specialists will continue learning the technology to broaden its use across the organization and research farms.

"There is a considerable wow factor to UAV technology," Whitley said. "But we aren't quite there yet to recommend producers go out and get one. We don't want to look at these areas through a tunnel. It is important to look at agricultural systems on a broader level, and we want to conduct research with the awareness that one area will impact many others. But it's clear this technology has come a long way. It's a new type of 'boots on the ground.'" ■

"Through projects conducted on our research farms, we are able to incorporate this technology and learn ways UAVs can benefit agricultural producers. The research aspect is exciting. I look forward to the day where we can access timely information from the office or desktop. Land and operation managers will be able to manage their resources more effectively and efficiently without exhausting human resources."

Evan Whitley, Ph.D., Noble Foundation CAAST manager

Thank Ag for Picnics

Agriculture plays a major role in all aspects of our lives. It's more than just the food we eat.

Take the typical all-American picnic basket. It is filled with fruit, sandwiches and homemade dessert – all of which we know originates with agriculture. But did you know everything at your picnic, including the actual basket, wouldn't be possible without agriculture?

As part of Noble Academy's mission, several hands-on lessons were created to provide learning opportunities to today's youth about the value of agriculture and its presence in everyday life.

Here's a look into Noble Academy's famous picnic basket lesson.

Chocolate Milk
Dairy cattle produce 83 percent of the world's milk supply. In Oklahoma, the average dairy cow produces about 5.6 gallons of milk per day. Chocolate comes from cocoa beans, which grow on cocoa trees in hot, rainy climates.

Apples
Apples are 25 percent air, which allows them to float. The most common varieties produced in Oklahoma are Gala, Jonathan, Red Delicious, Golden Delicious and Fuji.

Oranges
The United States is expected to produce about 5.4 million tons of oranges in 2016. Florida is the main production state.

Grapes
Grapes grow on vines planted in February to March in Oklahoma. Bunch grapes are grown in western Oklahoma and Muscadine grapes grow in northern Oklahoma.

Pears
Pears are good sources of dietary fiber and Vitamin C.

Ceramic Bowl
This is made from clay soil. Soil is one of the most critical aspects of agriculture. The Noble Foundation helped launch the Soil Health Institute in 2015. Learn more at www.soilhealthinstitute.org.

Ketchup
Ketchup is made from tomatoes. It is the most commonly used condiment.

Mustard
Mustard is made from mustard plant seeds. Mustard plants can be grown in Oklahoma but only have a 50- to 55-day growing window in the spring and fall.

Coca-Cola®
Soda is made with high fructose corn syrup, a natural sweetener made from corn. About 38 million bushels of corn are consumed each year around the world.

Tomatoes
Tomatoes are the fourth-most-popular fresh market vegetable in the U.S. (after potatoes, lettuce and onions). About 93 percent of American gardens include tomatoes.

Bread
Bread is made from wheat, which is one of the staple crops for the world along with rice and corn. Red hard winter wheat is the major variety used in breads.

Carrots
The edible part of carrot is the root portion. Carrots grow best in sandy soils and are resistant to most pests and diseases.

Salt
Salt is found in the Earth's crust. It typically comes from mining rock or evaporating salt waters. Salt is used to season and preserve foods.

Black Pepper
Black pepper comes from the fruits of a pepper plant, which is a woody, flowering vine that can grow up to 33 feet long in hot and humid tropical climates.

Pretzels
Pretzel dough is made from wheat. Wheat is the number one crop produced in Oklahoma.

Picnic Basket
Wicker, a popular type of basket, is commonly made from willow. Willow grows from temperate zones to the Arctic and from coastal plains to the mountains.

Natural Bug Spray
Bug sprays can be made with oil from cedar trees. Observations of mosquitoes staying away from cedar trees led to finding that the oil from the tree was a repellent.

Football
Even though it's called a "pigskin," cow hides are used to cover footballs. One cow hide can make about 20 footballs.

Plastic Spoons and Forks
Bioplastics can be made from cellulose and starch from plants. They are more biodegradable than petroleum-based products.

Disposable Camera
The plastic cover is made from animal fat. Early plastics were based on casein, a protein found in cow's milk. Gelatin, which is made from animal byproducts, is used in all photographic film.

WELCOME TO THE

BACK YARD

Will Chaney helps develop the Noble Learning Center in his role as a senior research associate in the Center for Pecan and Specialty Agriculture.

The Noble Learning Center demonstrates how food is grown and how everyone can be part of agriculture.

by Courtney Leeper

The Noble Foundation is building a backyard. Four, actually.

Cars zip by the agricultural research institution's campus on Highway 199 east of Ardmore, Oklahoma, every day. Now, just before they reach the main entrance, they pass a field with a slatted oak fence. It's a privacy fence that could be found in any neighborhood, except this one is 200 feet long.

Behind that wooden fence begins the Noble Learning Center showcase, a work-in-progress that will demonstrate more than 100 different ways anyone can incorporate hands-on agriculture into their daily lives. The Noble Learning Center will also translate small-scale, backyard agriculture done by individuals to the large-scale, commercial agriculture accomplished by farmers and ranchers.

Will Chaney drove up to the south side of the fence in a golf cart one chilly October morning. The senior research associate works in the Center for Pecan and Specialty Agriculture (CPSA), one of four Noble Foundation research centers designed to benefit agricultural producers and consumers. CPSA is leading the Noble Learning Center project.

Chaney stepped out of the vehicle and said, "Welcome to the backyard."

This land was an actual backyard at one time, he explained. Two houses sat here, and summer interns lived in them while working at the Noble Foundation. The ground is still rocky in some places where the original driveway existed. Today, this parcel models four "backyards" that demonstrate ways people can grow food at home regardless of space, soil, budget and skill limitations.

The Noble Learning Center's demonstrations continue well beyond the backyards. Across a gravel path that will one day be paved are rows of raised and elevated garden beds. Some are store-bought; others are made from old tires, cattle feeders and other recycled materials. A wildlife area will show native and invasive plants as well as the signs of and ways to manage feral hogs. Pollinator plots and hives will display ways to promote populations of agriculture's little helpers, the bees and other species essential for robust crops of many fruits, vegetables and other foods.

Chaney's favorite area is "The Acre." Commodity crops, like wheat and corn, will be planted there. Visitors will learn how the basic principles of growing plants in their garden translates to what farmers do in large fields (see full details on pages 19-21). They'll also learn how these crops connect to their everyday lives from providing food for cattle to becoming the basic ingredients for cooking oil or bread.

Construction on the Noble Learning Center began with the wooden fence in late summer 2015, and progress continues. The plan is to eventually open to the public during daylight hours for self-guided tours.

WHY THIS? WHY NOW?

There are more than 318 million people in the United States. Less than 2 percent of them operate farms or ranches, yet 100 percent of people eat. That means everyone is connected to food – and agriculture.

This 98 percent gap between food producers and consumers concerns Charles Rohla, Ph.D., CPSA manager, as well as many others in agriculture. Very few people have hands-on knowledge and experience in agriculture yet everyone is connected to it through food. And it seems many have an opinion on how agriculture should be done.

"More people are becoming interested in knowing how their food was grown," Rohla said. "We realized we needed a place to show people what agriculture is and how they can be involved."

Rohla and other Noble Foundation agricultural consultants have observed a trend over the past 15 years: more people are coming to them for advice on how to start a successful agricultural operation. These new farmers and ranchers have made their careers as doctors, engineers, lawyers. Some of them have bought land; others have inherited from a grandparent. Now they want to trade city life for a rural lifestyle, but they are not sure how or where to start.

Other groups are also interested in agriculture, even if "agriculture" is not the word they initially use. Schools want to teach their students the hands-on science of growing food. Community organizations, including the Carter County Health Department, want to encourage people to increase their physical activity and eat more fresh fruits and vegetables. "Many people don't realize they can or already are participating in agriculture," Chaney said. "We want to help them understand that if they are growing anything, they are involved in agriculture. We want to give them examples that they can use to grow food and help them understand agriculture as a whole."

This is especially important, Rohla said, at a time when farmers and ranchers face increased regulatory pressure, which affects how they do their jobs. The Mercatus Center at George Mason University, the largest public research university in Virginia, reports regulation on agriculture, forestry, fishing and hunting has grown by 77.98 percent since 1997.

"The greatest thing we can do for the future of agriculture is educate," Rohla said. "It doesn't matter if you're interested in organic, traditional or nontraditional agriculture; there is room for everyone at the table. The Noble Learning Center will be a place for all ages and backgrounds to learn about how they can participate in agriculture and what farmers and ranchers do to produce the food they buy at the grocery store."

Here's a sneak peek walk through the Noble Learning Center backyard and beyond.

continues on p. 19

Left: Steve Upson, soils and crops consultant, contributes his horticulture expertise to the Noble Learning Center.

Top: Chicken coops will be included in Noble Learning Center demonstrations.

Bottom: Charles Rohla, Ph.D., manages the Center for Pecan and Specialty Agriculture, which leads the Noble Learning Center.

THE BACKYARDS

Each backyard will be 50 feet by 50 feet and will include a wide variety of examples of do-it-at-home agriculture projects. The plan is to arrange the yards by amount of money, space and building skill needed so that they can be adopted by anyone.

In the spring of 2016, the CPSA set the idea of the backyards in front of students in a landscaping class at the Oklahoma State University Oklahoma City campus. The students created plans for what might go into the spaces, and some of these ideas will be incorporated into the Noble Learning Center during different seasons.

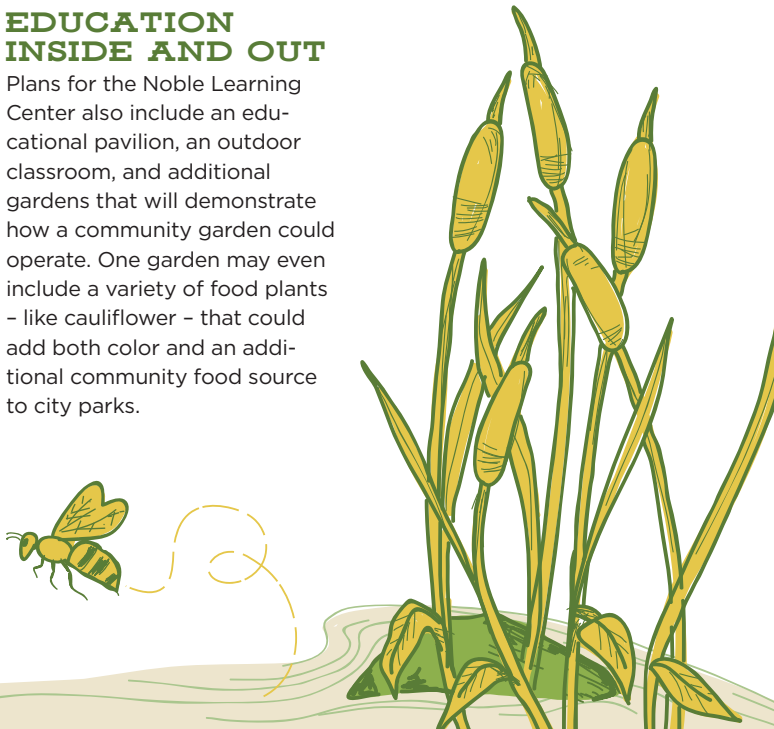
The backyards will include chicken coops, rabbit hutches, raised beds that will be home to edible plants nearly year-round, planters made from recycled materials, and small fruit trees. One backyard features a small hoop house and another a small greenhouse, where foods like green peppers can be grown year-round.

The backyards will also test new or new-to-the-region plants (like kiwis, bananas, figs, oranges and the plum-apricot cross called a pluot) to see how well they grow in the greenhouse or outside in the Southern Great Plains.

Innovative agricultural techniques will also be demonstrated, such as espalier, in which a fruit tree is trained to grow along a flat surface like a fence; hydroponics, where plants are grown in water rather than soil; and vertical farming, which allows more plants to be grown in a smaller amount of space.

EDUCATION INSIDE AND OUT

Plans for the Noble Learning Center also include an educational pavilion, an outdoor classroom, and additional gardens that will demonstrate how a community garden could operate. One garden may even include a variety of food plants – like cauliflower – that could add both color and an additional community food source to city parks.



GARDEN BED SHOWCASE

Rows of garden beds are displayed just beyond the backyards. The showcase includes raised beds, which are contained beds that sit directly on the ground, and elevated beds, which have space between the container and the ground. Each bed will be made of different materials: some bought; some made from scratch; and others made from repurposed stock tanks, mineral tubs, feeders and tires. Plans involve 30 different examples. Peanuts are even in the plan. Since the protein-rich "nut," which is actually a legume, prefers sandy soil, an elevated bed will demonstrate how peanuts grow. (Hint: You'd have to dig to find them. Peanut plants flower above-ground but the fruit grows below.)

WILDLIFE AND NATURE WALK

A resource for learning about native plants and wildlife will be developed across the pond. A trail will wind through the trees, and visitors will be able to identify native plants planted and invasive species contained along it. BoarBuster, the trap developed by Noble Foundation researchers for reducing the invasive feral hog population, will be set up for demonstration. This area of the Noble Learning Center will be particularly used by Noble Academy during fishing and other wildlife workshops, as well as by agricultural consultants to show specific plants in real-time.

THE ACRE

An acre is a common measurement in agriculture. Large-scale producers determine how much seed they need to plant by the acre. They sell their crops by how much they produce on an acre. But what is an acre? It's 43,560 square feet. So what does that look like? The Acre will show visitors exactly what an acre looks like as a single acre will be contained within four yellow posts. On this acre, there will be three plots that crops will be rotated among. One for cool-season crops, like wheat and rye. One for warm-season crops, like corn and cotton. The other will lay fallow, or in a rest period. Visitors will be able to relate what they are learning about growing food at home to how a large-scale farmer grows crops in the field. They'll also learn how much an acre will produce, on average, of a particular crop and what that crop is used for. For example, a farmer can grow, on average, 40 bushels, of wheat on one acre. That 40 bushels will make enough flour for 1,600 loaves of bread.

POLLINATOR PLOTS

Examples of bee hives (minus the bees) will be shown along the wooden fence on the backside of the backyards. Groups especially interested in bees could visit the apiary (where bees do live and work) further south in the larger production area of the CPSA. A plot on the east side of the backyards will feature pollinator-friendly plants, like milkweed. These plants are commonly thought of as weeds by farmers and ranchers because they compete with plants more suitable for livestock and human consumption. But, as Chaney said, they might be able to find a small plot of unfarmable land where they can cultivate these plants to help the bees and other pollinators, like Monarch butterflies. ■

Cracking Pecan's Problems

Researchers from across scientific disciplines come together for the first time in history to answer pressing, fundamental questions about the native nut as it gains global popularity.

by Laura Beil

Yanina Alarcon, research associate, infects a pecan tree with pecan scab to better understand the plant and the disease and ultimately add knowledge that will benefit pecan producers and consumers.

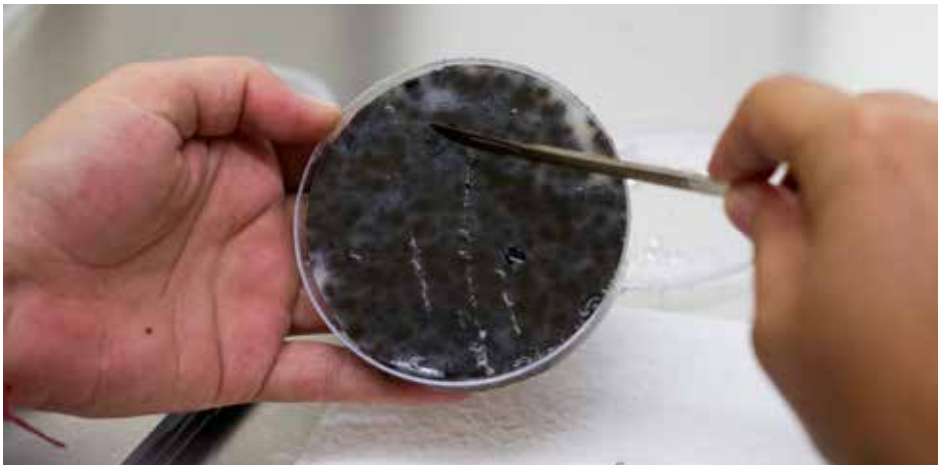
One of the first Americans to appreciate the flavor of pecans was George Washington, who planted the stately trees on the lawns of Mount Vernon in 1775. Yet true cultivation of the nuts wouldn't begin for about another century, when entrepreneurs established orchards in Texas, Louisiana and Georgia.

Today, pecans remain as all-American as ever. They live naturally nowhere else in the world, thriving in the moist but well-drained soil along the riverbanks of Texas and Oklahoma, stretching as far north as Illinois. Over the past few decades, production has expanded far outside a pecan's native range, to 15 states. And while the trees have changed little over the centuries, modern demand has. Spurred largely by a rising appetite for pecans in China, production has gone nuts over the past decade. Now about 300 million pounds of pecans are produced annually.

But the trees are paying a price for their newfound popularity. Crops are increasingly attacked by pecan scab, a disease that is caused by a fungus. "We're pushing the trees harder, and that makes it worse," said Charles Rohla, Ph.D., director of the Center for Pecan and Specialty Agriculture (CPSA) at the Noble Foundation. The scab spores only strike actively growing tissue. Therefore, when the trees maximize production, they also become more vulnerable to disease.

More than two thirds of pecan varieties are now affected by this disease, especially those grown in warm, humid states like Georgia. Plus, to get the most economical use out of their land, growers will plant trees close together, which limits air circulation and enhances the moist, muggy conditions the fungus likes. Some southeastern growers spray fungicide multiple times a year to keep the disease under control.

This real-world production problem has become the focus of a new Noble Foundation research project that draws together the organization's expertise from the laboratory to the orchard. The effort received a boost in October, when the National Institute of Food and Agriculture awarded a historic, $4.3 million grant to Noble and five other institutions to develop resources for pecans and study some of the toughest problems facing pecans.



Top: A close up of a pecan leaf reveals a small piece of the intricate nature of researchers' work to better understand the plant.

Bottom: Pecan scab fungus grows in a petri dish for research purposes.

Will Chaney, a research associate in the Center for Pecan and Specialty Agriculture, moves young pecan trees that will become part of studies into a shaded area to protect them from direct sun.

Answering the Fungus Question

Along with new ways to tackle pecan scab, Noble Foundation scientists are discovering other ways to keep trees productive and healthy for decades by investigating pecan root structure, biology and genetics.

These scientific efforts have already led to at least one surprising discovery about the pecan scab culprit. Traditional wisdom maintains that the fungus reproduces asexually – meaning it grows from genetically identical spores dispersed by the wind and rain.

Yet a team led by Carolyn Young, Ph.D., an associate professor in the Forage Improvement Division, has found evidence that the fungus can also reproduce sexually in laboratory experiments, recombining its genetic material with other scab isolates. The next step is to determine if and when this occurs in the wild.

Once confirmed, this research will help explain why pecan scab has preferences for certain types of pecans and how fungicide resistance can spread. "Everybody we talk to says it's an asexual fungus," Young said. "But one of the fundamental assumptions may not be true. This impacts our understanding of the pathogen's biology and may influence how we manage the disease."

Fingerprinting Pecans

Some varieties of trees are naturally less vulnerable to scab. It's just a matter of identifying them. The laboratory of Maria Monteros, Ph.D., an associate professor who leads a genomics laboratory in the Forage Improvement Division, is working to establish a genetic profile or "DNA fingerprint" unique to each variety. Currently, she says, growers tend to identify varieties based on observations of the nut characteristics including size and shape. But visual identification can be challenging, given that the water or nutrient availability, or the presence of disease, can change the appearance of the nuts. Also, young trees don't produce nuts at all for several years.

A more precise – and objective – way to identify a tree is through its DNA. As of now, Monteros is building a genetic catalog of about 60 different tree samples. "The focus of this work is to provide growers with a tool to determine which trees they have in their orchard," she explained. "If certain trees are susceptible to pecan scab, knowing this information would help develop orchard management practices. Also, if a grower has a tree that was exceptionally productive, and wanted to get more of them, we could develop a genetic fingerprint of that tree." The concept of DNA fingerprinting has already been applied to other crops, she said, including coffee. In that case, coffee grains are visually difficult to distinguish, but those with better flavor are in higher demand and often get a price premium. Her team is also working on identifying DNA segments that provide resistance to pecan scab disease.

In addition to genetic exploration, the laboratory of Elison Blancaflor, Ph.D., a professor in the Plant Biology Division, is starting to look at ways by which microscopy equipment at the Noble Foundation can provide insight into root development in pecans, an area where very little is known. Propagation of elite pecan varieties requires grafting of the upper part of a tree to a compatible rootstock. Blancaflor and Rohla want to understand how the root system of pecans contribute to healthy and more robust rootstocks.

Other questions about fundamental pecan biology also remain. Rohla is exploring why all trees cycle in unison between low and high production on the same years. A heavy production followed by lighter bearing the following year is a hallmark of the crop's natural rhythm. But quantity sacrifices quality. "Whenever we have a big crop, it takes so many nutrients from the tree resulting in poor quality," Rohla said. "The following year the crop is smaller as a result of the stress the tree endured the year before."

That makes sense, but what's not known is why each tree, no matter what cycle it begins with, eventually produces in sync with every other tree in the country. If production years were mixed, farmers could have more predictable prices – especially as worldwide demand rises. "Because they are native to North America, most countries don't even know what a pecan is," Rohla said.

They soon will. As more parts of the world discover health benefits and tastiness of the pecan, Noble researchers will continue to support a food with roots deeper than America itself. ■

To Learn, Return and Serve

The Sam Noble Scholarship supports area youth pursuing higher education in agriculture and technology.

by Courtney Leeper

Young people leave their homes in rural Oklahoma each year in pursuit of higher education. They head for cities throughout the state and country to gain knowledge and experiences at universities and technical schools.

Sam Noble, the eldest son of Noble Foundation founder Lloyd Noble, left home for his education. First to St. John's Military Academy, then to the University of Oklahoma for his bachelor's degree and to Dartmouth College for his master's in business administration.

He returned home to work with his father in 1949. Lloyd Noble died a year later, and 24-year-old Sam assumed leadership of the family's oil companies. He also became a trustee of The Samuel Roberts Noble Foundation, named for his grandfather and founded by his father.

Through the next 43 years, Sam Noble earned his reputation as a smart, successful businessman and leader who trusted, empowered and stood up for the people who worked for him. He loved his family and respected their heritage. He was also known for his generosity.

When Sam Noble died in 1992, he left a financial gift to the Noble Foundation. His instructions were to endow a scholarship fund for south-central and southeastern Oklahoma students studying agriculture or technical trades. His gift has become the Sam Noble Scholarship Program, which has awarded more than 193 students with scholarships in excess of $2.4 million since 1999.

"Sam Noble was an influential leader just like his father. He hoped these scholarships would help the recipients forge a path to success and become leaders in their own way," said Mary Kate Wilson, director of philanthropy, engagement and project management, and administrator of the scholarship program. "They are our future agricultural producers, scientists, tradesmen and women, and community leaders. Assisting them as they pursue higher education will benefit our rural communities and agriculture as a whole."

Meet Seth Coffey and Samantha Howe, two Sam Noble Scholarship recipients.

Seth Coffey, a Sam Noble Scholarship recipient, assists with a prescribed burn. He plans to use his educational experiences to benefit his family's ranch in southern Oklahoma.

SETH COFFEY

Year: Second-year master's student | Area of Study: Fire ecology
Undergraduate scholarship recipient from fall 2010 to fall 2014
Graduate scholarship recipient since fall 2015

Drought reigned the summer of 2011, and Seth Coffey was home after finishing his freshman year at Oklahoma State University.

He spent nearly every afternoon pumping water for cattle that summer. He'd work from 6 a.m. to 2 p.m. in the oil fields about 30 minutes away from his family's ranch in the Arbuckle Mountains of south-central Oklahoma. Then he'd come home, take an hour-long nap and head back outside.

Many times Coffey observed the landscape around him. Some grasses withered in the dry ground leaving others to take the brunt end of the cattle's constant food seeking, or foraging. He saw the classic symptoms of overutilization: stressed and dying plants, which led to limited grazing sources for the cattle and other problems like bare ground, which can lead to erosion.

"That summer showed me how important it is to manage land correctly," said Coffey, a sixth generation rancher. "Not that we were doing it incorrectly. The cows had to have water, and those were the only two pastures with working wells. But I distinctly remember thinking, 'I never want to see this pasture like this again.'"

During his junior year, the agribusiness student added a second major: rangeland ecology and management. The following fall, he took an elective fire ecology class taught by John Weir, an OSU research associate known for his work with prescribed burns. He took another in the spring.

"We see a lot of eastern redcedar trees around the Arbuckles," Coffey said. "When I learned about prescribed fire and its benefits to the land, including managing cedar, I knew this could be my way of giving back to my community when I return to the ranch."

In February 2015, he helped with his first prescribed fire. He was in charge of using a leaf blower to prevent smoldering debris from escaping the burn unit. He'd go on to help with as many more burns as his schedule would allow. He even opted out of a spring break trip to Florida with friends so he could go home to help his family conduct their first prescribed burn.

As Coffey's final undergraduate semester approached, Weir asked if he would be interested in pursuing a master's degree in fire ecology. He said yes, applied and is now advised by Professor Samuel Fuhlendorf, Ph.D., and Weir in the program.

Coffey was awarded the multiyear Sam Noble Scholarship as an incoming freshman. He then reapplied as a master's student and was awarded the graduate scholarship.

"The scholarship has helped me financially, of course," he said. "It's also helped me learn how to be successful because I'm paying attention to my GPA and treating college as my job. If you learn to treat your education as your job, you can find different ways to apply your educational opportunities to your career."

He remembers reading the story of Lloyd Noble on the Noble Foundation website when reapplying for the scholarship. He connected with Noble's desire to do something to help when he saw the Dust Bowl's effects on the land.

"That's kind of how I felt when I saw the problems from the drought in 2011," Coffey said. "I see my duty as getting my education in fire ecology and bringing that knowledge back to the ranch and community. It'd be a good way of passing on that legacy."

Samantha Howe (right), a Sam Noble Scholarship recipient, helps build a birdhouse as part of her summer internship with the Center for Pecan and Specialty Agriculture in 2016. She is interested in animal genetic research.

SAMANTHA HOWE

Year: Sophomore | Area of Study: Animal science, emphasis in animal biotechnology

Scholarship recipient since fall 2015

Samantha Howe stood in front of a panel of judges at the 4-H Horse Field Day speech contest held at Oklahoma State University (OSU) in 2010.

She was in seventh grade at the time and had just learned that her speech on the genetics of horse color had won first place. She would go on to compete and earn fourth place at the national level in North Carolina.

"I had researched all the information for that speech and found it so cool," Howe said six years later. "I couldn't get enough."

She continued to read articles about human and animal genetics. And, in high school, she savored her biology teacher's lessons on the topic. Now she's studying animal science at OSU with an emphasis in animal biotechnology. "I've been interested in going into agriculture as long as I can remember," said Howe, who grew up on a commercial Black Angus ranch between Sulphur and Dickson, Oklahoma. "It's always been science that has clicked in my mind, so that's what I want to pursue."

She is particularly interested in beef genetics, the study of hereditary traits in cattle.

In the mid-1700s, an English cattle and sheep farmer, Robert Bakewell, became the first to improve his herds through a genetic approach. He strayed from the day's standard practice by separating male and female livestock. Then he intentionally selected mating pairs based on desirable physical characteristics, such as size and ability to convert grass to muscle. Hundreds of years later, cattlemen and women continue to use his method of selective breeding to enhance desirable traits in their herds. Over time, they've developed polled, or hornless, bloodlines within horned breeds of cattle and black-colored bloodlines in historically red-colored breeds (such as Simmental and Limousin). Cattle producers also select for traits beneficial to their animals' health and well-being as well as to match consumer preference for marbling, leanness and other meat quality traits.

The study of beef genetics also makes cattle producers (particularly those who raise purebred cattle) aware of rare, recessive diseases, such as neuropathic hydrocephalus. With this genetic information, cattle breeders know how to avoid breeding carriers and evade the emotional and economical heartache caused when a calf is born with the recessive disease.

"I've seen how those defects affect the cattle and our ability to make a living and produce beef," Howe said. "It's interesting to me that it may be just one gene that causes the problem, that one little thing can so significantly affect a whole animal."

The science-seeker was familiar with the Noble Foundation before she decided to pursue a career studying cattle genes and finding ways to help producers improve their herds. Her father has asked questions of the agricultural consultants from time to time, and she visited the facility during middle school field trips. A close family friend who previously received the Sam Noble Scholarship encouraged Howe to apply, which she did in 2015.

"Receiving this scholarship means so much to me," Howe said. "Because of it, I don't have to worry about loans, and I can focus on classes and leadership activities."

She also hopes to focus on work in an animal genetics laboratory as an undergraduate student at OSU soon. "My life goal is to go into animal genetic research," she said. "Having a prominent agricultural research institution's support means a great deal to me." ■

Sam Noble Scholarships

COLLEGE IS EXPENSIVE; THE NOBLE FOUNDATION CAN HELP.

APPLICATION DEADLINE: FEB. 15

The Sam Noble Scholarship Program supports students from southern Oklahoma as they strive toward achieving an associate degree in technology, or bachelor's and graduate degrees in numerous agriculture-related fields.

Sam Noble Scholars pursuing a future in agriculture can study subjects ranging from communications and economics to agribusiness and biosystems agricultural engineering. For scholars focused on technology certifications or degrees, available fields extend across the full spectrum of vocations, including computer information systems, photography, high-voltage electricity and more.

Students at any classification level – from incoming freshmen to graduate students – may request an application today by visiting noble.org/sam-noble-scholarship.

Eligible institutions for the agricultural scholarship include:

- Oklahoma State University (Stillwater).
- Oklahoma Panhandle State University (Goodwell).
- Texas Tech University (Lubbock).
- Texas A&M University (College Station).
- Any land-grant institution in the remaining states.

Eligible institutions for the technology scholarship are:

- Oklahoma State University Institute of Technology - Okmulgee.
- Oklahoma State University - Oklahoma City.

What is the amount of the scholarship?

- Agriculture scholarship – $2,500 per semester for undergraduates; $3,125 per semester for graduate students.
- Technology scholarship - up to $1,875 per semester.

Up to:

$20,000
for Bachelor of Science

$12,500
for Master of Science

$7,500
for Technology Program

Who qualifies to apply for a scholarship?

- Students residing within the south-central and southeastern Oklahoma counties depicted in the graphic below.

To request an application for a Sam Noble Agriculture or Technology Scholarship, visit noble.org/sam-noble-scholarship.

For more information, please contact Samantha Ephgrave or Mary Kate Wilson at scholarships@noble.org or 580-224-6247.

KALYN'S DREAM

No one knows the future, but one thing is certain: love for producing beef transcends time.

by Courtney Leeper | photo by Janelle Azevedo

Studio lights shone on Kalyn McKibben sitting on a wooden barstool in a gravel driveway. A straw hat covered her long, blonde hair, which hid a small microphone clipped to her button-down shirt.

Hay bales, tucked behind a row of trees, lined the driveway a few paces away. Cattle grazed in the distance. McKibben sat up straight, laughing with the people around her: a video camera crew, her father and her brother. There, on the land she felt most at ease – the family ranch in northeastern Oklahoma, near Wyandotte – she told her story.

All eyes focused on her words and her giant smile that never seemed to fade. Not when she expressed excitement for the future of the beef industry and her place in it. Not even when the interview turned to the main subject of the video: the time she almost lost the chance to pursue that future.

CERTAIN PASSION

When McKibben was 11 years old, she went out to check calves like she had many times before. But this time, when she stepped down from her horse, Angel, to shut a gate, something spooked the horse. The horse ran and dragged McKibben behind until her face hit a tree stump.

Her older brother, Thomas, found her, and the family rushed to the hospital in Joplin, Missouri, about 40 minutes away. From there, she was flown to Springfield, Missouri, where she underwent hours of surgery to reconstruct her crushed face and torn ear.

"The doctors had a whole list of things she may never do – walk, talk, live," said her father, Lyndon McKibben. He recalled having to physically pull his wife, Phyllis McKibben, from their daughter's side so that medics could fly her to Springfield. "That was the toughest day of my life," he said. "It's the toughest thing our family has ever gone through. There were so many uncertainties."

McKibben doesn't remember much of the crisis first-hand, but she does remember the day the eye doctor told her they needed to remove one of her eyes. The bad one was pulling nutrients from the good one, which could lead to blindness. The next day, a surgeon replaced her right eye with an implant.

McKibben went home to the ranch to recover. She was back on her horse checking cattle two weeks later.

In July 2015, the 20-year-old shared her story with the Southwest Center for Agricultural Health, Injury Prevention and Education to help others understand the importance of farm safety. The ability to participate in the future is a blessing, she said. And the experience proved to her that agriculture was the field she wanted to pursue.

"It's made her a driven person," Lyndon McKibben said. "She proves she can do more with one eye than most people can do with both."

STEPPING OUT

McKibben was determined to step outside her comfort zone and meet people in the beef industry when she went to Oklahoma State University in 2013 first as an agricultural education major then as an animal science, agricultural economics double major.

At the 2015 National Cattlemen's Beef Association Convention, she learned about the Lloyd Noble Scholars in Agriculture program. She had originally wanted to "cowboy up" in Montana for the summer, but her role as a national beef ambassador required travel that would take her away from the hay field, so that wasn't an option.

> "My dream is to make a difference. I love that the beef community feeds the world, but I also love the individuals who make up the beef community and all we stand for."

During a tour of a JBS beef packing plant in Greeley, Colorado, McKibben learned she'd been selected as a Lloyd Noble Scholar. That summer, she created a fact sheet about persistently infected bovine viral diarrhea virus (PI-BVDV), attended a heifer development forum in Nebraska, and met Integrity Beef Alliance producers and updated the member database.

"If I had to sum Kalyn up into one word it would be enthusiastic," said Robert Wells, Ph.D., Noble Foundation livestock consultant and one of McKibben's summer mentors. "She will be one of the beef industry's strongest advocates. Her positive attitude about life and beef is infectious, and she always has a can-do attitude and willingness to do whatever needed to get a job done."

Sometimes that meant going "off the livestock grid" to manage honey locust trees, identify plants and help with a tomato research project.

"In three short months, we crammed a lot of experiences in there," she said at the end of the summer. "It's been a look at everything that interacts with beef production from wildlife to forages to economics as well as livestock. This one summer at the Noble Foundation has provided me a comprehensive view of agriculture."

Before starting her senior year, her mind reeled with many dreams for the future. She considered pursuing a master's degree in animal welfare and handling. She desired to connect with consumers about beef and give beef producers a voice by going into public policy. Most of all, she dreamed of returning to the family ranch after a few years in industry.

FACING THE FUTURE

It's been a little more than a year since McKibben shared her dreams for the future. Now she sees her future taking a different turn.

She returned to classes that fall and fulfilled her goal of working on a ranch in Montana the following spring. Then came graduation, which included the honors of "Outstanding Senior" from both the College of Agricultural Sciences and Natural Resources and the Department of Animal Science.

A couple days later, the man she had fallen in love with (during conversations about their mutual interest in agriculture, of course) proposed. Now she works part-time for a start-up cattle marketing company based in Montana while helping on both her family's ranch and the ranch her fiance, Connor Grokett, manages three hours away, near Shidler, Oklahoma. Preparing to move her life west after a late-October wedding is not exactly what she saw for herself a year ago.

"In my mind, I was going to be this tiny lady competing with a bunch of old, white haired guys at an ag company," she laughed.

Working behind-the-scenes for a young business has sparked her interest in starting her own company. Maybe a country boutique where she could express her "funky" fashion style, she said while adding that her current attire (jeans and an old T-shirt) was most appropriate for the weed-eating she planned to do later. Preferably something to serve beef producers while connecting consumers with the people and practices behind beef.

"My dream is to make a difference," she said a year ago. It's a sentiment she repeats now. "I love that the beef community feeds the world, but I also love the individuals who make up the beef community and all we stand for."

Now she shares her love of beef production with Grokett, and the couple plan to build their own cow herd. "You can't always put a time table to the future," McKibben said. "But the one thing that has stayed the same is my passion for ranching and the beef industry." ■

Ed Noble

1928-2016

Longtime Noble Foundation trustee passes away, leaves legacy of generosity, service.

Renowned visionary, entrepreneur, business developer and philanthropist Ed Noble passed away Sunday, Dec. 4, 2016, at his home in Atlanta, Georgia, after a lengthy illness. He was 88 years old.

Edward Everett Noble was the son of Lloyd Noble, founder of The Samuel Roberts Noble Foundation. He served on the Noble Foundation Board of Trustees for more than half a century, from 1951 to 2003. He also served as a director of Noble Affiliates, Inc.

"Mr. Noble was a phenomenal man with extraordinary vision and business acumen," said Bill Buckner, president and CEO of the Noble Foundation. "Throughout a life hallmarked by hard work, Mr. Noble gave back to the communities he loved in Georgia and Oklahoma through his time and his resources. He built many structures and businesses through his career, but he was also focused on building up and encouraging those around him. He will be greatly missed."

Noble was born in 1928 in Ardmore, Oklahoma, to Lloyd and Vivian Noble. He spent his formative youth in Ardmore before attending St. John's Military Academy in Delafield, Wisconsin, and the

continues on p. 35

Above: Ed Noble served the Noble Foundation as a trustee member from 1951 to 2003. Here he is pictured alongside fellow board members (from left) C.C. Forbes, Edgar Holt, Sam Noble, Ann Noble Brown, Ed Noble, Dr. A. A. Kemnitz and James Thompson, in 1955.

Right: Ed Noble was born in 1928 in Ardmore, Oklahoma, to Lloyd and Vivian Noble. He worked in the West Texas Division of the family business, Samedan Oil Corporation, before moving to Atlanta, Georgia, at the age of 28.

Ed Noble was known for his business acumen and dedication to the communities he loved in Georgia and Oklahoma. He built many structures and businesses during his career, and he also built up and encouraged the people around him.

Ed Noble continued his father's legacy by helping steward the Noble Foundation for 52 of the 71 years the agricultural research organization has been in existence. Noble's voice of wisdom joined with the other trustees, including his sister Ann Noble Brown (right), to guide the Noble Foundation during tenures of five presidents, including Mike Cawley (center) from 1992 to 2012.

University of Oklahoma, where he earned a Bachelor of Science degree in geology. After college, he worked in the West Texas Division of the family business, Samedan Oil Corporation.

At the age of 28, Noble moved to Atlanta, Georgia. There, he developed and opened Lenox Square Shopping Center in 1959. Lenox Square was one of the first and largest regional shopping centers in the U.S. He also built an award-winning small, independent chain of motels/hotels, Noble Inns Corporation; spearheaded the development of the land west of Interstate 35 in Norman, Oklahoma, in the late 1980s; and founded and served as President and CEO of Noble Properties, Inc. until his retirement.

In the early 1980s, former President Ronald Reagan appointed Noble to lead the transition team for the U.S. Synthetic Fuels Corporation. Noble served as chairman from 1981 to 1986. He understood the benefits of synthetic fuels for the country's strategic security but believed companies seeking government funds should be willing to put their money at risk along with taxpayers. Thanks to Noble, the U.S. Synthetic Fuels Corporation developed outcomes that only spent $1.7 billion of the designated $88 billion in taxpayer funds.

Noble served on numerous boards throughout his life including: the Foundation of the Holy Apostles, Pace Academy, Oglethorpe University, the George West Mental Health Foundation, Buckhead Coalition, Piedmont Hospital Foundation, Southeastern Legal Foundation, St. John's Military Academy and the Hoover Institute. He was one of the initial founders of The Heritage Foundation in Washington, D.C.

He received numerous civic honors from the City of Atlanta, Georgia, for his contribution to improving the quality of life. During the 1995-1996 session, the Georgia House of Representatives passed a resolution commending Ed Noble for his contribution to the state.

He is survived by his wife, Maria; daughter, Vivian and husband, Sam DuBose; Ben Noble; granddaughter, Ginger and husband, James Heckman; sister, Ann and husband, Dr. David Brown; LaVerne Noble; Carol Elizabeth Lindsay; cousin, Carolyn Smith, and numerous dearly loved cousins, nieces, nephews and extended family. Noble was preceded in death by his parents, Lloyd and Vivian Noble; brothers, Sam Russel Noble and Richard Noble; and cousin, Margaret Baldridge. ■

Singin' in the Rain

by J. Adam Calaway

You never forget the moment you meet the love of your life.

For me, a drizzly June morning three years back turned out to be more than just the day of our company softball tournament. On that particular Thursday, my future changed forever.

Once a year, the Noble Foundation hosts its Parkway Series, a casual, employee-only day where colleagues swap daily duties for double plays.

Since my athletic ability ranks somewhere between nonexistent and laughable, I serve as the play-by-play announcer. In the midst of worrying about the weather and last-minute preparations, a fellow employee approached me and explained that one of our summer scholars was a singer who had returned to college after a music career. This co-worker then asked (insert thunder clap here) if the scholar could sing the national anthem.

"Right, she's a 'singer' and I'm Babe Ruth," I thought, envisioning some kid warbling her way through the national anthem in front of 350 slightly soggy employees.

"Sure," I said, completely unsure of the situation. "Send her over and let me talk with her." My intention was to hold an impromptu audition. I feared I'd be the first person in her life to explain that she was, in fact, not a singer.

Moments later I met my future wife. The image of her standing there wearing her Oklahoma State University ball cap and a rain jacket with those bright brown eyes staring up at me is one that will never fade. Neither will my first words to her.

"So, Summer, you're a singer?" I asked, hoping my disbelief was obvious. "If this was American Idol, would you get through to the next round or would I make fun of you in a British accent?"

I expected mild shock. I expected back peddling. Her return volley was veiled attitude. Without hesitation, she cocked an eyebrow, smiled and said, "Oh, I'd make it through."

Bowled over by her confidence, I handed her a microphone without another word.

A few minutes later – in front of the entire employee base – she took a deep breath and belted out "The Star Spangled Banner" like Whitney Houston at the Super Bowl. Everyone was blown away, and I melted. She'll tell you that she played hard to get, but six months later we said, "I do."

Three Parkway Series have come and gone since that day. Each time we play "The Star Spangled Banner" from a prerecorded track, and each time I think about that day and my sweet wife.

And then I think about this place and all that's happened in my decade here, and all that will undoubtedly happen in the 10 years to come.

Each of the stories held within this issue of *Legacy* are focused on tomorrow, on what's next. These are the people, projects and programs that will shape the future of the Noble Foundation.

We make these plans and chart our course fully aware that we do not own tomorrow nor can we bend it to our will. The road of life is going to pitch up and down and take the unexpected turns. Trials and mistakes are inevitable, but as I look ahead, I'm filled with hope.

I believe that tomorrow is going to be better than today, and if it's not, then we'll wait another day. I believe that failure means we tried something daring, and we'll learn from the experience and be better for it. I believe in the men and women who fill the Noble Foundation's farms, laboratories, and offices with energy and eagerness that will undoubtedly find success.

And I believe in the miraculous because one moment the love of my life didn't exist and the next she was singing in the rain right in front of me. ■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Snow blankets Wyoming cattle country in November 2016. Though climates and soil types differ throughout the country, 915,000 cattle operations span the nation as part of the U.S. beef industry.