

Legacy

Winter 2012



Noble Academy

YOUTH

SCIENCE

BIOLOGY

EDUCATION

FUTURE

CAREER

DNA

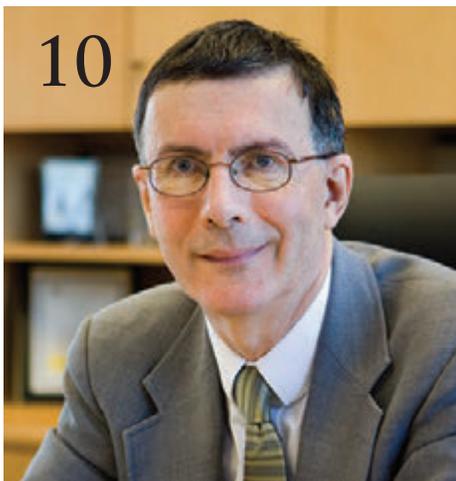
Agriculture



(on the cover) The Noble Foundation has launched a new educational initiative called Noble Academy. Through this program, the organization hopes to help reverse the trend in which youth have little knowledge of food production or agricultural science. Chalk illustration by Katie Brown.

*(above) The fungal pathogen *Phoma medicaginis* is seen growing on an alfalfa leaf that was infected as part of a plant-microbe study. The leaves' chlorophyll has been removed to better visualize damage inflicted by the fungus. Noble Foundation researchers study both harmful and beneficial fungi and how they interact with their host plants.*

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Cover Story

16 **Noble Academy**
 With fewer than 2 percent of the labor force working in agriculture, Americans' knowledge of how food is produced has dropped to an alarmingly low level. The Noble Foundation plans to change that with Noble Academy, the organization's new educational outreach program for young students.

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Legacy

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Continuing Education

Growing up on a small farm in mid-Missouri, no one ever talked about the importance of agriculture. No one had to.

Agriculture was not just our livelihood; it was a way of life. Our community was rooted in family, faith and farm, so the concept of anyone questioning agriculture's fundamental importance to society seemed unthinkable. However, life has since afforded me alternative perspectives.

My 30-year career in agriculture-related industries has taken me from Canada to Germany and across the United States. There has been and continues to be a growing lack of understanding about agriculture's role in society. We often isolate this phenomenon to the United States, but it is a global event.

A century ago, almost 40 percent of the United States' population worked in agriculture. Today, less than 2 percent of the population is required to feed a country and – in part – the world.

Through the generations, the reduced need for society to participate in agriculture has led to an ever-widening chasm between agriculture and our collective consciousness, despite the fundamental role of food in our daily lives. This gap alters people's opinions and understanding.

As this is a generational issue, understanding declines as we look at today's youth and even future generations. Today, unlike any time in our history, youth has become disconnected from agriculture, so much so that they are completely unaware of the origins of their food or the absolute necessity to conduct research to keep that food plentiful. Further, because many do not have a strong foundational knowledge, opinions can be easily shaped and swayed by "experts" with ready access to the mainstream world of Internet blogs, Twitter and other outlets.

In the Noble Foundation's own interactions with students, we've learned that some did not know that hamburger meat comes from cattle. (Don't believe me? Turn to page 16 for this issue's cover story.)

Of course, awareness of agriculture is more than just knowing the source of food on our plates; it's also understanding the complexities, infrastructure and people necessary to grow it. Some predict that without a cultural awakening toward understanding the fundamentals of agriculture, future decision makers – today's youth – could inadvertently reduce this nation's capacity to produce for the world through poor policy-making, overregulation and a lack of commitment to research.

We knew that to truly affect change, we had to reach out to this generation and make agriculture (its challenges and complexities) real to them. They needed to experience agriculture beyond just the grocery store. They needed to have that "aha" moment when science, agriculture, the environment and food come together and become real. As our founder said, "All the deeds start in the hearts and minds of the individual ... and the family is the cornerstone of all communities, states and nations." His perspective was and continues to be right.

This fall, the Noble Foundation launched Noble Academy, which centralized and focused our long-standing educational



efforts for students from elementary school to college. We provide fact-based information so that the present generation (their parents) and all those who follow can make educated decisions concerning agriculture. We want to provide them a sound understanding that extends from the laboratory to the field. Our initial offering may be small – starting in the classrooms of southern Oklahoma – but just as our organization grew from a regional entity to an internationally recognized agricultural research center, our efforts ultimately will contribute to state, regional and national education.

Certainly, we join a tremendous group of like-minded organizations, such as Ag in the Classroom, Oklahoma Department of Agriculture, Oklahoma Farm Bureau and others, at both the state and national levels, dedicated to raising agricultural awareness. Working in concert with these collaborators will broaden our ability to share the necessity of agriculture and the research that advances this field. If that seems unimaginable, remember this: a student who was visiting our horticulture plots on a school field trip once said, "Wow, a strawberry comes from a plant. I didn't know that." He does now.

Sincerely,

Bill Buckner
President and Chief Executive Officer

Notables

Udvardi appointed interim director, named AAAS fellow

This has been a busy and rewarding fall for Noble Foundation Professor Michael Udvardi, Ph.D.

In November, Udvardi was appointed interim director of the Plant Biology Division, while the organization conducts an international search to replace retiring Division Director and Senior Vice President Richard Dixon, D. Phil.

Udvardi has been a researcher at the Noble Foundation since 2006. Originally from Cooma, New South Wales, Australia, Udvardi earned his doctoral degree in biochemistry from the Australian National University in 1989. He served as an independent group leader and associate professor at the famed Max Planck Institute in Germany before coming to the Noble Foundation as a principal investigator, leading one of the organization's 26 laboratories.

His research is focused on understanding the molecular genetic basis of important plant processes, including symbiotic

nitrogen fixation, seed development, nutrient cycling and adaptation to abiotic stresses such as drought and salinity.

At the end of November, Udvardi was named a 2012 Fellow of the American Association for the Advancement of Science (AAAS) – the world's largest general scientific society.

Election as an AAAS Fellow is an honor bestowed upon AAAS members by their peers. As part of the Agriculture, Food and Renewable Resources section, Udvardi was elected an AAAS Fellow for his distinguished contributions to the field of legume biology and genomics, particularly for explaining biochemical features of the *Rhizobium*-legume symbiosis.

"I am honored that my research has been recognized by the AAAS and my peers. This is a career milestone and one that I truly appreciate," Udvardi said. "I look forward to applying the results of our fundamental research to agricultural problems in our region and around the world."



Sam Noble Scholarship applications available

Sam Noble Scholarships are now available for students seeking undergraduate and graduate degrees in agriculture-related fields.

Applicants must pursue their education at a university awarding baccalaureate or higher degrees through a division or college of agriculture, such as Oklahoma State University, Oklahoma Panhandle State University, Texas Tech University (Lubbock campus) or Texas A&M University (College Station campus).

Scholarships are also available for those seeking degrees or certification in technology-related fields. Applicants must pursue this degree or certification at Oklahoma State University's Oklahoma City or Okmulgee campus. To be eligible to receive a scholarship, a student must plan to attend or be attending a qualifying university or technology training institution during the 2013-2014 academic year.

For full eligibility requirements or to request an application, visit www.noble.org/philanthropy/scholarship or contact Jennifer Fitzgerald at 580.224.6247. Completed scholarship applications must be received on or before Friday, Feb. 15, 2013.

Connecting With You



How many of you have a Facebook page? Go ahead, raise your hand. Good for you. You've joined a highly select group of about 1 billion active users worldwide (about 15 percent of the planet's population) who are sharing their lives online with friends and family.

Ten years ago, the concept of social media did not exist. Today, social media sites like Facebook, Twitter (500 million users) and YouTube (800 million users monthly) have revolutionized how we communicate and interact. Traditional media like the very magazine you're reading offer one-way communication. We write. You read. That's the deal. Social media allows us to write, you to read, then we start a dialogue about the topic. And the Noble Foundation has a lot we'd like to talk with you about.

Established by Lloyd Noble, this organization is dedicated to advancing agriculture through education and interaction with farmers, ranchers and land managers, not to mention conducting world-class agricultural and plant science research.

In the last year, we've increased our social media presence to make the Noble Foundation more accessible, filling numerous sites with our stories, information and findings, and seeking your feedback about topics important to you. Most importantly, these platforms offer us an invaluable outlet to share agriculture's story as a whole. Below is a snapshot of each of the Noble Foundation's social media outlets. So come visit us on one or all of them. Give us some feedback. Connect. That's what social media is all about.

- The Noble Foundation Facebook page provides an in-depth look at the people, programs and research occurring every day on the organization's Ardmore, Okla., campus. Photos of visitors and tours are posted regularly, and we often offer informational links, videos and event information.
- Noble's Twitter account offers real-time news about agricultural issues, as well as tidbits of timely advice affecting agricultural producers in the Southern Great Plains. Through Twitter, Noble agricultural consultants relay necessary tips to farmers and ranchers in real time. If, for instance, a particular pest is moving into the area (such as armyworms), consultants can alert producers through our Twitter page.
- The Noble Foundation YouTube channel offers videos of recent agriculture educational programs and – coming soon – we will have a series of “how-to” videos for



- agricultural producers.
- Our Pinterest and Flickr pages present a more visual look into every aspect of Noble activities, including history, infrastructure, research and agricultural programs.
- The Noble Foundation's presence on LinkedIn provides job seekers a chance/the ability to see employment opportunities. The page also offers a forum for current and past researchers to connect in the Noble Alumni section.

Shane Porter
Web and New Media Manager

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What Fictional Character Do You Most Resemble in Your Job?



I relate to the Flash. It is a constant race to complete a series of important tasks each year when field-breeding grasses. From initial plant crosses in winter and cleaning progeny seed in spring to planting and growing out seed in summer and planting it in field trials in the fall; it's a continual race. The end product is improved cultivars to help producers with their operations.

Mike Trammell, Senior Research Associate



At work, I'm a little like Nancy Drew. Research is a lot like solving mysteries. Career researchers and good detectives need curiosity, knowledge, innovative thinking, logic, perseverance and a dose of common sense to perform their jobs. Researchers here also need to work as a team to make new discoveries and solve problems in plant science. I am constantly juggling the needs of the lab and multiple projects at any one time.

Bonnie Watson, Senior Research Associate



This is an easy question to deduce. My job requires me to be Sherlock Holmes. I'm always searching for new and better ways to improve production of forage samples, such as finding new processing methods. I am always investigating possibilities and following up on leads. But I don't have a pipe or a guy named Watson following me around.

Tabby Campbell, Ag Services and Resource Supervisor



I am most like Dr. Robert Hartley from *The Bob Newhart Show*. He was equal parts humor, thoughtfulness and compassion, which I hope I bring to my job as an agricultural consultant. You never know what a producer's problems are when they walk in the door. We have to spend time getting to know them and analyzing their particular situation. I hope to bring insight, knowledge and some laughter to the process.

Clay Wright, Rural Life Consultation Program Manager

THE PECAN

Graphic Illustration by Scott McNeill

Pecan is a species of hickory and is native to North America. Newly planted pecan trees become productive in

6 TO 8 YEARS.

Properly managed trees can produce nuts for hundreds of years.

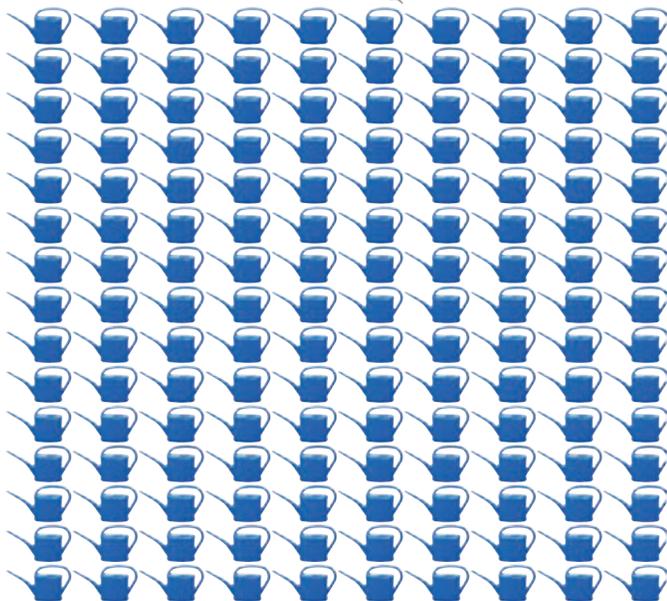


Since purchasing the Red River Farm (Love County, Okla.) in 1973, the Noble Foundation has been engaged in pecan research and now manages more than 450 acres of pecan trees. How much do you know about this popular Southern delicacy?



Pecans are the **3RD MOST POPULAR**

nut in the U.S. after almonds and walnuts. In antioxidant capacity, pecans rank No. 1.



During summer months, one mature pecan tree can consume as much as

150 GALLONS OF WATER PER DAY.



The U.S. exported

\$300.5 MILLION

of pecans in the 2010-2011 season.

Top importer was

CHINA,

which purchased

25 PERCENT

or more of all U.S. pecan exports.



Between 2005 and 2011, U.S. pecan production averaged

263,975,000 POUNDS PER YEAR.

Just five states produced 82 percent of all U.S. pecans:

- Georgia 31.5%
- New Mexico 21.9%
- Texas 15.7%
- Arizona 7.1%
- Oklahoma 5.8%
- Remaining states 18%

HEART-HEALTHY

pecan kernels are comprised of 70 percent oil by weight and contain 87 percent unsaturated fatty acids consisting of 62 percent mono-unsaturated and 25 percent polyunsaturated fats.



Sources:
Ag in the Classroom
National Pecan Shellers Association
Charles Rohla, Ph.D.
Royalty Pecan Farms (www.royaltypescans.com)
United States Department of Agriculture
The Wall Street Journal
Wikipedia

Pecans supply more than

19 VITAMINS & MINERALS.

Among them are vitamins A and E, several B vitamins, calcium, zinc, and potassium.



Will Moseley

by Jessica Willingham

Meet the man behind the beard: Will Moseley. He's a little bit Bohemian and a little bit Daniel Boone with a big passion for agriculture.

The Stillwater, Okla., native left his hometown for dusty Lubbock, Texas, to pursue a bachelor's degree in wildlife and fisheries management. He later completed his master's degree in range and wildlife management at the Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville. Today, Moseley, 29, serves as a wildlife and fisheries consultant with the Noble Foundation.

Growing up, he traveled across the country in a pop-up trailer, camping and fishing with his family. Those experiences, mixed with one fateful day on the Noble Foundation wildlife unit, set the stage for his life's pursuit. Below, he discusses snakes, guitar strings and how his career is a perfect match for the sum of his experiences.

How did you come to the Noble Foundation, what drew you?

Some Noble Foundation consultants who knew my dad professionally invited him and his sons (me included) to come to the wildlife unit in Allen, Okla., for a doe hunt. I always wanted to do something in natural resources, but I never knew exactly what. The wildlife staff showed me some of the research they were doing on deer, and it blew my mind. From then on, I knew wildlife management was it.

Did you have any other interaction with the Noble Foundation?

I interned at the Foundation as an undergraduate. Now, as a consultant, I realize that the longer you're here, the more relationships you build with landowners. You get to see the impact you make on their lives. It's amazing when someone tells you what your help has meant to them. I get Christmas cards. It's really touching.

What's a typical day like for you?

It's different every day, which is one of the great things about this job. One day I'm on a farm visit, helping a producer. Another day I'm inside writing up a management plan or helping with a tour for youth.

How's working with youth?

I absolutely love it. Working with kids and showing them the fun side of science has always been a passion. It's exciting to see a group of kids really get into an activity. They keep me on my toes!

How so?

Sometimes their questions are more difficult than the ones I get from agricultural producers because they're not afraid of asking the wrong

question or what some people perceive as a stupid question. It's just questions to them, and they're never dull.

What was your first day here like?

I was extremely nervous. I was fresh out of graduate school when I moved here, and I thought I knew quite a bit about wildlife management. Then the first day, I got that first phone call from a rancher asking me what to do with their property, and I realized how little I knew. It was a sobering moment. Luckily, we have a solid team that provides that real-world training.

Do you have any phobias?

Snakes. It's an awful, debilitating fear. It's paralyzing. I can't even look at them.

Um ... But you're in wildlife. Don't you encounter snakes frequently?

My first week at the Foundation, an employee called me because she caught a snake on a glue board in her laboratory. I was the only biologist around that day, and she needed me to remove it. I psyched myself up and went over there, looked at it and completely wimped out. I finally had to tell everyone I don't do snakes. It was embarrassing. If a farmer has a snake issue on their place, they can call me, but don't expect a visit (he laughs).

What is your favorite childhood memory?

It's a collection of memories from our family vacations. We camped our way to different places, like to my parents' professional meetings or my brother's summer camp in the Blue Ridge Mountains in Georgia. We spent weeks on the road, and they are my favorite memories as a kid. It's where I developed my interest in the outdoors.

What kind of music is on your iPod?

It's very eclectic, anything from European gypsy folk to western swing to electronica. I love music, and I try to go to lots of concerts. I attend the Austin City Limits Music Festival with 120 bands and eight stages every year, and I always come back with a new favorite band.

Do you play music?

I used to play a lot, mostly guitar and singing. I've been in multiple bands, but my favorite was a three-piece bluegrass band in graduate school with a banjo, fiddle and guitar. We would play at grad student get-togethers, the annual crawdaddy hoedown and impromptu sing-alongs in friends' driveways and backyards. It was just for fun, and we had the coolest name: Children of the Cornbread. ■



The Road Less Traveled

Set for retirement, Richard Dixon reflects on his unexpected journey from England to the Noble Foundation

by *Laura Beil*

The semester Richard Dixon's world changed, he was sitting in a lecture hall during his third year of college at the University of Oxford. He had already decided that he wanted a profession devoted to either biology or chemistry. Even as a boy he had tinkered with chemistry sets and had the burns on his bedroom carpet to show for it. But that year at Oxford, Dixon enrolled in a plant biochemistry class where one life-altering idea suddenly hit him: All the really cool chemistry happens in plants.

The class was taught by Professor

Vernon Butt, whom Dixon had never met before – nor had contact with since he graduated from Oxford. But of all the lectures Butt gave that semester in 1971, nothing struck Dixon as much as the talk on lignin. Lignin is the molecule that allows plants to stand taller than buildings. It makes wood woody and is one of the most abundant biological substances on Earth.

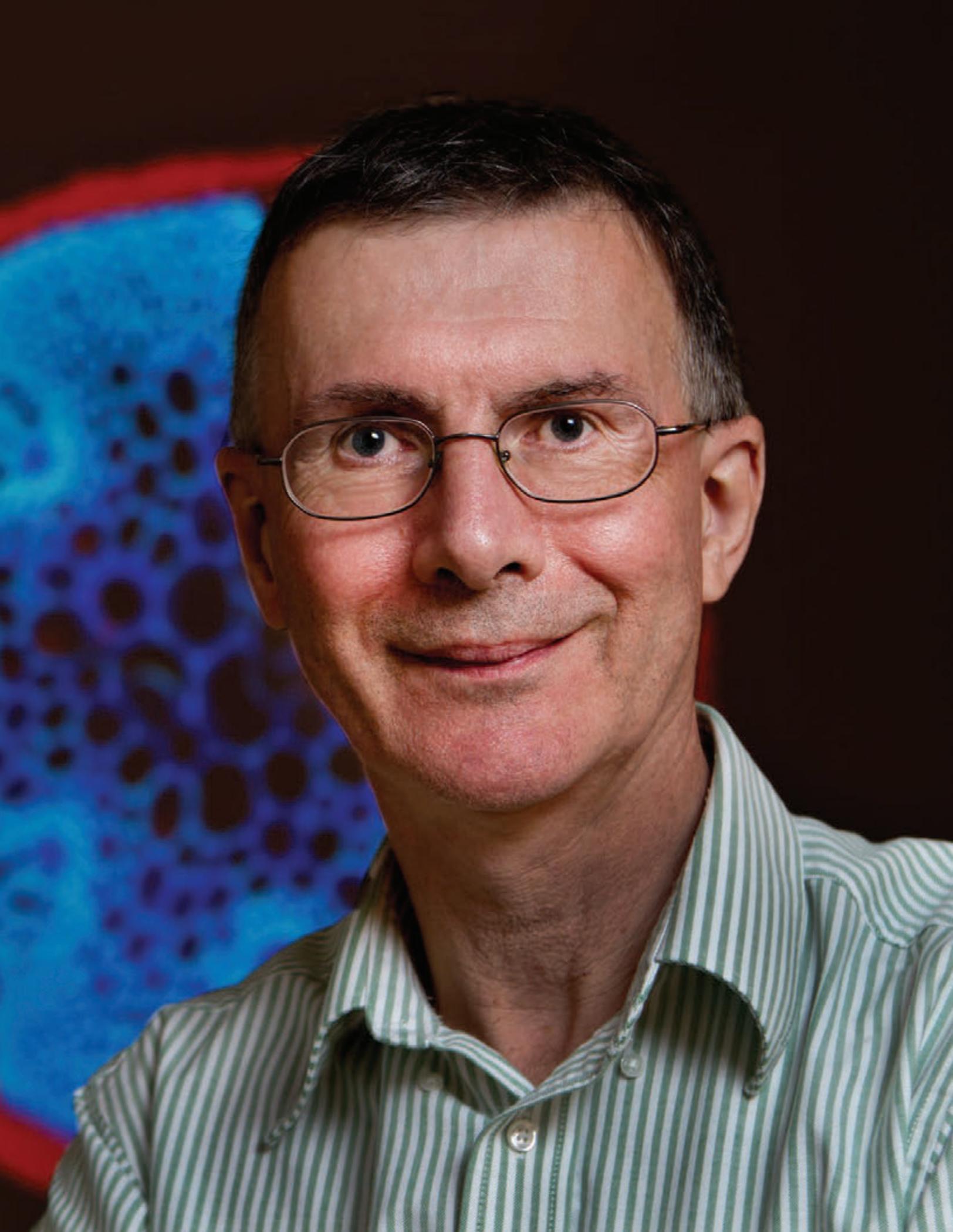
Dixon left the class smitten with lignin. “Lignin is the most complicated molecule you can think of,” he said. “It looks like chicken wire.” He thought he could spend a career

learning its secrets.

That career, which eventually brought Dixon to The Samuel Roberts Noble Foundation, enters a new phase in January when Dixon will retire as the first and only director of the organization's Plant Biology Division. He leaves behind one of the most respected plant research centers in the world, credited with some of the major discoveries about plant biochemistry in a generation.

From Oxford to Oklahoma

When the idea of coming to the ▶





Dixon (front row, right) and the 22 other staff members of the new Plant Biology Division gathered for this 1988 group photo in the Noble Foundation's Kruse Auditorium. By the end of Dixon's tenure, the group had grown to more than 110 researchers and support staff.

Noble Foundation was first presented to Dixon in 1987, he wasn't entirely sure he could locate Oklahoma on a map, much less Ardmore.

Dixon had grown up in central England in Burton-on-Trent – which he describes as “the Milwaukee of England” for its famous breweries – where his father worked as an engineer. As a teen, he excelled in school, but he also loved the arts and in his youth envisioned himself one day becoming a professor of literature or music. But science became his passion. He was accepted into Oxford and ended up staying to earn his doctoral degree, along the way hearing about lignin.

In the random encounters that often shape the course of a lifetime, a postdoctoral fellow named Chris Lamb joined Oxford about

six months before Dixon was to leave. To Dixon, Lamb was one of the smartest, most engaging scientists he had ever met. The two men would eventually collaborate on research projects that spanned four decades and resulted in more than 100 co-published research papers.

After Dixon finished his doctoral degree at Oxford, he took a job teaching at the University of London's Royal Holloway College in Surrey. During a 1987 sabbatical, Dixon visited Lamb in the United States, where his friend had become director of plant biology at the Salk Institute in La Jolla, Calif. One afternoon, the two men sat eating lunch by the sea, their feet in a tidal pool, when Dixon confided that he was ready for a career change. Back in England, he felt his career was beginning to stagnate.

Lamb mentioned that he was advising the Noble Foundation in establishing a plant biology program. Would Dixon be interested? “I think I've actually heard of the Noble Foundation,” Dixon recalls telling his friend. (Dixon had edited a book on plant cell culture; one of the chapters was submitted by a Noble scientist.) “But who would be crazy enough to run a plant biology division that doesn't exist?”

Who indeed.

Building a division

From their first visit to Ardmore, Dixon and his wife were sold. Among other things, they loved the fact that Ardmore seemed like a place they could raise children, affording a house with land enough to grow whatever



Dixon conducts a laboratory experiment in 1989.

they fancied. He decided to see how serious the Noble leadership was about establishing the new division and doing things right.

He faxed a request saying he would take the job if he could hire 40 people and establish a postdoctoral study program with the Salk Institute. Oh, and he needed a new building. The response came back almost immediately: No problem.

Dixon planned to stay five years. Five years became 10, then 10 became 25, despite attempts by universities – including his alma mater, Oxford – to lure him away.

Dixon's personal research focused on lignin and the use of plants to produce natural products such as anthocyanins, tannins and isoflavonoids. These compounds are often associated with health benefits for human conditions such as cardiovascular

disease, cancer, diabetes, Alzheimer's disease and obesity, as well as improved animal health and performance.

Among his most notable discoveries are genes involved in the synthesis of lignin. The ability to manipulate these genes has opened the door to producing more digestible crops for livestock and more efficient plants for biofuel production.

Dianna Bowles of the University of York in England said that from the time she met Dixon in graduate school, he has been intellectually absorbed in the chemical properties of plants. "Rick has an immense understanding of plant biochemistry and all the many benefits plants can contribute to society," she said in an email. "He has an integrity, generosity and openness of thought that is rare these days."

Along the way, he helped guide one of the most respected plant biology research centers in the world, and, in 2007, was inducted into the National Academy of Sciences, one of the most prestigious honors a scientist can achieve.

Dixon is visibly proud of the Plant Biology Division he helped nurture and guide. The division has grown to more than 110 scientists and support staff, who conduct fundamental biochemical, genetic and genomic plant research.

Much of the research of the division is designed to benefit the value and productivity of forage legumes, such as alfalfa. "We've taken it from nothing to something to which we can recruit people from all over the world to come here," he said. "The profile now is international."



The soundtrack of life

Though retiring from Noble, Dixon will continue his research. He will join the faculty of the University of North Texas in Denton, and he also anticipates trying to squeeze in more time for personal pursuits. He has a British love of walking and will spend what spare time he has hiking near his home in the Arbuckle Mountains, swimming at the UNT campus and tending to the more than 800 cactus plants that occupy his garage-sized greenhouse. (He has always been fascinated with cacti because, he says, they thrive even when neglected and are so long lived “they can be your friends for a lifetime.”) His two children are grown and have moved away, so he and his wife also look forward to seeing the few parts of the world Dixon has not already visited.

And there will be music. Dixon has a collection of more than 2,500 records –

actual records, not CDs or iTunes – that he listens to on a stereo system that cost as much as an average sedan. Music is to Dixon as lignin is to plants. It’s a fundamental component of his life. His daughter Lois said she and her younger brother, Arthur, learned as children not to ask their father a casual question about a particular composition. “You’d be sucked into that room for hours,” she said with a laugh.

Perhaps, Dixon mused, his next endeavor will be to write a book on music. He always feels the need to rack up accomplishments, describing himself as ambitious “but not to the point of being obnoxious. I’m very aware of what I don’t know.” He’s content with what he’s done so far and the name he has earned in scientific circles, but he’s still driven to do more.

Earlier this year, the journal *Planta* devoted an issue to Dixon as a tribute on the occasion

of his 60th birthday. As he perused the chapters, he was shocked to see a contribution from Vernon Butt, the man who, without knowing it, had shaped the course of Dixon’s career. Nearly 40 years have passed, but Professor Butt’s lesson remains. More than ever, Dixon believes that all the cool chemistry happens in plants. ■

(above) Mike Cawley (left), president of the Noble Foundation from 1992 to January 2012, toasts Rick Dixon’s induction to the National Academy of Sciences in 2007.

*(right) Dixon talks about legume research at the Noble Foundation in a January 2012 Profiles and Perspectives series talk in Ardmore, Okla. The organization played a key role in advancing *Medicago truncatula* as a model plant for legume studies.*





Inspiring the Future

Years of educational activities at the Noble Foundation crystallize into the formation of Noble Academy. Agricultural education will never be the same.

by J. Adam Calaway



Pick any day and there's bound to be a student tour snaking its way through the hallways and corridors of the Noble Foundation. No matter their educational status – elementary to college – their reactions are always the same.

They run the paces in a laboratory, learning about the nature of research critical to the future of agriculture. They gawk at the size and complexity of Noble's research greenhouse (one of the largest in North America). And inevitably end their day in a grassy field, seeing the fruits of the organization's labor.

With so many students, someone's bound to say something remarkable.

On a perfectly normal tour last spring, a fifth grader made an unusual statement. When learning that hamburger meat originated from cows, the young man balked and said in a huff, "I would never get my meat from a cow. I'd just buy it from the grocery store."

"The story would be funny if it wasn't so common," said Bill Buckner, president and CEO. "The reality is that many people, specifically our youth, are detached from agriculture. They just don't know where their food comes from. It is troubling. It's also dangerous."

As it turns out, the cow-hamburger conundrum was not an isolated incident. Through recent months, the stories of agricultural unawareness have accumulated. Strawberries come from plants? You can make clothes from cotton? And these comments originate from youth growing up in "rural" America.

Tyler Norvell, former vice president of public policy for Oklahoma Farm Bureau and current executive director of the Oklahoma Youth Expo, the world's largest livestock show, can envision the potential outcomes if this trend continues unchecked.

"Today's young people will be tomorrow's leaders," he said. "If they are unaware of agriculture and the process of producing our food, agriculture could face unnecessary regulation and hindrances to production. Could you imagine the United States importing food because we weren't allowed

Frank Hardin, Ph.D., educational outreach manager, shows Ardmore Christian Schools students how to extract strawberry DNA.

to produce it? Americans need to wake up. They don't realize the potential negative outcomes if we don't educate our youth."

A brief history

For most people – especially those in the big square states in the middle of the country – the concept of agriculture becoming overlooked seems far-fetched. The necessity of the industry seems inherent. Farms and ranches literally form a patchwork quilt of earth and grass that covers the majority of the country. Agriculture equals food, fiber, feed and sometimes fuel. It's a heritage. It's life.

But times have changed.

At the turn of the last century, about 40 percent of the U.S. labor force were associated with farming or ranching. Then the country underwent an Industrial Revolution followed by a Green Revolution that saw the modernization of agriculture. Today, less than 2 percent of the U.S. work force plows a field or raises animals.

Reduced need for agricultural producers provided the opportunity for other pursuits. Steadily, with each passing generation, cities grew and rural life shrank. "This transition away from fundamental rural knowledge has caused a 'gulf' between producers and consumers," Buckner said. "Now the food that arrives on the dinner table is not linked to the endless stream of effort necessary to produce it."

These events served as a call to action.

Education has been a cornerstone of the Noble Foundation since its inception. Lloyd Noble established his foundation in the post-Dust Bowl era to educate farmers and ranchers on methodologies for safeguarding the soil to prevent future calamity.

Through almost seven decades, the Noble Foundation has continued to provide educational opportunities to agricultural producers through field days, workshops and seminars, as well as direct consultation.

The organization developed key internship programs both in science and agriculture to promote advancement in these fields and – through its philanthropic efforts – has provided more than \$3 million to support agriculture and science youth educational programs and scholarships.

In the last decade, the growing lack of understanding has brought an increased

focus on youth education. Special programs were developed – like the Noble Foundation's Science in Ag Day, which focuses on how research and agriculture impact everyday life, and Ag Safety Day, which is part of a national effort to educate youth about safety on the farm – and adult-focused tours were modified to better engage youth participants.

Finally, in the fall of 2012, the Noble Foundation centralized its outreach and educational activities toward delivering agriculture- and science-based education for all students, from elementary through college.

Noble Academy was born.

"Noble Academy's purpose is straightforward," Buckner said. "We want to demonstrate the importance of agriculture to society and the need for research to advance the industry, and communicate the wide range of career opportunities in agriculture and agriculture-related research to students."

Soon word spread that the Noble Foundation was entering the agricultural education arena. "Having the Noble Foundation deliver a focused educational effort is massively important to our region and the agricultural industry," Norvell said. "When the Noble Foundation speaks, listen to what they say and take it to heart."

Now the only question became: Who should lead the effort?

F is for Frank

Frank Hardin, Ph.D., slips on his pressed white lab coat, pulls a pair of protective glasses into place and cocks a quick eyebrow as he scans his audience – 15 students, ranging from fifth to eighth grade, from Ardmore Christian School, whose eyes are locked on him.

He turns his attention to the experiment before him. "This next step is critical," says Hardin. "You must take the strawberry slice, place it in the plastic bag and mash it up."

Hardin begins to demonstrate. Soon the strawberry is reduced to a gooey paste. Like miniature shadows, each of the students begins mashing away, teasing their neighbors as they learn.

Hardin effortlessly leads the students through a series of steps that ultimately lead to extracting the strawberry's DNA. At the end of the experiment, the students ▶



are left with enriched DNA that they can scoop into a test tube and take home with them.

“This whole lesson is about DNA – the blueprint of life – what it is, where it comes from and what it does,” Hardin said. “They’ve studied DNA, but they’ve never actually experienced it. That’s the trick to teaching, providing students with hands-on experiences. That’s the methodology behind Noble Academy – give students tangible learning moments at the intersection of agriculture and science.”

Hardin’s experience in education began on a path far afield from agriculture, a path infested with tsetse flies.

Originally from Marietta, Ga., Hardin earned three degrees (bachelor’s, master’s and doctoral) in cellular and molecular biology with an emphasis on biochemical parasitology from the University of Georgia.

During his graduate studies, he worked in the laboratory of Dr. Kojo Mensa-Wilmot, in the department of cellular biology. Hardin’s project focused on studying *Trypanosoma brucei*, the parasite that causes African sleeping sickness, which is transmitted by the tsetse fly. In essence, the parasite enters the bloodstream, invades the central nervous system and, among other symptoms, disrupts the sleep-wake cycle. The pest can also infect livestock. “In many parts of Africa, livestock is everything. It’s life,” Hardin explained. The project hooked Hardin on research forever.

While in college, two other events transpired to reshape Hardin’s life pursuit. First, he experienced his first taste of teaching. He earned a teaching assistantship and led classes in biology and human anatomy and physiology.

“When you have the opportunity to teach a student something new and it clicks, you can see that in their faces,” Hardin said. “That’s a phenomenal moment.”

And there was more love to come.

(top) Participants in the Noble Foundation’s Science in Ag Day learn how to test an alfalfa plant for presence of the Roundup Ready® gene.

(bottom, left) A student examines liquid obtained from a banana during a DNA extraction class.

(bottom, right) A student at Science in Ag Day packs soil around a strawberry seedling he planted.

In the fall of 2003, Hardin went to a friend’s annual pumpkin carving party and met Maria Monteros, a young coed from Guatemala. He asked a mutual acquaintance about her and, unfortunately, she had a boyfriend. But Hardin would remember her.

Two years later, the couple met again and began dating. By 2007, the pair had married, and Monteros, a plant breeder and geneticist, had earned a position as a principal investigator at the Noble Foundation. Hardin finished his doctoral studies at UGA two years later and headed west to the Oklahoma prairie to join his wife. While plants and tsetse flies are far apart in the animal kingdom, Hardin’s experience effectively transferred to conducting research on improving switchgrass for biofuel production. After three years in the laboratory, the creation of Noble Academy allowed Hardin the opportunity to apply all of his skill sets – education and research.

“I get to have the best of both worlds,” Hardin said. “I have the opportunity to be a scientist, which I love and have a passion for, and then I get to teach and possibly impact the next generation of scientists or producers. I couldn’t ask for more.”

Hardin’s background affords him many advantages, mainly understanding and relating technical scientific aspects in usable, relatable terms. “As a scientist, I understand what’s being done in the laboratory,” he said. “As an educator, I work on engaging the students – no matter the age level – so they too can understand.”

Hardin is joined by Cindy Crane, a research assistant turned educational outreach assistant, who has worked at the Noble Foundation for more than a decade. This fall, the pair began building collaborations and curriculum to bring to schoolchildren in southern Oklahoma and beyond. “Educating youth about agriculture and science is my passion,” Crane said. “We are already interacting with more than a thousand students per year, and what’s great is this is just the beginning.”

The next steps

Noble Academy is working with Oklahoma teachers and education-related associations to expand its efforts to provide key lessons to students through in-class demonstrations. Students can also visit the Noble Foundation for on-campus events and tours.

In addition to its own programs and initiatives, Noble Academy will serve as an

entryway for external partners seeking to further their own programs by connecting and collaborating with Noble Academy.

Dana Bessinger is the coordinator for Ag in the Classroom, a joint effort between the Oklahoma state departments of education, agriculture, food and forestry, and the Oklahoma Cooperative Extension to integrate agricultural literacy through core subjects from prekindergarten to eighth grade. Ag in the Classroom has been offering agricultural education in some form since 1980, and Bessinger understands the need for collaboration better than most.

“I can’t begin to tell you the importance of collaboration,” she said. “In the agricultural world, the stronger the collaboration, the more you achieve and the quicker you achieve it. It’s the old adage that three cords tied together are not easily broken. Noble will play such an important role in this arena. You have so much to offer.”

“Part of what I think is amazing is the brain power and knowledge at Noble. This can demonstrate the many career options that kids can have in agriculture. It is so vital to let them see there is a bigger world out there. You guys have the world at your doorstep, and you’ll be able to funnel kids toward their futures.”

And the future remains the focus. With global population expected to balloon from 7 billion to 9.5 billion, agricultural producers will need to produce 70 to 100 percent more food and do so with less land and water resources. An estimated 70 percent of these gains will come from efficiency improvements and technology which may not yet even exist, meaning research and young researchers will play a critical role in advancing agriculture. These circumstances will require equally profound commitments by researchers, producers and policy makers to provide sustainable solutions.

But Hardin is not worried. He believes all the necessary solutions to agriculture and the world’s problems lie in the minds and imaginations of the next generation.

“When you start talking about agriculture with kids, something inside of them begins to stir,” he said. “When you link what’s happening in the world around them, when you show them the true scope of agriculture and its impact on their lives, there is a magical moment. It is a life-changing moment. That’s what Noble Academy’s about – making that moment happen.” ■



Invasion

As agricultural producers grapple with the costly damage of feral hogs, two Noble Foundation researchers provide a revolutionary solution

by Robyn Peterson

On an unusually warm fall morning, Clay Forst carefully navigates his white Tahoe through rocky terrain down into a series of interconnecting pecan bottoms on Boggy Creek. Forst, who manages the wildlife outfitting division of his family's 13,000-acre ranch near Caddo, Okla., would enjoy this morning ride except he's preparing to show a pair of visitors something that truly frustrates him. Deep, sporadic holes scar a lush, green, turnip-filled food plot; clear evidence of feral hogs looking for food in the night.

As Forst continues touring the ranch, he spots a small, tripod deer feeder, frowns and moves to investigate. For weeks, Forst has been battling the hogs to keep this feeder upright. He would fix it; they would tip it back over and gorge on the golden corn within. He'd fix it again, fastening it with wire; they'd wrangle it loose again.

"Lots of hard work and money go into planting food plots, as well as repairing what the hogs tear up," Forst said. "It's depressing at times to see all the money and work destroyed overnight."

Farmers and ranchers have cursed (and, in a few rare cases, enjoyed) feral hogs for decades. Once managed as free range livestock, feral hog populations are spreading throughout the United States. As this hog population expands, agricultural producers and landowners grapple with the reality of controlling these ever-present pests. Just ask Forst.

A Hog History

Simply put, feral hogs are an invasive species in the U.S. Early explorers, such as

Clay Forst of Caddo, Okla., shows damage to his food plots caused by the rooting of feral hogs.

Hernando Cortes and Hernando de Soto, brought domesticated swine with them on their global explorations, managing them as free range livestock. Many of the swine simply wandered off and became feral (i.e., an animal that has changed from domesticated to being wild or untamed), which led to the rise of hunting the hogs.

Feral hog populations continued to grow through the decades and embrace a larger footprint. Feral hogs now exist in approximately 38 of the 50 states with California, Florida and Texas possessing the heaviest populations. (Oklahoma's population is considered healthy and growing.)

Feral hogs' success can be attributed to several factors, including the animal's ability to adapt to a variety of situations, eat a variety of foods and reproduce rapidly.

"They are prolific reproducers," said Russell Stevens, Noble Foundation wildlife and range consultant. "However, there is a lot of misinformation about how many piglets they can have. Feral hogs are capable of producing two litters per year (but rarely do) with each litter consisting of four to 10 piglets. Good habitat, nutrition and weather allow production of the most young, with peak numbers usually born in late winter or early spring."

Despite their prolific breeding and expansive range, the exact number of feral hogs remains difficult to accurately measure.

"Historically, there has never been an accurate report of feral hog numbers or their distribution in Oklahoma," Stevens said. "Their secretive nature makes it difficult to obtain. Statewide distribution is easier to estimate, but is mostly limited to knowledge of their presence or absence in a particular county."

During the summer of 2007, Noble Foundation wildlife and fisheries staff initiated a statewide survey to obtain a better estimate of the distribution and number of

feral hogs in Oklahoma.

Representatives of the surveyed agencies were contacted in every Oklahoma county and asked if feral hogs were present in the county and to estimate the density.

Based on the respondent estimates, the feral hog population in Oklahoma was between 617,000 and 1.4 million. With inherent mapping error taken into account, the estimated feral hog population in Oklahoma was calculated to be about 500,000. Estimates nationwide range from 4 million to 5 million feral hogs.

"Feral hogs can adapt to any plant community," Stevens said, "but they prefer moist bottomlands or riparian areas associated with streams and rivers."

The hogs' penchant for following riverbeds explains part of their expansion. As water development has spread into more arid regions, along with improved range conditions through better livestock grazing practices, the hogs have followed the availability of land and food.

"We have had a hog problem for a few years," Forst said. "However, when Boggy Creek flooded a couple of years ago, the hog numbers increased and so did the damage."

The costly case against feral hogs

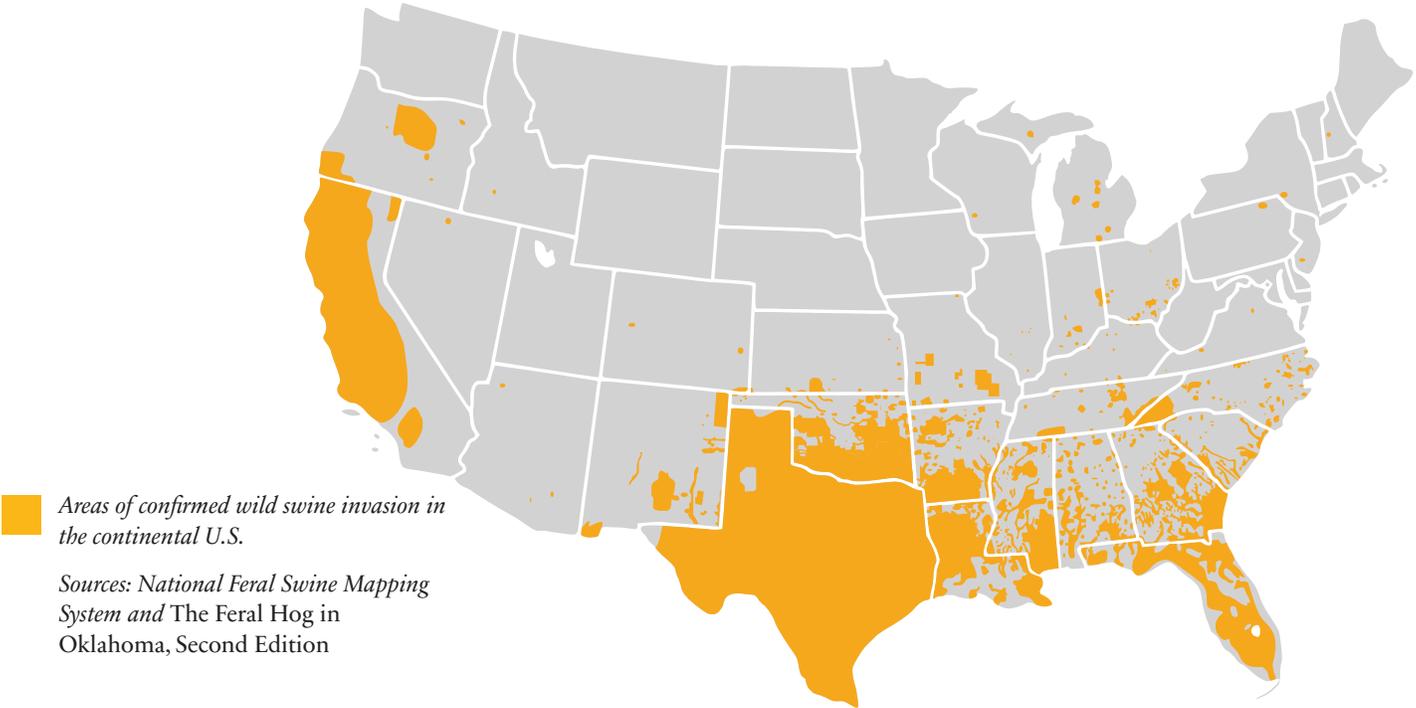
Feral hogs, like all animals, are susceptible to many infectious and parasitic diseases, but cause more problems through rooting, wallowing and destruction.

As an introduced species, feral hogs compete with native wildlife and domestic livestock, consuming large amounts of mast production like acorns and pecans that wildlife species depend on for winter survival, and consuming and damaging forages necessary to livestock.

"For example, most producers in southern Oklahoma and northern Texas use ▶



A feral hog sounder eats corn at a research site established by the Noble Foundation.





Josh Gaskamp, agricultural research assistant, monitors feral hog activity using an iPhone app developed with Roland Stolfa of the Computing Services Department.

bermudagrass as the main forage for cattle,” Stevens said. “However, bermudagrass seems to be one of the favorite food items for feral hogs in the winter. Hogs rooting up the bermudagrass decrease the production potential for that field the following spring and summer.”

Harm to crops and farming can be very costly to producers in Oklahoma and Texas. The most extensive crop damage usually occurs at planting time or when a crop is nearly mature. Rooting also causes physical damage to the property by creating holes and a rough surface for planting and harvesting equipment.

In Texas, it is estimated that one hog can cause about \$200 in agricultural crop damage each year. If one multiplies \$200 by the average size of a sounder – about 20 animals – then producers face significant losses.

“A small 1.5-acre food plot isn’t much, but it cost me \$95 an acre to plant,” Forst said.

“Within two nights, hogs destroyed a quarter of what has taken me a year to grow.”

Feral hogs can also cause costly damage to landscaped areas such as golf courses or other public facilities that may be near areas that have populations of hogs. “We have photo documentation of hogs on the Noble Foundation’s campus, rooting through the lawn and flower beds,” Stevens said. “That’s not too expensive to replace, but you get into golf courses and costs skyrocket.”

Besides damage to the land, feral hogs also hurt water resources and quality for wildlife and livestock consumption. Small water sources, such as streams and creeks, sustain the most damage through the hogs rooting and wallowing.

The actual effect of feral hogs on the environment is largely unknown, but it doesn’t matter to Forst. He wants them gone. “There needs to be a collective push to trap, hunt and harvest feral hogs,” he said.

“They will overrun the land and destroy a lot of acres, and a lot of money will be spent to control them after the damage has been done.”

Many people experiencing problems with feral hogs are, like Forst, eager to eliminate them, but extermination is difficult. Feral hogs are adaptable and tenacious when it comes to survival.

No easy solution

Although total and permanent removal is unlikely, trapping is currently the best method for controlling hog numbers.

“Controlling hogs using trapping isn’t a one-time job and you’re done,” said Ken Gee, Noble Foundation senior wildlife researcher. “Due to their mobility and high reproduction rate, you have to monitor hog populations and implement control techniques periodically.” ▶



Cage and corral-type traps are the most prevalent trap designs because they are relatively inexpensive and somewhat portable.

Unfortunately, sometimes the feral hogs become trap-shy. "They are smart animals," Gee said. "Feral hogs can become educated and become wary of traditional, corral-type traps,"

Feral hogs can be hunted throughout the year. Traditional hunting is generally ineffective for controlling hog numbers, according to Gee. Another method of population control is the "Judas pig" tracking technique. This technique was signed into law as Senate Bill 1751 and became effective Nov. 1, 2012. The law allows landowners and hunters to use an electronic tracking device to monitor this pig until it joins the sounder (group of feral hogs), revealing the position or pattern so the sounder can all be removed.

For most, however, trapping is the answer. But how do you best trap feral hogs?

Research

The Noble Foundation began research on feral hogs in 2010. Gee, along with Josh Gaskamp, Noble Foundation wildlife research assistant, conducted a two-year research study to measure the effectiveness of drop nets versus corral traps in capturing feral hogs.

"Numerous trap designs have been used to capture hogs," Gee said. "However, drop nets have never been examined as a potential tool for feral hog control. In the mid-1990s, we began using drop nets to capture feral hogs that were interfering with our white-tailed deer capture efforts. The technique was successful enough to warrant further exploration."

A two-year study was implemented to compare the effectiveness and efficiency of a 60-foot by 60-foot drop net, which is completely suspended, eliminating near-ground visual obstructions, versus a traditional corral trap where pigs enter a cage structure and a door closes behind them

Ken Gee (left), senior wildlife researcher, rigs a weather-proof camera while Josh Gaskamp adjusts programming on the BoarBuster hog trap. Gee and Gaskamp developed the new system so that it can be triggered remotely.

“What has taken me two years to grow, hogs destroyed a quarter of it within two nights.”

– Clay Forst

when a trip wire is activated.

In 2010 and 2011, multiple trap sites were identified on 10,000 acres in Love County, Okla. Trap sites were baited with whole corn and monitored with infrared-triggered cameras. The study, which removed 356 hogs between the two methods, showed that the drop nets were more effective than corral traps.

"We captured a larger portion of the population with drop nets, often capturing the entire sounder," Gaskamp said. "The hogs were not hesitant to walk under the drop nets because there isn't a structure at ground level."

Capturing an entire sounder reduces instances of hogs becoming educated to the inner workings of the trap, Gaskamp said. Additionally, non-target captures, such as deer, raccoons and turkey, are eliminated because humans, not the animal, trigger the drop net. To some landowners, this is an inconvenience. They prefer capture techniques that do not require observation time in the field, especially since hogs are often active throughout the night.

While effective, a drawback of drop nets is that it is difficult to get the hogs out of the net without euthanizing them.

After the first year of the study, Gee and Gaskamp began to see that combining the best of both traps might lead to the most effective and efficient trap. "We needed the unobtrusiveness of the drop nets," Gee said. "And the convenience and accessibility of the corral traps."

Necessity became the mother of invention. Now they just had to design and build it.

The birth of the BoarBuster

Gaskamp and Gee developed the *BoarBuster*, a fully suspended, remotely activated, selec-

tive corral trap made out of cattle panels. "The *BoarBuster* is basically a corral trap that we are able to suspend, and then monitor and drop from a remote location," Gaskamp said. "All visual obstructions are eliminated so the hogs don't become trap-shy."

The new system allows the wildlife team to be offsite during the drop. In fact, Gaskamp can drop the trap anywhere he can get cell phone reception. The new *BoarBuster* system will send Gaskamp an email or text message to alert him that there is motion at a trapping location.

Using cameras set up at each site, Gaskamp can watch the animal(s) through his smartphone or personal computer (eliminating any unwanted animals from being trapped) and then remotely spring the trap whenever the expected number of hogs has entered the trap.

"I can be at home watching TV or at a ballgame, receive a message, watch the sounder gather and then spring the trap," Gaskamp said. "I can then leave the hogs in the trap and go collect them the next day."

Building and field testing the trap soon sparked another study. Gee and Gaskamp wanted to compare the efficiency and effectiveness of the *BoarBuster* to the two previously studied methods. This study is currently in progress, but initial results are positive.

The catch per unit effort for the *BoarBuster* was roughly 300 percent greater than drop nets and corral traps, and the trap has snagged a maximum of 39 hogs in a single trapping event. "About 88 percent of the identifiable hog population is being removed using the *BoarBuster*, which is similar to drop net effectiveness," Gaskamp said. "However, unlike drop nets, the *BoarBuster's* remote operation saves time by eliminating the need to observe them from the field. A load-out door allows us to remove animals with ease."

Word about *BoarBuster* is out and desperate landowners want the new trap. The Noble Foundation is currently working to license the *BoarBuster* patent to a manufacturer/distributor. "We have also received calls from state and government wildlife agencies that want to implement this trap into their control programs," Gaskamp said. "The new trap has potential to be a game changer for localized feral hog control."

For agricultural producers like Forst, "control" would be a welcome relief. Until then, he'll be out fixing his deer feeder. ■



Bobby Nelson celebrates his graduation from TEEM's Career Development Workshop.

CERTIFICATE OF ACHIEVEMENT
Bobby Nelson

has successfully completed

Development Workshop

CONGRATULATIONS AND BEST WISHES FOR FURTHER GROWTH, AND IN SEEKING SELF-SUFFICIENCY.

Second Chances

Noble Foundation granting changes lives, circumstances

by Jessica Willingham

Some people get there by bike. Some get there using a free bus pass issued to them by the prison upon their release. Some borrow a ride from a friend or stranger. Still others walk from their makeshift bed – a park bench.

Their destination stands just past the Mercedes dealership, where the buildings quickly morph into dilapidated warehouses and abandoned businesses with windows as tired and empty as the eyes of those standing outside them.

On the other side of the tracks, headed toward the east side of Oklahoma City, The Education and Employment Ministry (TEEM) would seem as hopeless a cause as the people who shuffle through its doors. Yet not everything is always as it seems.

At least, that's what Brent Berry learned. An accomplished Oklahoma City attorney, he dropped off a box of old suits to TEEM's headquarters when his law firm was participating in the drive for charity. The man taking his boxes was tattooed and clearly down and out. "I didn't have high expectations of the people at TEEM," Berry confessed. "I admit I immediately passed judgment on the people here." Despite outward appearances, Berry found the man assisting him with his boxes to be polite, helpful and proud of his work. In fact, each of TEEM's 18-member staff impressed Berry to the point he truly wanted to understand the organization's mission.

TEEMing up

TEEM works with more than 100 partners to eradicate poverty, homelessness and unemployment in Oklahoma. Their task is

not an easy one.

Sixteen percent of Oklahomans live below the poverty line, and one person in eight is incarcerated. The Sooner State ranks No. 2 in the nation for female incarceration and No. 5 for males. More than 2,000 are released every year and expected to find employment, but are rarely given the chance to do so.

"We all want jobs," said Bobby Nelson, a student at TEEM. "If you can't work, you can't eat. If you can't eat, you steal. I'm tired of being hungry and stealing. I'm a man who can do better."

Of those who show up at TEEM's door, nearly 50 percent are recently released from prison. "A lot of people think that when you get released from incarceration, the Department of Corrections has properly prepared you to re-enter the workforce," said Sarah Blaney, TEEM Development Coordinator. "The truth is, all you get is \$50 and a bus pass."

Another large portion of TEEM students – 31 percent – are homeless, and the majority suffer from addiction and generational poverty. They all come from different situations and walk through the door with one objective: meaningful employment.

"The more time I spent with TEEM, the more my impressions changed," Berry said. "The staff and students carry themselves with a strong sense of importance. The services TEEM provides are vital because it's about survival. They're giving others the tools to succeed and be self-sufficient. I have been, and continue to be, blown away by the people here."

Berry is now a board member and active volunteer with TEEM.

A Legacy of Support

Like Berry, The Samuel Roberts Noble Foundation also came to believe in TEEM and its cause. In 1991, the Foundation began a relationship with the nonprofit that has resulted in 27 grants and more than \$470,000 dollars in support.

"The stories of TEEM students and their successes are remarkable," said Mary Kate Wilson, director of granting at the Noble Foundation. "The Foundation wanted to be a part of continuing that success. Our relationship has been a consistent one because the trustees truly believe in the work TEEM is doing – giving people a hand up, not out."

TEEM receives funding from individual donations, but a large majority – 60 percent – comes from private institutions like the Noble Foundation. "The impact Noble has on TEEM and its services is hard to quantify. It's our lifeblood," Blaney said. "Most organizations want to support programs specifically, such as bus passes or meals. We need those, too, but the most difficult dollars to raise are general operating funds. People don't want to pay to keep the lights on, the building open or make sure you have a receptionist. That's not the glamorous stuff people want to give to, but it's what allows TEEM to keep running efficiently so we can impact the world in the way we want to impact it."

Keeping the lights on has ensured TEEM's assistance to more than 12,000 people since its inception. Yet, as the economy continues to suffer, TEEM's need in Oklahoma City grows and puts a strain on staff and resources. As usual, they face opposition with optimism and the help of the Noble ▶



What is TEEM?

TEEM began in 1987 with the intention of assisting men overcome alcohol addiction. Since then, the interfaith nonprofit ministry has expanded its reach to people of all genders and backgrounds in need of assistance in gaining, or often regaining, independence. TEEM has a three-pronged approach to meeting this goal: education, employment and social services.

Every Monday, desperate, yet determined, individuals line up outside TEEM's door. The first 15 are accepted into Career Development Workshop, the preliminary class for those seeking to improve their life through TEEM. In the weeklong class, they become oriented with the organization, the services it provides and the skills they need to develop. Upon graduation, students can enroll in other classes to expand their skill set and marketability to employers, such as GED classes and those that focus on character, communication in the workplace, and personal life management and navigation; and various trade and training certifications.

Foundation, other generous organizations and people like Brent Berry, who are willing to give their time and faith.

Giving back

Thirty-eight percent of TEEM's staff are former participants in the programs.

"Many people are anxious to get jobs, but simply aren't ready," said LaNeeta Bradley, a former student who is now employed as a job coach by the organization. "By the time they get here, their self-esteem is down so low they have a fear of interviewing. We help build that self-esteem and identify values and goals. By the time they complete the class, the anxiety is gone and they're prepared for the interview." Of those who complete Bradley's class, 98 percent gain meaningful employment. Bradley continues to mentor each student through their first year back in the workforce.

TEEM reaches beyond the efforts to secure meaningful work and offers additional support through social services. "If life isn't working in the home, it's not working anywhere," said Rev. Tony Zahn, former attorney and current executive

director of TEEM. "A person who goes through TEEM receives help with finding treatment, housing and other parts of their lives that we don't directly handle. We try to help them in every area, to improve their whole lives."

Transportation, child care and various rehabilitation centers are all available to students through TEEM. Two meals are served a day at the headquarters, made possible by the Regional Food Bank and grocery store donations. TEEM's kitchen manager, a former student, cut the organization's food costs by 25 percent after being given a chance at employment. Doing more with less isn't something new for TEEM and its students and staff.

To help support its many activities, the nonprofit hosts a series of drives to restock its clothing closet and hygiene items.

Graduation day

It's Friday afternoon, and light streams through the glass windows of TEEM's chapel, dancing as people shuffle past and take their seats in the pews. Many students are wearing suits and pride for the first time.



It's graduation day. They each take their turn, speaking words of encouragement to their classmates and words of gratitude to TEEM. As the final speaker concludes, the chapel stands with an emotional and powerful ovation. In the very back stands Berry, clapping with admiration for the graduates who have defied all odds, even the ones they placed on themselves. Whatever shadows loom in people's lives, TEEM is a place to turn expectations and perceptions around, Berry knows all too well. ■

(left page) Portraits and quotes from past TEEM participants serve as inspiration to current program students.

(top left) Glenn Denison, a volunteer at TEEM, arranges clothing that is provided to program participants for job interviews.

(top right) Nellie Cotreras, a program participant, speaks at her graduation from the Career Development Workshop.

(bottom) Deborah Patterson (seated), a TEEM program participant, learns keyboarding from instructor Lyn Turner.



Setting the Stage

A former postdoc shares memories and experiences about his transformative time at the Noble Foundation

by Baxter Stewart

In the summer of 2001, Imad Eujayl, a new Noble Foundation postdoctoral fellow, could only marvel as he watched his first rodeo. Taking in the barrel races and calf roping, Eujayl had never seen anything quite like this in all his travels. “It was amazing,” he said. “I was watching real American cowboys.”

On a hot summer evening many years later, Eujayl smiled at the memory as he reflected on his time at the Noble Foundation, the many memories he made and how a few years in southern Oklahoma prepared him for his future.

Though this was not his first visit to the United States, Eujayl’s postdoctoral fellowship at the Noble Foundation would offer him a chance to live permanently in the United States. An opening in Rouf Mian’s lab naturally fit his research focus in genetic markers.

Eujayl received his master’s degree in crop science from the University of Gezira in Sudan and his doctorate in molecular genetics from the University of Helsinki in Finland.

“My Ph.D. research was in the development of DNA molecular markers, and this seemed to be the next step,” Eujayl said. “The Noble Foundation’s facilities and equipment made a huge impression on me right away. I hit it off quickly with my mentor, Mian, and my experience only got better from there.”

Under Mian, Eujayl was given the freedom to design his own experiments and operate in a scientific culture unlike anything he had ever experienced. “While working in other research laboratories at other institutions, I

could only imagine an environment where I didn’t have to worry about having enough materials or up-to-date equipment,” Eujayl said. “At Noble, I was free to focus on what I do best, and that was the science. We were not competing against each other across departments; instead we were collaborating, resulting in a much better scientific product.”

At the Noble Foundation, he worked to develop molecular markers for tall fescue and *Medicago truncatula*. Comparative mapping with DNA markers can reveal key genetic information, for example, to breed better forage plants. The tedious process required late nights and hard work from Eujayl. He often worked on two or three different experiments at a time, doing analysis work, running PCRs and constructing cDNA libraries.

One of his main goals was to develop a set of transferable molecular markers from *Medicago truncatula* that would be useful for important crop species, particularly alfalfa. His research found a high level of transferability in those markers that indicated that the markers would be highly useful with alfalfa.

Eujayl’s dedication resulted in his work being published twice in peer-reviewed journals while at the Noble Foundation, setting the stage for many more to come. “Getting your work out there and having it published is vitally important for a postdoctoral fellow,” Eujayl said. “It helps you along as you compete for that next research opportunity. What we were able to accomplish paved the way for my future position.”

The next step for Eujayl took him to Pullman, Wash., to work for the USDA’s Agricultural Research Service. After success there, he went to work for the International Food Policy Research Institute in Washington, D.C. Finally, Eujayl made it to his current destination, working again for the USDA as a research molecular biologist at the agricultural research station in Kimberly, Idaho, where he works to develop molecular markers to increase the cost-effectiveness and precision of selection for the best trait combinations in sugar beets.

His experiences with the Noble Foundation, the Ardmore community and his first rodeo have had a lasting impact. Eujayl still enjoys watching live rodeos and has even taken up horseback riding. He also continued his personal and professional connection to Mian after he left the Noble Foundation. Mian now works for the USDA, where they remain colleagues and friends.

“My time in Ardmore was a wonderful experience,” Eujayl said. “For a postdoc, the Noble Foundation is a great place to do research and advance your career without distractions in a great scientific environment. You get this sense while you are there that everyone is truly on the same team with one focused mission.” ■

(right) Imad Eujayl, Ph.D., examines a sugar beet as part of his research for USDA near Pullman, Wash. Eujayl advanced his career through a postdoctoral fellowship at the Noble Foundation that began in 2001.



The Doorway to the Future

by J. Adam Calaway

There's a picture of a door that you've likely never seen. Even if you had stumbled across it, the faded black-and-white print probably didn't leave much of an impression.

The snapshot – one of the earliest photographs in our organizational history – shows the door to the original Noble Foundation offices in downtown Ardmore, Okla. There's no one in the photo, no face to recognize. It's just the door with its whitewashed wood frame, rippled glass window and brass fixtures.

If “The Samuel Roberts Noble Foundation” wasn't stenciled on the front in bold black letters, you'd swear the door would open to a 1940s-era private investigator's office or a newsroom filled with clanking typewriters.

But for Boyd Howell, this door led to a career and a future. More than 60 years later, he'd encounter that door in the most unexpected place.

Each fall, the Noble Foundation retirees migrate back to campus for a special luncheon in their honor. They spend a few hours sharing food and fellowship. They swap stories about old friends and new grandchildren. They roll out inside jokes with long forgotten origins.

This event has become one of my favorites. Standing in one room are the men and women responsible for building our organization. They embody greatness and grace. They wrote our lore. They are a living legacy. They are Noble's equivalent of the 1928 Yankees.

As part of the festivities, we award prizes. This year, we printed several striking posters of current and historical images – including the original Noble door. With each drawing, the winner collected their prize and received a little teasing from the audience for their victory.

When the poster of the door was awarded, Howell's name came out and, as the applause subsided, he said, “This is perfect. I walked through that door more times than I can count.”

I stopped cold. I had never considered that someone in the audience would have actually used that door. The organization moved to its current campus east of town in the early 1950s. Our campus is Noble's home base, but not for everyone.

After the event, I sidled up to Howell and his wife, Margaret, for more details. Sweet memories poured out of them like warm honey.

Howell was about 19 years old when he began working for the Noble Foundation. Fresh out of high school, he was hungry to support his ailing mother and forge a life with his high school sweetheart. He snatched up the opportunity to become a research technician in the biomedical division just five years after the organization's establishment. “I didn't know it at the time,” Howell said. “But that was the doorway to my future.”

The years sped by like thumbing through a deck of cards. Howell



served in the military during the Korean War, married Margaret and together they raised two children. When he needed to finalize a college degree to advance his career, the Noble Foundation leadership rearranged his work schedule. Soon, 42 years had slipped by, and a career that began at an old wooden door had ended.

Howell retired in 1993; I had just received my learner's permit.

Age should truly divide Howell and me, but we're linked by a common “Noble” story. When I think of the opportunities I'm afforded today, I am thankful for all those who came before.

They are the men and women who have spent the better part of seven decades building this organization from a small foundation focused on two Oklahoma counties to an internationally renowned research institution.

They are the innovators and the guardians of our founder's original idea. They are the true heroes of our story. They are Boyd Howell and all our retirees.

I hope to work hard enough to justify the inheritance they afforded me. I hope to add my own portion and make them proud. I hope that when I see that next door, I can walk through it boldly because, like Howell, you never know where it's going to lead. ■



(above) Gene Autry (in white hat), the famous singing cowboy, admires an ice sculpture of a bull with Lloyd Noble, oilman and founder of the Noble Foundation. In 1939, Autry purchased the Flying A ranch in Berwyn, Okla., a small town located about 10 miles northeast of Noble's hometown of Ardmore, Okla. Berwyn was renamed Gene Autry, Okla., in 1941 in honor of the actor.

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*Rows of small grains planted on the Noble Foundation
Headquarters Farm stand backlit by the afternoon late fall sun.
The Noble Foundation has conducted annual variety trials on
small grains since 1966.*

