

SPRING 2019

A PUBLICATION OF THE NOBLE RESEARCH INSTITUTE

# LEGACY



## In the Wake of Leadership

After 18 years of service, Steve Rhines takes the helm of the Noble Research Institute ready to steer the organization into the next generation.

2019 SEASON

The Profiles and Perspectives Community Enrichment Series  
**PROUDLY PRESENTS ITS 2019 SEASON.**

Join us this year to hear from these world-class speakers.



7 P.M. | AUGUST 29

When  
**Life Blows Up,  
Build a Tribe**

**Shilo Harris**

Staff Sergeant Shilo Harris' Humvee hit an IED while on patrol in Iraq in February of 2007. In that blast he lost his ears, part of his nose, some fingers and more than a third of the skin on his body. He also lost three of his best friends. What followed was an agonizing road to recovery, which began with nearly two months in a medically induced coma. Harris shares his inspiring story in his memoir, *Steel Will: My Journey Through Hell to Become the Man I Was Meant to Be*.

7 P.M. | NOVEMBER 5

**Mending Broken Linkages:  
Soil, Plants, Herbivores and Humans**

**Fred Provenza, Ph.D.**

While the flavors of produce, meat and dairy have become blander, processed foods have become more desirable as people learned to link synthetic flavors with feedback from processed foods that obscure nutritional sameness and diminish health. The roles plants and animals once played in nutrition have been usurped by processed foods that are fortified and enriched in ways that adversely affect appetitive states and food preferences. Provenza shares how to grow and combine wholesome foods into meals that nourish and satiate for the health of people and the planet.

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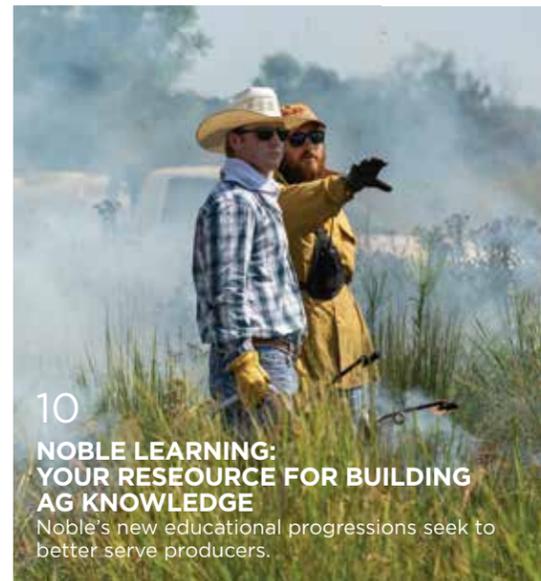
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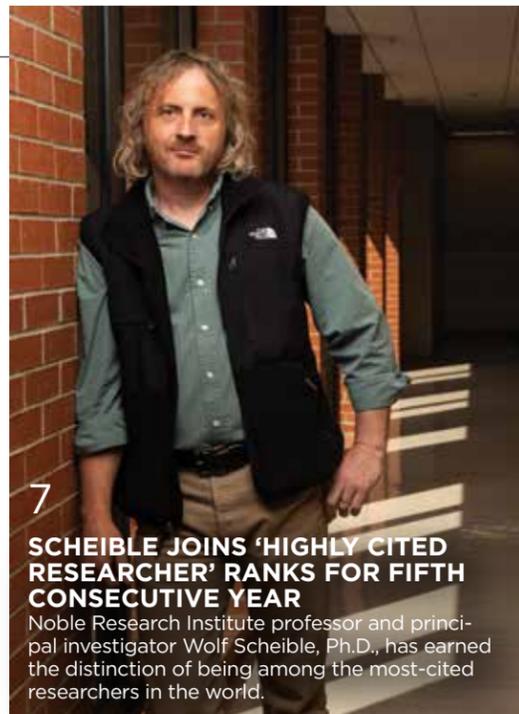


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# LEGACY

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## TO OUR READERS: HI. I'M THE NEW GUY.

Almost 20 years ago, I arrived at the Noble Research Institute as its intellectual property counsel.

During one early conversation with former principal investigator Greg May, Ph.D., who is now research director for Corteva Agriscience, I kept saying what I wasn't and what I didn't possess. I wasn't a Ph.D. I didn't have a background in biology. I had no experience working in academia and so on. My list of noncredentials quickly overshadowed my meager list of accomplishments. Greg listened for a while then uttered these 11 words: "Quit telling me what you're not; tell me what you are."

There's an avalanche of wisdom in that sentence. So as I sit to pen my first president's message, let me tell you who I am.

I am the son of Paul and Phyllis Rhines. Their impact in my life cannot be overstated. They are supportive and encouraging and always have been.

They showed me the importance of discipline, the value of continually learning, and that personal character is a way of life, not a hobby.

I live in one of the best communities and states in the world — Ardmore,

Oklahoma. I am married to Debbie, who loves me the same on my worst days as my best. I have triplet, 20-year-old sons — Andrew, Thomas and Grant — who Debbie and I are immensely proud of. As a man, I have learned the utter simplicity and sheer magnitude of God's grace.

Being a lawyer was my chosen profession, but I've been afforded the opportunity to grow far beyond the scope of that job description. As of Jan. 28, 2019, I'm the new president and CEO of the Noble Research Institute. I am humbled and honored to have been selected by Noble's governing body to serve in this capacity.

While my introduction is a formality, it is vastly more critical that I introduce you to Noble's purpose. Each of us at Noble — all 350 employees — serve our nation's farmers, ranchers and landowners. We help them meet the many (and growing) challenges of beef cattle production.

Our founder, Lloyd Noble, endowed us with the mission to deliver solutions to great agricultural challenges. That is a grand undertaking that is honed and clarified through the lens of our primary focus: land stewardship in beef cattle production with producer profitability.

We strive to accomplish this through our ranch operations, demonstrations and research, linking the complex interactions of soil, water, plants and animals. Because we operate ranches, we experience and understand the needs and problems faced by ranchers. We share answers through our competency-based, producer-focused educational programs and through the direct interactions between our consultants and producers.

There are more than 600 million acres of pasture and rangeland in the United States. Within that, there are thousands of families who have two primary objectives: steward the land with excellence and be sufficiently successful so they can continue to care for the land. Noble's part is simple: We do everything we can to come along-



side these families and assist them in achieving both objectives.

Noble is an incredible organization with an extraordinary purpose. I could not be more proud to be part of this organization and to walk side by side with our employees, who are dedicated to bettering the lives of the people around them.

I have spent almost two decades at Noble, and I look forward to many more years as president. While we measure our lives in these large spans of time, we know that the choices and actions of each day are the true building blocks of excellence.

So, we focus on doing all that we can today, and as we like to say around here: It's a great day to be Noble.

STEVE RHINES, PRESIDENT AND CEO

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**ON THE COVER:** Steve Rhines is an Oklahoma native who was drawn into the Noble Research Institute's mission after hearing the story of Lloyd Noble's desire to help farmers and ranchers take care of the land following the Dust Bowl. He joined the organization in 2001 and was selected as its ninth president in January 2019. Discover his journey and vision for Noble's future on page 20.

# HOW CAN YOU SEE SOIL HEALTH?

Many soil health measures require laboratory analysis. However, there are a few indicators you can look and smell for right in the field.

by Jeff Goodwin, conservation stewardship leader and pasture and range consultant

Soil health is often defined as “the continued capacity of the soil to function as a vital, living ecosystem that sustains plants, animals and humans.”

We often think of soil health management as a new strategy, but it’s not. Healthy soils, with effective nutrient and hydrologic cycles, were functioning well before man decided to manage them. Agriculture in the early 1900s tended to focus more on plowing up the prairie soils with industrial technology and machinery rather than focusing on the soil’s ecology. At the time, soils were largely viewed as a medium for growing crops.

The Dust Bowl of the 1930s changed perceptions of soil and its importance to

our work and lives. For instance in 1949, Aldo Leopold in *A Sand County Almanac* said, “Land, then, is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants and animals.” Leopold went on to state, “When we see land as a community to which we belong, we may begin to use it with love and respect.”

Much has changed in how we view the soil today. We realize now that soil is living, and we’re working to learn more about its biological components. What has not changed is our responsibility as land stewards, and that process starts with how we see the soil.

You can use the following five indicators of soil health on any farm with just a shovel, your eyes and your nose.



## BIOLOGICAL ACTIVITY

Healthy soils are biologically active soils. The presence of biological activity can give you insight into the soil’s state of health. Essentially, we are referring to the presence of earthworms, earthworm castings, dung beetles, etc., or evidence of their activity.

Earthworms are not only major decomposers of organic material, they are underground engineers. Earthworms create burrows through the soil profile, which increases porosity, enables water to move down and creates channels for roots. Earthworm excrement, known as castings, help increase nutrient cycling because pound-for-pound they contain significant amounts of nitrogen, phosphorus and potassium.

Dung beetles are another indicator of biological activity. Dung beetles are found on every continent except Antarctica, and they provide tremendous ecological services. These beetles take dung from the soil surface, roll it into a ball, lay their eggs in it and bury it deep in the soil. This creates a food source for their young and brings nutrient-rich organic material into the soil profile, which increases nutrient cycling and availability.

## SOIL COLOR

Soil color provides a tremendous amount of information. Soil color can tell us the amount and state of organic matter and iron oxide, age, and other physical processes. In general, the darker the soil, the higher the organic matter content. Soil is typically darkest in the uppermost layers of the soil profile, and it lightens as depth increases. Soil organic matter and soil organic carbon are primary drivers in biologically active soil systems. In some cases, the dark color can be due to the presence of reduced iron and manganese in our deep prairie soils.

Today, we use soil color to not only gain a general sense of organic matter but to classify soils across the globe with a standard soil color system. Albert H. Munsell first standardized the soil color system as we know it today based on a system with three components: hue, value and chroma. It was primarily standardized for use in industry as a way for companies to order standard, consistent colors for materials. The U.S. Department of Agriculture later adopted the Munsell system as its official classification of soil colors. Following much success in its use by soil scientists, the USDA later helped develop the industry-standard Munsell Soil Color Book.



## SOIL STRUCTURE

Soil structure is the arrangement of soil particles in different sizes and shapes. Structure often determines the amount of pore space between particles. Pore space is the space between soil aggregates, which the USDA Natural Resources Conservation Service define as “groups of soil particles that bind to each other more strongly than to adjacent particles.” More pore space allows for greater water infiltration.

The ability of a soil to hold its particles together and form soil structure is referred to as “aggregate stability.” Soil aggregation can occur by physical processes, such as when positively charged cations bind with clay particles. Soil aggregation can also occur biologically by organic adhesives. The amount of organic matter in a soil is a primary driver of aggregate stability. Commonly, aggregate stability increases as the percentage of soil organic matter increases.

Soil texture, or the amount of sand, silt or clay content, also plays a large role. Generally, soils with higher clay content inherently have greater amounts of organic matter. It is more difficult for sandy soils to build soil structure largely due to lower organic matter concentrations.



## ROOTING RESISTANCE

When looking at a soil profile or even a shovel slice, we can often see evidence of layers of resistance. These resistance layers can be seen in the soil structure with the presence of platy structure or horizontal layers. A couple of common sources of this effect are the continuous compaction of a soil from the soil surface and previous tillage creating what is known as a plow pan. Both of these restrictive layers limit root penetration and water infiltration.

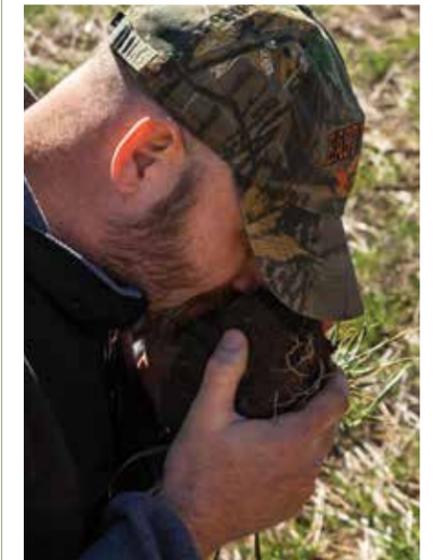
One common indicator of a resistance layer can be found in the plant roots themselves, specifically in taproot species. On these sites, taproot plants will show signs of “J” rooting, which means a plant root grows down to the resistance layer and turns 90 degrees because it cannot penetrate the resistance layer. In extreme cases, water infiltration is also halted at this layer, which limits the soil’s water holding capacity and ultimately exacerbates the effects of drought.

## SOIL SMELL

The fifth indicator isn’t visual, but it depends on another one of our senses: smell. The earthy smell of a biologically healthy and active soil is the presence of an organic compound called geosmin.

In 1965, American scientists isolated the primary odor of soil to a single compound, which they called geosmin from the Greek, geo (earth) and osme (odor).

Geosmin is an organic product produced by active soil bacteria. Essentially, if your soils are cycling organic matter, they will have that fragrant earthy smell. Soils can have other smells, but they are not associated with soil health. Soils absent of oxygen can have a rotten egg or sulfur smell. This is often a sign of poor drainage.



### MEET THE NOBLE EXPERT SOURCE

Jeff Goodwin serves as conservation stewardship leader and a pasture and range consultant at the Noble Research Institute. He leads development of the Noble Research Institute’s Land Stewardship Program. Before coming to Noble in 2016, Goodwin served as the state rangeland management specialist for the Natural Resources Conservation Service (NRCS) in Temple, Texas.

# LOOKING THROUGH THE MICROSCOPE

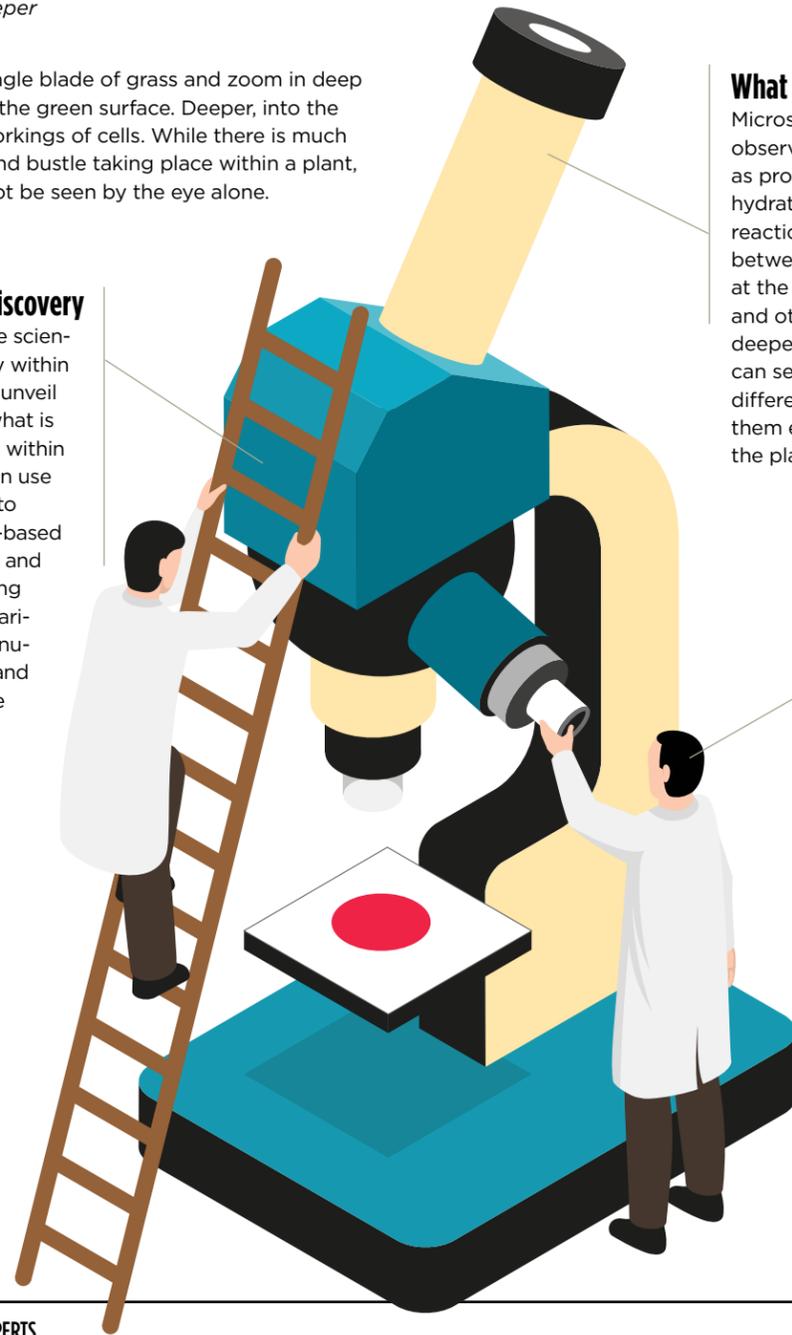
Advances in technology allow scientists to gain increasingly greater glimpses into how plants function, generating knowledge that can be turned into tools for farmers and ranchers.

by Courtney Leeper

**T**ake a single blade of grass and zoom in deep beyond the green surface. Deeper, into the inner-workings of cells. While there is much hustle and bustle taking place within a plant, much of it cannot be seen by the eye alone.

## A Journey of Discovery

Microscopes take scientists on a journey within so that they can unveil the mystery of what is really happening within a plant. They then use that knowledge to develop biology-based tools for farmers and ranchers, including improved crop varieties with fewer nutrient demands and greater resilience against drought and diseases.



## What Do Scientists See?

Microscopes allow scientists to observe a cell's building blocks, such as proteins, fatty acids and carbohydrates, as well as the chemical reactions that take place within and between cells. Sometimes they look at the surface of a group of cells, and other times they need to peer deeper into an individual one. They can see how a cell develops under different conditions, which helps them explore what that means for the plant in the field.

## The Trouble With Live Cells

In the not-so-distant past, cellular imaging was limited to pre-prepared slides called "bio-dead" slides. However, today's high-tech microscopes (for example, spinning disk confocal microscopes), combined with innovative ways to mark the cell and its individual parts, enable researchers to study live cells more efficiently. That doesn't mean working with live cells is easy. Live cells are sensitive to temperature, pH levels and CO<sub>2</sub> levels, and they can easily be damaged by the very light needed for their observation. However, the struggle reaps a rich reward when a scientist is able to see how a cell functions in real-time, right before their eyes. 🌱

## ABOUT THE NOBLE EXPERTS

Jin Nakashima, Ph.D., manages the Cellular Imaging Core Facility, which serves Noble scientists who want to dive beneath the surface of the plants they study. Alison Blancaflor, Ph.D., leads the Plant Cell Biology Laboratory, which primarily looks at roots on the cellular level to gain a better understanding of how they grow and support healthy crops. Follow @noble\_cell\_imaging on Instagram to see agriculture from behind Noble microscopes.

*Wolf Scheible, Ph.D., is working to reduce farmers' and ranchers' need for phosphorus fertilizer by gaining a better understanding of how plants acquire and use the nutrient. This knowledge can be applied to breed more efficient crop and forage species.*



## SCHEIBLE JOINS 'HIGHLY CITED RESEARCHER' RANKS FOR FIFTH CONSECUTIVE TIME

**F**or the fifth year in a row, Noble Research Institute professor and principal investigator Wolf Scheible, Ph.D., has earned the distinction of being among the most-cited researchers in the world.

Being a "highly cited researcher" indicates that Scheible is among the top 1 percent of science and social science researchers worldwide. He is also one of only 223 plant and animal scientists recognized.

"Publishing our research is a key component of what we do as scientists," Scheible said. "We want to share our information so the science community as a whole can continue to advance and

understand the world around us, specifically so we can improve agriculture locally, nationally and internationally."

Scheible's team studies how plants thrive under phosphorus-limited conditions in certain areas of the world. They then figure out how to transfer that ability to crop plants so that farmers and ranchers can grow food and forage more efficiently. Phosphorus-enriched fertilizer promotes abundant, healthy, high yielding plants. It is a linchpin for growing food and cannot be substituted. However, phosphorus is a limited resource. Efficient plants are vital to keep production agriculture feeding the world while using fewer inputs. 🌱

# Moen to Lead Legal, Government Relations

Jeff Moen was selected as the Noble Research Institute's new general counsel. He has served for the past four years as director of strategic alliances, guiding the organization's intellectual property and technology efforts within the agricultural marketplace. Before that, Moen spent eight years as Noble's corporate counsel and assistant general counsel.

"Jeff brings tremendous legal expertise and a wealth of institutional knowledge to the job," said Steve Rhines, president and CEO. "He helped shape our legal strategy as assistant general counsel, and he has contributed to many of our major projects. Most importantly, he has a passion for Noble, the agriculture sector, and our local and state communities."

As general counsel, Moen will be responsible for overseeing Noble's legal strategy and legal work. In addition, he will head the Institute's government relations (state and federal) activities and continue to lead organizational project management efforts. Moen fills the post vacated by Rhines, who was recently selected as president and CEO.

"It is truly an honor to work for the Noble Research Institute," Moen said. "Lloyd Noble established this organization to assist farmers and ranchers in the conservation and improvement of our natural resources. This remains our focus to this day. I'm proud to support this organization in any and every way I can." 🌱



Jeff Moen

# Association Honors Stevens for Dedication to Improving Rangeland Management

The Oklahoma Section of the Society of Range Management (SRM) Association awarded Russell Stevens, Noble Research Institute strategic consultation manager, its 2018 Outstanding Service Award. Stevens was selected for the award because of his dedication to improving rangeland management.

"Russell has been a leading advocate of rangeland and natural resource management for our state and region throughout his career," said Hugh Aljoe, director of producer relations. "He is well deserving of this recognition for all of his contributions. On top of all his work, he's just a great guy. He exemplifies our core value of 'Be Noble' in all he does."

In addition to his leadership responsibilities at Noble, Stevens has served as a wildlife and range consultant for 30 years. He is a member of the Oklahoma and Texas sections of SRM. He is a founding member of the Oklahoma Prescribed Burn Association and works with landowners across the state to establish local associations. Stevens is active in the Oklahoma Invasive Plant Council, Oaks and Prairies Joint Venture, Great Plains Fire Science Exchange, Oak Woodlands and Forest Fire Consortium, National Grazing Lands Coalition, Oklahoma Wildlife Management Association and The Wildlife Society. Stevens is a certified wildlife biologist and a certified professional in rangeland management. 🌱



Russell Stevens

# Mysore Set to Study Plant Disease, Drought Stress in India as Fulbright Fellow

Noble Research Institute professor and principal investigator Kiran Mysore, Ph.D., has been selected for a Fulbright-Nehru Academic and Professional Excellence Fellowship.

Mysore will travel to the University of Agricultural Science in Bangalore, India, to study how plants respond to multiple stresses, such as disease and drought, at one time.

"I'm honored for this opportunity as I get to return to my home university and work with their scientists," Mysore said. "I've hosted visiting scientists from the university in my lab. Now, I get the opportunity to learn from them."

Indian summers are similar to those in the Southern Great Plains, where heat, drought and disease are common problems for farmers and ranchers. Scientists in India are leading experts in their research to determine a plant's ability to handle drought conditions.

At the Noble Research Institute, Mysore's team works to find disease-resistant genes in plants to help reduce crop plant losses. Diseases cause significant losses in food production, but not all losses are due to disease alone. Plants that grow with less water and greater disease resistance are vital to keep the agriculture sector productive. 🌱



Kiran Mysore, Ph.D.



Jim Johnson

# Johnson Receives State Award as Soil Health, Conservation Leader

Jim Johnson, Noble Research Institute soils and crops consultant, received the 2019 Oklahoma Association of Conservation District (OACD) President's Award.

The award recognizes Johnson as one of the leading experts and promoters of soil health in Oklahoma and for his contributions to the state conservation districts.

"Jim is a tremendous asset to the Noble Research Institute," said Hugh Aljoe, director of producer relations. "This award is recognition of his hard work and dedication, qualities that we've known and appreciated at Noble for years"

Johnson's areas of interest include no-till, cover crops and soil health. He works daily with farmers and ranchers to improve their operations. Johnson has more than 20 years of experience in plant and soil sciences, including 18 years as a Noble Research Institute consultant. He is a certified crop adviser and certified agricultural irrigation specialist. 🌱

# NOBLE LEARNING: Your Resource for Building Ag Knowledge

by Amy Hays, Noble Research Institute adult education manager, and Brook Gaskamp, adult education associate



Producers and subject-matter experts share their experiences in the field during tours.

## WE WANT YOUR FEEDBACK

You can always connect with the Noble Research Institute through our various social media platforms. Each day on Facebook, Twitter, Instagram and LinkedIn, we highlight upcoming events, offer useful tidbits of information to improve your operation, and feature Noble's work to provide solutions to great agricultural challenges. To provide feedback, you can visit the website ([www.noble.org/contact](http://www.noble.org/contact)), comment or message us through any social media platform, or call/email a Noble communications/adult education team member.

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When was the last time you learned something new? Something big enough that you felt a real shift? McDonald's founder Ray Kroc said, "When you're green, you're growing. When you're ripe, you rot." Every time we are willing to learn and develop, we are green and growing. However, when we decide we have "arrived" and there is nothing else to learn, we've matured and ripened.

One of the things you probably feel when you are opening the door

to "greenness" again is that it's a great feeling. A challenge. There is something to look forward to: growth and the

potential to build. For Noble Learning, there is nothing more important than serving producers who are seeking growth and "greenness." Our challenge is how can we help you keep green and growing? We are seeking the learner who wants to learn.

In 2019, Noble Learning will fully introduce education progressions as a service to learners to build their skills and abilities to manage production systems.



Demonstrations give participants the opportunity to see principles and practices in action.

## WE ARE HERE FOR YOU

Stewardship of the soil and resources is the story of the steward, not the story of the practice. We serve and work with producers so they can maximize their operations and build profitable, innovative and resilient systems. The ability of only 2 percent of us to provide food and fiber for everyone is a great challenge. Noble Learning's role is to offer guidance and proven ideas — things we see on our own ranches and from our own pastures and livestock at the Noble Research Institute — that enable you to successfully move forward. In 2019, we invite you to work with us and utilize Noble Learning's offerings to build and work toward achieving your production, stewardship and financial goals.

## WHAT IS THE GOAL?

The goal is that you will be able to pick and select the education events that best suit your operation or goals at your skill level and with others who are



Seminars build foundational knowledge through presentations and discussion.

experiencing the same challenges. An evolving list of education events will be added to the website so you can see all the courses that will be offered and what courses complement each other.

## OPPORTUNITIES FOR PRODUCER NETWORKING

Perfection is unachievable, but we all can get better every day. Our goal is to provide you with relevant and resourceful educational events that foster your learning and ultimately your success. We also want to provide you with interactions and networking opportunities with like-minded and like-sized producers to explore ideas or practices. We look forward to serving you and to learning and sharing things that allow us to get better every day. 🌱

## WHY THE CHANGE?

We know that learning happens in pieces and builds over time, and research validates this as a more effective learning environment for producers. Therefore, you will see a course listing that spans an entire year, and you can anticipate future events to build competencies during the next several years. We hope you will plan to join us for many of these new events throughout the coming years.

## BUILDING BLOCKS

We now offer courses that build on one another and increase your knowledge in a subject area from basic to advanced levels. This means that instead of one long course, educational material is broken down into more digestible and manageable chunks of information.

## HOW YOU LEARN

As educators, we know some information is best learned in a classroom, but we have a vast set of resources and expertise to offer you the chance to learn in the environment you work in. That's why we're offering more learning opportunities through demonstrations and in the field.

## SHOULD YOU ATTEND?

New, transparent event descriptions will give you the information you need to decide whether to take time away from work and spend it with us. Understanding what experience level is needed for each event and knowing what you will learn will help you choose courses that best fit your needs as a producer.

## Mending the Disconnect: Teaching the Next Generation About Ag

by Frank Hardin, Ph.D., Noble Research Institute youth education manager

Who taught you about agriculture? A parent or grandparent? Your high school agriculture teacher?

For some of you, agriculture may have been part of your life since you were born. Others of you perhaps learned about agriculture later in life. I don't recall learning about agriculture in school. And although we were only an hour away from the apple orchards of North Georgia and the pecan groves of South Georgia, my family was completely removed from agriculture when I was growing up 30 years ago.

Today, as the Noble Research Institute's youth education manager, I am teaching youth about the value of agriculture and the science, technology, engineering and math (STEM) behind it.

Inundated with mobile phones, computers, tablets and gaming consoles, today's youth are more removed from agriculture than ever. These students are our future policymakers, educators and decision-makers. If we don't do something to mend this disconnect, agriculture will suffer consequences in the future.

To help solve this challenge, our program targets sixth through 12th graders and introduces them to agriculture and ag careers via a variety of programs, including hands-on science experiments, robotics programs, internships, youth hunts and teacher workshops. We deliver our message to more than 7,000 recipients per year with the hope that they learn to appreciate agriculture a little more than they did before we walked in the room. 🌱



Students learn about the science, technology, engineering and math of agriculture.

Learn more about youth educational opportunities at [www.noble.org/education/youth-education-outreach](http://www.noble.org/education/youth-education-outreach)

# CONNECTING WITH YOU: About the New Educational Event Progression Levels

by J. Adam Calaway, Noble Research Institute director of communications and public relations

At the heart of Noble's new educational progressions is a simple idea: We want to better serve you.

The process began by asking ourselves some pointed questions: What information is most valuable to you? What problems are you experiencing that we could help overcome? Do our educational courses provide quality information in the best possible learning environment? And — most importantly for this article — how do we improve our communication so you receive timely, relevant information?

## WHAT NOBLE LEARNING LOOKS LIKE

When you look at the Noble Research Institute events page ([www.noble.org/events](http://www.noble.org/events)), you will see several changes to our traditional outreach programs. You will find:

- 1 Offerings designed as education progressions, a series of connected and interrelated learning opportunities spanning two to five years.
- 2 Education events listed with new labels to help you find what level of knowledge the event delivers.

Introduction, Level 1: Essentials, Level 2: Building, Level 3: Advanced and Level 4: Master. (We also offer some "general public" courses, which do not fit into an educational progression. These courses offer information about agriculture-based hobbies and natural resource topics relevant to anyone.) See the sidebar for a description of each level. These descriptions will help you determine where you fit into the progressions. As participants gain competencies, they can progress to the next level.

The transition from individual educational programs to educational progressions will happen throughout 2019, which means our website will be changing.

Continue to check [www.noble.org/events](http://www.noble.org/events) to keep track of all the upcoming offerings. Each educational event listed online now has an official level assigned to it. If you'd like to see the level descriptions again, you can always visit [www.noble.org/events/course-levels](http://www.noble.org/events/course-levels).

Soon each educational event will have a list of related courses that will help you move through the educational progressions. For example, if you sign up for a Level 1: Essentials livestock seminar, you will see upcoming educational opportunities that relate to the livestock progression.

In the near future, there will be a course catalog dedicated to each educational progression. These catalogs will provide visual maps of the interconnected classes and the learning objectives for each educational event. 🌱

This is about a relationship between Noble and you. Some relationships may only be a few months old; some are generational, passed down from parent to child. But every relationship is important to us. We know that good communication is the bedrock for building stronger bonds.

As we unveil these new educational opportunities, it is critical that everyone can easily understand the changes and access the necessary information.

## ABOUT THE EVENT LEVELS

The first step is to understand the educational event levels.

Each educational event will be assigned one of five designations:

## PROGRESSION LEVELS

Each educational event will be assigned one of five designations below. The assigned level will be based on the content of the class.

### INTRODUCTION

Introductory courses are designed to provide you with basic concepts, definitions and introductory information on a topic related to production agriculture. These courses are generally offered as a seminar.

### LEVEL 1 ESSENTIALS

Level 1 courses provide you with information on the core basics of a production management topic. Essential courses are intended to provide you with strong foundational knowledge. These courses are generally offered in a classroom setting.

### LEVEL 2 BUILDING

Level 2 courses build on the knowledge that you receive in Level 1 courses. These courses will provide you with necessary information that will help you begin to build toward a management plan. These courses are generally offered in the field and provide demonstration of tools, techniques and equipment.

### LEVEL 3 ADVANCED

Level 3 courses help you begin to manage your operation as a system. Advanced learning will provide you with confidence to make more informed decisions. These courses are generally offered in a production operation setting and are hands-on.

### LEVEL 4 MASTER

Level 4 courses meet the needs of highly skilled and operating producers. These classes will provide you with the most advanced content available in each discipline. These courses are designed to be intensive and will have a limited number of participants.

JOIN THE NOBLE RESEARCH INSTITUTE ON

# YouTube

Find research-based tips and advice for your farm or ranch. View these videos and more at [www.youtube.com/nobleresearchinstitute](http://www.youtube.com/nobleresearchinstitute).



## COVER CROPS

If you're one of many who are interested in planting cover crops for soil health, your first question might be, "Which species to do I grow?" Jim Johnson, Noble Research Institute soils and crops consultant, shares what he has learned about various options.



## BACKYARD GARDENING

Growing food in small spaces can be rewarding, but it brings its own challenges. Learn about how to get started and what options you have through this video series. You can also find resources for how to preserve your produce so you can enjoy it long after the harvest.



## FERAL HOGS

Wild hog populations continue to rise in the U.S., creating problems for ecosystems and agriculture. Discover research and tools, such as BoarBuster, that can help you combat this invasive species on your property.

# FROM OUR FEEDS

FOLLOW ALONG @nobleresearchinstitute @nobleresinst

We love to connect with colleagues and friends on social media. Join us today to see what people have been saying, and follow #everyNoblestory to see more science serving agriculture through the eyes of Noble researchers.



Our mission at Noble is to deliver solutions to great agricultural challenges. But what is a great challenge? Hugh Aljoe, director of producer relations, and Michael Udvardi, Ph.D., chief scientific officer, share the Noble Research Institute's definition of "great challenges" and how our work aim to provide solutions. Read more: <http://bit.ly/2NhgORf>



"Symbiosis is a friendship." Noble Research Institute postdoctoral fellow, Barbara Nova Franco, Ph.D., shares a simple yet intriguing look into her research on rhizobia bacteria, nitrogen deficient plants and nodules. Read more about the research taking place here at Noble: [www.noble.org/research/](http://www.noble.org/research/)



Creede Speake, a Noble cooperator, received the National Association of Conservation Districts (NACD) Distinguished Service award at the 2019 NACD Annual Meeting last week in San Antonio, Texas. Join us in congratulating him on this prestigious award.

Out of the classroom and on to live animal evaluation to demonstrate differences in weight and pelvic area in developing heifers.

**Sheila Amos**  
Fantastic educational facility and beautiful campus.

At the 2019 National Cattlemen's Beef Association Convention, the Integrity Beef Alliance was awarded the 2018 Trailblazer award by BEEF Magazine. Congratulations to this program for being recognized. To learn more about the Integrity Beef program visit, [integritybeef.org](http://integritybeef.org)



Chuck Coffey, a former pasture and range consultant for the Noble Research Institute, was elected to serve as the Cattlemen's Beef Board Chair at the 2019 Cattle Industry Convention. The Cattlemen's Beef Board guides the national Beef Checkoff Program throughout 2019. Congratulations Chuck. [oklahomafarmreport.com](http://oklahomafarmreport.com)

## IN CASE YOU MISSED IT: TOP 10 NEWS & VIEWS

Noble News and Views is your resource for the latest news and advice from Noble Research Institute agricultural consultants and researchers. Our goal is to provide you with a look at our research and what we're learning by working on our farms and ranches as well as with other producers and industry groups.

See the top 10 articles at [bit.ly/nv-top-10-2018](http://bit.ly/nv-top-10-2018)



# Instagram STORIES

FOLLOW ALONG @nobleresearchinstitute



### MARCH 29

The Oklahoma Envirothon is taking place today. These students are competing for a chance to move on to the national contest. Good luck to all Envirothon participants across America! [#envirothon2019](#) [#envirothon](#) [#ageducation](#) [#forestry](#) [#soil](#) [#wildlife](#) [#aquatics](#)

# 3 Things to Look Up

## A Conservation Journey

Third-generation farmers Russ and Jani Jackson have seen the benefits of working with nature as they grow crops, including cotton, wheat, corn and soybeans, in Mountain View, Oklahoma. Over the past decade, they have transitioned to no-till, incorporated cover crops, and added cattle to mimic the natural processes of bison grazing the prairie. The Jacksons were recognized as 2018 Oklahoma Leopold Conservation Award recipients.

Hear their story at [bit.ly/lcap-jacksonfarms](http://bit.ly/lcap-jacksonfarms)

## Are You Intentional?

An intentional producer is better able to handle surprises on the ranch because they have been managing with a plan in mind. For example, intentional producers during the drought of 2011 were able to destock early because they had an early warning system: They were using a water-year table to help them monitor rainfall and plan accordingly. Hugh Aljoe, Noble Research Institute director of producer relations, shared this and more about what it means to be intentional at the 2019 Cattle Industry Convention.

Burt Rutherford offers some of his notes from the presentation at [bit.ly/intentional-producer](http://bit.ly/intentional-producer)

## Fast Facts About Agriculture

Did you know there are about 2.1 million farms and ranches across the U.S. and that about 96 percent of them are family-operated? How about that one farm feeds 165 people? American agriculture has a history of doing more with less, and it's a strong player in the global food marketplace.

Learn more at [bit.ly/agfastfacts](http://bit.ly/agfastfacts)

# WHERE ARE THEY NOW?

For more than a decade, college students from across the country have joined the Noble Research Institute for a summer of preparing for careers in science and agriculture. We've followed up with a few of them to see how those futures are shaping up.

## ABOUT THE LLOYD NOBLE SCHOLARS PROGRAM

In 2004, the Noble Research Institute launched a program to provide undergraduate students the opportunity to conduct plant science in a real-world laboratory setting. In 2009, another, in-field experience was formed for agriculture students. Today, the programs have merged into one Lloyd Noble Scholars Program, which continues to offer tracks for both science and agriculture students while evolving to create better experiences. Learn more at [www.noble.org/scholar-program](http://www.noble.org/scholar-program).



**MICHAEL PASSALACQUA, 2016 PLANT SCHOLAR**

Baylor College of Medicine Research Assistant

### What did the program show you?

The program showed me the many possibilities in research. I realized there is a lot of space in the field to study traits that could dramatically help farmers and ranchers.

### What are you doing now?

I am applying to graduate schools for plant breeding and plant genetics. I'd like to work on using gene editing and gene transfer to improve abiotic stress and yield-focused traits.

### What would you tell others about the program?

The program helped solidify my love of plant science and was an excellent experience for the summer. If you're thinking of a Ph.D. in plant science, it's one of the best experiences you could ask for.

**KELSEY HOEGENAUER, 2010 AG SCHOLAR**

Soil Health Institute Project Scientist

### What did you learn as a scholar?

I was able to see firsthand how scientific agricultural research directly impacts farmers and ranchers. I also learned how to conduct applicable scientific research and describe the practical implications of the results.

### How does this tie to what you do now?

This ties much to what I do today in collecting soil samples and analyzing data from long-term research sites across North America to evaluate the impact of long-term management on soil health parameters.

### How else did your experience help prepare you for the future?

The researchers and consultants I worked with were great teachers and mentors. They provided meaningful hands-on learning opportunities that helped me apply what I learned in the college classroom. When applying for graduate school and jobs, my experience at Noble was viewed as meaningful and notable by interviewers.





**VERONICA GREVE,  
2014 PLANT SCHOLAR**

HudsonAlpha Institute of Biotechnology  
Genetic Counselor

**How do you draw on your scholar experience today?**  
Participating in the scholar program helped me become familiar with data analysis and interpretation that is relevant to my current field through performing a genome-wide association study (GWAS). The information I learned through that experiment now helps me interpret human GWAS studies and understand how those findings can impact human health.

**What would you tell someone who is considering the program?**  
I would say apply. It is a unique opportunity to gain useful research skills and make connections with current researchers and your peers who also have a passion for agriculture and science.

**What should a student do to get the most out of the program?**  
Think of some key skills you would like to learn. It could be bench work, analysis or soft skills. From my experience, mentors fully embrace that title and are quick to help fulfill those goals.

**SAMANTHA BEARD, 2017 AG SCHOLAR**

North American Meat Institute Manager of Legislative and Public Affairs

**What did you learn as a scholar?**  
The experience and education I gained at Noble far exceeded most anything I learned in a classroom. I was introduced to issues and experiences I had never encountered before: feral hogs, prescribed fire, and advanced technologies like unmanned aerial vehicles (UAVs).

**What was your most valuable experience during the summer?**  
I had the opportunity to travel to Washington, D.C., with fellow scholars. Throughout the course of the trip, I experienced a side of agriculture that is rarely discussed but is vital to the future of our industry: government advocacy.

**How has that helped you get to where you are now?**  
I always had an interest in being a voice for agriculture, but I didn't have a clear direction on how best to apply myself. The experience and the connections made during my trip to Washington, D.C., would later bring me back to our nation's capital for an internship with National Cattlemen's Beef Association's public policy team and on to my current job.



**BRAY HAVEN, 2016 AG SCHOLAR**

Norvell Consulting Community and Government Affairs Consultant, Oklahoma Youth Expo Director of Operations

**How did the program expand your understanding of agriculture?**  
For a small-town kid from western Oklahoma who grew up with knowledge of only beef cattle and wheat, the broad in-depth knowledge of the Noble staff and their research helped me understand more about all of Oklahoma's agriculture industries.

**How has that helped you in your current roles?**  
It opened my eyes to new ideas and innovative technology in an industry so vitally important to this state. It was an experience that I draw on regularly in my current position working with elected officials on all levels.

**What would you tell students about the program?**  
Spending a summer at the Noble Research Institute should be a goal of any student looking to broaden and expand their experience within the agriculture industry. The staff and Noble family make you feel right at home. It's also a great opportunity to meet other students from across the country who are passionate about agriculture. I still try to keep up with fellow scholars on social media and see the great work many of them are doing.



BY J. ADAM CALAWAY



# In the Wake of Leadership

After 18 years of service, Steve Rhines takes the helm of the Noble Research Institute ready to steer the organization into the next generation.

*Steve Rhines grew up in Antlers, Oklahoma, and graduated from the University of Oklahoma before attending law school. Rhines joined the Noble Research Institute in 2001 as intellectual property counsel and has been involved in some of its key initiatives. He was selected from a national pool of candidates to become the Noble Research Institute's ninth president in January 2019.*

Q&A

What makes Noble so special?

Our direct connection to farmers, ranchers and landowners. As an agriculture-focused research institute, it is important that we understand their challenges and problems and that we aren't developing "any" solutions but real solutions that national producers can adopt and implement. That said, we have a clear purpose, a great history, and operations extending from the laboratory to the ranch to answer these challenges. That is all pretty special.

What is your leadership philosophy?

I believe that intentionality and discipline is the recipe for success. Begin with the end in mind; plan where you want to go and what outcome you are seeking. Align your resources to reach that destination and achieve that outcome. Once you've laid your course, be disciplined to follow it. If things change or your destination was wrong, have the courage to reassess and move forward.

Right now Steve Rhines' chin is a little too low, and Rob Mattson is having none of it. "Move your chin slightly up and a little that way," says Mattson, Noble's photographer, pointing to the right. Rhines complies. He lifts his chin an almost imperceptible amount but enough to evoke a smile from Mattson. "Perfect," the photographer says. A flurry of shutter snaps launches retina-retracting flashes from a hula-hoop-sized soft box sitting over Rhines' head like a small alien spaceship.

Rhines has entered his fourth week as president and CEO of the Noble Research Institute, and he is politely enduring a presidential rite of passage — a photo shoot.

Creative Manager Rachael Davis and Mattson discuss the virtues of jacket versus no jacket. They smooth unruly wrinkles in his white shirt. They fuss over the proper way to roll up his sleeves. They critique his smile and, generally, poke and prod him.

All the while, Rhines sits quietly, occasionally trading quips with a staff member attempting to elicit a spontaneous smile with ill-timed children's jokes. The moment might try the patience of most new executives who have an ever expanding to-do list upstairs. Instead, Rhines takes every moment in stride. He'll even send a thank you note to the team for all their effort the next day.

For a man who spent most of his career side-stepping the spotlight in favor of promoting others, the transition to Noble's top leadership role might feel awkward. But it's not.

A lifetime of experiences and an intentional journey of self-improvement have coalesced to prepare him for the momentous task now ahead: leading the country's largest private agricultural research organization.

The brainy boy, who grew to be a thoughtful leader, has started to write his chapter in the storied history of the Noble Research Institute. A sentiment

**“We wanted someone who possessed three distinct characteristics: a significant understanding of agricultural research, the vision to advance the Noble Research Institute into the next generation, and high personal integrity.”**  
—RUSTY NOBLE



ABOVE: Steve Rhines addresses employees for the first time as Noble Research Institute president and CEO on Jan. 28, 2019.

he waves off with a few words and a smile: "It may be a new chapter, but it's the same book. And I'm not writing it. We're all writing it together."

A SERVANT LEADER

The decision to hire Rhines as the ninth president and CEO in the organization's 74-year history came on a Friday afternoon in January. Noble's governing body concluded its regularly scheduled meeting with a vote. Six months, a global executive search firm, interviews with national candidates, and careful consideration by all those involved ended with a unanimous chorus of yes votes.

"We wanted someone who possessed three distinct characteristics: a significant understanding of agricultural research, the vision to advance the Noble Research Institute into the next generation, and high personal integrity," says Rusty Noble, chairman of The Samuel Roberts Noble Foundation Board of Directors (see side note) and grand-

RIGHT: Steve Rhines with his wife, Debbie, and parents, Paul and Phyllis.



Side note: The Samuel Roberts Noble Foundation is the sole member/manager of Noble Research Institute, a nonprofit single-member limited liability company. The Foundation acts through its board of directors to provide leadership for the Institute to carry out its charitable purposes, act as a good steward of its resources, and conduct and support its activities in accordance with the vision of founder Lloyd Noble.



son of the organization's founder, Lloyd Noble. "We found all of those qualities in Steve."

Since Rhines was an internal candidate and his predecessor Bill Buckner had already retired, there was no need to delay the announcement. On the following Monday, employees gathered in the Atrium, morning sunlight streaming through the panels above. A new day was beginning in more than one way.

Excited chatter filled the massive space as Rusty Noble took to the stage to introduce the new president. When he said, "The individual selected has been working at Noble for almost 20 years and has led many of the organization's key initiatives," the audience began to look side to side and smile. Noble continued: "Through this process, this individual has demonstrated the ability to articulate the challenges facing Noble and the potential opportunities before us. This made it clear to us that he was the only candidate to lead this organization. Please join me in congratulating the next president and CEO of the Noble Research Institute, Steve Rhines."

The Atrium erupted with applause and cheering. Rhines took to the stage. His 10-minute speech recapped his journey to Noble and revealed what everyone in the room already knew: He loves Noble. "For the last 18 years, there have been good days and bad days. But I have never lost my passion for this place or my love for what we're trying to do," he says. "I see it as more than a job. I see it as a calling. I know all of you feel the same way."

Rhines called on his employees not to fear change and outlined Noble's continuing mission to advance land stewardship in beef cattle production with producer profitability. He talked about his personal faith and his desire to be a servant leader for an organization dedicated to serving others. "Today is the first day of my last job," he pauses, emotion in his voice. "By God's grace, and as long as the board will have me, I will be here until I retire, working alongside you to fulfill our mission."

Thunderous applause again swelled and subsided. An impromptu line of well-wishers immediately formed. Rhines shook hands and chatted for a minute with each person, repeating the process again and again. Employees filed out with

TOP: Steve Rhines (center) listens to Noble retirees Fred Schmedt (left) and Gary Simmons following the announcement that the Noble Foundation would be renamed as the Noble Research Institute.

LEFT: Steve Rhines explains how a public charity more closely aligns with the operations of the Noble Research Institute.

OPPOSITE PAGE: Steve Rhines keeps a map of Oklahoma soils, alongside model rockets, in his home workshop.



several voicing their insights. "That's the right guy at the right time," one says. "I've never been happier," another adds.

The only missing piece to this perfect morning was his parents, Paul and Phyllis. However, as with most great days, details just seem to work out. Rhines' wife, Debbie, made a command decision and slipped his folks into the back of the room so they could watch their son take the culminating step in his 30-year career. They unexpectedly emerged from the crowd and embraced their son then stepped back so that he could continue interacting with his employees, beaming wide smiles as only parents can.

As the announcement began to wind down, Rhines turned and says, "It's a lot to happen to a boy from Antlers, Oklahoma."

### ANTLERS, ROCKETS AND KETCHUP

Antlers is nestled in southeastern Oklahoma and is home to about 2,500 people, a population density that has remained virtually unchanged since the 1930s. The tiny hamlet was Rhines' home from third grade through high school.

Rhines' father managed multiple retail stores in southeastern Oklahoma during his son's formative years. Rhines served as stock boy and janitor a couple hours a day after school in the Antlers stores. He can recall the smell of the stores and even picture the arrangement of stock on the shelves. He also

remembers forming an early opinion: "My father was a great salesman and loved it. I figured out pretty quickly that I was not cut out for the retail profession."

A sales career was clearly a nonstarter, so Rhines cast his eyes up. His parents gave him his first rocket model set in the seventh grade. (To be clear, not spaceships but missiles.) He launched it and, one might say, as it skyrocketed, so did his interest. He was hooked.

Play turned to tinkering. Building turned to designing. In short order, Rhines' life trajectory was set; he was going to be an aerospace engineer and pilot. Throughout high school, he remained obsessed with all things missiles. During his senior year, he won his local, state and regional science fairs to earn a slot at the International Science and Engineering Fair. His project's title? "Computer-Assisted Design and

Analysis of Exterior Ballistic Projectiles." In layman's terms, he developed computer software for designing and assessing a surface-to-surface missile. In high school.

He was admitted to the University of Oklahoma with a U.S. Air Force ROTC scholarship. Everything was on course to fulfill his blue sky dreams right

“Today is the first day of my last job. By God’s grace, and as long as the board will have me, I will be here until I retire, working alongside you to fulfill our mission.”  
—STEVE RHINES

## Q&A

*Our focus is “land stewardship in beef cattle production with producer profitability.” Is that too narrow?*

No. For us it is a national focus. We seek to impact more than 650 million acres of ranch and pasture in the U.S. — this is essentially 33 percent of our nation's land. The primary occupants of these acres are cattle. We believe that caring for and stewarding the land encompasses managing the complex interactions of the soil, water, plants and animals. While most agriculture organizations and subsequent research funding focuses on cropland, we will assist this nation's farmers, ranchers and landowners in enhancing our nation's ranch and pasture lands.



## Q&A

### What do you mean by “producer profitability”?

This is a practical reality of agriculture or any profession — ranchers need to make a living. There are not many of us who can stay in a profession that consistently costs us more than it makes. We seek to support land stewardship and at the same time preserve “producer profitability.” If a rancher cannot make enough to maintain his or her operation, then somebody else is controlling the outcomes of the land. Further, it is not enough just to get by. If a producer is barely making ends meet, they are often sacrificing long-term land stewardship practices for short-term returns. In addition, producer profitability allows us to look at other enterprises that complement and add to beef cattle production, including pecan production, wildlife management and other similar enterprises.

up until Rhines went to take his physical prior to his freshman year in college. “As it turns out, I was blind as a bat,” Rhines says. “There was no way I could fly a jet. Later in life, I came to realize that I do not have the needed skills or constitution for flying, so everything worked out.”

He doesn’t linger on the memory. He chuckles and moves on. In fact, that’s what he did 30 years ago. While disappointed, Rhines regrouped quickly, looking toward the horizon instead of the past. He was determined to be part of the defense industry even if it wasn’t in the cockpit.

On the advice of an engineering faculty adviser at OU, he shifted from aerospace engineering to mechanical engineering. The class load looked like ingredients for NASA stew: chemistry, fluid and thermal dynamics, and 12 hours of higher mathematics. “I’m not the smartest guy in the room, but I am a worker,” Rhines says. “I studied a lot.”

College was not all books and slide rules, however. Just a week before Halloween 1990, Rhines was introduced to Debbie Little, an elementary education major. Debbie’s friend Angela was dating one of Steve’s engineering classmates. The couple was planning a Halloween get-together and dragooned their single friends into joining them. Angela wasn’t playing matchmaker, though. “She told me, ‘You’re not going to like him. You have nothing in common with him, but you’re single and he’s single, so you’re just going to come with us,’” says Debbie with a laugh.

The evening started with dinner at a burger joint, and a dry cleaning bill seemed more likely than love. As Rhines attempted to put ketchup on his fries, he began to bang the bottom of the glass bottle (no plastic squeeze containers in ‘80s). In almost sitcom-fashion, a red glob unexpectedly shot out and landed in Debbie’s hair. Everyone laughed, including Debbie.

Dinner turned into game night and, when the other two couples headed off to a haunted house,



THIS PAGE: Steve and Debbie Rhines enjoy time together in their kitchen at home.

OPPOSITE PAGE: Steve Rhines bowls with fellow Noble Research Institute employees during an after-hours activity with leaders of the employee team.



Q&A

*Is Noble going to do this alone?*

Oh no, far from it. While we have some unique resources and talented experts, we can't go it alone. We will continue to partner with like-minded industry, universities, nonprofits and foundations, and government agencies. We have recently joined a collaboration with the Choctaw Nation, so we now add "sovereign nations" to our list of collaborators. The sector needs all of us to be successful.

Rhines and Debbie split off from the group. The engineer-to-be and the teacher-to-be who had "nothing in common" sat in the car in front of her apartment, talking and laughing until the wee hours of the morning. "Steve is so smart, and he's got this dry wit," Debbie explains. "It's part of his charm. I was totally smitten."

The next morning, Debbie woke up and found dried ketchup in her hair. She laughed again, and they were a couple from then on. Ask Rhines if it was love at first sight and he'll give you a slight eye roll, but then admits: "Probably something close."

Rhines graduated a few months later and started working for Texas Instruments, at the time a manufacturer of advanced missile and avionics systems, in early 1991 in Dallas, Texas. He had interned for the defense contractor for

**Steve has a gift of seeing things in a bigger picture. He sees how pieces will fit together for a greater purpose. ... His vision of greatness becomes contagious.**  
—JILL WALLACE

three consecutive summers, so the segue into full-time employee was seamless. However, the internships had brought a simple revelation: a career in engineering was not likely his endpoint. "The research and the science were amazing," Rhines says. "I liked the concept but didn't like the reality."

During his final semester at OU, Rhines had applied to law school. Two of his best, childhood friends had decided to pursue careers in law. It sparked an idea. Rhines could see the connections between engineering and being a patent attorney. The profession provided exposure to emerging technologies, which he enjoyed. It also afforded him the opportunity to assist inventors and companies in fully realizing value in their ideas (something else he loved to do). Patents were legal puzzles to be put together and a perfect fit for a brain already hard wired for finding solutions.

Rhines started law school in the fall of 1991, ending a short engineering career. Another life redirection, but this time, he wasn't alone.

By summer, Debbie had graduated from OU and moved to Dallas with Angela, her unintentional match-making friend, to teach. Rhines and Debbie were engaged in June, and soon she was offered a position at the prestigious Highland Park School District. Rhines began to survey his future options with earnest.

The couple married in May 1992 after his first year of law school. The wedding was picture perfect (besides some unfortunate eye glasses that his sons still ridicule to this day). The next half of a decade sped by in a blur. Graduation in 1994. Two stops as an in-house counsel before making the jump to the prominent Sidley Austin, LLP in 1997.

Working in the hyper-competitive law firm culture only served to feed Rhines' insatiable desire to achieve. His work ethic shifted into a new gear and soon he was cresting 2,400 billable hours a year and writing off countless more to develop clients and mentor junior attorneys.

The breakneck pace was fine when it was just Debbie and him. However the next year, she gave him three reasons to come home early.

DADDY, MOMMY AND BABY MAKE 5?

A little less than six months after Rhines earned his downtown-facing office on the 34th-floor of the KPMG Centre Building, Debbie announced they were having a baby. Well, actually, three babies. The couple welcomed triplet boys — Andrew, Thomas and Grant — into the world in the spring of 1999. Suddenly everything was times three. Three cribs. Three diaper changes. Three bottles. Three spit ups. Three more diaper changes. Three of everything.

The serenity of their suburban home had turned into a three-ring circus of activity. Babies were constantly being juggled. There was nonstop motion and noise. And there was always food on the floor.

While most parents begin with a two-on-one advantage, the Rhines were playing zone defense from the beginning. They were outnumbered and outgunned. Even with help from family, it was only a matter of time before a tipping point.

It wasn't work. Rhines kept pace. The long hours continued. He helped with the boys when he wasn't in the office, choosing to sacrifice sleep to maintain his work and home responsibilities. "I remember writing patent applications with Grant sleeping in my lap," Rhines recalls. "You always had a baby in one hand and an eye on the other or the other."

But the law waits for no one and neither do doctor appointments. Rhines missed (another of) the boys' checkups due to work, and the dam broke. He returned home and found his wife sitting at the computer. Debbie's eyes said she was angry. Her words clarified that she was very angry.

"My wife is — by all accounts — the living embodiment of patience," Rhines says. "But on this day she had decided life was going to change."

Debbie sat at the computer, looking online for jobs in her hometown of Ardmore, Oklahoma, where most of her extended family still lived. They needed help, and they were moving to where the cavalry was stationed.

She went to the Noble Research Institute (then the Noble Foundation) website and began pointing at jobs on a list. "Can you do this?" Stunned Rhines just shook his head no. "How about this?" said the exhausted mother. Again no. Then three words appeared on the screen: Technology Transfer Manager. All the emotion was sucked out of the room, and they sat reading the job description. It was perfect. The job looked tailor-made for Rhines. "I didn't want to be that guy who was never there," Rhines explains. "We needed a change, and I believe God provided the path."

While he sought out all the information he could about Noble before the interview, there was no substitute for the experience of visiting campus. During his interview, he heard Noble's genesis story: Philanthropist Lloyd Noble lived through the Dust Bowl and wanted to secure the land for future generations through education, consultation and research. He immediately fell in love with the mission. "Debbie brought me to the doorstep, but I ran through it," he says. "I don't have to tell you, this place is special."

On March 1, 2001, Rhines walked into Noble as an employee for the first time.



ABOVE: Steve Rhines talks with members of the Ardmore community during a meet-and-greet with the new Noble Research Institute president.

RIGHT: Steve Rhines works in his home workshop.

OPPOSITE PAGE: Steve Rhines speaks to state leaders.



Q&A

Are there any other goals for Noble?

Maintain a workplace that gives each employee pride in what they do to further the whole organization and its purpose. Simon Sinek says: "Give people a reason to come to work, not just a place to go to work." When we achieve that, much of the downstream impacts to farmers, ranchers, landowners and land stewardship will be taken care of.

SO A LAWYER WALKS INTO NOBLE

Rhines went from the Dallas skyline to an office in the center of a research building. The new office was short-lived, and due to facility renovations, he soon found himself in a trailer out back. This trailer — divided down the middle — housed both legal and security. The legal-security trailer shared a wooden deck with a neighboring trailer-laboratory, where a young scientist and her staff sought to improve alfalfa as a forage. It may not have been the trajectory many lawyers would have sought, but it was perfect. Rhines loved the people, the place and the work.

Opportunities to contribute beyond intellectual property management began immediately. Noble had only started receiving government research grants in the year prior to his arrival, so he was enlisted to build a system to manage the incoming grants, helping navigate rules and regulations new to the organization. The next year he was promoted to director of legal affairs.

In addition, he contributed to many assignments that had nothing to do with legal work. He helped then-executive-vice-president, and now close friend, Larry Pulliam raise money for an interna-

tional research project to sequence the genome of a model legume.

It became clear to Rhines' colleagues that he was far more than just a lawyer.

"Early in his career, Steve had little knowledge of biological sciences or genomics. It was amazing to watch him consume information and be able to immediately apply that information to our work," Pulliam says. "That's Steve. He can take in and process huge amounts of information then translate that knowledge into a usable plan that connects across an organization."

As the organization grew, so did its legal requirements. Rhines dove into technology transfer, policies and contracts, then helped create a government affairs program in 2005. Rhines was again promoted to vice president, general counsel and director of public affairs.

Over the course of the next 12 years, he'd pick up the communications department, helping guide the organization's messaging and public relations efforts. He'd also help reshape Noble's educational offerings and take on one of organization's most comprehensive projects.

In 2008, Rhines headed the organization's effort to modify the U.S. tax code to create a

new type of 501(c)(3) public charity called agricultural research organizations (AROs). The proposed modification would increase agricultural research capacity in the United States and provide philanthropists another option to invest in public agricultural research. The legislative measure became law in December 2015.

"The development of AROs was almost a seven-year journey, and Steve led the entire effort," Rusty Noble says. "The project is but one example of his demonstrated vision, critical thinking and tenacity."

Rhines then saw an opportunity to transform youth agricultural education, not only at Noble, but around the region. The mechanical-engineer-turned-patent-attorney sketched out the plan for creating Noble Academy, a STEM-based youth education program that teaches students about the value of agriculture to their lives. A few years later, Rhines assumed leadership of Noble's entire educational effort, outlining a system to transform the institution's producer education effort into a competency-based program. The new system is designed to build producer skills from beginner to mastery over time and through engagement with the Institute's subject matter experts.

"Steve has a gift of seeing things in a bigger picture. He sees how pieces will fit together for a greater purpose," says Jill Wallace, CFO and friend of more than 15 years. "He doesn't stop at good; he strives to make things great, and his vision of greatness becomes contagious."

In addition to the professional growth, Rhines had been on an intentional journey of perpetual leadership development. Several years ago, he and Wallace began challenging each other to become better leaders. They trade books and articles on leadership. They listen to podcasts. They hold each other accountable.

"We have a responsibility to those we lead and to the organization to constantly improve," Rhines says. "It is important to be constantly striving to grow. It is what we require of our employees, and it is what I require of myself."

He rooted himself in his faith and focused on living out the principles he had learned. "Steve's leadership fosters the development of his employees both personally and professionally," says Brenna Gaik, adult education associate. "He humbly approaches his position of leadership and continually invests in others."

In the fall of 2018, Bill Buckner, who had served as Noble president for seven years, announced his retirement. Rhines realized that all the work was leading to this moment. He gave voice to his vision. He interviewed. And ultimately he was selected. Reflecting on the entire journey, he says: "It was not always clear where I would end up, but now I believe this is where I was meant to be."



“As every leader moves, they leave a wake like a boat cutting through the water. Every employee works in the wake of leadership, so I am determined to be purposeful in what I do. At the end of the day, every decision is intended to make Noble better, to give our employees a reason to be proud of the work we do, and to serve this nation's beef cattle producers.”

—STEVE RHINES

IN THE WAKE OF LEADERSHIP

For the better part of 18 years, Rhines had been the man behind the man.

When he came to Noble, he served under Mike Cawley, a sincere and steadfast leader with a fatherly touch and a baritone voice. The stalwart of Noble's chapter of growth, Cawley guided the organization for 22 years. He's now a mentor and friend.

For the past seven years, Rhines' predecessor, Buckner, challenged Noble to undertake large-scale, national projects.

Rhines hopes to embody the best qualities he's observed in the leaders around him and beyond: Cawley's genuineness and mentoring, Buckner's vision for impact, his father's work ethic and character, and — from his faith — Christ's love for others. All the while, he is mindful of how his actions affect those he leads.

"As every leader moves, they leave a wake like a boat cutting through the water," Rhines says. "Every employee works in the wake of leadership, so I am determined to be purposeful in what I do. At the end of the day, every decision is intended to make Noble better, to give our employees a reason to be proud of the work we do, and to serve this nation's beef cattle producers." 🌱



ABOVE: Steve Rhines (center) answers questions alongside former President Bill Buckner and former Director of Philanthropy, Engagement and Project Management Mary Kate Wilson during the Ardmore community announcement that the Noble Foundation would become known as the Noble Research Institute. OPPOSITE PAGE: Steve Rhines is known for his thoughtful sense of humor and ability to see a grand vision focused on serving people.

# IN THEIR VEINS

By: COURTNEY LEEPER

Agriculture is not just a job for many at the Noble Research Institute.

~ IT'S LIFE. ~

## PRODUCERS SERVING PRODUCERS

Many at the Noble Research Institute have personal ties to farms and ranches across the globe. Earlier this year, employees were invited to share their production agriculture experiences through a survey. The following pages contain their stories.

*Frank Rhoades, research assistant, brings cattle up to be weighed and vaccinated at the Noble Research Institute's Oswalt Cattle Facility.*

# THERE ARE MOMENTS OF PURE BLISS OUT ON THE OPEN PRAIRIE.

A feeling of freedom, where peace arises from watching the cattle graze on gently rolling hills. There is satisfaction in making an unproductive piece of land spring to life again and in guiding an animal to meet its potential, knowing the act of working with nature is the basis for nourishing nations.

But there are also nights when temperatures drop and calves come anyway. Days when the drizzling rain makes tagging those new babies miserable. Fences break at the weight of an ornery steer, and drought dries up his food. Then the rains come but the rivers rise. The harvest spoils, and the bank note comes due.

*"What next?"*

*"How am I going to get through?"*

These are the questions for which the Noble Research Institute seeks answers. For the moment of frustration but, more important, to help prevent the crisis. Weather and markets can't be controlled, but risks can be managed and tools developed so that farmers and ranchers can make intentional decisions for their land and operations.

It takes a team of people from across the planet to dig up knowledge and turn it into resources for producers. This quest is just as much personal as it is professional for many at the Noble Research Institute. Sometimes they, too, are the producers striving to improve their operations.

They may have grown up on farms or ranches just down the road or on another continent. They may unravel mystery behind the microscope or out in the fields. Either way, they share a deep-rooted desire to serve producers. Agriculture is not just a job for them. It's in their veins.

*Devlon Ford, research associate, waves an electronic reader over a heifer's electronic identification (EID) tag. The tag number connects to an electronic database that allows the individual animal's information to be traced throughout its lifetime.*



**"The best part of what we do is helping producers. I'm in the background; the consultants and researchers design the projects, and we do the work on the ranches. But eventually what we learn out here can be taken to the producer."**

## RANCH TO NOBLE RANCH

Mid-February rains have given way to a day of sunshine, and **DEVLON FORD** isn't wasting it.

Ford sets his laptop on a work-worn metal table next to the cattle chute at Noble's Oswalt Ranch while other cowboys ready a group of heifers that had come in from Valentine, Nebraska, four days before. They had been waiting for better weather to work with the young females.

"They came off the truck looking pretty good," Ford had said earlier of the cattle that will soon graze different forages as part of a project led by Twain Butler, Ph.D. They may also become part of studies that look at how to develop heifers into cows that stay in the herd longer.

Ford wears a pair of black gloves with "Oklahoma Beef Quality Assurance" written across them and the tip cut out of the right pointer finger. He laughs, calling them his "specially modified gloves." They make it easier to poke numbers — data points, like weights — into the computer.

Ford grew up just 30 miles away, in Lone Grove, Oklahoma, and spent much of his younger years on his grandparents' land outside of nearby Springer. His mother's family raised horses and rodeoed, while his father's family raised cattle and farmed.

"As I grew older, I became more interested in the cattle side of livestock," Ford says, "and, although I seldom have the opportunity, I still enjoy being mounted on a good horse to work cattle."

Ford was only 24 years old when he started working on Noble's Pasture Demonstration Farm, just north of where he grew up. However, he had already spent nearly a decade working on different operations with cattle, from Longhorn to Simbrah, beyond his family's ranch.

In those first few years at Noble, Ford stayed many late nights in the tractor planting wheat and rye for stockers. Often, he wouldn't go home until 8 or 9.

Gradually, he became more involved with keeping the cattle records. Today, he is a go-to person for those wanting to know how many cattle are on Noble's 14,000 acres of research and demonstration land (1,601) or how many calves have been born (159 from Jan. 9 to Feb. 22). He can also tell the story of each cow, through numbers and personal experience, and how she contributes to research just by doing her thing — eating and raising calves.

"The best part of what we do is helping producers," Ford says. "I'm in the background; the consultants and researchers design the projects, and we do the work on the ranches. But eventually what we learn out here can be taken to the producer."

Ford's home base is Coffey Ranch, one of seven Noble properties, where he can watch some of the herd from his front porch. The ranch is where he and his wife, Tina, raised their two sons. But 45 minutes away, Ford also runs his own cattle on his father's portion of the family land. The small herd is largely built from heifers his kids showed in their 4-H and FFA days, though this fall he plans to sell the cows and start fresh.

"Right now, it's not an economically sustainable operation," Ford says. "I want to get in and do some of the things we talk about here at Noble."

That starts with the soil, he says. He'll clean up the property and reorganize fences so that he can better manage rotational grazing when he puts cattle back on the land. He plans to work with soils and crops consultants to start rebuilding organic matter. And, before bringing cattle back, he wants to run different marketing scenarios with the economics consultants to see what would work best for his management style and time limitations.

"I like working with the cattle, and I like working with people who like working with the cattle," Ford says. "But I also want to improve the quality of land that my grandfather worked so hard to buy and make a living off of."

## A NOBLE CAUSE

Delivering solutions to great agricultural challenges is a personal mission for many at Noble.



**TIM BOATRIGHT** grew up on a beef cattle, corn and cotton farm in Littlefield, Texas, and now maintains and repairs tractors and other equipment at Noble.

*"I became a John Deere technician because I saw how important the support of farming was — and is — to production agriculture."*



**GAYLE DONICA**, human resources manager, grew up on a ranch in southeastern Oklahoma and now manages stocker cattle with her husband, Kent.

*"Knowing the risk, struggles and challenges in the ranching industry, and having a personal stake in producing beef, gives me great appreciation for what the Noble Research Institute does. It helps me not only understand what we as an organization are trying to accomplish, but also what other farmers and ranchers are up against."*



**ROBERT WILLIAMS**, safety and risk manager, grew up on a small beef cattle operation on the 120-acre farm that his grandfather started in Overbook, Oklahoma.

*"Being part of an organization that supports the family farm is very important to me."*



**LARRY YORK, PH.D.**, grew up tending horses in London, Kentucky, and now gardens with his wife, Xinji, and their 4-year-old daughter, Wanda.

*"While I didn't grow up in production agriculture, I appreciate the hard work involved from years of breaking ice in the horse trough, throwing bales into the loft and feeding no matter the weather. Growing up in the country around 'real' farmers gave me an appreciation for their labor as well as for nature."*

## CATTLE CALCULATIONS

Numbers come naturally to **MYRIAH JOHNSON, PH.D.** After all, she's been counting cows since she was 2 years old.

Johnson grew up on a 2,000-acre wheat, cow-calf and stocker operation in north-central Oklahoma, where her father and brother continue to farm and ranch. She smiles, remembering her early years of tending bottle calves and following her dad out to the pasture to feed cattle.

In high school, the farm girl excelled in math. Calculus. Statistics. All of it. But she knew she wanted to remain involved in agriculture. During her search for a college major, agricultural economics seemed like the obvious choice.

"I thought, 'This is the ag field that does math, so that's what I'm going to do,'" she says.

Johnson went to Oklahoma State University, just 30 minutes from home. During her first semester, she took an ag econ class with Derrell Peel, Ph.D., who uses his livestock marketing and risk management insights to serve Oklahoma producers. From that first day, she thought: "Yep. This is where I'm supposed to be."

After earning her master's in ag economics and doctorate in animal science at Texas A&M, Johnson joined the Noble Research Institute as an agricultural economics consultant in 2016.

One of her responsibilities is to analyze information collected as part of a national beef sustainability pilot project, which follows calves all the way through the beef value chain, from the ranch to the feedlot to the packer, processor and ultimately McDonald's. She studies the data, looking for clues that help her build recommendations on how producers can be more efficient on their operations.

"Farmers and ranchers have so many things they have to be: animal nutritionists, agronomists, mechanics, marketers," Johnson says. "They don't have time to be a mile deep in all those things. I feel like that's where I can be useful: I can do the deep dive and provide that information they need to make decisions."

While Johnson has been known to spend vacation days on her family's farm planting wheat and weaning calves, most of her contributions are made at the computer 150 miles south. She runs numbers, helping her father and brother decide on insurance programs and marketing strategies. In the last two years, they have gone from marketing calves at the sale barn to directly selling to the feedyard, and they continue to look into other options, such as retaining ownership of calves as they gain their final pounds.

Staying in tune with her family's cattle operation helps her assist not only them but also other producers because the more data she can pore over, the more complete a story she sees.

She knows her family's herd health protocol is similar to that of many producers who work with Noble. So when she sees some cattle getting sick in the feedyard while others don't, she is able to look at other factors (like age, weather and genetics) to get a better picture of what might be going on — and what adjustments can be made to keep cattle healthier.

"Our work is tailored to answering important questions that require a lot more time and resources than any one person could give on their own," Johnson says. "I've always had an internal feeling that whatever I do, I want it to apply back to the farm, and I never want to stray from that."

**"Farmers and ranchers have so many things they have to be ... I feel like that's where I can be useful: I can do the deep dive and provide that information they need to make decisions."**



*Myriah Johnson, Ph.D., serves as the economics program leader and an agricultural economics consultant.*



### BY THE NUMBERS

A total of 57 employees shared their personal stories of growing up on farms and of their current involvement in production agriculture.

# 70%

of respondents are still **ACTIVELY INVOLVED** in farming, ranching or gardening



of current producers raise **BEEF CATTLE**



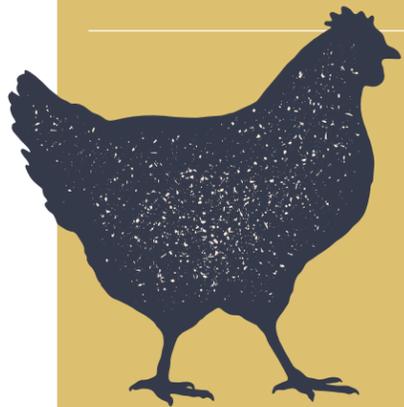
# 44%

of current producers grow their own **FRUITS AND VEGETABLES**

## LIFESTYLE YIELDS TASTY REWARDS

As a child, **TABBY CAMPBELL** spent time on her grandfather's small farm in Enville, Oklahoma. Today, she continues to grow fruits and vegetables in her backyard, and she supervises the Ag Services and Resources Core.

“My grandfather raised chickens for eggs and meat; a cow for milk, butter and cream; hogs for pork; and vegetables to eat as well. He lived a very simple life, and I loved being with him. He raised bees for honey and had a small pond that provided us with an occasional fish dinner. He was a man of God and depended on the land to take care of him and his family. More recently, I've done a little research myself. I grew new potatoes in a pile of hay covered with hog wire. Once the potatoes started making large vines, they came up through the hog wire. I was able to lift the wire up like a car hood and pick some potatoes for supper. I find growing my own food very rewarding, and I like to try new things to improve my crops.”



**TIM WOODRUFF**'s family gardened and raised a billy goat and 25 egg-laying chickens in the backyard of their home, in an Atlanta suburb. He now serves as a web designer.

“My family's interest in agriculture was only a hobby, but we enjoyed being able to have eggs and vegetables to supplement our groceries.”

Venkatachalam Lakshmanan, Ph.D., studies soil microbes as a postdoctoral fellow. He also manages a farm in India with his brother.



## TO SOLVE HUNGER

**VENKATACHALAM LAKSHMANAN, PH.D.**, grew up following his grandfather across the red loamy land his family has farmed since 1901.

As a child, he would dart out of school every day to help his “ayya” tend goats or work in the fields of their remote village near Oddanchatram, Tamil Nadu, about 200 miles from the southernmost tip of India. When the elder man hitched up the ox to plow, Lakshmanan would go with him. When it was time to irrigate, the young boy would let his grandfather know when the well water had filled one plot and it was time to move to the next.

“I was involved in all aspects of farming,” says Lakshmanan, whose village is home to about 80 families, all of whom grow food on 2 to 20 acres.

After finishing fifth grade at the local school, Lakshmanan attended high school in town. Every morning, he would ride his bicycle the 2.5 miles to school and return in the evenings. On days when his father sent vegetables — like tomatoes, eggplants, beans, chili peppers and okra — to market, Lakshmanan would stop by to watch them sell and collect the baskets to bring home.

Lakshmanan became the first in his family to go to college, turning down an engineering school in favor of studying agriculture. On his first day of class, he knew he had made the right decision. The teacher walked in and asked, “Why do we need agricultural research?”

“He looked at us and said, ‘Today, 20 million kids in India are going to sleep without food,’” Lakshmanan says. “That’s the moment I knew I wanted to get all of my degrees in agriculture.”

In 2011, he earned his doctorate and went to the University of Delaware to study soil microbes as a postdoctoral fellow. Five years later, he learned of another postdoc position at the Noble Research Institute.

“I knew from my education and working in the fields in India that there was something to soil microbes, something beneficial for plant growth,” Lakshmanan says. “I knew I wanted to do something that would have direct use for farmers, so I thought, ‘OK, I’ll do this.’”

“Having the direct contact with farmers is my favorite part of what I do. Helping them is what gives me satisfaction. I am a scientist, but I am a farmer first.”

He started working with Kelly Craven, Ph.D., who, along with James Rogers, Ph.D., looks at a combination of two agronomic practices, no-till and cover crops, in winter wheat pasture to see how they influence subsequent wheat production, cattle performance and economics. Lakshmanan studies how the practices affect the beneficial microbial communities in the soil. Now in the Functional Genomics Laboratory, led by Michael Udvardi, Ph.D., Lakshmanan is also interested in isolating microbes specific to a particular plant so they could be used to achieve targeted benefits in that crop.

The research has given him opportunities to speak to producers at conferences, like No-Till on the Plains. He shares with them his hope that they will soon be able to test for microbes and know which ones they need to add or reduce based on their soil's needs.

“Having that direct contact with farmers is my favorite part of what I do,” Lakshmanan says. “Helping them is what gives me satisfaction. I am a scientist, but I am a farmer first.”

On their family land in India, Lakshmanan and his brother continue to manage guava and sapota trees as well as *Gloriosa superba*, a lily that is highly valued for its medicinal uses. They are also establishing a guava orchard nearby on land they bought three years ago.

Though Lakshmanan is able to visit the farm only once every year or two, he constantly communicates with his brother. He finds his work on microbes too fascinating to give up, but he hopes to someday return to his homeland to continue his research and farming.

For now, he grows traditional Indian vegetables in his Oklahoma garden with the help of his wife, Vidhya Raman, Ph.D., also a postdoctoral fellow at the Noble Research Institute, and their 5-year-old daughter, Aadya Bharathi.

“I started out in agricultural research because I wanted to help with the hunger problem in India,” Lakshmanan says. “Now I also have the opportunity to help farmers and ranchers in the U.S.”

## LIFE LESSONS

Some of the greatest products that come off the farm or ranch are character qualities and skilled people.



**BECCA MCMILLAN**, senior administrative assistant, grew up around horses and goats and her husband, Zeno, grew up around cattle, chickens and goats in Mason, Texas, where his family also produced wheat and peanuts. They now raise cattle and goats with their 9-year-old daughter, Rory, on their ranch near Mannsville, Oklahoma.

“I believe growing up on a ranch teaches kids to be more responsible at an early age. Having animals depend on you invariably builds character, morals and values.”



**RONALD TRETT** grew up on a family dairy in rural south-central Oklahoma, and he has also managed a commercial cow herd of his own and haying operations of around 1,200 acres. He currently manages cattle and forages on Noble's Ardmore-area farms.

“Coming from a farming and ranching background gives you a different outlook on life. It has taught me perseverance over the years.”



**HUGH ALJOE**, director of producer relations, grew up on the family farm in Roscoe, Texas, and worked on several other farms and ranches as well as at cattle auctions before becoming a ranch manager at Marquez, Texas, after college.

“Raising a garden and constantly working with livestock throughout my youth taught me much about work ethic, animal husbandry and agriculture in general.”



**CHLOE JONES**, social media coordinator, grew up raising cattle in Rising Star, Texas, where her family also grows corn, peanuts, cotton and milo. She and her husband are developing their own herd outside of Ardmore, Oklahoma.

“Growing up on a ranch taught me the value of hard work and to love and take care of the land and its animals.”

## AROUND THE WORLD

Employees come together at the Noble Research Institute from 20-plus countries to carry out the vision of Lloyd Noble.

**YANINA ALARCON**, grew up following her father, an agronomist, to the field in Argentina. She now studies pecan genetics in hopes of improving disease resistance.

“My father is an agronomist who has a medium-sized company that sells alfalfa, soybean and sunflower seeds as well as agrochemicals. When I was little, he worked as a consultant for a research institute in Argentina. I remember going with him to check on sunflower and soybean field plots or taking soil samples. I was also exposed to people working in the lab, and all that raised questions for me that made me want to get answers through science. I would ask questions like ‘Why do the sunflowers move?’ ‘Why are you taking soil samples?’ and ‘What do you do to the samples?’ **It made me a curious person who, at the end, wanted to become a scientist and work on trying to answer some of those questions and, with those answers, help farmers.**”

**DAVID MCSWEENEY**'s father was a government agriculture adviser in New Zealand who, when he retired, bought a cattle and sheep farm, where the family spent all their spare time. McSweeney manages the acre of grass under glass as biosafety and greenhouse research manager. He also grows herbs in his aerogarden.

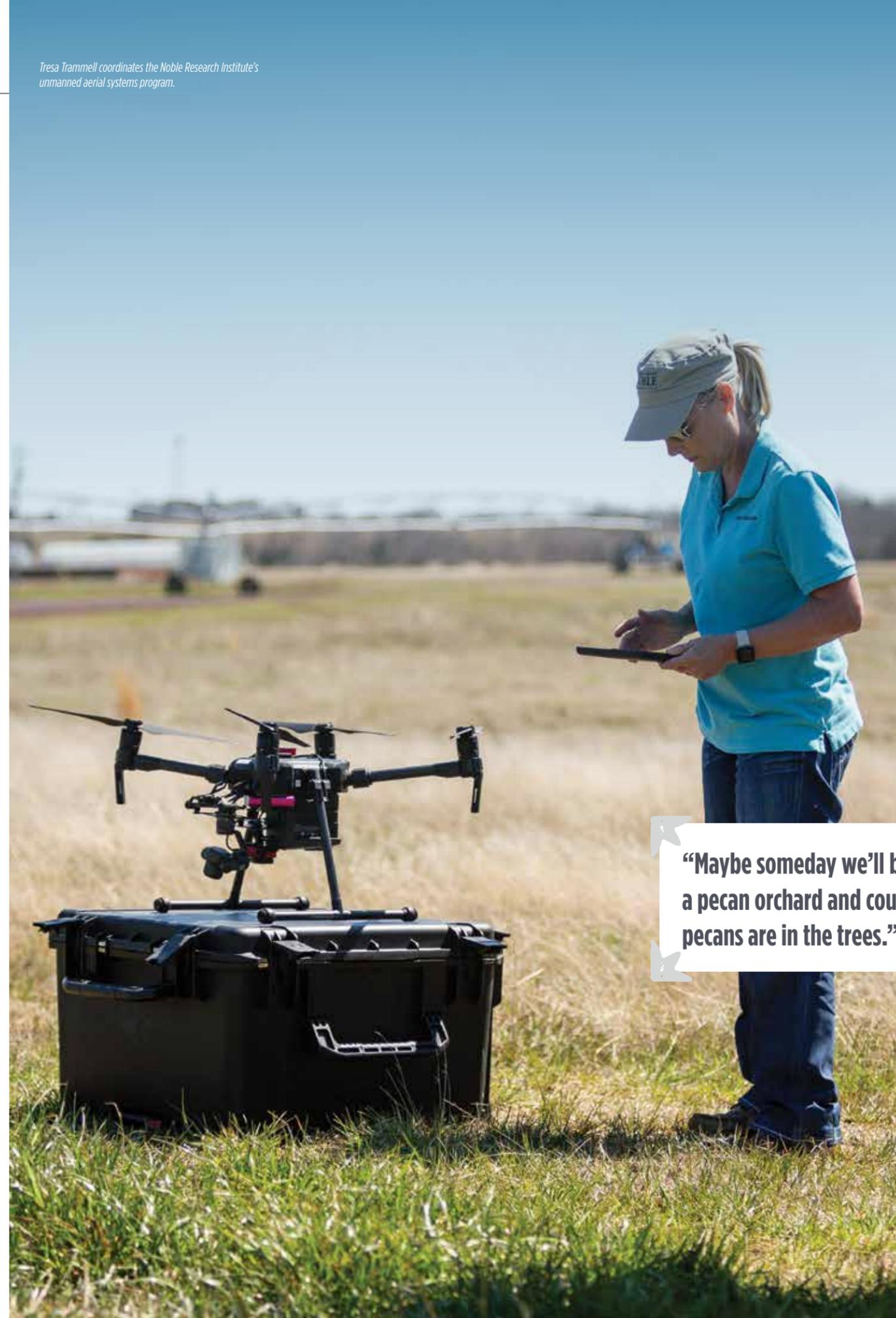
“We always had a strong ag background, but our time on the farm really helped me **share the passion of those who want to make things happen with the land.**”

**WANGQI HUANG**, grew up in Poyang, Jiangxi, China, where his family grew rice and raised chickens. He now works in Noble fields as a small grains breeder.

“My experiences taught me how to grow food. My wish is to **help farmers improve their income and life quality.**”

**YUHONG TANG, PH.D.**, fondly remembers working alongside her mother in the community field and family vegetable garden during her childhood in Yingjing, Sichuan, China. She now manages the Genomics Core Facility and teaches her children how to grow vegetables in their backyard.

“My childhood helped me **develop a love of nature and a compassion for farming and farmers.** At the end of the day, we all need to eat. We want to survive and find happiness. We are not so different from each other, and food and agriculture can be a common ground.”



“Maybe someday we’ll be able to fly a pecan orchard and count how many pecans are in the trees.”

## NO-TECH, HIGH-TECH

**TRESA TRAMMELL** was 3 years old when she moved to the C-Bar Ranch in Madill, Oklahoma.

When her father, Alden Combs, a schoolteacher in Carnegie, saw an ad for 1,000 acres, he decided to drive down and see it. Soon after, he took out a loan and moved his wife and three small children into a tiny trailer on the property, 200 miles southwest of the “nice little farmhouse” they had called home.

Combs taught in town and drove a school bus while building up his cow herd and planting pecan trees. The family lived off the land, growing fruits and vegetables to can or freeze. They raised 100 meat chickens every summer and milked their own dairy cow to churn butter.

“Things were tight, but we did what we had to do,” Trammell says. “It taught us a strong work ethic.”

Trammell remembers hoeing weeds with her sister in the cotton fields. Their father would take the cotton to a gin in Kenefic and bring home the seed to feed his cattle in winter. She also recalls picking pecans up by hand. As the youngest in the family, she would stand with her gunny sack closest to the tree trunk. The line of pickers would extend out to her father, who used a cane pole to knock the pecans from the trees.

“We use all modern equipment now, but we didn’t use any kind of mechanization back then,” Trammell says. “It’s amazing how far technology has come.”

In 1993, Trammell went to work as an administrative assistant at Noble. At the time, the agricultural consultants purchased aerial images of land owned by producers with whom they were working. Part of Trammell’s job was to take those images and put them in a form that a consultant could use to measure land areas and make maps useful to the producer.

It would take at least two days, often a full week, to create one map. Then, in 1996, Trammell started learning software that used geographic information systems, or GIS, to take the handwork out of mapmaking. While the consultants today digitize most of the producer maps thanks to rapid advancements in programming, Trammell has her eye on other futuristic technology.

Most of her time now is spent flying drones across fields, gathering data for plant science research projects. She and others are also watching the evolving technology space for tools that hold potential for farmers and ranchers.

There are many tech startups coming out with suites of tools for producers, she says. Drones can be flown to count plants and detect diseases, weeds, pest problems and water stress. Research companies are testing the use of drones equipped with thermal imaging to identify feverish animals before they show symptoms of illness, which may help reduce use of antibiotics.

“These are all things we don’t know much about yet,” Trammell says, “but we know they’re coming.”

While most of the Noble Research Institute’s drone use is to gather information for scientists looking at how to develop more efficient, disease-resistant forages, Trammell says some of the data they collect is also used to help companies hone the algorithms of web-based apps and other tools for producers.

“Maybe someday we’ll be able to fly a pecan orchard and count how many pecans are in the trees,” says Trammell, who continues to help with her family’s pecan harvest every year.

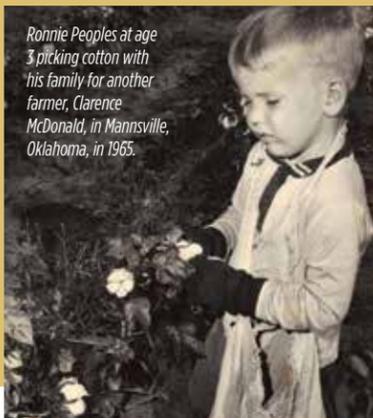
Her father, now 82, still works from sunup to sundown alongside her brother, she says. They now manage 1,500 pecan trees and 140 cows on more than 3,000 acres.

“Looking back, I’m so thankful for what Mom and Dad did for us,” Trammell says. “There wasn’t anything given to us. We built it all on hard work, and we did it all as a family.”

## HONORING THE PAST, GROWING STRONGER

**RONNIE PEOPLES**, construction maintenance technician, grew up on a farm in Mannsville, Oklahoma, where he continues to grow some of his own fruits and vegetables.

“My dad used to grow cotton, as did his dad. I remember stories of Dad telling about how he used to ride with my grandpa on the wagon loaded with cotton. In one story in particular, they had to stay overnight camping out in bitter cold weather. I also remember my mom making me a cotton sack, and I started pulling bolls with them when I was 3. In later years when I was growing up, we always had huge gardens or ‘truck patches,’ where my parents grew a variety of vegetables to sell and put up. As a youngster, I developed a distaste for shelling peas, snapping beans and cleaning corn; but we always had a cellar full of canned goods. My income as a youngster and teenager revolved around selling pecans, hoeing, selling blackberries, trapping, selling crawdads and hauling hay. I’ve grown a few fruit and pecan trees and vegetable gardens for myself. **All of this plays a part of who I am of being independent but also having a connection to the agriculture community and learning to never give up; to always strive to do better; and to appreciate the outdoors, friends and family, as well as life and what our ancestors accomplished to bring us to where we are today.**”



Ronnie Peoples at age 3 picking cotton with his family for another farmer, Clarence McDonald, in Mannsville, Oklahoma, in 1965.



Josh Anderson, senior research associate, works in the field as part of the small grains program.

## THE BEST INVESTMENT

Many of **JOSH ANDERSON**'s childhood memories were made in a John Deere tractor.

From the time he could toddle, his grandfather would hold him while letting the young boy “steer” the tractor through peanut, corn and soybean fields. Later, as a teenager, he would drive solo, planting wheat and rye to feed cattle through the winter on their farm in Mannsville, Oklahoma.

By the end of elementary school, Anderson owned his first cow. She had come from his father’s herd, so, in exchange for pasture and feed, Anderson would give his father the bull calves while building his own herd through the heifers. One summer in high school, during baseball season, Anderson remembers checking a cow that was close to calving. He’d gone out to the pasture before a game and decided he’d stay home to make sure she didn’t have trouble.

“Life revolved around the farm,” Anderson says. “We were very family-oriented, and the farm was our job. It was all I knew.”

Shortly after Anderson graduated high school, the farm bill changed and his family could no longer afford to grow peanuts. In addition, the man from whom the family rented land died. Anderson’s grandfather retired and his father took an off-farm job, but Anderson was able to buy 240 acres of land they had previously rented so he could keep his cows.

To make the loan payments, Anderson worked part time in the small grains breeding program at the Noble Research Institute while attending Murray State College. Seven years later, he returned to the organization after earning his bachelor’s and master’s degrees at the University of Arkansas. During his time away, he managed turfgrass — even spending a year tending the field at Fenway Park for the Boston Red Sox.

“I moved home intending to either work on the farm or at Noble,” says Anderson, who seized his chance to return to Noble’s small grains breeding program.

“That focus on forage is good for the cattle producer. It’s exciting being a part of that because it means what I do here directly relates to what I do now on the farm.”

In the 12 years Anderson has worked, both part time and full time, with the program, it has released six different wheat, rye, oat and triticale varieties that emphasize forage production.

“That focus on forage is good for the cattle producer,” Anderson says. “It’s exciting being part of that because it means what I do here directly relates to what I do now on the farm.”

At home, Anderson manages 500 acres primarily for grazing cattle. He plants small grains he has helped develop as well as radishes, turnips and other species, which add diversity and boost soil health.

In 2017, he bought a no-till drill, which he says has been one of his best investments for both his land and his pocketbook.

“We don’t have to plow anymore,” Anderson says. “We’re only driving over a field once now instead of twice. That saves us fuel and time, which is a huge benefit especially when you also work off the farm.”

With no-till, Anderson now has more time and money to plant both pasture and field areas. His goal is to produce year-round forage for his cows, something Noble researchers have been evaluating. Following what they’ve found, he plants wheat and rye (which grow in cooler months) into his bermudagrass and native pastures (which grow in warmer months) so that there is nearly always something green. He also plants a summer cover crop for his cattle to graze so they don’t put as much pressure on the bermudagrass, allowing it to last longer into the fall.

As a result, Anderson doesn’t need as much hay to get his cattle through winter. While he used to feed 50 to 60 bales per year, he is down to 10.

“I’ve lived the good and the bad of farming and ranching,” Anderson says. “It makes all of what we do here seem a little more important.”

## FIRSTHAND EXPERIENCE

We combine our various backgrounds and expertise to find solutions to problems faced by farmers and ranchers.



**MIKE TRAMMELL**, senior plant breeder, grew up on a beef operation in Oklahoma before moving to Nebraska and working with cattle producers there. He now manages his own small herd in Wilson, Oklahoma.

“My experiences give me more of an appreciation for the decisions that producers make about the management of their operations when it is their sole source of income.”



**TWAIN BUTLER, PH.D.**, grew up on a beef and dairy cattle, hog, and wheat farm in Vashti, Texas. Today he leads Noble’s Forage Agronomy Laboratory.

“Growing up on a diversified livestock farm in the Southern Great Plains gives me an appreciation for what can help producers in this region.”



**CHARLES ROHLA, PH.D.**, grew up raising beef cattle (stockers) and hogs and growing wheat and alfalfa on his family’s farm in Chester, Oklahoma. Today, he manages beef cattle, hogs, horses and pecans on his own farm in Roff, Oklahoma. He also manages Noble’s pecan and specialty agriculture activities.

“Having an operation helps me better understand what a producer deals with daily. This helps me understand what questions producers are asking so that we can help develop research projects that address those questions.”



**JIM JOHNSON**, soils and crops consultant, grew up working on corn and soybean farms in Illinois. He now manages a beef cattle and pecan operation in Pottawatomie County, Oklahoma.

“I know firsthand the weather, labor and financial struggles that a cattle producer faces and have firsthand experience with many of the practices I recommend on the job.”

**FIXING**  
**HAIRY**  
**VETCH'S**  
**BAD REPUTATION**



Noble scientists are using the gene editing technique CRISPR to improve legume cover crops.

BY DANA SMITH, PH.D.





Like a professional sports team, what producers do in the offseason can make a big difference when it comes to their bottom line. And one of the most important decisions a producer makes is which crop to use as a cover.

Cover crops protect the soil from erosion due to wind and water and help suppress weeds. They should have deep roots and cover the ground completely, and

many double as a forage crop for cattle. Different regions may also have specific requirements, such as cold tolerance in the North or drought and heat tolerance in the South.

Small grains such as rye, oats and wheat are the most common type of cover crop and are used in more than half the acreage. However, scientists at the Noble Research Institute think that legumes, which currently constitute less than 20 percent of cover crops, could be a viable — and valuable — alternative.

Legumes add nitrogen back into the soil through a symbiotic relationship with certain species of bacteria. The bacteria live in the roots of the legumes and convert nitrogen from the air into a form that's beneficial for plants. When the legume is decomposed back into the soil, the nitrogen is released, providing nutrients for the commodity crop. This "green manure" can reduce growers' nitrogen fertilizer needs and may be a cheaper alternative to traditional fertilizers.

"The advantage of using legumes as a cover crop is they are kind of a protein punch, like those power bars that we eat, because they fix nitrogen in the soil," says Suresh Bhamidimarri, Ph.D., who leads Noble's Forage and Cover Crop Legume Breeding Laboratory. "In comparison, other plants used as cover crops are nitrogen hogs."

One legume in particular stands out for its regional versatility. Hairy vetch has good cold tolerance and can be used as a winter cover crop in northern latitudes to protect the ground from ice and snow. It can also be grown in southern states, where it is used as a dual forage and cover crop.

*Suresh Bhamidimarri, Ph.D., who leads the Noble Research Institute Forage and Cover Crop Legume Breeding Laboratory, collects leaf tissue from hairy vetch plants. He and his team visit a selection nursery after collecting data on hairy vetch growing in Knox City, Texas (opposite page, bottom). They are also experimenting to propagate hairy vetch through stem cuttings (opposite page, top) in the laboratory as part of the breeding program.*



### HAIRY VETCH FOR PASTURES

Suresh Bhamidimarri, Ph.D., is also working to develop a solely hardseeded variety of hairy vetch. This could be useful to producers who want to overseed the legume into perennial pastures, such as bermudagrass, for its nitrogen-fixing abilities. The plant grows in the summer, and the hardseededness trait makes it more likely to grow back in the fall.





“If Suresh is successful in producing a softseeded hairy vetch, the potential for crop farmers could be huge. All of the corn and soybean acreage in the U.S. needs a cover crop of some sort. Producers typically use a rye or a wheat, but they understand the legume’s potential benefit because of its ability to fix nitrogen. If this works, the sky’s the limit.”

—TWIN BUTLER, PH.D.

Despite its potential advantages, many producers see hairy vetch as a liability. The plant’s bad reputation is rooted in its hardseededness, which is present in roughly 25 percent of the crop. Hard seeds lie dormant in the ground for years. In a forage environment, this can be an advantage because growers don’t have to worry about replanting every year. But producers consider hairy vetch to be a weed because if the plant grows at the wrong time, it can interfere with their commodity crop.

“Many farmers frown upon using hairy vetch because it’s perceived as a noxious weed,” says Twain Butler, Ph.D., a research agronomist at Noble and project manager for the national cover crop research initiative funded by Noble and the Foundation for Food and Agriculture Research (FFAR). “Due to this perception, many producers won’t even try to plant it. If we could solve the seed problem, it would allow it to be more widely adopted.”

#### A BETTER COVER CROP

Bhamidimarri is trying to fix this seed problem using CRISPR/Cas9 to edit the plant’s genome. He hopes to produce a new variety of hairy vetch that only has

soft seed by deleting the hardseededness genes.

“We want to provide farmers and ranchers with more options,” he says. “This way, they could choose an exclusively hardseeded or softseeded variety depending on their needs for a forage or a cover crop.”

The CRISPR/Cas9 system acts like a pair of genomic scissors. The CRISPR part of the package is designed to exactly match a section of DNA so it can home in on a specific gene. Once the section is located, the Cas9 protein snips the DNA, inactivating the target gene.

One benefit of using genome editing in hairy vetch is that it eliminates the chance of the hardseededness trait being reintroduced when the plant reproduces. Hairy vetch is an outcrossing plant, which means it needs pollen from a different plant to reproduce. With traditional breeding methods, there is no guarantee that a bee that’s been pollinating a wild variety of hairy vetch won’t fertilize the bred variety. The next generation of plants could be contaminated with a new copy of the hardseededness gene and potentially carry that trait. With CRISPR, you edit out both copies of the hardseededness

gene, removing this possibility.

The process is easier said than done, however. Because hairy vetch is not a popular plant like wheat or corn, its genome hasn’t been sequenced. So the first step for Bhamidimarri’s team is to find the genes responsible for hardseededness. Fortunately, they have a template in soybean, a related legume in which two hardseededness genes have already been identified.

Once they confirm the relevant genes, the researchers will get to work knocking them out. Amr Ibrahim, Ph.D., a postdoctoral fellow in Bhamidimarri’s lab, is currently perfecting the process to introduce the CRISPR/Cas9 package into the plant’s cells. Eventually, they will help the edited cells grow into a new variety of hairy vetch, one that hopefully only produces soft seeds.

“If Suresh is successful in producing a softseeded hairy vetch, the potential for crop farmers could be huge,” Butler says. “All of the corn and soybean acreage in the U.S. needs a cover crop of some sort. Producers typically use a rye or a wheat, but they understand the legume’s potential benefit because of its ability to fix nitrogen. If this works, the sky’s the limit.” 🌱

## DO-IT-YOURSELF



### JOIN A BEE CLUB

Beekeeping is an age-old art that has received renewed interest in the past few years. Before getting started, Charlie Canny recommends joining a beekeeping club to learn from others with personal experience. The local public is welcome to attend the Texoma Beekeepers Association’s meetings at the Noble Research Institute every second Saturday of the month. Follow TOBA on Facebook at [www.facebook.com/TOBAbees](http://www.facebook.com/TOBAbees) or find associations across the U.S. by visiting [www.abfnet.org/page/states](http://www.abfnet.org/page/states)

## BUZZING INTO SPRING

Spring has brought new calves and fresh growth on farms and ranches across the nation. The warmer weather is also stirring up the bees, which will be busy pollinating crops and making honey this season. If you are interested in taking up beekeeping, turn the page to find out how to build a hive and where to meet fellow bee enthusiasts. There’s no better way to build community than through food, so be sure to also check out Yaxin Ge’s eggroll recipe on page 52. 🐝



See Charlie Canny and Pat Tickle build a brood box and a frame by watching the DIY video at [www.noble.org/diy-beehive-brood-box](http://www.noble.org/diy-beehive-brood-box).

# How to Build a Beehive



If you are thinking about becoming a beekeeper, the first step is to find a community of people on the same learning journey. The next is to build a hive — the home for your bees.

## SUPPLIES

- Cut pine wood or bee box kits (see note)  
You will need the following components for a 10-frame Langstroth hive:
  - 2 brood boxes and 3 super boxes (this is a starting point; some beekeepers use more, depending on their bees' productivity)
  - 10 frames per box
  - 1 bottom board
  - 1 inner cover
  - 1 outer cover
- Wood glue and brush
- 6-penny nails
- Screws
- Hammer
- Clamps and square
- Paint (white or other light/pastel color)
- Nail gun (optional)
- Cordless drill/driver with driver and drill bits (optional)
- Frame assembly jig (optional)

**Note:** While you can cut your own pine wood to size for the boxes and frames, Charlie Canny says it's usually also cost effective to buy kits. The kits come with pre-cut wood pieces in the right dimensions, and they are often built to include finger joints that give extra strength to the box. If you would like to build your hive from scratch, see the appropriate dimensions for a 10-frame Langstroth beehive at [bit.ly/frame-langstroth-beehive](http://bit.ly/frame-langstroth-beehive). Langstroth beehives can also be built slightly smaller, with eight frames.

## DIRECTIONS

### Build the brood and super boxes

**Step 1:** Brush wood glue onto the wood and join the edges of the boxes, making sure that the handles are on the outside if you are using a kit that offers built-in handles. This is an important step because wood swells as it ages, creating gaps. The glue helps solidify corners, ensuring the beehive can last several years. It's common for a hive to remain in good condition more than 10 years.

**Step 2:** Use a hammer to ensure that all edges are well joined. Then attach clamps to the glued box and use a square to make sure the corners are perfectly squared.

**Step 3:** Nail the box together with a basic hammer or with a nail gun. You'll want to make sure there is a nail at each finger joint, or about 36 in one brood box.

**Step 4:** Once the box is built, paint it with an exterior latex paint to protect the wood against the weather. White is the most

popular color because it helps reflect light, which keeps the bee home cool in the summer. Other popular colors include pastels, like yellow, green and pink.

### Build the frames

**Step 1:** If the kit has a piece (called a "wedge") that snaps out of the top bar, remove it. Then brush wood glue onto the edges of the other pieces and stick them together. They should easily snap back snugly into place.

**Step 2:** Add a piece of foundation to the frame. The foundation is where the bees will do their work. They are frequently embossed with small honeycomb shapes that encourage the bees to use them. Each cell is the exact size needed for one egg to be laid and hatched. Foundations can be made from natural wax or plastic. They often have a waxy film on them.

**Step 3:** Reinstall the wedge, then nail all the sides together. Use shorter nails to reinforce the area around the wedge.

**Optional:** If you have a frame assembly jig, you can make all 10 frames at one time.

### Setting up the hive

*The Langstroth beehive, which is named after Rev. L. L. Langstroth — the father of American beekeeping and the mind behind this still-popular design, is made up of several boxes. Each is stacked on the other throughout the season as the bees become more productive.*

**Step 1:** Place a "bottom board" on bottom. The bees will fly in and out of the hive through this board. When you have a young or small colony, you can install an "entrance reducer," that restricts the entry space. This allows the bees to more easily protect themselves against intruders, like crickets and mice. Bottom boards can be purchased or made from a kit or from scratch.

**Step 2:** Place one of the brood boxes on top of the bottom board. Once you get bees, you will install them in this box. The queen bee will lay her eggs in the brood box, and worker bees will use it to store pollen and honey that the colony will consume.

**Step 3:** Place an "inner cover" over the brood box. This prevents the bees from completely sealing up the box. Place an "outer cover" on top of this. There are different types of outer covers. The one Charlie Canny uses is called a "telescoping cover."

**Step 4:** Once you have installed bees, the setup is called an "apiary." When the bees have filled the bottom brood box about 80 percent full, place another brood box on top. Once that box is 80 percent full, top it with a super box, which is slightly shorter than a brood box. Continue this process as much as needed. Beekeepers harvest honey from super boxes, which once full can weigh up to 60 pounds.



Charlie Canny, Noble Research Institute director of facilities, manages two beehives and is active in the Texoma Beekeepers Association (TOBA), which is supported by the Noble Learning Center. Pat Tickel, TOBA president, has been managing bees for 12 years. Canny and Tickel say one of the best parts of beekeeping is the close-knit community of people who come together and help each other achieve their goals, whether to sell honey, pollinate crops and flowers, or simply enjoy these fascinating insects.

**SLICE, DICE AND MIX IT UP**

Yaxin Ge says most egg rolls contain finely chopped ingredients, but she prefers a slightly thicker texture. Any vegetable will do, she says. Often she adds black agaric, a Chinese mushroom that should be soaked in water for two hours before use. You can also add meat, such as beef, pork or chicken. Simply slice and stir-fry before adding it to the other ingredients.



## Colorful Vegetable Egg Rolls

Yaxin Ge, Ph.D., shares her egg roll recipe, a favorite at the Noble Research Institute for more than a decade.

**INGREDIENTS**

- 1 package (25-count) spring roll wraps
- 2 eggs
- 1-2 carrots, peeled
- 1/2 pound green cabbage
- Onions (in different colors, such as green, yellow, red and white)
- Dark green vegetables of your choice
- 1 small package bean starch vermicelli (also known as cellophane or glass noodles)
- Salt, to taste
- Canola oil
- Egg white

**Yields:** 25 egg rolls

**DIRECTIONS**

*Begin by heating the canola oil in a deep fryer to 350°F. Set out the spring roll wrappers so that they reach room temperature.*

**Make the filling**

**Step 1:** Cook noodles in boiling water and set aside.

**Step 2:** Wash and chop all vegetables, placing them in a large mixing bowl: Julienne slice or grate the carrots. Thinly slice the green vegetables and cabbage (Yaxin used a second cabbage as her dark green vegetable) and onions (Yaxin used one yellow onion and one bunch of green onions).

**Step 3:** In a lightly oiled frying pan, scramble the eggs. Add them to the mixing bowl.

**Step 4:** Once the noodles are fully cooked, drain and chop them. Add to the mixing bowl.

**Step 5:** Stir all prepared ingredients in the bowl until well-mixed. Add salt to taste.

**Make the egg rolls**

**Step 1:** Place one spring roll wrapper diagonally on a plate so that one corner is closest to you.

**Step 2:** Pile 2 to 3 tablespoons of the filling in the bottom corner. Some of the wrapper should still show around the filling.

**Step 3:** Fold the bottom corner over the filling and begin to roll. It is important to roll tightly so that the filling does not come out of the wrapper during the frying process. About halfway up the wrapper, fold the two sides in and continue rolling until there is about a half-inch of wrapper showing.

**Step 4:** Wash the final, bare end of the wrapper with egg white and stick it to the rest of the roll.

**Step 5:** Place the egg rolls seam-side down in fryer and let cook five to six minutes or until they are golden-brown. Flip them over about halfway through cooking.

**Step 6:** Place the egg rolls vertically in a paper-towel-lined bowl or pan to allow the oil to drain off of them. Once they have cooled, enjoy!



Yaxin Ge, Ph.D., and Guangming Li, college classmates who married in 1983, learned to make egg rolls while living in the Netherlands before coming to Noble in the early 2000s. They say these tasty appetizers are not common in China, but even their Chinese relatives ask them to make egg rolls when they visit. These egg rolls are a favorite among their co-workers, who readily buy them up as part of the Noble Research Institute's 4-H fundraiser. Ge serves as a senior research associate in the laboratory of Larry York, Ph.D., and Li serves as a research associate in the Transformation Core.

JUNE

# 4 HOW PLANTS AND ANIMALS RESPOND TO GRAZING

8:30 a.m.-noon |  
Tues., June 4, 2019  
Noble Research Institute  
Kruse Auditorium, Entry 5  
2510 Sam Noble Parkway  
Ardmore, OK 73401

LEVEL 2 BUILDING

Many factors influence the way grazing affects your forage and your cattle. Join us to learn about the interactions between plants and animals as well as how both will respond to different grazing management practices. You'll also have the opportunity to visit some of our grazing paddocks and discuss the effects of grazing and applied management in the field.

No registration fee



# 11 MANAGING BRUSH WITH PROPER TECHNIQUES

8 a.m.-noon | Tues., June 11, 2019  
Noble Research Institute  
Coffey Ranch  
16877 State Highway 32  
Marietta, OK 73448

LEVEL 2 BUILDING

During this field day, you will learn the potential positives and negatives of woody plants depending on differing goals. You will also hear discussion on how to manage woody plant encroachment using several different techniques such as fire, mechanical and chemical control options. This field day will demonstrate how to apply certain control techniques as well as show past treatments.

No registration fee

# 14 MATCHING FORAGE QUALITY TO PERFORMANCE

9 a.m.-4 p.m. | Fri., June 14, 2019  
Noble Research Institute  
Coffey Ranch  
16877 State Highway 32  
Marietta, OK 73448

LEVEL 3 ADVANCED

One of the best ways to reduce your feed costs and increase revenue in your livestock operation is to optimize the utilization of forage in your pasture. This event is designed to help you learn how to manage the relationship between native forage and livestock, enabling you to improve the health and productivity of your native pasture while benefiting your cow-calf operation.

At this workshop, you will learn firsthand how to estimate native forage quality and quantity and how to use this to best meet your herd's nutritional needs. We will also explain and demonstrate the benefits of tools, such as grazing exclosures, prescribed fire and forage testing.

Registration fee: \$25, includes lunch



For more information or to register for one of our agricultural events, visit [www.noble.org/events](http://www.noble.org/events) or call 580-225-5810. **Registration closes five business days before the event.** If you have other agricultural questions, please call our Ag Helpline at 580-224-6500 or submit a question using the online form at [nobleapps.noble.org/aghelpline](http://nobleapps.noble.org/aghelpline).

JULY

# 30 MANAGING CROP LOAD FOR IMPROVED PRODUCTION

9 a.m.-noon | Tues., July 30, 2019  
Noble Research Institute  
McMillan Farm  
14797 McMillan Rd.  
Madill, OK 73446

LEVEL 2 BUILDING

Alternate bearing in pecans leads to problems associated with consistent production, quality and pricing. Proper pecan management can reduce the tendency for tree production to change drastically each year. By using fruit thinning, you can better manage for consistent, high quality pecans and help maintain crop and cash flow. This course will show you the proper ways to determine crop load and how to take action using fruit thinning.

No registration fee



AUGUST

# 27 UNDERSTANDING IRRIGATION SYSTEMS AND TECHNOLOGY FOR PECANS

9 a.m.-noon | Tues., Aug. 27, 2019  
Noble Research Institute  
Kruse Auditorium, Entry 5  
2510 Sam Noble Parkway  
Ardmore, OK 73401

LEVEL 2 BUILDING

With the extreme environmental swings that we are experiencing, irrigation is critical for maximizing production and profitability in pecans. This course will allow you to gain a better understanding of different irrigation systems and the technologies you can use to develop irrigation scheduling.

What You Will Learn:

- Types of irrigation equipment that is available
- How to use technology to improve irrigation efficiency
- How to determine the proper irrigation schedule

No registration fee

# THE GREAT HOT CHOCOLATE SAGA

by J. Adam Calaway, editor

It was a big day. I mean historic big. Monday, Jan. 28, was new-tie, shoe-shine, call-your-momma-later big.

After more than six months of searching, Noble's governing body had selected Vice President and General Counsel Steve Rhines to be the organization's ninth president and CEO. To give some context, Noble announces new presidents less often than Jurassic Park movies are released. Since 1993, dinosaurs have roamed the theater five times. New Noble presidents: 3.

With Steve's predecessor, Bill Buckner, already retired, there was no need to dillydally with the announcement. The governing body voted at its regular January meeting, and the following weekend was an electric ride of preparation that would culminate on a brisk Monday morning.

I arrived at the backdoor early, looking like a J. Crew pack mule with leather attaché slung over one shoulder, folders under my arm and a neatly stacked totem pole of food: a Tervis tumbler of tea topped by a small hot chocolate. The two drinks were crowned by a hinged-lid container holding that morning's breakfast.

As I stretched to run my badge across the electronic reader, my "Leaning Tower of Breakfast" did the inevitable. The container slid sideways. I attempted to counter by leaning the opposite direction, which accelerated the problem. The hot chocolate ricocheted off the backdoor and exploded like a Willy Wonka Napalm bomb. My usual catlike reflexes failed me, and my chocolatey treat drenched my stark white shirt, suit and, yes, new tie. This could have seemed like an omen for the day. Instead, it set the scene for a small example of why Steve is our new president.

Standing in the puddle of cocoa and annoyed with my own stupidity, I kicked the now empty cup to the side, stepped over the mess and proceeded inside,

attempting not to drip on the carpet. Within minutes, the communications team would assemble in our conference room to receive their marching orders for the day. So much had to be done in a matter of hours.

The plan was simple: get them started on their assignments, change clothes then return to the scene of the chocolate-debacle and clean up my mess. As with most big days, only two of those tasks happened. A flurry of activity commenced. Chairs and sound systems were set up. Video equipment prepped. Email announcements sent. Last minute tweaks to the speech finalized. Everything hummed along like a Disney cartoon song.

Thanks to my wife's childhood experience with her Ken doll, my new shirt-suit combo looked even better than the original.

Soon employees gathered for the big announcement. Rusty Noble, chairman of the Noble Foundation Board of Directors and grandson of founder Lloyd Noble, announced Steve's appointment. Steve stepped to the stage as thunderous applause and a few hoots and hollers filled the room.

The employee response offered a resounding affirmation that Noble's governing body had identified the right person, at the right moment, for the right reasons. In his trademark Steve-ness, our new president's first comment was a joke. As the applause subsided, he said, "Well, that went better than I expected."

Steve then rolled through his speech — a collection of reflections mixed with appreciation and a vision for the future. When he talked about his goal to be a servant leader, no one doubted his authenticity. Least of all me. Almost 13 years ago, Steve hired me. During my first few weeks, he told me this fundamental truth: "No matter our title, we are all here to serve."

The rest of the day was a blur. Photo shoots. External announcement. Pure



exhausting communications fun. In the waning moments of this big day, I ran to the backdoor to cross campus and came across a scene that serves as a glimpse into the heart of our new president.

There was Steve in his shined shoes and his new tie picking up a Styrofoam cup, one stained with cocoa, one that I had forgotten about. The local red ant colony had laid siege to the cup, opening a microscopic Starbucks. Steve was finessing the ants and the sticky cocoa, looking for the nearest trash can.

There he was — on the day he was named president — picking up my trash. He wasn't angry. He didn't ask why it was there. He was taking care of the problem.

If you want to know who our new president is, just know this — he is a servant first and foremost. He believes that we are all responsible for the details. No one is too important to do any job. Because even on big days, we still do all the little things that make Noble noble. 🌱



## News and Information at Your Fingertips

- Keep up with the latest news and information from Noble Research Institute consultants at [noble.org](https://noble.org)
- Check out our online store to purchase books about wildlife, plants and more at [noble.org/store](https://noble.org/store)



AVAILABLE FOR PURCHASE AT [NOBLE.ORG/STORE](https://noble.org/store)



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 **LEGACY** | Spring 2019 | Vol. 13, Issue 1



*Steve Rhines was selected to lead the Noble Research Institute as president and CEO in January 2019.*