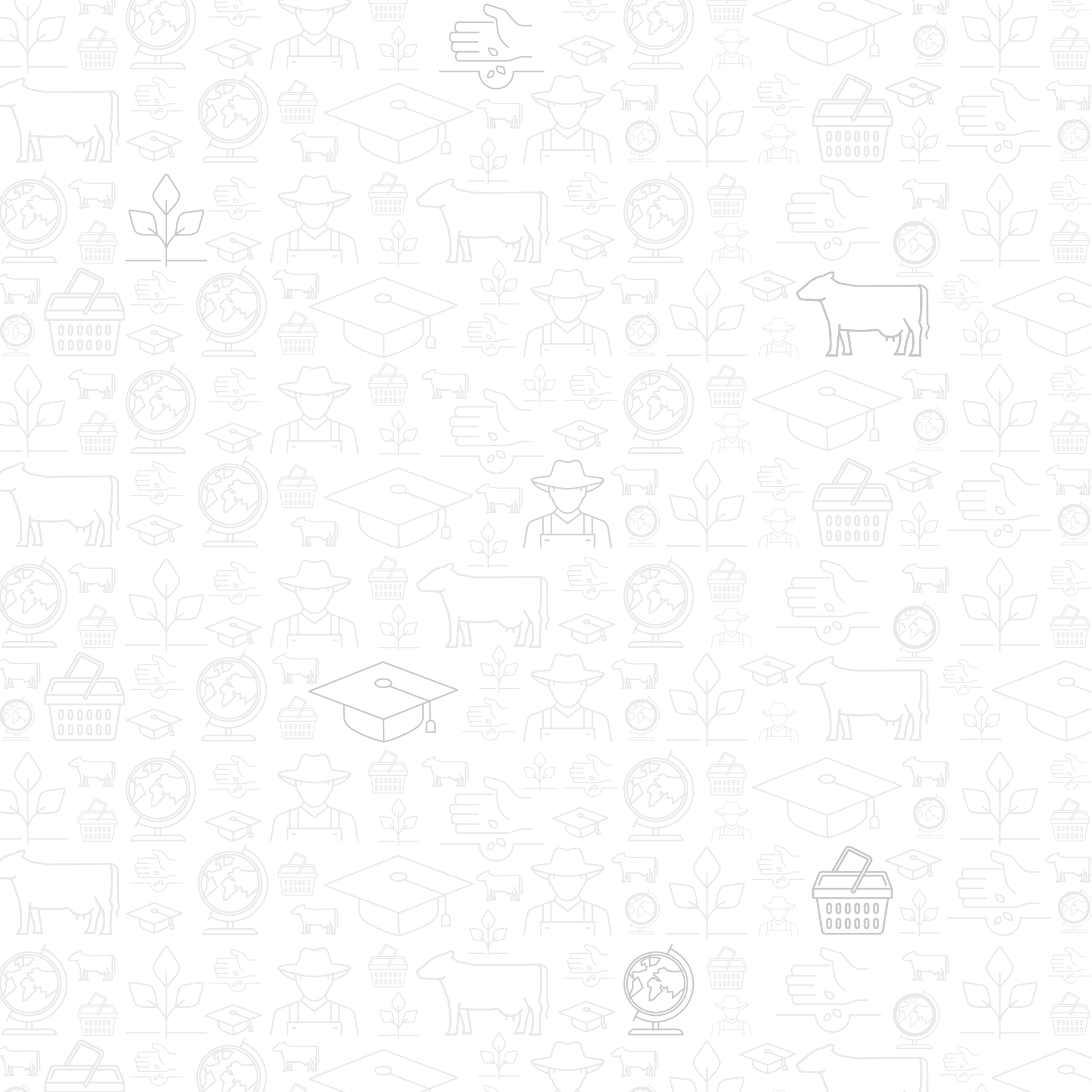


**2016**  
ANNUAL  
REPORT

# CONNECT

THE SAMUEL ROBERTS NOBLE FOUNDATION



“The Noble Foundation has been in existence slightly over three years. ... we feel a lot like a youngster who has just learned to walk and is about ready to start to run. ... However,

**we realize with the greatest humility that we can't run alone.”**

From Lloyd Noble's speech during the Samuel Roberts Noble Prize Presentation, Jan. 22, 1948

THE SAMUEL ROBERTS  
**NOBLE**  
FOUNDATION

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INTRODUCTION

## SPURRING ACTION THROUGH CONNECTION

**T**hroughout his life, Lloyd Noble possessed the unique ability to connect people with ideas and propel them toward a grand vision.

Noble recognized and linked together seemingly unrelated concepts to create solutions before most even understood the problem. He tethered bold thinking and a selfless perspective with a concert of collaborators to generate lasting success in business and conservation.

Noble launched his oil exploration and drilling company in 1921 with little to no personal experience in the burgeoning energy production sector. But he staked his claim on two concepts: constantly seeking and developing new technologies, and hiring dedicated employees.

Noble continually pressed the boundaries of technology, testing, failing and pressing forward, while others clung to tradition. He saw a direct correlation between advancements in machinery and methodology, and oilfield achievement.

He also understood that people – hardworking men and women – were the lifeblood of his industry. He hired and empowered a network of employees, relying on their collective expertise and skill to accomplish more than an individual could ever imagine.

Noble wove these two principles together: people generating new ideas and technology, which allowed him to drill deeper and faster than his contemporaries. Within 15 years, Noble was one of the most successful oilmen of his time, and soon he became a philanthropic touchstone in the post-Dust Bowl era.

Noble witnessed how poor farming practices – caused by a general lack of knowledge – had left the soil vulnerable and the region desperate for answers. He watched as the economic engine of the Southern Great Plains sputtered and stalled without its agriculture base.

He understood the direct association between the soil and the vitality of society. His scope was not

skewed by the enormity of the challenge or concern with personal gain.

As in his professional endeavors, Noble introduced new concepts and a positive perspective to the hearts and minds of a generation. He became a founding father of soil conservation and land stewardship, seeking to inspire change, knowing that soil must be repaired and protected to ensure prosperity for the next generation.

Noble established The Samuel Roberts Noble Foundation in 1945 with the simple mission to connect farmers in two southern Oklahoma counties back to the soil. The organization provided foundational education, conducted contests to spur interest in land stewardship, and offered soil testing to help producers make informed decisions.

More than 70 years later, the Noble Foundation has built upon and expanded its scope to include research, education, demonstration and consultation; each focused on revealing agriculture's critical role within society.

Noble's messages of land stewardship and soil conservation have been heard. They have reached beyond the Southern Great Plains and circled the globe. They have been embedded in the hearts and minds of multiple generations, stirring them to action. And they brought together 400 employees from 25 countries to pursue a shared vision of solving agriculture's greatest challenges.

Thus, the 2016 Noble Foundation annual report is entitled *Connect*. The following pages illustrate how the Noble Foundation links soil, forages and cattle with agricultural producers, students, consumers and the world, to form an interconnected web to advance agriculture.

Following our founder's template, the Noble Foundation seeks to connect people with ideas and propel them toward a grand vision.

This was Lloyd Noble's gift. It is our mission.

## TO OUR READERS:

**B**ig ideas can come from the most unexpected places: Isaac Newton and his apple tree. Alexander Fleming and a moldy petri dish. Inspiration needs location. And that's where we come in.

For the past five years, the Noble Foundation has increasingly served as a venue for discussing state and national agricultural challenges. We've become the literal site of "common ground." Part think tank. Part Switzerland. Everyone is welcome.

We bring together individuals independent of background, political affiliation or personal motivation; present a significant topic facing agriculture; and go to work.

Differing perspectives collide (respectfully). A natural tension fills the room like an itchy sweater. Commonality is discovered. And then *bam!* A breakthrough. Compromise leads to a flash flood of ideas, and soon a group with no shared history is marching in lockstep toward a collective vision.

We have seen the miraculous outcomes of convening happen time and again. The process birthed the Soil Health Institute, helped focus state and national coalitions on everything from conservation to cover crops, and offered struggling organizations renewed energy.

That's part of our mission. We serve as a hub of connection, a place to set down differences and search for like-mindedness.

This role has never been more critical. The fragmented nature of the agriculture sector and fearmongering from external forces drives a heavy wedge between potential collaborators.

However, our conviction remains: we must overcome this present generation's much-ballyhooed division and build bonds of agreement. The enormity, complexity and sheer number of challenges facing agriculture cannot be solved by a single individual or institution.

Collaboration – a genuine sharing of responsibility, resources and ideas – is the only solution. So we offer our expertise and our home as a place to connect, knowing solutions flow directly from our ability to forge alliances and motivate them into action. Building connections is fundamental to who we are; it permeates our organizational DNA.

This annual report serves as a testimony to how the Noble Foundation connects to agriculture and beyond. Within these pages, you will see how our coordinated and tightly woven research, educational, and philanthropic activities span from the molecules in the soil to the producers in the field before ultimately impacting a world of consumers.

As you read, one undeniable truth becomes apparent: agriculture is the great common denominator. While we construct walls that divide us, we, as a species, share a dependence on the fruits of agriculture and, therefore, we have at least one element that unites us.

And that's a good place to start.

Sincerely,



BILL BUCKNER, PRESIDENT AND CEO





Lloyd Noble created the Noble Foundation as a resource to help farmers conserve the soil.



MORE THAN  
**1 MILLION**  
microscopic creatures can  
live in a single teaspoon  
of soil.

Soils are formed by the interaction of minerals, organic matter, living organisms, water and air.

“No civilization has outlived the usefulness of its soils. When the soil is destroyed, the nation is gone.”  
—Lloyd Noble, Nov. 18, 1949



START WITH SOIL

## PROTECT THAT UPON WHICH WE DEPEND

The essence of Earth lies quietly below a busy world. Rarely noticed by most. Desperately needed by all. From it, civilization has been born. Without it, no civilization will survive. Yet there's so much more we have yet to understand.



The Soil Health Institute is an outcome of the Noble Foundation and Farm Foundation's Soil Renaissance. Its mission is to safeguard and enhance the vitality and productivity of soil through scientific research and advancement.





**BELOW:** Cattle stand near a water hole almost completely covered by shifting topsoil, April 1936, in the Oklahoma Panhandle.



Photo by Arthur Rothstein (Library of Congress).

Soil is the foundation of agriculture. Actually, it's the foundation of every culture.

Thousands of years ago, in what is modern-day Iraq, the early Mesopotamians were among the first to build cities. But first they developed their agriculture, starting with the soil.

The land between the Tigris and Euphrates rivers was known for producing abundant food, thanks in part to the Mesopotamians' irrigation systems. Moistening the soil in an otherwise dry climate helped produce enough barley, dates, lentils and wheat to nourish thousands of people in one urban center. No longer did everyone have to be a farmer to survive. Communities gained doctors, craftsmen, tradesmen and more.

Unfortunately, many believe the

same systems that enabled the early civilization to flourish also contributed to their demise. Salt left behind by evaporated water eventually built up in the soil and reduced its fertility.

Fast forward to the 1930s, and Lloyd Noble, an oilman from Oklahoma, saw another sign of soil sickness that he knew, if left unchecked, could result in his society's downfall. Tremendous dust storms whipped the Great Plains. Extended drought aggravated poor quality soils. Dying crops (and soils) withered and blew away, leaving ground that no longer supported much life – crop, livestock or human.

By December 1934, the U.S. Department of Agriculture *Yearbook of Agriculture* reported "Approximately 35 million acres now in crops have

lost all or most of their topsoil." There were 125 million more "rapidly losing topsoil," totalling about 13.5 percent of the approximately 1.9 billion acres of farmland reported on Jan. 1, 1935.

Noble saw the scarred land from the sky as he flew from his home in Ardmore, Oklahoma, to oil rigs throughout the country. In 1945, he took funds from his oil businesses and created The Samuel Roberts Noble Foundation, named for the most charitable man he knew – his father. He charged the organization with taking care of the soil by taking care of the people closest to it – farmers and ranchers.

To this day, 71 years later, Noble Foundation agricultural researchers and consultants study and demonstrate practices that could help these

land stewards enhance soil health, productivity, and quality of life for themselves and, ultimately, the rest of the world.

But the age-old struggle to care for soil continues.

#### FILLING THE GAPS

Leonardo da Vinci once said, "We know more about the movement of celestial bodies than about the soil underfoot." Five hundred years later, the Renaissance man's observation is still frustratingly true.

This notion was one of the premises behind the Noble Foundation and Farm Foundation joining forces in 2013 to create their own kind of renaissance: the Soil Renaissance, which reawakened interest in soil health, including the need for more research.



Soil layers of eastern Washington's Palouse region are revealed in a deep road cut.

Photo by Jim Richardson (National Geographic).



On Dec. 3, 2015, the two institutions announced a major outcome of the Soil Renaissance: the Soil Health Institute. The Noble Foundation committed an initial \$20 million across 10 years to support the Institute.

In its first year of existence, Wayne Honeycutt, Ph.D., a soil scientist and previous deputy chief for science and technology with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), was selected as the new nonprofit's president and CEO. Steve Shafer, Ph.D., most recently the associate administrator for national programs in the USDA Agricultural Research Service (ARS), would lead its research arm.

The year 2016 was for defining goals and enhancing partnerships. Honeycutt said. "We've been given a tremendous opportunity by the Noble Foundation, and we feel the most important way we can make the most of this opportunity is by having a strong, actionable plan moving forward," he said.

So they've drafted and continued to refine their goals for closing gaps in soil research, measurement, economics and education, as well as steps for achieving those goals. They brought together 10 organizations now working in sync to improve soil health as part of the Coordinating Coalition on Soil Health. And they've educated other foundations on how investing in soil health would help achieve their respective goals in sustainability, water quality and climate change.

Already, the Soil Health Institute has secured more than \$1 million in financial commitments from outside groups. These funds will make soil health research and the creation of knowledge-sharing tools possible.

The first tool has already been built: the Soil Health Research Landscape tool, a free, publicly accessible online library and search engine. It centralizes current knowledge of soils and soil health so that anyone can more easily consider ways to improve soils in their region.

**HIDDEN POTENTIAL**

While scientists have known for decades that soils are living, eagerness for a better understanding of how this fact could improve soil health and resiliency has boomed in the last three to five years, Honeycutt said.

The majority of living components within soil are microscopic – small enough that billions of tiny creatures can live in just one teaspoon of soil. Some of the microbes that call soil home live in close community with plant roots. Scientists like Kelly Craven, Ph.D., and his team at the Noble Foundation are uncovering the potential of these microbial communities in promoting healthy plants and ecosystems.

Since coming to the Noble Found-

ation in 2006, Craven has been studying the microbes that help switchgrass thrive in poor soils and drought conditions. In 2015, his team isolated a microbe from switchgrass native to the tall grass prairies of northern Oklahoma. The strain, *Serenidipita vermifera* subsp. *bescii*, is part of a fungal family that associates with nearly all plant families throughout the world, and single strains of this fungus can be successfully inoculated onto the root systems of a wide variety of forage and row crop species. That means Craven can use it and what he's learned with switchgrass to benefit other crops, including common forages grown in the Southern Great Plains like bermudagrass and wheat. He'll be studying Oklahoma soils

more in-depth soon as part of a collaboration with James Rogers, Ph.D., a forage agronomist at the Noble Foundation. In 2016, Rogers began a project, funded by an NRCS grant, to study the effects of cover crops and tillage systems on winter annual pasture production and cattle performance. Craven will study how these practices affect the communities of microscopic creatures in the soil.

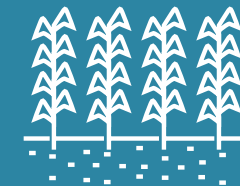
"We know that microbes play essential roles in helping plants in stressful situations like drought," Craven said. "So by optimizing the interactions between specific soil microbes and their plant hosts, we can tap into these natural solutions to help alleviate the struggles farmers and ranchers face now and in the future." ●



**ABOVE:** Kelly Craven, Ph.D., studies the interactions between plants, like switchgrass, and soil microbes.

# BUILDING ON THE FOUNDATION OF SOIL

The Noble Foundation was born out of Lloyd Noble's concern for soil health. He founded the nonprofit in 1945 after experiencing the ramifications of the great Dust Bowl. Early activities included analyzing soil and providing fertilization recommendations to farmers and ranchers. Today, the Noble Foundation continues to promote soil testing as a fundamental component of making land management decisions. As science has advanced, the Noble Foundation has also attracted scientists interested in connections among the soil, plant health, animal productivity and consumers. This is a whole-systems approach.



**Cotton root rot is caused by *Phymatotrichopsis omnivora*, a fungus that spreads and infects plants**

(including cotton, alfalfa and pecan trees) through the soil. Noble Foundation researchers study this fungus and test ways to manage this devastating disease.

The greenhouse used nearly **30 tons of soil** to grow plants for studies in 2016.



**The soil holds nutrients, such as nitrogen and phosphorus, that are essential for plant growth.**

Noble Foundation researchers discover mechanisms and genes within plants that determine how efficiently they take in and use those nutrients.

**Cattle in the Southern Great Plains commonly graze annual small grains pastures through the winter and spring.**

In the fall of 2015 and continuing through 2016, James Rogers, Ph.D., began a study to see what happens when summer cover crops (established with both till and no-till practices) are planted in these pastures. Kelly Craven, Ph.D., will study the effects of cover crops and tillage systems on the microbial communities within the soil.



**FARMERS, RANCHERS AND OTHER LAND MANAGERS SENT MORE THAN 1,500 SOIL SAMPLES TO THE NOBLE FOUNDATION FOR TESTING IN 2016.**



**HIGH SCHOOLERS DEMONSTRATED THEIR KNOWLEDGE OF NATURAL RESOURCE MANAGEMENT TOPICS, INCLUDING SOIL, DURING THE OKLAHOMA ENVIROTHON.**

Noble Academy hosted the competition at the Noble Foundation for the second time in 2016. They sent the five first-place Edmond North High School students to the North American competition in Ontario, Canada, in July 2016.



**NEARLY EVERY FOOD EATEN BEGINS WITH 6-8 INCHES OF TOPSOIL.**



**SOILS WILL BE EXPECTED TO SUPPORT MORE THAN 9 BILLION PEOPLE ON THE PLANET BY 2050.**





Alfalfa is a legume studied as part of Forage 365, which seeks to extend the grazing season.





From the soil rises a green sprout of life. Its cells duplicate and expand; leaves form, flowers bud and fruit is born.

Rows and rows of these leafy life forms fill the Noble Foundation greenhouse, the “acre under glass.” In 2016, thousands of plants – alfalfa, clover, tall fescue, even young pecan trees – grew under the controlled environmental conditions the greenhouse provides.

Others faced the sometimes harsh Oklahoma sun in small plots on the Noble Foundation Headquarters Farm or in larger fields at the Pasture Demonstration Farm. Native species populate acres upon acres at the Coffey Ranch. The 14,000 acres of research and demonstration land, divided among seven farms and ranches, are covered with plant life, primarily forages consumed by cattle.

Each plant holds a special purpose. For covering the soil, keeping it cool and protected against erosion. For providing nourishment to cattle. For supporting wildlife. Or for feeding humans, as is the case with the pecan and fruit trees and the gardens in the Noble Learning Center.

Each plant also plays a special role in a greater study to learn more. These studies range from gaining knowledge at the basic level about how plants function to the applied, which looks at how well cattle perform on different plant systems. But at any point on the spectrum, the underlying goal is to generate knowledge and tools that benefit farmers and ranchers, consumers, and the world.

#### ROOTED IN KNOWLEDGE

First to emerge from an awakened seed is the radicle, a tiny root that grows downward seeking water and nutrients from the soil. As the meristem cells at the tip of this root divide and elongate, the root grows deeper into the ground, as far as 15 feet in the case of alfalfa, one of several plants. Alison Blancaflor, Ph.D., studies as part of collaborative research with other Noble Foundation scientists. When



**ABOVE:** Noble Foundation researchers gather wheat and rye samples for root architecture studies led by Alison Blancaflor, Ph.D. (far right). They will examine roots from plants grown in both tilled and no-till conditions.

this root is fully grown, it’s called the tap root. It anchors the plant to the soil and takes in water and nutrients. Eventually, it produces offshoots, or lateral roots, which take in more soil resources.

Zoom into the cellular level of these roots, and you’ll find where Blancaflor spends most of his time studying. He and his team look at the roles different cell components play in shaping this whole network of roots.

In 2016, Blancaflor and his team discovered genes that control the length and shape of root hairs in the model plant *Arabidopsis thaliana*. Root hairs extend from the outermost root cells and absorb nutrients and minerals.

The knowledge gained from model plants could be applied to breeding forage crop cultivars that better

acquire nutrients and water. This is an area Blancaflor and other Noble Foundation researchers, including small grains breeder Xuefeng Ma, Ph.D., and forage agronomist James Rogers, Ph.D., are pursuing.

“Roots are crucial for plant growth and development,” Blancaflor said. “Roots help plants acquire nutrients and water, so improving their architecture could reduce the need for costly inputs and help in drought. But first, we have to understand how root cells work so that we can tap into their natural abilities to produce healthy and strong root systems.”

#### GENOME DECODED

Dig even deeper into a cell, into its nucleus, and you’ll find DNA: the genetic

instructions that tell an organism how to grow, develop and carry out its daily functions.

DNA is arranged into genes, and a genome includes a complete set of genes. This is the blueprint for life.

Scientists are interested in uncovering these blueprints. With it, they can tweak the instructions to build even better plants that provide advantages to the environment, animals and humans.

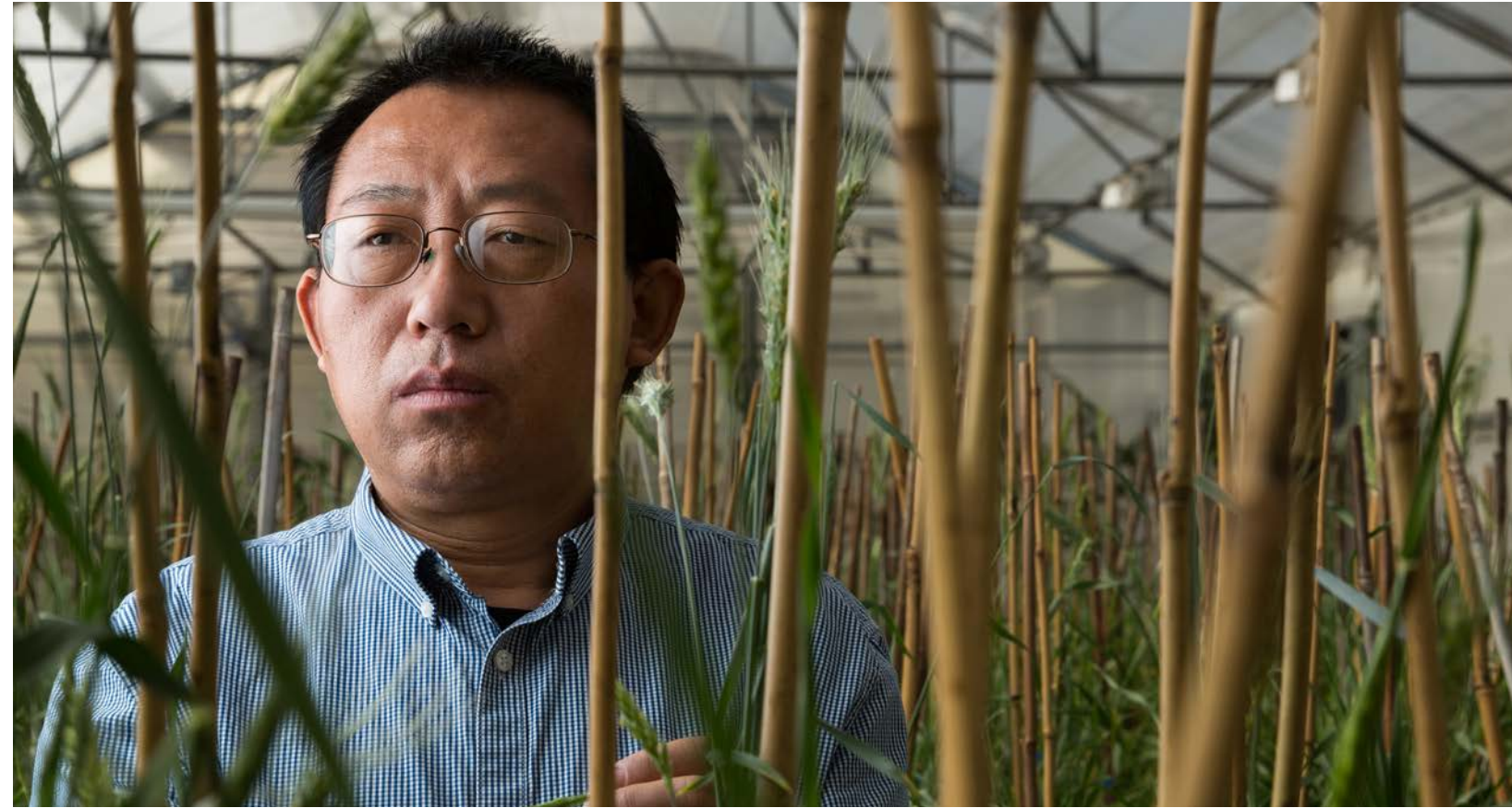
In 2011, Noble Foundation scientists, including Maria Monteros, Ph.D., and Michael Udvardi, Ph.D., joined colleagues from the University of Minnesota and the National Center for Genome Resources to begin sequencing the alfalfa genome. Alfalfa ranks fourth in value among crops grown in the U.S. (after corn, soybeans and



Flowering alfalfa plants grown for drought research led by Maria Monteros, Ph.D.



BELOW: Xuefeng Ma, Ph.D., leads the Noble Foundation's 65-year-old small grains breeding program.



wheat) at \$8 billion annually. This legume (a type of plant that does not require nitrogen fertilizer because of interactions with a specific bacteria in the soil that allows it to obtain nitrogen from the atmosphere) is commonly grown as a food source for livestock, especially dairy cattle.

"The alfalfa breeding community had been clamoring for the alfalfa genome," said Monteros, who leads the Noble Foundation's legume breeding laboratory, "and it proved to be a complex plant genome to sequence."

On July 13, 2016, the researchers revealed their findings about the alfalfa genome at the North American Alfalfa Improvement Conference in Madison, Wisconsin. The blueprint was finally clear enough for plant breeders to start using it.

With it, breeders have a tool to

improve alfalfa's ability to survive drought and tolerate disease. They could boost yields, extend its growing season in different climates, or help it better adapt to different soil types and conditions.

**CONTINUING TRADITION**

Plant breeders turn the knowledge gained by scientists who study what is happening inside the plant at the genetic level into new plant cultivars for farmers and ranchers.

By the end of 2016, Xuefeng Ma, Ph.D., the Noble Foundation's newest plant breeder, had completed his first year as only the sixth researcher in the last 65 years to lead the small grains breeding program.

Small grains breeding is unique at the Noble Foundation in that it focuses on improving small grains (like

wheat, rye, triticale and oat) for cattle forage, or, in the case of dual-purpose winter wheat, both forage and grain production. The breeding program aims to provide cultivars suited for the Southern Great Plains to produce forage from October to March, a time during which warm-season grasses don't grow. The program contributes to Forage 365, a flagship activity that seeks to extend the grazing season and reduce dependency on hay in those colder months.

In his first year, Ma worked toward expanding the program. He inherited a rye breeding program, which has produced popular varieties including Elbon and Bonel.

But he plans to double its capabilities, and he and his team are looking at new breeding methods that would accelerate the breeding cycle. They

have also been collecting more plant materials to diversify the wheat, triticale and oat breeding programs.

Building a better plant requires many plant materials (seeds and the genetic information found in them) just as building a house requires many bricks, Ma said.

Every year, they save seeds from a few select plants that show promise for meeting farmers' needs, whether it's better drought or cold tolerance or higher yielding, higher quality forage production. The next year, they plant those seeds, and the cycle continues 10 to 12 years until they're released as new cultivars.

"When I came here, that wheel was turning," Ma said, "but we are working to make the wheel bigger and faster so that we can better meet the needs of small grains growers." ●

# GAINING KNOWLEDGE AND PLANTING PROGRESS

Plants provide the most basic food source for humans, livestock and wildlife. Plant science at the Noble Foundation explores various aspects of how plants work and interact with the world around them. Scientists discover mechanisms and genes that determine how plants take in and use nutrients and tolerate stresses, such as drought and disease. Basic knowledge is gained, which is translated into superior cultivars; then those plants are tested in real-life grazing situations.



**Noble Foundation plant breeders work with other researchers and farm staff**

to see how well different plants persist when grazed by cattle as well as the quality of nutrition they provide the cattle.

**1,748 acres**

are grazed by cattle as part of the Forage 365 studies and grazing season extension demonstrations.



Cattle at the Noble Foundation graze **bermudagrass, tall fescue, clovers, wheat, oat, triticale, rye, switchgrass and native species.**

During the first season of the small grains field demonstration program (2015-2016),

**115 farmers**

participated in field days to see the Noble Foundation's commercially available small grains varieties growing (and being grazed) on five real-world farm sites in western Oklahoma.



FOURTH- AND FIFTH-GRADERS AT ST. AUGUSTINE CHRISTIAN ACADEMY IN TULSA, OKLAHOMA, ENJOYED THE **SWITCHGRASS SAMPLES** SENT TO THEM BY THE AG SERVICES AND RESOURCES CORE FACILITY. THE STUDENTS LEARNED ABOUT THE NATIVE GRASS AS PART OF A UNIT ON OKLAHOMA.



THE NOBLE LEARNING CENTER DEMONSTRATES DOZENS OF WAYS ANYONE COULD **GROW FOOD IN THEIR OWN BACKYARD** using edible landscaping, garden beds, small hoop houses and greenhouses, and containers.



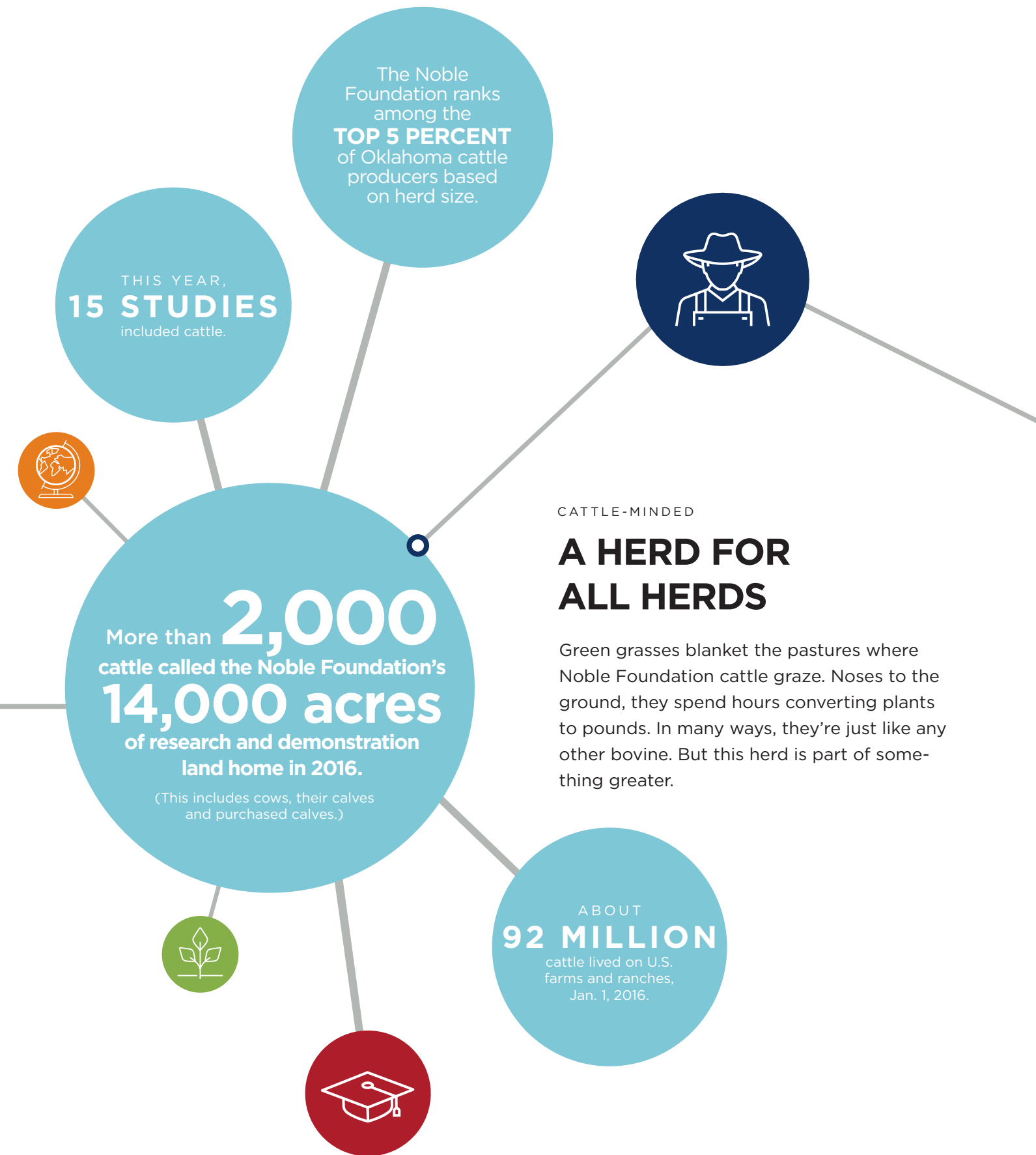
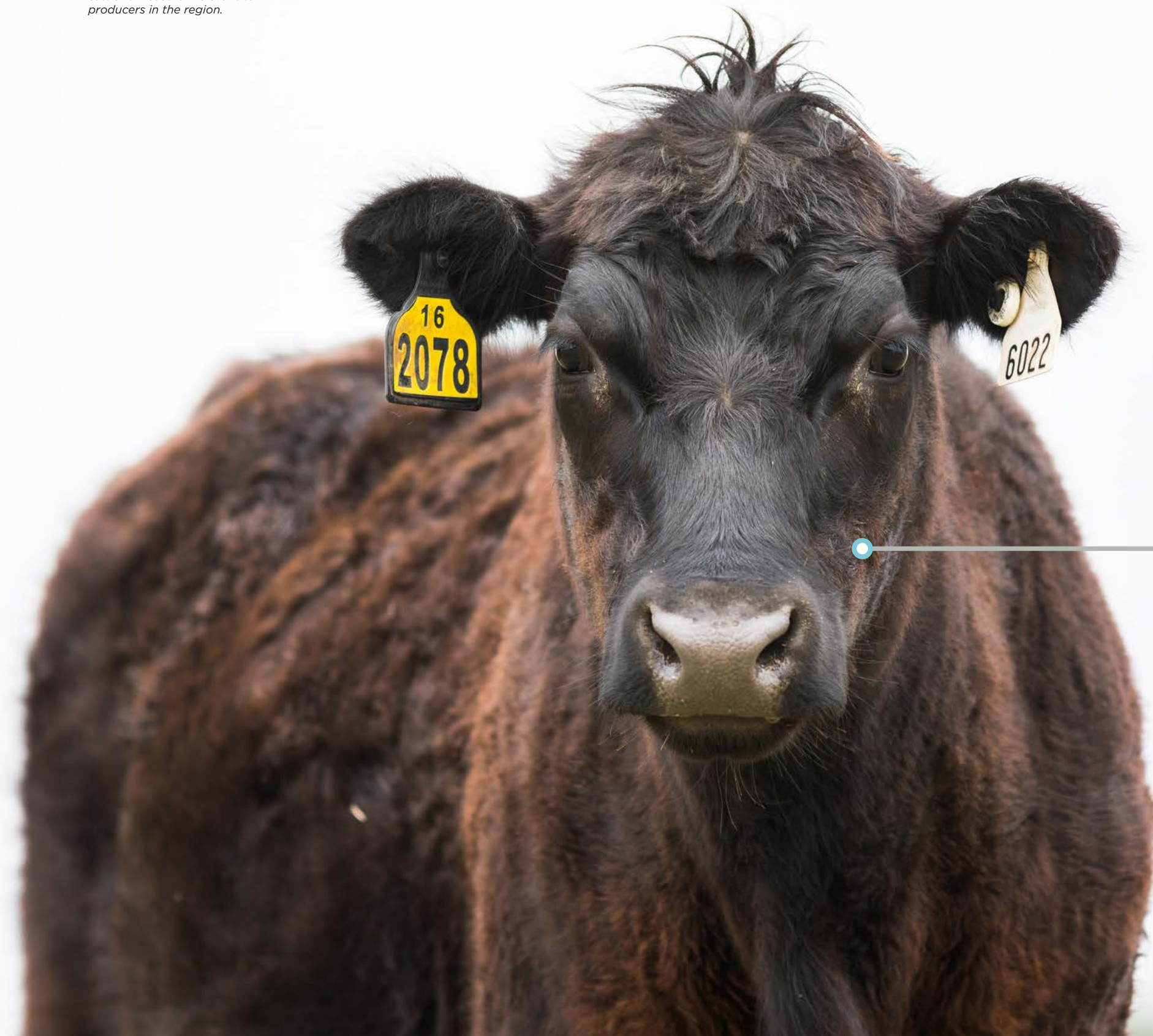
THE NOBLE FOUNDATION HAS COLLABORATED WITH **ARGENTINA-BASED GENTOS** since 2005 on summer-dormant tall fescue breeding projects. This relationship has produced Chisholm tall fescue, which was released in 2016.



THE NOBLE FOUNDATION RELEASED ITS **FIRST WHITE CLOVER**, RENOVIATION, IN COLLABORATION WITH THE UNIVERSITY OF GEORGIA IN 2016.



The Noble Foundation raises cattle for research relevant to producers in the region.





A black muzzle brushes against the green ground; a black-topped tongue stretches out, curls around a clump of bermudagrass and pulls it back into its mouth. Nourishment. The cow barely lifts her head as she slowly sweeps it across the field, creeping forward and pausing frequently to take that perfect next bite.

It's fall, and she's eating for two. When spring comes, she'll welcome another calf into the world. Just like many cows throughout Oklahoma and the country will do.

What makes her different is just one detail: she's part of the Noble Foundation herd, which means she's part of research that looks at the best systems for raising forage-based beef cattle.

#### ABOUT THE HERD

Throughout the year, more than 2,000 cattle called the Noble Foundation's 14,000 acres of research and demonstration farmland home. This includes the 500-head cow herd, their calves from 2016 and the previous year, as well as purchased calves.

The cattle are raised much like others in the region. Calves are born February through March. They receive the necessary care from both the cow and personnel until weaning in the fall. Then they graze various forages, including small grains like wheat and rye in the winter, until big enough to either go to a finishing yard to gain those final pounds (and marbling) or back into the herd as replacement females to live a long and productive life.

The Noble Foundation produces cattle for beef like other cattle managers, and, based on herd size, the operation ranks among the top 5 percent of those in Oklahoma. But the herd is also part of something bigger than steak. The herd, which is managed using Integrity Beef Alliance protocols, is an integral part of testing novel production systems and technologies that could benefit cattle, farmers and ranchers, and the environment while bettering the beef industry's ability to provide high quality, affordable beef to consumers near and far.

While a new practice might present great promise for soil health or efficiency, it must be proven valuable and practical before it can be widely adopted by producers. And the average

cattle producer doesn't have a lot of extra time or money to risk on vetting all the new ideas coming to market.

That's where the Noble Foundation herd, and its caretakers, many who raise their own herds at home, come in. In the process of making regular production decisions, they have the opportunity to ask questions they have as producers, questions that other producers have as well. Then they find answers by trying out new strategies and collecting countless data points throughout the regular production cycles: cattle weights, body condition scores, forage availability and nutritional quality, and more.

In 2016, the vast majority of the Noble Foundation herd was involved in at least one study to demonstrate

Cattle graze switchgrass at the Red River Farm.



**ABOVE:** Ronald Trett, a farm facility manager, feeds first-calf cows and their calves in a pasture of triticale and oats at the Pasture Demonstration Farm. The farm is one of seven operated by the Noble Foundation for research and demonstration.





the potential benefits and downfalls of new technologies or systems that could help solve their production challenges. There were about 15 research and demonstration projects overall, each meant to answer different questions from how to enhance the value of cull cows to best practices for improving weight gain.

#### EXTENDING THE GRAZING SEASON

Gregg Sweeten has been working with cattle in “some shape, form or fashion” most of his life. Before joining the Noble Foundation in 2007, he managed a 2,000-head stocker operation in Marshall County, Oklahoma. Now he goes home from the Noble Foundation Pasture Demonstration Farm every day to take care of his own herd at home northeast of Ardmore.

Sweeten facilitates the research of James Rogers, Ph.D., a forage agronomist. Rogers has designed several applied projects that involve cattle as part of the Forage 365 research initiative, which seeks to help producers extend their grazing season and reduce hay usage (and the costs associated with it). While other Noble Foundation researchers are looking toward the future by gaining knowledge that can be translated to improved varieties that grow better in cold or drought, Rogers is tackling the challenge right in the pasture using currently available tools.

One study, which started in the fall of 2015 and continued through 2016, looks at grazing cows on small grains, like wheat and rye, through the fall and winter (a practice commonly used with stocker cattle in the region) after the bermudagrass season ends compared to feeding hay through the winter. The same study also includes a third group that grazes small grains through the winter and a mix of forages (millet, corn, cowpeas, soybean, sunn hemp and buckwheat) planted in the same field as the small grains as a summer cover crop.

“A lot of producers are interested in



**ABOVE:** Evan Whitley, Ph.D., talks about applied agricultural systems and technology projects, including GrowSafe units, during a tour of the Noble Foundation’s Red River Farm. Agricultural researchers monitor cattle weights and water consumption using the GrowSafe technology, which was developed by a Canadian company.

extending their grazing season and reducing hay use,” Rogers said. “Through this study, we’re evaluating different methods for achieving this and, in the process, seeing how these methods affect various aspects important to a producer, including cattle performance, soil health and the economics.”

#### TRYING OUT TECHNOLOGY

As more and more technologies come into play on farms and ranches across the country, the Noble Foundation herd gets an early look at many of them. One technology the Noble Foundation tests is GrowSafe, which is an innovative monitoring system used to help cattle producers monitor and track livestock behaviors like eating and drinking. GrowSafe is

used in a couple of different places on the farms, including a pasture known as “Pasture 19” on the Red River Farm in Love County.

Since 2015, this pasture has been where heifer (female) calves born from the Noble Foundation herd are developed until they’re old enough to be bred and return to the herd.

But there’s a problem producers commonly face in this system. When they take weaned calves that have gone through a preconditioning program that includes a bunk/trough-fed ration and put them on wheat pasture through the winter, the calves tend to not gain much for the first 14 days.

Using the GrowSafe technology, each calf’s weight can be measured

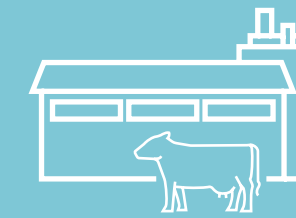
every day so that the researchers can understand more of when and why this transition occurs. Then they try different management intervention practices to see if that improves the animals’ health and performance within those first 14 days and later on.

“We let these types of production questions drive our research,” said Evan Whitley, Ph.D., an agricultural researcher. “Each project considers the various aspects relevant to a cattle producer in their environment: the cattle, the land and the economics. In this way, we have the opportunity to provide producers with science-based information that connects all the dots within a system in a way that’s truly applicable to them and can assist them in their decision-making.” ●

# RAISING AND GRAZING BEEF CATTLE

Cattle, and other ruminant animals, have the unique ability to convert grass into muscle. Because of this, land not well suited for crop production can produce animal protein for food. Cattle production is a major enterprise in the Southern Great Plains (Texas ranks first and Oklahoma fifth as top cattle-raising states), so the Noble Foundation’s research centers on forage-based beef cattle: from breeding hardier plants to grazing management systems.

**80%**  
of land managers who receive consultation from the Noble Foundation raise cattle.



Ranchers received premiums on 1,942 calves sold through the Integrity Beef Alliance,

which was started by the Noble Foundation. Participants follow protocols based on industry-recognized best management practices designed to deliver a highly desirable calf to the next segment of the industry.

**730**  
people attended 13 agricultural education events directed toward cattle production.

Topics included grazing strategies, forage systems, technology and economics.



**38** southern Oklahoma 4-H and FFA members entered **46** steers in the Noble Foundation Junior Beef Excellence program,

which recognizes young beef producers based on the carcass merit of their steers. Of the carcasses, 25 were graded as choice and 16 as select.



AMERICANS ATE ABOUT **50.1 POUNDS** OF BEEF PER PERSON IN 2016, ACCORDING TO USDA ESTIMATES.



NEARLY **60.5 MILLION** METRIC TONS OF BEEF WERE PRODUCED WORLD-WIDE IN 2016. The U.S. is the world’s top beef producer (nearly 19 percent) followed by Brazil (15 percent).



CATTLE PLAY AN IMPORTANT ROLE IN THE **SOIL HEALTH OF GRAZING LANDS.**

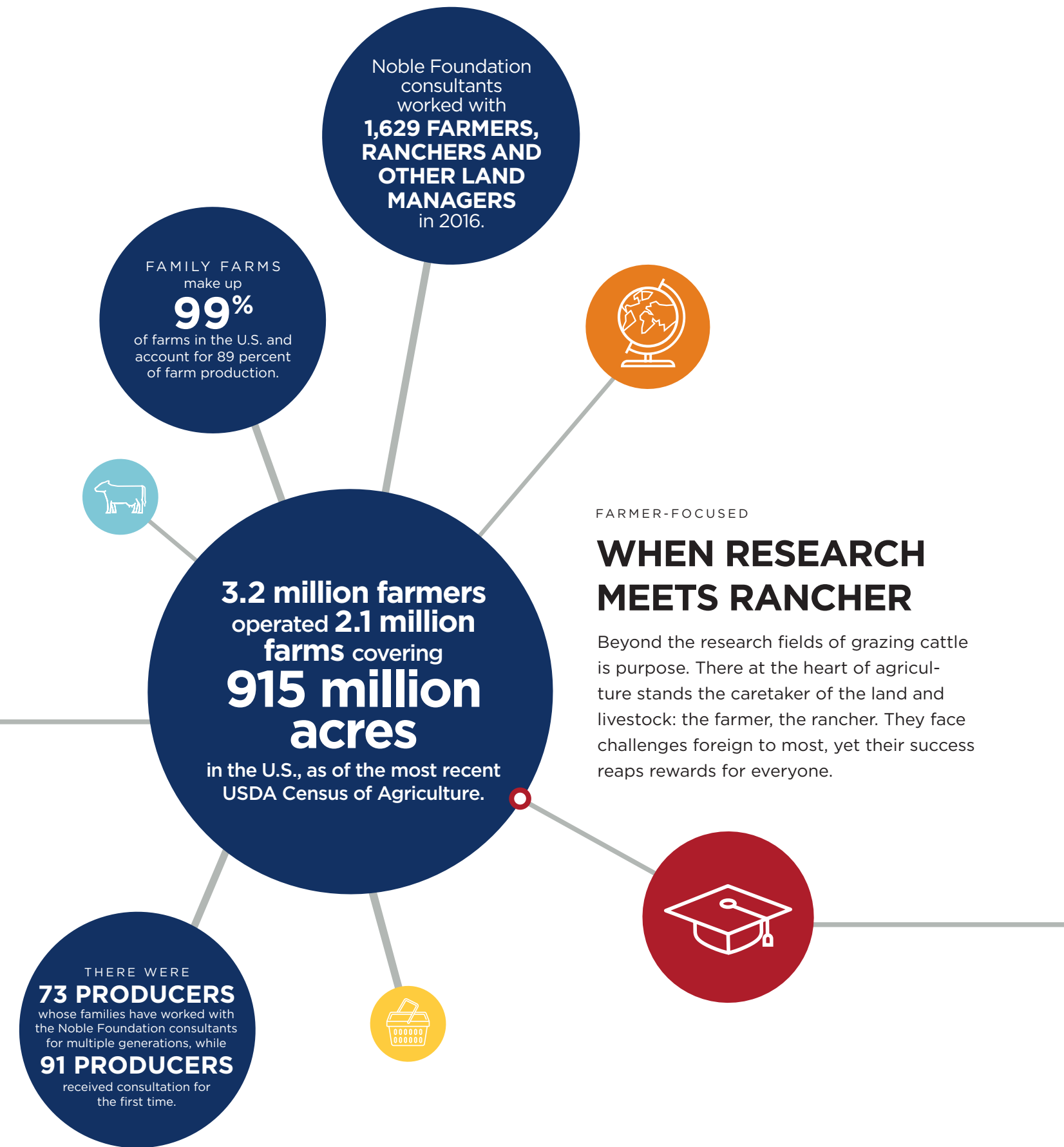
Livestock return nutrients to the soil through manure and by trampling plants. This feeds soil microbes, which, in turn, feed plants.



IN 2016, FARMERS IN 37 STATES COULD GROW HARVXTRA, A LOW-LIGNIN ALFALFA. NOBLE FOUNDATION RESEARCHERS WERE AMONG THOSE WHO DEVELOPED THE **BIOTECHNOLOGY TO REDUCE LIGNIN CONTENT,** which can increase digestibility in the livestock that eat it. Alfalfa is a popular food source for dairy cattle.



Robert Smith, a cattleman from Noble, Oklahoma, has worked with Noble Foundation consultants for 12 years.





Research reveals knowledge, the most powerful tool of all. But research at its best does not stand alone. The knowledge it generates moves minds and hands to action toward a better future. It explores ideas, builds on ingenuity and solves problems.

The true joy of research surfaces when problem-solvers and problem-facers connect, when tested ideas become reality not just in research fields but in the next field and the next. Since its beginnings, the Noble Foundation has fostered this real-world connection by working directly with farmers and ranchers to help them apply knowledge gained

from soil tests and broader research to improve their soils and agricultural production.

The key to doing this? Extending a hand of friendship.

#### MEETING THE NOBLE FOUNDATION

Retirement brought a new career for Robert Smith: a career in cattle. But Smith was no stranger to agriculture.

He had raised a few cattle here and there, first as a young boy growing up in north-central Arkansas then while working for the U.S. Postal Service in Kansas City, Missouri, and ultimately Norman, Oklahoma. After coming to the Sooner State in 1970, Smith and his wife, Joyce, bought 80 acres southeast

of Noble, Oklahoma, and he signed up as a volunteer firefighter for the community. Thirty years later, Smith retired from everything but the cows.

By then, he and Joyce had expanded the farm to 200 acres: 80 in bermudagrass and the rest in native grasses or woodland. He wasn't sure he was getting as much out of the bermudagrass as he should. So, after a conversation with a neighbor in 2004, he decided to give the Noble Foundation a call.

Within a couple of months, a trio of agricultural consultants had visited his farm for the first time. "They gave me recommendations, and it worked," said Smith, smiling. His words, quiet

and matter-of-fact, reflect over the past 12 years. "That knowledge that they've shared has been so valuable."

#### THE WORKSHOP THAT CHANGED EVERYTHING

The summer after that first visit, Smith attended a week-long grazing school hosted by the Noble Foundation. The workshop covered rotational grazing and how to calculate the amount of forage available to cattle in a particular pasture.

"That was a turning point for Robert," said Hugh Aljoe, producer relations manager and one of several consultants who has worked with Smith. "That's when he came to us

**BELOW:** Steve Howard feeds cattle on his family's ranch, Howard Cattle Company, in Ringling, Oklahoma. Howard's family has received consultation services from the Noble Foundation since 1973 when his father, Don Howard, first contacted the Noble Foundation about soil testing.



Jeff Goodwin, pasture and range consultant, shares information at the 2016 Fall Grazing Workshop.





**ABOVE:** Robert Smith received the Noble Foundation's Leonard Wyatt Memorial Outstanding Cooperator award in 2016. The award is given annually to one of the 1,600 farmers and ranchers who receive no-cost consultation from the Noble Foundation. The recognition is based on the farmer or rancher's accomplishments within their operation, their community service and their willingness to assist other producers.

saying he wanted to make his place better than it was. He was willing to do whatever it would take."

Smith was interested in rotationally grazing his 20 Charolais cows, but he wasn't sure he wanted to move them every day. So, the consultants helped him develop a plan that would work for him. Their first step was to look at his pasture resources.

Previously, as one of the consultants' first recommendations, Smith began sending soil samples off to be analyzed so that he could fertilize properly. As a result, his bermudagrass began to reach its production potential. But his native pasture also needed some help.

The consultants encouraged him to apply for an Environmental Quality Incentives Program (EQIP) grant from the U.S. Department of Agriculture Natural Resources Conservation Service. The grant helped him build a pond on the native pasture, which originally lacked a water source. It also helped him clear brush and build more fence to manage his rotational grazing system.

Now, he is able to rest his native grasses most of the summer while rotationally grazing the bermudagrass. In the winter, his cattle graze the native grasses rather than eating hay, which Smith had previously paid someone to bale from part of his bermudagrass. By doing this, he's been able to stop overgrazing and only has to feed hay less than a month per year.

**SMALL SCALE, HIGH QUALITY**

The consultants also helped Smith adjust his breeding season, and, in 2007, Smith became a founding member of the Integrity Beef Alliance. The Alliance is a producer-led organization emphasizing best management practices in a defined terminal cattle production system that includes a cattle marketing program.

It was started by the Noble Foundation to add value to producers' calves as they retain ownership at least

through the next step in the beef production chain. Though he's a small-scale producer, Smith has found value in the program.

Part of the draw of Integrity Beef for Smith is the meetings, where the consultants and other experts share the latest information on cattle care and management. For example, information on the latest regulations surrounding animal antibiotics.

Beyond the Integrity Beef meetings, Smith has attended nearly every workshop – from those on prescribed burn to managing cattle, forages and wildlife – organized by the producer relations program. In many cases, he's a repeat attendee.

"Sometimes you're attending a class and think, 'I know that. Why haven't I been using it?'" he said. As a former firefighter trainer, Smith is always interested in learning and listening for ways he could improve.

In 2011, Smith shared what he had learned on his farm with other producers during a grazing workshop the Noble Foundation hosted at his place. "That was one of the most effective workshops we've had," Aljoe said. "You don't have to be big to be impactful. You don't have to be young or old. Robert is a quiet, gentle man who does the right things for the right reasons. You do that long enough and people take notice."

In 2016, the Noble Foundation honored Smith with the Leonard Wyatt Memorial Outstanding Cooperator award. Smith had become a model of what a small-scale cattle producer can do when they manage their resources well. He had also become a friend of the Noble Foundation and its consultants.

"There's a saying, 'You're only as good as the people who surround you,'" Smith said. "They've been great people to surround me. There's been so many personnel at the Noble Foundation who have helped me and provided me advice. They've become my friends, and I couldn't thank them enough." ●

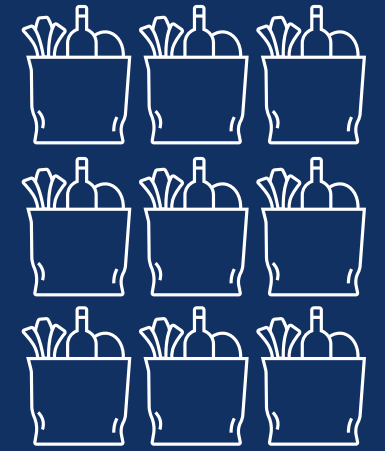
# WORKING DIRECTLY WITH FARMERS AND RANCHERS

Noble research is grounded in what will help farmers and ranchers improve productivity and land stewardship. To do this, the Noble Foundation remains in connection with real-world producers. Some of these farmers and ranchers have worked with Noble Foundation consultants for generations. They receive free advice for improving their individual operations. Others take advantage of educational resources from a distance through videos and articles. In the process, their real-world challenges and questions inform Noble Foundation researchers on what to explore next.

**2,347** farmers, ranchers and others interested in agriculture and land stewardship attended 58 educational events and tours.

**Landowning members of the Walnut Bayou Deer Management Association, through coordination by the Noble Foundation,** gave 16 youth the opportunity to hunt as part of the annual Oklahoma Department of Wildlife Conservation Private Lands Hunt program.

**22** Natural Resources Conservation Service agents from throughout the country spent a week at the Noble Foundation to learn more about how to work effectively with livestock producers. During tours and workshop classes, they visited with Noble Foundation consultants and area cattlemen.



One U.S. farmer feeds **155 people today.** Compare that to 26 in 1960.



**TAKASHI NAKAHORA, WHOSE FAMILY OPERATES A DAIRY IN JAPAN, LEARNED ABOUT PLANNED GRAZING AND LAND STEWARDSHIP** during a tour of the Noble Foundation and its farms in 2016. Nakahora visited the U.S. to see the ranch of family friends Tim and Chie Jones, Oklahoma ranchers who receive consultation services from the Noble Foundation.



**3 TONS OF SOIL** FROM DAVID ORME'S RANCH NEAR ANADARKO, OKLAHOMA, became part of soil health research conducted by Kelly Craven, Ph.D., and collaborators at the University of California, Berkeley. Orme receives no-cost consultation from the Noble Foundation producer relations program and is president of the Integrity Beef Alliance.



**THE NOBLE FOUNDATION HAS RELEASED 23 FORAGE OR DUAL-PURPOSE CULTIVARS,** including two in 2016. It takes 10 to 12 years of selection before a cultivar can be released.



**48 CATTLE PRODUCERS** made up the Integrity Beef Alliance in 2016.



Akaesha Ward, a high school student from Ardmore, Oklahoma, learns about science and agriculture through Noble Academy.





**BELOW:** Eighth-graders learn about polymers, including cellulose (polyglucose), proteins (polypeptides) and DNA (polynucleotides), while making slime at Noble Academy's Science in Ag Day.



Just as a farmer cultivates fields, a teacher plants and nurtures seeds of knowledge. The first produces food the world needs to survive. The latter yields a harvest of healthy minds, and healthy minds can do anything.

They can feed the world. Heal the world. And make sound decisions that benefit the world.

Founder Lloyd Noble once said, "The only degree to which we have reached the end of opportunity is the degree to which we have exhausted the imaginative capacity of the human mind."

That's why the Noble Foundation believes in sparking the next generation's interest in learning, helping students explore the world around them in a mindful and thought-

provoking way.

Noble Academy invests in these young minds and the teachers who help cultivate them. The future waits on the other side of today, and today the future's greatest resource - its farmers and ranchers, food buyers, decision-makers, scientists, and leaders - sits in classrooms throughout the world.

**TRAVELING LESSONS**

Noble Academy's Frank Hardin, Ph.D., and Jenn Scott navigated more miles than ever before in 2016.

Hardin often spends his days hosting a middle or high school class at the Noble Foundation, while Scott takes lessons to classrooms elsewhere, or vice versa. Their presence is well-known in local schools, but

they're traveling to the Oklahoma City and Tulsa areas and south to Dallas more often now.

Some days, they are teaching lessons that reinforce science principles while also exposing students to agriculture and its importance to society, just like Noble Academy has always done. Other days, they show teachers how they can do the same and on a budget.

Noble Academy has worked with a team of science educators to create 18 lesson plans they use and share with teachers. These lessons incorporate science, technology, engineering and math (STEM) education and meet science standards required of Oklahoma teachers. Plus, they are interactive, which, for many students, is the key to unlocking curiosity and

excitement for a subject.

Five of these lesson plans were new in 2016, and some of them were given the opportunity to reach even more students through the Science Exploration Trunk program. Noble Academy launched the program with financial support from Devon Energy Corporation, Oklahoma FFA Foundation and the Noble Foundation. Teachers can check out a trunk that provides all the materials and instructions needed for exploratory laboratories on the carbon cycle and soil's chemical properties.

"These trunks help provide another resource for our educators who are looking to engage their students in hands-on lessons, which is an essential part of learning," Hardin said. "Additionally, these lessons spark students' imaginations. Science isn't scary. It's



Jonathan Harris (center) and Amber Presley (right) celebrate successful coding at the Junior Botball Challenge.



all around us. These activities help students see the critical involvement of science in our everyday lives.”

#### OPENING DOORS

In every lesson, every interaction, Noble Academy aims to open doors to students by exposing them to new opportunities in STEM.

Nothing makes learning more exciting than a little competition. For the second year, in 2016, Noble Academy hosted the Oklahoma Envirothon, which allows high school students to demonstrate their knowledge of natural resource management. Noble Academy then sent the state winners to compete in the North American competition, which was held in Ontario, Canada.

Noble Academy also hosted its first Junior Botball Challenge day, which introduces elementary students to basic computer programming. In the months leading up to the challenge, Hardin pulled in the help of the Noble Foundation Department of Computing Services to prepare 12 local children for the event.

“I was very impressed by the students’ enthusiasm and attitude facing the challenges, finding the problems and working together for solutions,” said Yinbing Ge, a senior analyst and developer who helped train the Junior Botball students. “Botball challenge is a great opportunity to build confidence and help students seek innovative ways to overcome challenges.”

Noble Academy also opens up new opportunities for educators. In 2016, for the second time, Noble Academy hosted the science leadership group Project Newton during their annual retreat, when they discussed the future of science education in Oklahoma.

Twelve teachers from eight different states came to the Noble Foundation for the CASE Institute in Principles of Agricultural Sciences – Plant, part of a national program that provides intense training and certification in curriculum teachers then

take home to their classrooms. This was the first CASE Institute offered in Oklahoma, and the Noble Foundation plans to host a plant-science-focused institute every two years.

“Noble Academy’s staff seeks so many different avenues to teach science and agriculture,” said Micki Runyan, a Dickson High School biology teacher who has worked with Noble Academy since its beginnings in 2012 and has even presented at teacher professional development workshops. “We are blessed to work with Noble Academy. It’s a phenomenal working relationship that benefits both students and teachers.”

#### TOMORROW’S LEADERS

Agriculture, science and career possibilities are never more real-life than when students see them firsthand during a tour at the Noble Foundation.

In 2016, hundreds of students walked through the Noble Foundation’s greenhouse and explored science in one of the working laborato-

ries. Students came from as far away as Nicaragua, through Fabretto, a nonprofit that empowers underserved children through education and nutrition, and as close as Ardmore schools.

Jack Blount teaches math and science in the Ardmore Take Two Alternative program, and he brings his biology, anatomy and physiology, and environmental science students to the Noble Foundation each year.

For his anatomy and physiology students, Hardin and Scott have prepared lessons that connect with Blount’s in-class instruction. The students, including junior Akaesha Ward, don crisp, white laboratory coats to dissect sheep eyeballs; simulate the digestive process with panty hose “intestines”; and identify carbohydrates, proteins, and fats in milk. These and other lessons reinforce what they have learned in class while also exposing them to agricultural topics, like how animals with ruminant digestive systems (like cows and sheep) can turn grass to muscle unlike those with

monogastric digestive systems (like humans and pigs).

“I want to become a registered nurse like my mom, my greatest role model,” Akaesha Ward said during her class’s visit. “But just like we learned this morning, we’ve got to figure out how to make food for all the people in the world. I’ve enjoyed coming here and learning.”

That’s what Noble Academy is all about. Sparking the interest of students in science, in understanding the importance of the world’s most fundamental industry – agriculture – even if they never farm.

“These trips enhance what we do in the classroom,” Blount said. “Plus, it shows them something new. It opens their eyes to career opportunities.” Blount recalled a student from last year who, after seeing the researchers at work, said, “I think I’d like to do this someday.”

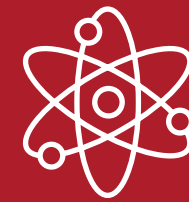
But no matter where the future leads them, these students are tomorrow’s leaders. ●

**BELOW:** Fifth-graders play interactive games on the Grown for You trailer. The mobile classroom travels around Oklahoma to provide a fun, fast and factual look at agriculture.



# CULTIVATING THE FUTURE THROUGH EDUCATION

Learning is celebrated as a lifelong process at the Noble Foundation. Research is all about gaining knowledge, and helping people apply it is a key component of consultation. Youth education at the Noble Foundation manifests in various forms, from in-class instruction to teacher training. There are hands-on activities during tours of the greenhouse and laboratories, games to play while learning about wildlife population dynamics, and competitions that reinforce lessons learned.



**Students identify macromolecules (carbohydrates, fats and proteins) in milk,**

read and interpret nutritional labels, and calculate the calorie content of food samples using nutritional labels as part of the Noble Academy “Milk’s Macromolecules” lesson.

**10,000 students in 21 Oklahoma counties**

experienced the *Grown for You* trailer, an interactive mobile classroom sponsored by Noble Academy, Oklahoma Farm Bureau, and the Oklahoma Farming and Ranching Foundation.



**Iron is an important element for both plants and humans.**

Students learn about iron and then extract it from their breakfast cereal using powerful magnets during Noble Academy’s “Nails for Breakfast” lesson.



Noble Academy lesson plans have traveled as far as

**8,344**  
miles to Field of Hope in Uganda.



**NOBLE ACADEMY’S “CSI IN A WHEAT FIELD” LESSON TEACHES STUDENTS ABOUT THE CHEMICAL PROPERTIES OF SOIL**

through a crime scene investigation scenario. Teachers can check out all the materials needed to teach this lesson through the Science Exploration Trunk program. Request a trunk at [bit.ly/science-trunk](http://bit.ly/science-trunk) or download lessons at [bit.ly/academy-lessons](http://bit.ly/academy-lessons).



**FIVE STUDENTS FROM FIVE STATES** SPENT THE SUMMER WORKING WITH RESEARCHERS

in Noble Foundation plant science laboratories as part of the Summer Research Scholars in Plant Science program.



**270 EIGHTH-GRADERS** USED MICROSCOPES TO SEE THE MICROBES THAT HELP CATTLE DIGEST GRASS DURING NOBLE ACADEMY’S SCIENCE IN AG DAY, MAY 4, 2016.



**NINE STUDENTS FROM SIX STATES** JOINED AGRICULTURAL CONSULTANTS AND RESEARCHERS

in working with farmers for the summer as part of the Lloyd Noble Scholars in Agriculture program.



Kyle Daley and Rhaylee Jones, 4, became friends through the Think Ability First community garden in Duncan, Oklahoma.





A trip to the grocery store is a mundane outing for most. Dinner on the mind, ingredient list in hand; it involves meandering up and down aisles. Finding the freshest-looking fruits and vegetables, comparing meat prices, and ogling the ice cream case.

No matter the packaging, someone somewhere spent months, years even, raising the livestock or growing the crops that become the basis of every food waiting on the shelf to become part of a meal.

Years of selection and testing went into developing the seed that was planted. Generations of animal husbandry experiences were passed down. Researchers gained knowledge of the “whys” and “hows” of agriculture, in the process figuring out ways to improve production and land stewardship. And information falls on the producers to incorporate into their decision-making.

Too often, this complex world goes unnoticed or misunderstood. Just 2 percent of eaters operate the farms and ranches that produce the basic ingredients that fill grocery carts. But, today, an increasing portion of the 98 percent want to know how their food is grown.

Therein lies an opportunity seen by the Noble Foundation to connect consumers with the process of growing food. To connect everyone with agriculture.

#### NOBLE LEARNING CENTER

When it comes to agriculture, all producers are consumers. Consumers, too, can be producers.

At the Noble Learning Center, located on the main Noble Foundation campus, people of all backgrounds can learn about agriculture, how it relates to them and ways to participate. It doesn't matter if they have access to acres of land or a concrete slab.

Construction on the Noble Learning Center began in 2015 with the raising of a 200-foot-long wooden fence just

off Highway 199, east of Ardmore. During 2016, four 50-foot-by-50-foot “backyards” took shape within the walls of the fence. Each demonstrates possibilities for growing food in a typical backyard.

One yard features a small hoop house and another a small greenhouse. Colorful strawberry and pepper plants line a walkway in a third yard all about edible landscaping. The fourth represents what can be done in an area with poor soil, including dozens of ways to use containers and raised beds. Those interested in raising their own protein could check out the rabbit hutches and chicken coops in the yards.

In front of the backyards is “The Acre,” where commodity crops like wheat, cotton, corn and rye grow. There, visitors can learn how basic principles of growing a garden translate to what farmers do in larger fields on a per-acre basis.

Making these connections is especially important now as 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 of agriculture, forestry, fishing and hunting has grown by 77.98 percent since 1997.

“The Noble Learning Center ties everything together from the producer to the consumer,” said Charles Rohla, Ph.D., who leads the project. “That’s something that hasn’t been done a lot in the past, and it’s what’s needed for agriculture to move forward.”

#### BUILDING COMMUNITY

Seventy miles northeast of the Noble Learning Center, in Duncan, Oklahoma, a group of Think Ability First leaders pondered how they could move forward to achieve two goals. First, they wanted to improve the nutrition of their clients, people with developmental disabilities. Second, they wanted to find a way to better connect with their community.



ABOVE: A pepper is one of many crops that can be grown in small spaces. The Noble Learning Center demonstrates various ways anyone can grow food.



Steve Upson, soils and crops consultant, shares his horticultural expertise with growers of all backgrounds.



BELOW: A community garden reconnects people with each other and agriculture at Think Ability First in Duncan, Oklahoma.



Their conclusion: a community garden.

They had the space. A large, empty lot lay between their main building and a store where some of their clients work. But they weren't sure how to get started. In Executive Director Robin Arter's words, they needed someone to hold their hand.

In early 2016, they called the Noble Foundation. They sought a counselor, Arter said, and so they placed a call. The answer on the other end of the line was quick: "Oh, you need Steve." Steve Upson has worked at the Noble Foundation since 1988, and the soils and crops consultant is known for his fruit and vegetable growing expertise.

A few months later, the Think Ability group traveled to Ardmore to visit Upson. Though the Noble Learning Center was in its early stages at the

time, they spent the morning talking and viewing different raised garden bed and hoop house options. After parting ways, Upson drew up plans for what their garden could look like, which Arter and her team presented to their board of directors.

By October, the garden infrastructure was in place. They'd decided on 65 raised beds, some low to the ground and others waist-high. Two small hoop houses line the back, and a small shed filled with tools sits in the corner.

There's enough room for dozens of community members to come together, grow food and grow together, which is the garden's ultimate purpose. In February 2017, more than 200 people, including Upson, came together to "break ground." Shovels in hand, they moved soil and sand into garden beds

in preparation for planting.

Four-year-old Rhaylee Jones and her mother, Sonja Jones, are community members who grow strawberries in the garden. They were pulling weeds one day when Kyle Daley, a Think Ability client who lives nearby, came over to help.

Amidst the weeds, Rhaylee and Daley bonded. Soon, Daley wanted his own garden spot. Arter arranged for his garden to be right next to Rhaylee's so their friendship would continue to grow.

"We hoped that conversations might get started with a 'How are your tomatoes?' in an aisle at Walmart and develop into people better understanding one another," Arter said. She continued, saying Daley wears a helmet and knee pads to protect himself when he experiences seizures, but Rhaylee has never acted fearful. "Hopefully she'll

grow up without preconceived notions about people who are different."

The garden has grown other community connections, including a relationship with the Duncan Farmers Market. The market will be hosted in Think Ability's parking lot, just outside the community garden, beginning in 2017. As the season progresses, the growers hope to sell some of their produce there.

The garden is also connecting people back to agriculture.

"Our society is so instant," Arter said. "We don't wait. We don't understand the process of where food comes from. We've had conversations like, 'Yes, that's lettuce. That's salad growing.' This garden is a real education in patience and cause and effect. At the same time, it's been great for our community." ●

# AGRICULTURE'S PURPOSE: FOOD FOR ALL

The need for food is one of the most basic necessities for all people. This need is why agriculture exists and why food is so central to every culture. While agriculture is the basis of every civilization, efficiencies gained mean fewer people can grow more food. In the process, many people have disconnected "food" and "agriculture." The Noble Foundation works to reconnect the two in the minds of consumers.



In 2016, the U.S. exported \$129.7 billion in agricultural goods.

Top products were soybeans and soybean products, corn, tree nuts, and beef and beef products.

There were **7.4 billion** mouths to feed worldwide in 2016. Global population is expected to reach 9.8 billion by 2050.



The U.S. exported nearly 1.2 million metric tons of beef, a value of about \$6 billion.

Japan, Mexico and South Korea are the top international consumers of American beef.



During the Earth Day Expo in downtown Ardmore, Noble Foundation employees reconnected community members with the soil

and its life-supporting abilities by helping them plant strawberries to take home.



ANYBODY CAN LEARN HOW TO GROW TOMATOES, PEPPERS, EGGPLANT, HERBS, CARROTS, LETTUCE, CAULIFLOWER, BROCCOLI AND MORE IN THEIR BACKYARD BY VISITING THE **NOBLE LEARNING CENTER.**



IN 2016, AMERICANS BOUGHT MORE THAN **25 BILLION POUNDS OF BEEF.**



NOBLE FOUNDATION VISITORS, BOTH PRODUCERS AND CONSUMERS, CAN SEE AGRICULTURAL SYSTEMS IN PRACTICE ON **14,000 ACRES** OF RESEARCH AND DEMONSTRATION FARMS AND RANCHES.

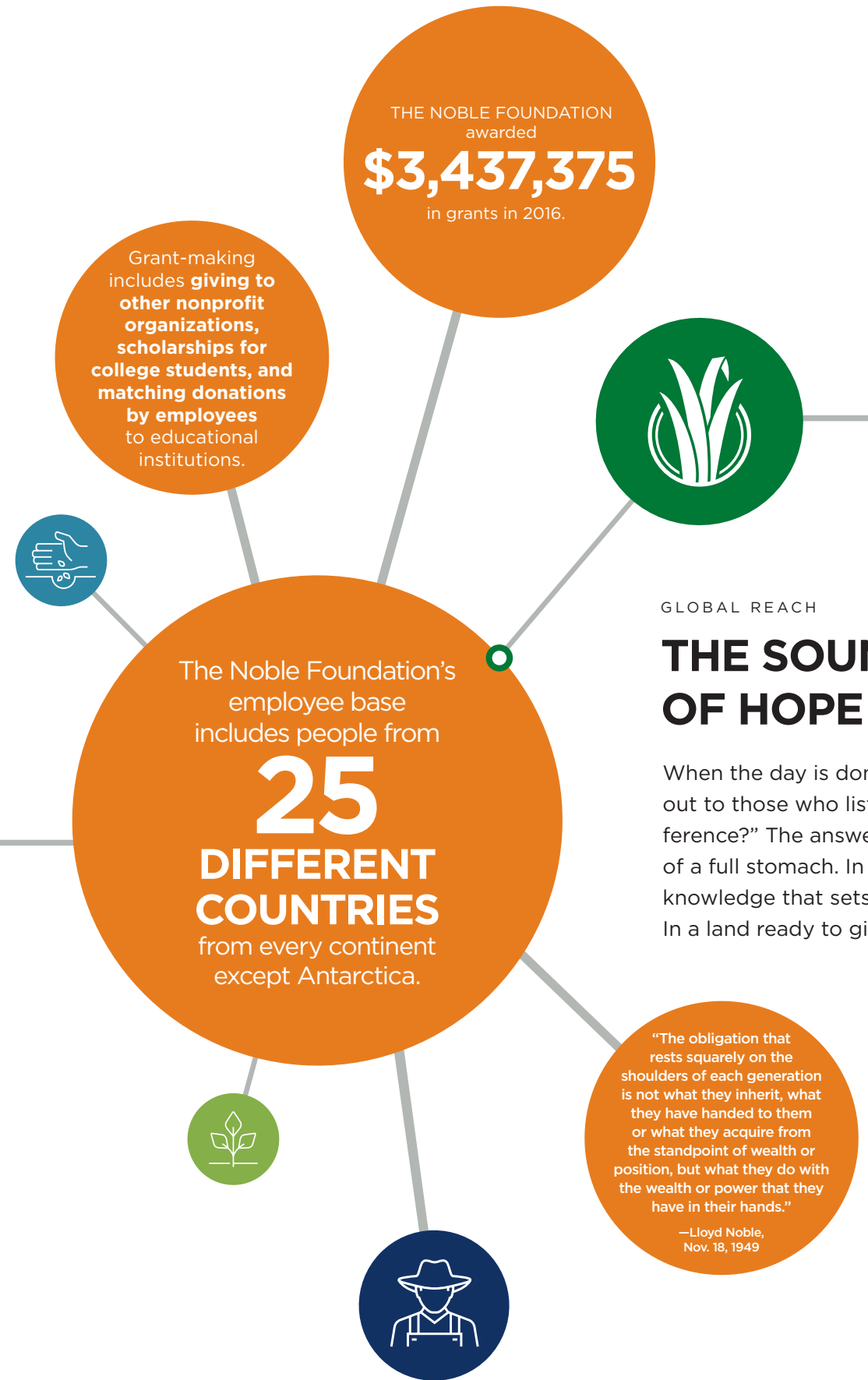


STUDENTS FIND OUT HOW AGRICULTURE CONNECTS WITH **EVERYDAY ASPECTS OF THEIR LIFE** THROUGH NOBLE ACADEMY'S PICNIC BASKET LESSON.

Take a look at [www.noble.org/thank-ag-for-picnics](http://www.noble.org/thank-ag-for-picnics).



The Johnson brothers: Joe, 6, and Jacob, 12, can hear and speak thanks, in part, to technology and Hearts for Hearing.







If soil is the foundation, then those who walk upon it must be accountable for strengthening the base.

Miles (or kilometers) are tread upon the surface of Earth. Each step different. Each individual nuanced by their own background, their own experiences. But inevitably, each one will feel the rumble of hunger.

The need for food, for agriculture, crosses all cultures, all continental divides, all beliefs. Mankind depends upon the soil, plants and animals. In turn, the soil, plants and animals depend upon mankind.

Perhaps this is why agriculture is such a global enterprise. Even at the Noble Foundation, located in a comparatively small town in southern Oklahoma, people come from every corner of the world to work. Some come from urban epicenters more

densely populated than any American metropolis. Others grew up in rural areas and on farms, whether abroad, down the road or across the country.

Though they each bring a different perspective to the table, together they strive to find solutions to great agricultural challenges. By advancing agriculture, they are ultimately benefiting mankind both here at home and throughout the world.

While benefiting mankind at the Noble Foundation begins with agriculture, it does not end there.

There are immediate needs among communities to be filled. Service opportunities. Funding opportunities.

In the generous spirit of Lloyd Noble, and the most charitable individual he knew - his father, Samuel Roberts Noble, for whom the organization is named - the Noble Foundation pro-

vides grants that cultivate good health, support education and build stronger communities, particularly in Oklahoma.

Because at the end of the day, whether it was spent in the laboratory or a greenhouse or the farm, the Noble Foundation is here to help people.

**WHEN REALITY HITS**

Jennifer Johnson will never forget the day she and her husband, John Johnson, rushed into their family doctor's office, an infant carrier in hand.

It was just days after the birth of their second child, Jacob, and tears rolled down Jennifer's face as reality began to set in. Jacob could not hear.

Jacob had failed the standard hearing test at the hospital shortly after birth in March 2005. At first, the parents had withheld their concern. But their son failed again. And again. And again.

After visiting the health department, their family doctor and an ear specialist in their hometown of Ardmore, Oklahoma, they were referred to Dr. Teresa Caraway. The auditory verbal therapist took the Johnsons under her wing, the family said.

Caraway told the family they had two options. They could work with her and others, including Dr. Jace Wolfe, and Jacob would be able to hear, talk and attend school in a traditional setting. Or, they could all learn sign language, and Jacob could go to the Oklahoma School for the Deaf.

The Johnsons didn't think long. "We said, 'Well, of course, we want our baby to hear,'" Jennifer recalled.

Jacob was diagnosed as "profoundly deaf" at 10 days of age. He couldn't hear anything but the equivalent of a jackhammer or jet plane engine run-



**ABOVE:** Team Noble cheers on cancer survivors at the 2016 Carter County Relay for Life. In 2016, Noble Foundation employee volunteers contributed 2,672 hours of community service valued at \$58,784, based on Independent Sector estimates.



Frank Maulana, Ph.D., identifies wheat plants with potential as parents for drought-tolerant lines.



ning right next to his ear. For the next six months, he would need to wear hearing aids. Then he could be eligible for a cochlear implant.

Keeping those hearing aids in Jacob's ears became Jennifer's daily battle, she said. He might pull them out 200 times a day, but she would put them right back. If she didn't, the auditory channel to his brain might have closed. The implants would have been useless.

Every few weeks, the Johnsons went back to see the doctors. "We would ask, 'Are you sure he's going to be able to hear and speak?' and they'd reassure us, tell us it'd be OK," John said. "And it was."

Jacob had his first cochlear implant surgery six days after his first birthday. The second was installed 10 months later.

In 2007, when Jacob was a toddler, his doctors, including Caraway and Wolfe, became affiliated with Hearts for Hearing. The nonprofit had been established in 2003 to provide hearing aids to Oklahoma babies born deaf or hard of hearing and to teach those children to listen and talk. In 2007, they expanded their mission to serve both children and adults.

"We had developed such an emotional connection with Jacob's doctors," Jennifer said. "We've been with Hearts for Hearing ever since, and they've been wonderful."

In 2011, Jacob's brother, Joe, was born, and the Johnsons faced familiar news: their newborn son had failed his hearing tests. This time, they knew to go straight to Hearts for Hearing.

#### EXPANDING HEARTS

Hearts for Hearing's services don't end with hearing aid fittings or cochlear implant programming. Audiologists and speech pathologists work with the children from an early age so they learn to listen and talk, not just read lips, and they teach parents what to look for at home.

Early on, the Johnsons visited the



**ABOVE:** Noble Foundation grants help other nonprofits such as Hearts for Hearing serve people, including brothers Joe Johnson (left) and Jacob Johnson. In 2016, the Noble Foundation awarded \$3,437,375 in grants and scholarships.

doctors and therapists every other week. Now, they go about every three months for Joe, now 6, who has worn hearing aids since he was a month old, and every six months for Jacob, now 12. The brothers have used a variety of Hearts for Hearing's services including speech therapy. While Jacob has now graduated from speech therapy, he is frequently called upon to participate in Hearts for Hearing studies to test new technology developed but not yet released.

In late 2015, the Noble Foundation gave \$25,000 to Hearts for Hearing to support the \$10 million Give Hope capital campaign and endowment to construct a new facility under one roof.

This new facility opened in November 2016.

Previously, Hearts for Hearing operated in five locations. The new

building allows the nonprofit to serve 500 to 1,000 new patients like Jacob and Joe. Already, they've seen an influx of families seeking services.

"This was only possible because of the support of those who gave generously and sacrificially to ensure that babies and children with hearing loss across Oklahoma have the chance to learn to listen and talk," said Joanna T. Smith, CEO and co-founder of Hearts for Hearing. "We are incredibly thankful to The Samuel Roberts Noble Foundation for their support to help us meet our mission."

The new facility includes a training room, four additional audiology booths equipped for remote therapy, and a research laboratory space.

"Hearts for Hearing does phenomenal work in the lives of Oklahomans with hearing loss," said Mary Kate Wilson, director of philanthropy, en-

gagement and project management. "They give hope to families, and they see that hope come to fruition by closely working with those families. The Noble Foundation Board of Trustees is pleased to give to such a worthy cause."

Today, Jacob can hear even better with the cochlear implants than those with normal hearing, Jennifer said. He and Joe are both in the gifted and talented classes at their public schools. Joe is a kindergartener reading at a third-grade level. Jacob makes A's and plays trumpet alongside older sister, Jessica, (a saxophone player) in the Ardmore Middle School band. Neither has any kind of speech impediment.

"It's not just because of the cochlear implant or the hearing aids," John said. "It's because of what Hearts for Hearing does for these kids." ●

# GIVING BACK AND REACHING ACROSS THE WORLD

Giving back and collaborating on the global level is part of the Noble Foundation's DNA. Lloyd Noble began this organization for the benefit of the land, starting in his home community of southern Oklahoma. Now, 71 years later, the network he set up has stretched across the globe. His family continues to give to nonprofits in their communities, from Oklahoma to Georgia. And the 400 employees from 25 countries come together to make discoveries and develop collaborations that will benefit the whole world – both its land and its people.



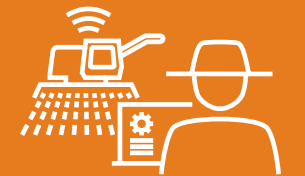
The Soil Health Institute was launched on **World Soil Day 2015: Dec. 5.**

The Noble Foundation and Farm Foundation NFP, along with thought leaders from around the country, helped launch the Soil Health Institute.

In 2016, the Noble Foundation provided the Soil Health Institute with \$2 million in operating support.

The Noble Foundation helps refocus attention on soil. Globally, about 40 percent of the soil used for agriculture is classified as degraded or seriously degraded. At current degradation rates, the world has about

**60 years of topsoil left.**



Vuyisile Phehane, Ph.D., the commercialization manager at the Agricultural Research Council in South Africa, visited the Noble Foundation as an Eisenhower Fellow in 2016.

His interests included advancing links between the U.S. and South African agricultural and biotechnology sectors.



GLOBAL CATTLE PRODUCTION TOTALED ABOUT **988.6 MILLION HEAD IN 2016.** THE U.S. RANKS FOURTH IN TERMS OF CATTLE POPULATION BUT FIRST IN TERMS OF PRODUCTION.



**THREE OKLAHOMA STATE UNIVERSITY INTERNATIONAL AGRICULTURE MASTER'S STUDENTS BECAME CROP AND LIVESTOCK MANAGERS IN UGANDA FOR A FEW MONTHS.** The 2016 Noble-Watoto Scholars assisted with agricultural development projects at Watoto Child Care Ministries. Read about their adventures at [www.noble.org/a-noble-journey](http://www.noble.org/a-noble-journey).



**24 STUDENTS FROM NICARAGUA VISITED THE NOBLE FOUNDATION IN AUGUST 2016 AS PART OF A TOUR OF THE U.S. WITH FABRETTO,** a nonprofit that empowers underserved children and their families in Nicaragua through education. They learned about specialty agriculture, including hoop house production, and soils during an interactive tour.



Community members enjoyed presentations on animal conservation, microbes and their potential in agriculture and medicine, and Ron Carnegie as "George Washington" as part of the **PROFILES AND PERSPECTIVES COMMUNITY ENRICHMENT SERIES IN 2016.**



Science Serving Agriculture

Bill Buckner, president and CEO, presents the organization's future.

CONNECTING TO 2017

## BECOMING THE NOBLE RESEARCH INSTITUTE

An annual report is a snapshot in time – a single year of memories and accomplishments collected for posterity.

The preceding pages chronicle a sampling of the countless moments from 2016 and demonstrate the Noble Foundation's vital role within agriculture.

Each day taught invaluable lessons. Each day will be cherished. And each day has now become a part of a storied legacy.

However, since crossing the threshold of 2017, the Noble Foundation has undergone a historic transition. So breaking with annual report tradition, these pages connect the past to the present and offer a glimpse into the organization's future.

During the spring of 2017, the Noble Board of Trustees officially separated the activities of The Samuel Roberts Noble Foundation.

The organization's research, education, demonstration and consultation activities remained with the existing entity but continued forward with a new name: Noble Research Institute, LLC.

The philanthropic activities, including grant-making and scholarship programs, were placed in a new, private foundation

that carries the original name, The Samuel Roberts Noble Foundation.

Each organization has unique functions – traditional philanthropic giving compared to extensive agricultural operations.

As a single entity, the organization served many audiences with diverse interests. By separating the activities into two unique entities, each organization can now build its respective name around its specific operations and build new relationships that were otherwise unavailable.

This transition has generated numerous questions. The answers to many of them can be found by visiting [www.noble.org/faq](http://www.noble.org/faq).

Most importantly, the Noble Research Institute remains devoted to fulfilling the vision of founder Lloyd Noble and will continue to support agriculture through research, education, demonstration and consultation.

This ongoing dedication to agriculture is evidenced by the Institute's new mission statement: to deliver solutions to great agricultural challenges.

That is a noble endeavor for this year and all the years to come.



# 2016 GRANTING REPORT

| ORGANIZATION   | GRANT AMOUNT |
|--|--------------|
| A Chance To Change Foundation, Oklahoma City, Oklahoma<br><i>Support for the A Chance to SUCCEED and Addiction Education Series</i>  | \$25,000     |
| Arbuckle Life Solutions Inc., Ardmore, Oklahoma<br><i>Renewed operating support</i>  | \$30,000     |
| Ardmore Main Street Authority, Ardmore, Oklahoma<br><i>Depot Park capital campaign</i>   | \$150,000    |
| Association of Professional Oklahoma Educators Foundation, Noble, Oklahoma<br><i>Renewed operating support</i>   | \$20,000     |
| Atlanta Union Mission Corporation, Atlanta, Georgia<br><i>Support for the men's and women's programs</i>   | \$20,000     |
| Board of County Commissioners of Love County, Marietta, Oklahoma<br><i>Fair barn insulation and painting</i>   | \$35,000     |
| Boy Scouts of America, Arbuckle Area Council, Ardmore, Oklahoma<br><i>Tornado/hail damage relief</i>   | \$7,500      |
| Carter County CASA Inc., Ardmore, Oklahoma<br><i>Renewed operating support</i>   | \$10,000     |
| Center of Family Love, Okarche, Oklahoma<br><i>Mobile accessibility project</i>  | \$25,000     |
| Charles B. Goddard Center for Visual and Performing Arts Inc., Ardmore, Oklahoma<br><i>Renewed operating support, art education outreach program and art studio scholarships</i> | \$35,000     |
| Cities In Schools Inc., Ardmore, Oklahoma<br><i>2017 Summer Day Camp</i>   | \$35,000     |
| Colonial Williamsburg Foundation, Williamsburg, Virginia<br><i>2016 Oklahoma Teacher Institute</i>   | \$12,000     |
| Criner Hills Fire Department, Overbrook, Oklahoma<br><i>Training room renovation</i>   | \$10,000     |



Team Noble lends a hand at the Food and Resource Center of South Central Oklahoma.



## 2016 GRANTING REPORT

| ORGANIZATION   | GRANT AMOUNT      |
|--|-------------------|
| Diabetes Solutions of Oklahoma Inc., Oklahoma City, Oklahoma<br><i>Support for Camp Endres</i>   | \$7,500           |
| Education and Employment Ministry Inc., Oklahoma City, Oklahoma<br><i>Renewed operating support</i>  | \$20,000          |
| Family Shelter of Southern Oklahoma for Victims of Domestic Violence, Ardmore, Oklahoma<br><i>Shelter program and advocate support</i>                           | \$50,000          |
| Food and Resource Center of South Central Oklahoma Inc, Ardmore, Oklahoma<br><i>Operating support</i>  | \$25,000          |
| Gloria Ainsworth Child Care and Learning Center Inc., Ardmore, Oklahoma<br><i>Renewed operating support</i>  | \$40,000          |
| Good Shepherd Community Clinic Inc., Ardmore, Oklahoma<br><i>Renewed operating support/Pharmacy program support</i>  | \$75,000/\$50,000 |
| Grace Center of Southern Oklahoma Inc., Ardmore, Oklahoma<br><i>Operating support</i>  | \$10,000          |
| Great Expectations Foundation, Tahlequah, Oklahoma<br><i>Renewed operating support</i>   | \$15,000          |
| The MORE Foundation, Ardmore, Oklahoma<br><i>Distribution from the Pettitt Educational Fund</i>  | \$65,037          |
| Mr. Tom's Heart Inc., Atlanta, Georgia<br><i>Operating support and website development</i>   | \$5,000           |
| Murray State College Foundation Inc., Tishomingo, Oklahoma<br><i>2016-2017 agriculture scholarships</i>  | \$5,000           |
| Oklahoma Arts Institute, Oklahoma City, Oklahoma<br><i>Support for Summer Arts Institute</i>   | \$10,000          |
| Oklahoma School of Science and Mathematics Foundation, Oklahoma City, Oklahoma<br><i>Faculty retention bridge stipend program</i>                                | \$35,000          |
| Oklahoma State University Foundation, Stillwater, Oklahoma<br><i>Support for the Oklahoma Agricultural Leadership Program/2016-2017 agriculture scholarships</i> | \$20,000/\$10,000 |
| Panhandle State Foundation, Goodwell, Oklahoma<br><i>2016-2017 agriculture scholarships</i>  | \$8,000           |
| Philanthropy Roundtable, Washington, D.C.<br><i>Renewed operating support</i>  | \$10,000          |



## 2016 GRANTING REPORT

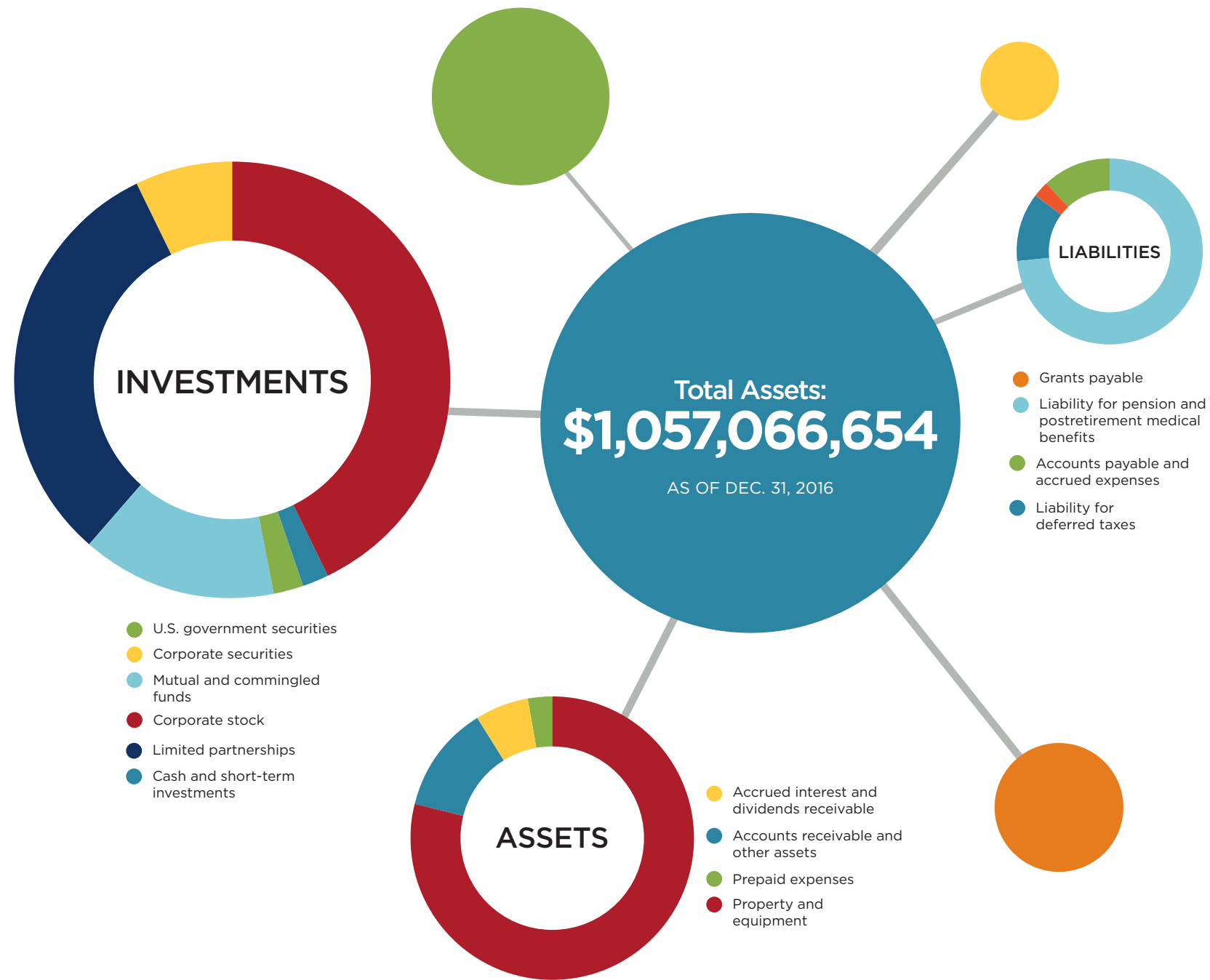
| ORGANIZATION   | GRANT AMOUNT |
|--|--------------|
| Soil Health Institute, Morrisville, North Carolina<br><i>Operating support</i>   | \$2,000,000  |
| Southern Oklahoma Technology Center, Ardmore, Oklahoma<br><i>2016-2017 scholarships</i>  | \$4,600      |
| Special Olympics Oklahoma Inc., Tulsa, Oklahoma<br><i>Operating support</i>  | \$5,000      |
| United Way of South Central Oklahoma Inc., Ardmore, Oklahoma<br><i>Match for employees' contribution 2017</i>  | \$26,985     |
| Young Men's Christian Association (YMCA) of Ardmore, Oklahoma, Ardmore, Oklahoma<br><i>Operating support</i>   | \$30,000     |
| <b>EMPLOYEE MATCHING GRANTS AND SCHOLARSHIPS</b>   |              |
| Employee Matching Grants<br><i>Matches, dollar for dollar, contributions made by employees and trustees of the Noble Foundation and employees of Noble Energy Inc. and Noble Corporation to qualifying educational institutions.</i> | \$194,503    |
| Noble Educational Fund Scholarships<br><i>Provides a maximum of 10 \$20,000 four-year awards to children of employees of Noble companies.</i>  | \$175,000    |
| Sam Noble Scholarships<br><i>Provides scholarships in the fields of agriculture and technology to southern Oklahoma students.</i>  | \$126,250    |

**TOTAL GRANTS AWARDED AND PAID IN 2016:**

**\$3,437,375**



# 2016 AT A GLANCE FINANCIAL REPORT



A bluebird helps control insects near the organic research block.



# STATEMENTS OF FINANCIAL POSITION

| ASSETS                                    | Dec. 31, 2016          | Dec. 31, 2015          |
|---|------------------------|------------------------|
| Cash                                      | \$130,927              | \$94,729               |
| Short-term investments                    | 19,224,977             | 21,665,978             |
| Accrued interest and dividends receivable | 1,040,890              | 1,008,219              |
| Due from brokers for securities sold      | 91,489                 | 1,898,911              |
| Accounts receivable and other assets      | 1,935,713              | 1,555,465              |
| Prepaid expenses                          | 812,741                | 700,172                |
| Limited partnerships                      | 289,705,353            | 236,226,004            |
| U.S. government securities                | 20,640,589             | 17,883,994             |
| Corporate securities                      | 65,007,317             | 69,625,302             |
| Corporate stock                           | 394,102,875            | 399,445,082            |
| Mutual and commingled funds               | 133,061,987            | 181,674,203            |
| <b>TOTAL MARKETABLE SECURITIES</b>        | <b>612,812,768</b>     | <b>668,628,581</b>     |
| Other investments                         | 388,557                | 388,557                |
| Property and equipment                    | 220,835,876            | 203,306,813            |
| Accumulated depreciation                  | (89,912,637)           | (81,877,945)           |
| <b>NET PROPERTY AND EQUIPMENT</b>         | <b>130,923,239</b>     | <b>121,428,868</b>     |
| <b>TOTAL ASSETS</b>                       | <b>\$1,057,066,654</b> | <b>\$1,053,595,484</b> |



| LIABILITIES   | Dec. 31, 2016          | Dec. 31, 2015          |
|---|------------------------|------------------------|
| Accounts payable and accrued expenses                     | \$4,074,226            | \$5,698,355            |
| Due to brokers for securities purchased                   | 398,312                | 1,115,418              |
| Grants payable  | 519,375                | 580,625                |
| Liability for deferred taxes                              | 4,250,000              | 3,250,000              |
| Liability for pension and postretirement medical benefits | 25,339,429             | 23,421,332             |
| <b>TOTAL LIABILITIES</b>                                  | <b>\$34,581,342</b>    | <b>\$34,065,730</b>    |
| NET ASSETS  |                        |                        |
| Unrestricted  | \$1,019,903,191        | \$1,017,170,705        |
| Permanently restricted                                    | 2,582,121              | 2,359,049              |
| <b>TOTAL NET ASSETS</b>                                   | <b>\$1,022,485,312</b> | <b>\$1,019,529,754</b> |
| <b>TOTAL LIABILITIES AND NET ASSETS</b>                   | <b>\$1,057,066,654</b> | <b>\$1,053,595,484</b> |

2016 ASSETS:  
**\$1,057,066,654**

2015 Assets: \$1,053,595,484

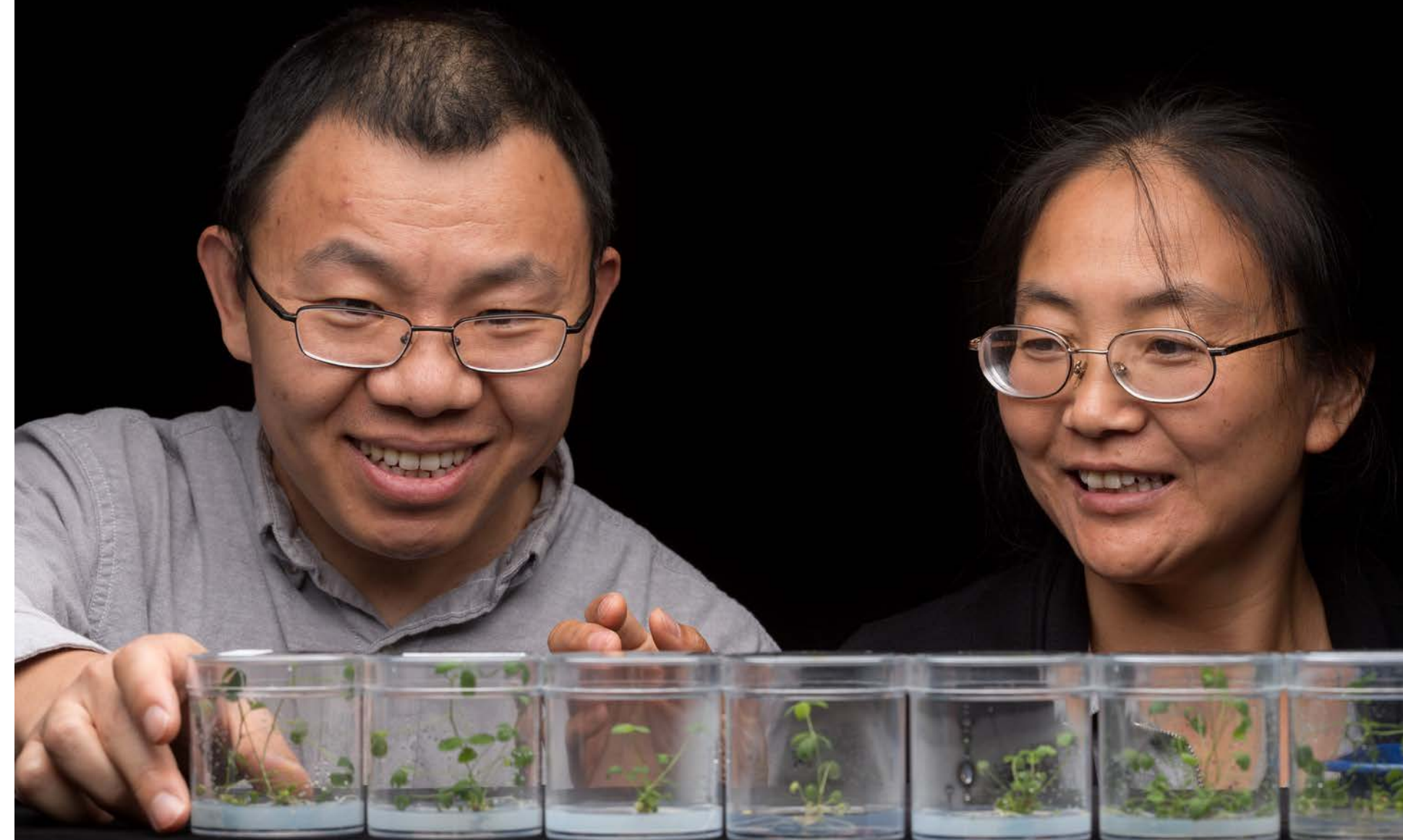
This information was derived from the Noble Foundation's annual financial statements for 2016, which were audited by the independent accounting firm of Grant Thornton LLP. A complete picture of the Noble Foundation's financial position and results of operations can only be obtained by reviewing the annual financial statements in their entirety. Please contact the Noble Foundation if you would like a copy of the complete financial statements.



# STATEMENTS OF ACTIVITIES

| ACTIVITIES   | Year Ended Dec. 31, 2016 | Year Ended Dec. 31, 2015 |
|--|--------------------------|--------------------------|
| Interest   | \$3,389,883              | \$3,329,224              |
| Dividends  | 8,011,939                | 10,605,825               |
| Net realized and unrealized gains (losses) on investments                        | 50,034,950               | (66,360,043)             |
| Other miscellaneous program and royalty income                                   | 8,325,172                | 10,186,640               |
| <b>TOTAL REVENUES, GAINS AND LOSSES</b>  | <b>69,761,944</b>        | <b>(42,238,354)</b>      |
| Operations (Agriculture, Plant Biology and Forage Improvement)                   | 53,369,938               | 47,191,583               |
| Grants   | 3,376,125                | 1,567,793                |
| Management and administrative  | 7,829,006                | 11,654,249               |
| Provision for federal excise taxes   | 777,405                  | (777,036)                |
| <b>TOTAL EXPENSES</b>  | <b>65,352,474</b>        | <b>59,636,589</b>        |
| <b>REVENUES, GAINS AND LOSSES IN EXCESS OF (LESS THAN) EXPENSES</b>              | <b>4,409,470</b>         | <b>(101,874,943)</b>     |
| Pension and postretirement medical-related changes other than net periodic costs | (1,676,984)              | 8,379,601                |
| <b>CHANGE IN UNRESTRICTED NET ASSETS</b>   | <b>2,732,486</b>         | <b>(93,495,342)</b>      |
| <b>CHANGE IN PERMANENTLY RESTRICTED NET ASSETS</b>                               | <b>223,072</b>           | <b>(111,068)</b>         |
| <b>CHANGE IN NET ASSETS</b>  | <b>2,955,558</b>         | <b>(93,606,410)</b>      |
| <b>TOTAL NET ASSETS, BEGINNING OF YEAR</b>                                       | <b>\$1,019,529,754</b>   | <b>\$1,113,136,164</b>   |
| <b>TOTAL NET ASSETS, END OF YEAR</b>   | <b>\$1,022,485,312</b>   | <b>\$1,019,529,754</b>   |

Maofeng Chai, Ph.D., (left) and Qingzhen Jiang, Ph.D., study plants grown in controlled environments.







# INSTITUTIONAL GOVERNANCE

The Noble Foundation Board of Trustees endeavors to have the highest standards of corporate governance practice and ethical conduct by all trustees and employees. Consistent with these intentions, the Board adopted the following Statement of Principles:

We, the Board of Trustees and the employees of The Samuel Roberts Noble Foundation, acknowledge and agree that the following principles apply to our association with the Noble Foundation and the activities we conduct on behalf of the Noble Foundation:

1. The Noble Foundation exists because of the vision and generosity of our founder, Lloyd Noble.
2. We are stewards of the resources and the vision of Lloyd Noble.
3. Our conduct will be fair and honest, and our activities will adhere to the purposes for which the Noble Foundation was established.

## ROLE OF THE BOARD OF TRUSTEES

The Board charts the strategic direction of the institution, focuses the organization to carry out its charitable purposes, serves as stewards of the Noble Foundation's resources, and conducts and supports activities in accordance with the vision of Lloyd Noble.

The Board is responsible for the appointment and evaluation of the president and chief executive officer. The president and chief executive officer is responsible for the conduct of the day-to-day affairs of the organization. Moreover, this position is charged with implementing and executing operations to support the Board's strategy.

## BOARD COMMITTEES

The Board includes five committees: executive, audit, compensation, investment and strategic planning.

## INDEPENDENT PROFESSIONAL ADVICE

The Board, each Board committee and each trustee has the right to seek independent legal counsel and other professional advice at the Noble Foundation's expense, concerning any aspect of the organization's operations or undertakings.

## BOARD EVALUATION

Each year, the Board completes a Board evaluation, and each Board committee completes a committee evaluation. The results of all evaluations are compiled and presented to the full Board for review and discussion.

## BOARD EDUCATION

The Board encourages each trustee to continue his or her education. The Noble Foundation hosts seminars, programs and other events to assist in continuing trustee education. Each trustee also is encouraged to attend external educational programs that concern exempt organizations, corporate governance, grant-making and administration, as well as other programs relevant to the Noble Foundation's operations and research objectives.

## CONFLICT OF INTEREST

The Board's conflict of interest policy outlines a procedure to disclose, identify and address the potential intersection between external interests and the interests of the institution. The Board, in adopting such policy, acknowledges and agrees that each trustee must at all times act with transparency and in the best interest of the Noble Foundation.

## "WHISTLEBLOWER" POLICY

The Board established a system for the confidential, anonymous submission of employee reports concerning any known or suspected violation of statutory, regulatory or internal requirements as well as questions or concerns regarding Foundation accounting, internal accounting controls or audit matters. This system further includes processes for the receipt, treatment and reporting (to the Board) of any such reports.

## 990-PF INFORMATIONAL RETURN

The Noble Foundation annually files a 990-PF informational return with the Internal Revenue Service. The Noble Foundation's current 990-PF may be downloaded at [www.noble.org/about/governance](http://www.noble.org/about/governance). Historical returns for the Noble Foundation are available at [www.guidestar.org](http://www.guidestar.org).

## ADDITIONAL GOVERNANCE INFORMATION

Noble Foundation governance information, including policies and procedures, may be found at [www.noble.org/about/governance](http://www.noble.org/about/governance).

Close-up of a leaf from a pecan tree, which Noble Foundation researchers study.



# BOARD OF TRUSTEES

D. Randolph Brown Jr., M.D.  
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Dallas, Texas

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Sugar Land, Texas

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Oklahoma City, Oklahoma

Patrick Rooney\*  
Tulsa, Oklahoma

Jack Waldo\*  
Little Rock, Arkansas

Stephen F. Young  
Oklahoma City, Oklahoma

*\*Advisory Trustee*

**BELOW:** Switchgrass is part of the grazing system at Red River Farm. The native grass can fill the forage gap between winter and summer pasture.



Cattle graze wheat and rye at the Pasture Demonstration Farm.



# LEADERSHIP TEAM

**Bill Buckner**  
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**Elizabeth Aldridge**  
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**Zengyu Wang, Ph.D.**  
Senior Vice President and Director, Forage Improvement Division

**Mary Kate Wilson**  
Director of Philanthropy, Engagement and Project Management

# NONRESIDENT FELLOWS

The Nonresident Fellows program brings together a distinguished panel of scientists, researchers and industry leaders to assist the Noble Foundation's three operating divisions – Agricultural, Forage Improvement and Plant Biology – and the Department of Computing Services. These outside reviewers perform candid examinations of their division's programs, offer objective advice and guidance, and provide fresh perspectives.

**AGRICULTURAL DIVISION**  
**John Butler**  
Beef Marketing Group (BMG)

**Jimmy W. Kinder**  
Kinder Farms

**Chip Ramsey**  
Rex Ranch

**Tom Woodward, Ph.D.**  
Woodward Cattle Company

**COMPUTING SERVICES**  
**Henry Neeman, Ph.D.**  
University of Oklahoma

**FORAGE IMPROVEMENT DIVISION**  
**Shawn Kaeppler, Ph.D.**  
University of Wisconsin-Madison

**Kendall R. Lamkey, Ph.D.**  
Iowa State University

**Lynn Sollenberger, Ph.D.**  
University of Florida

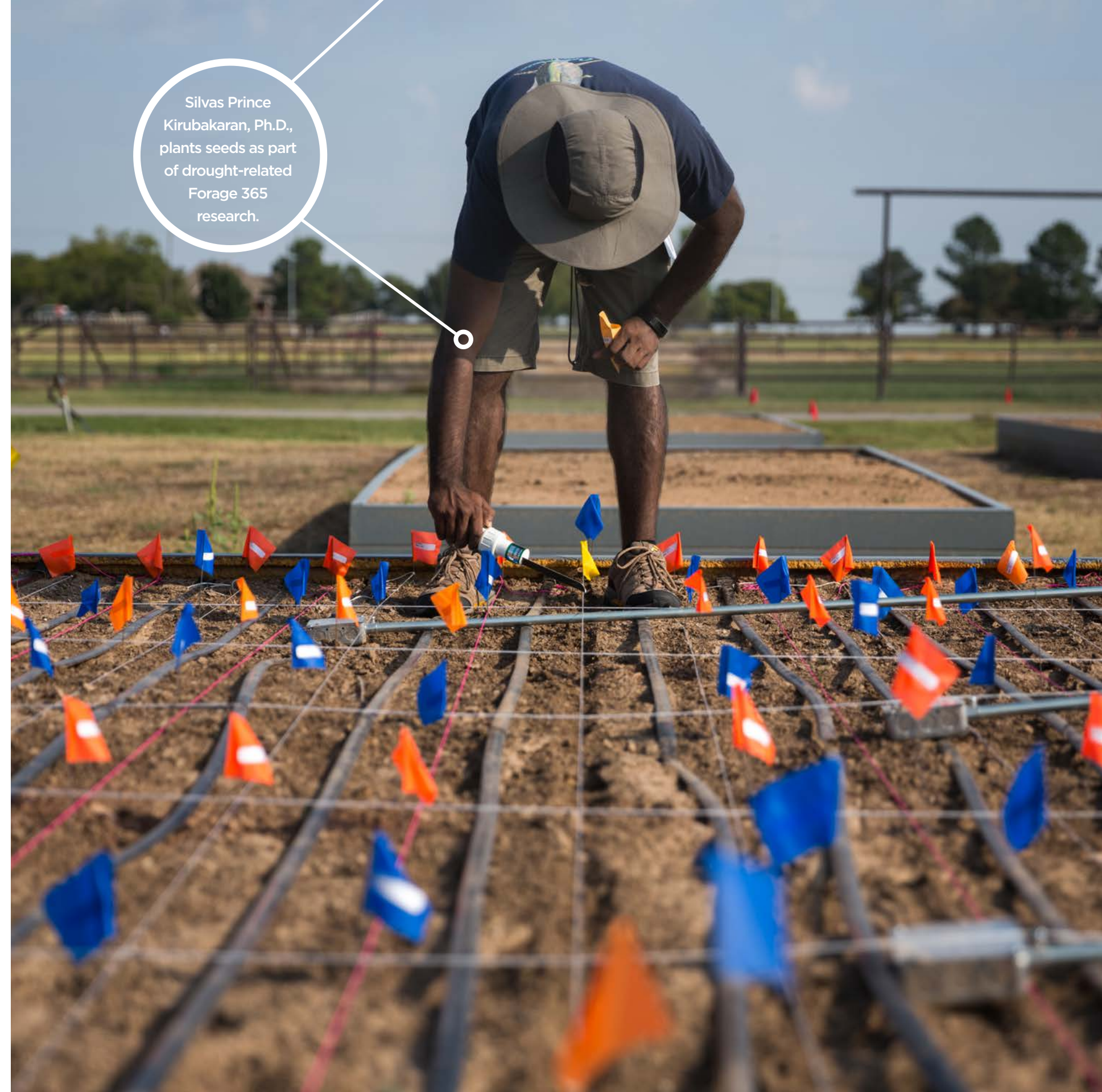
**PLANT BIOLOGY DIVISION**  
**Sarah Hake, Ph.D.**  
University of California-Berkeley

**Jonathan Lynch, Ph.D.**  
Penn State University

**Gary Stacey, Ph.D.**  
University of Missouri

**Barbara Valent, Ph.D.**  
Kansas State University

Silvas Prince Kirubakaran, Ph.D., plants seeds as part of drought-related Forage 365 research.



# CONNECT

Noble Research Institute, LLC  
2510 Sam Noble Parkway  
Ardmore, OK 73401

P. 580-223-5810



[noble.org](http://noble.org)



[facebook.com/nobleresearchinstitute](https://facebook.com/nobleresearchinstitute)



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[instagram.com/nobleresearchinstitute](https://instagram.com/nobleresearchinstitute)



[linkedin.com/company/nobleresearchinstitute](https://linkedin.com/company/nobleresearchinstitute)

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Sarah Richardson, Financial Report

Mary Kate Wilson, Granting Report



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