

# Legacy

Summer 2012

## Envisioning tomorrow

*Bill Buckner leads the Noble Foundation into a new era*

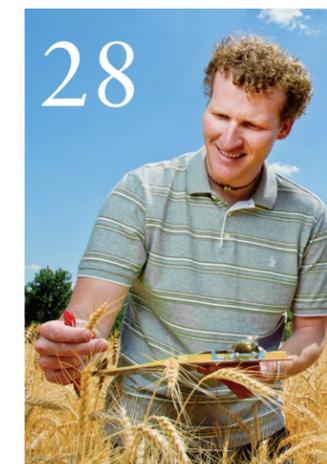


Summer 2012 | Vol. 6, Issue 1



*(on the cover) Bill Buckner was selected as the organization's eighth president and chief executive officer last fall and kicked off his tenure in January 2012. Buckner brings more than 30 years of experience in agriculture to the Noble Foundation's top leadership position.*

*(above) Noble Summer Research Scholar Kristen Clermont, a graduate student at Virginia Tech, inoculates a plant under the supervision of Postdoctoral Fellow and mentor Seonghee Lee, Ph.D. Participants in the 10-week Summer Scholars program perform real-world research working side-by-side with Noble Foundation scientists.*



## Cover Story

- 16 Envisioning Tomorrow**  
After retiring from Bayer CropScience LP, Bill Buckner jumped at the opportunity to lead the Noble Foundation. In an intimate Q&A, Buckner discusses the experiences that shaped his life, the future of his new organization and agriculture, and – again – talks about sharing a name with the other Bill Buckner.

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## An Agricultural Revolution

To our readers,  
The problem with tomorrow's challenges is that they seem so far away.

As a society, we have begun to seriously consider the bulging global population, but while the numbers are staggering (a growth from 7 to 9 billion people by 2050), the ramifications seem so distant.

There has been an uptick in discussion about dwindling resources from food (1 billion already classified as malnourished) and land (increased desertification and urban sprawl) to water (drained aquifers are only the beginning). However, the enormity of the challenge that lies before us has not fully soaked into the collective consciousness. We lack – for the most part – a general sense of urgency concerning the world around us.

And we have not even begun to discuss soil erosion, geo-political wrangling and a myriad of issues that dissuade agriculture and its countless products, including food.

The manner in which we collectively approach these issues seems to indicate that they are someone else's problems to handle. Or maybe these issues are drowned out and overlooked because agriculture is still churning out billions of tons of food and the pangs of hunger have yet to lap at our shores.

Answers to tomorrow's challenges require work today. In a cosmic sense, 40 years is a blink of an eye, but without laying the foundation of research and improving critical processes (e.g., distribution) in 2010, we cannot build to successful conclusions by 2050.

Most importantly, these issues require a full faith effort by everyone who eats. These issues are not just for agricultural producers, plant breeders and research scientists – we require an agricultural revolution that unites and motivates us to make necessary changes.

Nothing is more fundamental to our existence than food, and without the land it springs from, we are all in peril. With all that divides, surely we can agree that these precious resources should be protected and fostered so that we can continue to prosper.

This is why I came to the Noble Foundation. To my very core, I'm an aggie. My entire life work has focused on improving this industry by one means or another. As you will read in the following pages, I became president of this great institution because I believed in the mission of Lloyd Noble to advance agriculture and safeguard the soil. I also see how this organization is armed to bring tangible solutions to assist producers in the Southern Great Plains and beyond.



In this issue of *Legacy*, you'll read how our scientists are developing new methods of defending vital agricultural crops against the onslaught of pathogens (p. 11) and breeding healthier small grains varieties for livestock (p. 28). Additionally, we discuss educating future generations about the importance of sustainable agricultural practices (pp. 6 and 21). These students are the linchpin to lasting change.

These are common sense solutions with real impact. Together our scientists, agronomists and agricultural consultants join thousands of like-minded individuals around the world to ignite this revolution and bring hope to a dire situation.

But we need you. We need everyone. We need to educate – not just the youth – but our leaders and our policy makers. We need a real dialogue about these issues, one that supersedes politics and environmental hysteria. We need to begin making headway toward more solutions.

Because before you know it, tomorrow's challenges will be today's disaster.

Most sincerely,

Bill Buckner  
President and Chief Executive Officer

# Notables



### Noble around the world.

Staff Sgt. (SSG) David Verdine holds out the Noble Foundation flag as it is raised over the Texas Agribusiness Development Team (ADT) 5 headquarters in Afghanistan. Agricultural consultants and researchers with The Samuel Roberts Noble Foundation provided fundamental training to members of the Texas ADT 5 last spring in preparation for their mission in Afghanistan. This special National Guard unit has been on a one-year tour in the war-torn country, teaching regional farmers and ranchers basic agricultural practices. The hope is to provide an alternative economic source to the Afghan people, who often depend on extremist groups for income. Look for the full story on the Texas ADT's experiences overseas in an upcoming issue of *Legacy*.

### Letter to the editor

I want to take this opportunity to thank the Noble Foundation for all they do to support and educate the public and producers in agriculture. Your work is truly a public service. Your team was very helpful and instrumental in assisting the Matador Ranch in its grazing efforts. (As a result) we have been chosen to receive Environmental Stewardship Awards from among several outstanding producers.

Best regards,  
Bob Kilmer



### Butler receives Young Crop Scientist Award

Noble Foundation Associate Professor and Research Agronomist Twain Butler, Ph.D., has been selected to receive the 2012 Young Crop Scientist Award from the Crop Science Society of America (CSSA). The award recognizes crop scientists who have made an outstanding contribution in any area of crop science by the age of 40.

Butler's research program focuses mainly on the establishment, management and production of alfalfa, tall fescue and switchgrass. His goal is to develop better management practices for producers.

"Receiving this prestigious award is confirmation that I've positively impacted my field and the lives of farmers and ranchers," Butler said. "I'm proud to be a part of an industry and an organization that is focused on supporting agricultural producers."

**Grant expands legume research**

Noble scientists Drs. Michael Udvardi, Rujin Chen and Kiran Mysore received a \$6.5 million grant from the National Science Foundation (NSF) to expand research aimed at understanding and enhancing symbioses with legumes.

The NSF grant will allow the Noble researchers, along with their co-principal investigators, Drs. Maria Harrison of The Boyce Thompson Institute, Rebecca Dickstein of the University of North Texas and Janine Sherrier of the University of Delaware, to determine the genes responsible for the development and nitrogen-fixing function of nodules. Additionally, the research will examine how fungi in the soil form a symbiosis with plant roots, improving phosphorus uptake in the plant. Understanding the genetic controls and biology of the symbioses with rhizobia and fungi may lead Noble Foundation scientists to more sustainable agricultural practices.

*Michael Udvardi, Ph.D., examines a legume in the Noble Foundation greenhouse.*



**Feral hog experts provide national resources**

The Noble Foundation has joined several land-grant university extension entities throughout the United States to form a “community of practice” that will fight the growing feral hog problem.

This Feral Hog Community of Practice brings together a group of professional educators with expertise on a variety of feral-hog-related topics. Together, they have launched a new Web-based resource to help provide agricultural producers, wildlife managers and landowners with critical information and expert application of knowledge to meet the growing demand for timely and accurate information.

The new Web-based resource (available at [http://www.eXtension.org/feral\\_hogs](http://www.eXtension.org/feral_hogs)) will focus on control, adaptive management, biology, economics, disease risks and human interface relating to feral hogs across the U.S.



**New fescue variety offers grazing alternative**

For decades, farmers and ranchers in the Southern Great Plains have had two choices for feeding livestock during the fall and early spring – purchase hay or plant ryegrass, an annual forage. Perennial options have been unavailable because they can rarely survive the region’s summer heat.

Noble Foundation researchers, along with collaborator AgResearch of New Zealand, spent more than a decade developing a new variety of tall fescue that combines the advantages of a perennial – reduced time and expense of replanting annual crops – with removing the risk of fescue toxicosis, a common illness caused by a fungus in fescue.

Called Texoma MaxQ II®, the new variety is the first commercial forage designed to be a cool-season perennial grass for the Southern Great Plains. It is licensed to Pennington Seed Co. and will be commercially available this year.

**What Summer Olympic sport most resembles your work?**

There are parallels between my work and volleyball. Both require a group whose position is defined by their strengths. Players must have precise coordination and communication skills for a favorable outcome. Working in the lab, like volleyball, requires quick decisions; we improvise our strategies and consequently score by producing publishable papers.

**Ivone Torres-Jerez, Senior Research Associate**

My job requires continual training, but it is most like track and field. There is a lot of variety in track and field, and in the tasks I do. Also, I get to do much of my work outside. Some of the tasks I do are fast like the 100 meter dash; some take much longer like the marathon. My work is passed on to producers, like passing the baton in the relay.

**Corey Moffet, Assistant Professor**

I think my work is most relatable to gymnastics. In gymnastics, the athletes compete in individual and team competition, much like the work in our laboratory. While I’m working on my individual projects, I’m also working toward our team goal. It’s the combined efforts of our whole team that make us successful.

**Christy Motes, Senior Research Associate**

My career as a scientist requires hard work, creativity and team spirit, just like soccer. In both, various talents and skills come together to help meet shared goals. Success and failure are a part of both science and soccer. Failure gives us an opportunity to re-evaluate our methods and approaches, which can ultimately lead to success.

**Kishor Bhattarai, Postdoctoral Fellow**





# Defining a Future

Young agricultural scholars journey to the Noble Foundation for a summer internship like no other

by Jessica Canaday

**M**orning crests over open range, and golden light reveals a herd of cattle in the distance making their way down a rocky bowl. Behind the long, dusty line are the silhouettes of four cowboys on horseback. Their work-gloved hands wave straw cowboy hats, driving the herd.

The stock treks up the ridge, and hundreds of beasts kick up clouds of earth. Finally the herd passes, and two of the cowboys slow their horses to a walk as they come closer. One horse dips his head to nibble green grass as his rider booms “Welcome to Middle Creek Ranch!”

Yates Adcock has managed Middle Creek’s 15,000 acres for 25 years. He works daily to care for the land and its 800 cow-calf pairs, 50 bulls and 150-head goat herd. Among Adcock’s full-time hands is one of the Noble Foundation’s Lloyd Noble Scholars in Agriculture, a quiet young man who is (clearly) not having the usual summer internship.

Logan Jackson, an animal science junior at Texas Tech University, left

*Yates Adcock, left, manager of Middle Creek Ranch, and Logan Jackson string temporary fencing.*

Lubbock for a summer in Dustin, Okla., as Adcock’s right-hand man. His faded jeans tucked into tall cowboy boots and the clanking of spurs the only sound the student makes, his constant smile says there’s no place he’d rather be than on horseback, learning from Adcock.

“I’ve been saddled since 5 a.m.,” said Jackson, a grin spreading across his face. “Working with Yates has been an unbelievable learning experience. He’s given me his confidence and trust to help handle this ranch. I’ve never done anything like this before, but now I want to make a career out of it.”

## From the office to the field

Jackson’s defining educational experience at Middle Creek Ranch is a recurring theme for the Lloyd Noble Scholars in Agriculture who make their way to Ardmore each summer (more than 100 applicants vie for a coveted spot in Noble’s summer internship program). These hand-picked scholars conduct real-world agricultural research and projects on the Noble Foundation’s campus or participate in unique, on-ranch experiences with some of the region’s top commercial producers.

“The Noble Foundation provides each student with an experience meant to

challenge them, solidify their passion for agriculture and shape their career goals,” said Billy Cook, director of the Agricultural Division. “For the scholars, this is not just a foot in the door, but a chance to stand in the boots of Noble Foundation consultants and researchers, truly living the life of a professional.”

Each scholar is provided a mentor or team of mentors who offer individual guidance and support throughout the three-month program, imparting knowledge and sharing years of experience.

“As a mentor, I get the opportunity to hopefully have a positive impact on somebody’s life,” said Adcock, who has co-sponsored a scholar since 2007. “The quality of the interns we get through the coordination with the Noble Foundation has been unparalleled. These young people are passionate, serious and have an excellent work ethic. The real blessing to me, my family and the staff is the friendship we form with them. The closeness we build and maintain develops into a lasting relationship. I’m still a mentor to them years later.”

Nearly 200 miles away at Noble’s Ardmore campus, Austin Miles has experienced the same awe-inducing opportunities, just in a different setting. Miles wore coveralls and sipped ▶



steaming coffee from a mug emblazoned with the Noble Foundation logo. He sat behind a desk, pecking at his keyboard, his name proclaimed outside the entrance of his very own office. If a visitor didn't know better, the 24-year-old graduate student from Texas A&M would seem like a bona fide consultant, not a summer intern. "The atmosphere here at the Noble Foundation is unlike anything I've experienced before," Miles said.

Previously, Miles served as an agricultural policy intern in Washington, D.C., where he found himself more likely to be brewing coffee and making copies than consulting with agricultural producers. "As a scholar, I have a solid mentor-intern relationship, and I'm doing real work that matters," he said. "I really enjoy having my own project. It gives me autonomy, but I also communicate with my mentor every day. The interaction

is open with all of the consultants and researchers here."

### Changing course

The open communication with colleagues is a key component as each scholar adopts a research project tailored to their chosen field of interest. The scholar collects data, works through obstacles and draws conclusions about some of today's most pressing agricultural issues. At the end of the summer, they will present their findings to an auditorium of professional peers. "There's no busy work here. I have a substantial project that is vital to the Noble Foundation's overall research goals and agricultural producers in general," said Ashton Williams, who is working in agricultural safety. "I know my final presentation and the data I've collected will be utilized by other professionals working in the field,

*(above) Austin Miles, a graduate student at Texas A&M University, evaluates warm-season forages in a Noble Foundation grazing trial. Following his graduation and time as a Lloyd Noble Scholar, Miles accepted a full-time research position at the Noble Foundation.*

*(right) Livestock consultant Robert Wells, Ph.D., discusses forage quality with Audra Wilburn. Lloyd Noble Scholars in Agriculture work with a series of mentors to further their individual projects and overall knowledge of agriculture.*

and that's gratifying."

Like Jackson at Middle Creek Ranch, Williams is a part of another special collaboration between the Noble Foundation and the Southwest Center for Agricultural Health, Injury Prevention ▶



# 2012 Lloyd Noble Scholars in Agriculture

**Name:** Nicole Farless  
**University:** Oklahoma State University  
**Major:** Natural Resources, Ecology and Management  
**Project:** Testing plant species to determine the effects of new enzymes

**Name:** Logan Jackson  
**University:** Texas Tech University  
**Major:** Animal Science  
**Project:** Narrowing down Middle Creek Ranch's goat density population, determining effects on land

**Name:** Kristin Jones  
**University:** Oregon State University  
**Major:** Graduate studying Forest Ecosystems and Society  
**Project:** Surveying of Northern Bobwhite quail populations and statistical analysis for the white-tailed deer study

**Name:** Sarah Mays  
**University:** Tarleton State University  
**Major:** Wildlife Management  
**Project:** The effects of prescribed burning on pest populations and vegetation sampling through very-large-scale aerial imaging

**Name:** Austin Miles  
**University:** Texas A&M University  
**Major:** Agricultural Leadership Development  
**Project:** Studying animal performance on cereal rye and its impact on stocking density, animal growth and growth of the pasture

**Name:** Jess Price  
**University:** Oklahoma Panhandle State University  
**Major:** Agricultural Business and Animal Science  
**Project:** Economic challenges of producers, including cattle cycles

**Name:** Nick Richburg  
**University:** Texas Tech University  
**Major:** Agricultural Economics  
**Project:** Testing different nitrogen-based fertilizers on a bermudagrass plot

**Name:** Cassie Warren  
**University:** Texas A&M University  
**Major:** Horticulture  
**Project:** Hoop-house study of tomato and pecan growth

**Name:** Audra Wilburn  
**University:** Texas A&M University  
**Major:** Animal Science  
**Project:** Surveying commercial producers to determine drought-related management practices

**Name:** Ashton Williams  
**University:** University of Arkansas, Fayetteville  
**Major:** Animal Science  
**Project:** Studying potential safety improvements for ATVs, RTVs and UTVs for agricultural operations

and Education, which works to improve safety in agriculture. Williams, an animal science major from the University of Arkansas, recalled how an unexpected twist in her scholar's project has now redefined her future.

She arrived expecting a summer job with menial tasks, loosely related to her goal of becoming an agricultural economist. Instead of filing audits and answering phones, Williams was given a project focused on risks associated with ATVs (all-terrain vehicles) used on ranches and safer alternatives. The project has altered her post-graduation plans, and Williams is now open to something she never considered before – a graduate degree in occupational safety and health.

Beyond the new graduate focus, Williams discussed the variety of opportunities she's experienced. Prior to her interview, she had artificially inseminated cows, met the Ardmore Fire Marshall as part of the Noble delegation to discuss fire safety in a new building and swabbed laboratories for radioactive isotopes. "There is no day-to-day routine," Williams said. "There is a huge variety and so much potential for learning. This experience will set me apart from other graduate school applicants."

As for Miles, he, too, finds the path ahead leading into new venues. Once bound for the suit-and-tie world of politics, Miles has now changed course. "I never thought I would work for a nonprofit, and now I can't imagine working anywhere else," Miles said. "I haven't had a job yet that had so much emphasis on mission and family. From their large producers to the scholars, the Noble Foundation is here to help people succeed. It's about people and relationships. I value being a part of that."

Nicole Farless, a wildlife scholar, said her experience has been similarly diverse and rewarding, reaching across disciplines and showing her the intertwined web of agricultural activities. "I'm going to school so I can have a career working in wildlife, but my experience as a scholar has prepared me for much more, opening more doors of possibility," Farless said. "I have worked in plant and soil science, agricultural consulting and pest control, and I'm even helping with a livestock management workshop. It's like nothing I expected."

## More than interns

As for Jackson, the day at Middle Creek Ranch ended much like it began – by Adcock's side. The pair sat down at a dinner table filled with the farm's crew. In between recounting the day's events, herd health recommendations, laughter and slices of homemade pie, Adcock inquired about Jackson's thoughts on his internship.

Jackson talked about his expectations and how his current experience has exceeded all of them, from work opportunities to his relationship with his host. Adcock smiled and agreed, saying he never calls his scholars "just interns." Instead, they earn a different title – family. ■



## A New Solution

### Noble Foundation researcher pioneers new method for building disease resistance in crops

by J. Adam Calaway

As far as nightmare scenarios go, wheat rust remains near the top of the apocalyptic list. For generations, this fungal pathogen has devastated wheat crops, causing massive grain losses and famine in the early 1900s and 1950s.

Wheat, like rice, is essential to life on Earth. This hardy grass constitutes roughly 20 percent of the world's food calories. The Norman Borlaug-led Green Revolution of the 1960s saw

plant breeders and researchers race to build genetic safeguards into wheat to provide necessary disease resistance. And it worked until 1999 when a new variety emerged in Uganda (Ug99) that has consistently overcome the previously resistant wheat varieties. Ug99 continues to devastate wheat crops throughout the Middle East and Asia.

The new rust – which actually includes half a dozen mutations – has virility

*(above) Kiran Mysore, Ph.D., examines inoculated plants as part of his laboratory's research into nonhost resistance.*

comparable to antibiotic-resistant superbugs for humans. It devastates without prejudice, leaving fields of black stems and no harvestable grain.

In an op-ed written for The New York Times in 2008, Borlaug said Ug99 was ►



more dangerous than the original variety he defeated half a century ago. That version destroyed 20 percent of the American wheat crop. The Nobel Prize winner estimated that 80-90 percent of today's wheat varieties are susceptible to Ug99.

And since the fungal pathogen's spores are carried by the wind, it literally goes wherever the wind takes it.

"Wheat and rice are staples," said Noble Foundation Professor Kiran Mysore, Ph.D. "If wheat is gone, we're in trouble."

### Plant breeding 101

Plant scientists like Borlaug and Mysore have continually sought ways to improve crops, focusing on increasing yields and endowing disease resistance.

Today, plant breeders have several ways to accomplish their tasks. The most common involves finding a plant within the same species that already exhibits the desired trait. Plants – like humans – inevitably have family members who are less susceptible to a particular disease. While one alfalfa plant may be destroyed by a pathogen, the next one may be completely unharmed. Plant breeders seek out these naturally occurring variations and then breed for the trait. It is a costly, time-consuming and difficult process.

Advanced genomic technologies have aided the process in the last few decades, reducing breeding time and cost. Researchers can even pinpoint the gene responsible for these defenses and breed specifically for it.

Still, for every technological leap, there is a pathogen that evolves to overcome the latest genetic defense, keeping plant breeders on a constant quest to find new solutions.

Mysore is among a handful of researchers around the world currently

*(opposite) A switchgrass plant is covered in rust, a fungal pathogen that impacts many key crops worldwide.*

pioneering an advanced method for incorporating disease resistance into key agricultural crops.

The new process may show that plant breeders have been looking for their source traits in the wrong place. Or at least the wrong plant.

### A new solution

The lasting answer to disease resistance may be found, not in the plant affected by a pathogen, but in a completely different species. This "nonhost resistance" is based on a fundamental principle: there is specificity between a plant and its pathogen.

Simply put, what makes one plant sick may have absolutely no impact on another species. Instead of breeding in a resistance gene from the plant's own family, researchers search nature for another species that has already created the blueprint for blocking the disease. For example, a pathogen that causes blight in tomatoes may have no ramifications in soybeans because soybean has evolved a natural defense mechanism.

"There are thousands of fungal and bacterial pathogens in nature, and any given plant is susceptible to a minute fraction of these pathogens," Mysore said. "All we have to do is figure out which plant resists our target pathogen and apply its mechanism to the host plant."

Of course, that's much easier said than done.

Mysore uses two methods to identify disease resistance genes and move them into a target crop.

The first involves silencing a gene, which is a method where researchers alter a gene's "expression" level in a model plant. Through this process, the gene's impact on the plant's physical traits is reduced like turning down the volume on a stereo.

Once particular genes have been turned down, Mysore's team challenges the plant with a type of bacterium which normally

does not affect the species. If the plant gets sick, the gene in question has a role in plant defense.

In the second approach, Mysore's team uses Noble's extensive collection of mutants in a model legume. Mysore's team infects a whole population with a fungal pathogen that normally does not infect the model legume due to nonhost resistance. Mysore's team will then identify mutants that exhibit disease and research further to find the underlying genetic controls. Those genes are then added to a list of candidate genes that may be moved into another crop species.

### The question of durability

The ultimate goal of Mysore's research is to find longer lasting disease resistance. Nonhost resistance seems to be a viable solution. Instead of focusing on one gene, Mysore envisions layering several of the candidate genes together into one new variety, providing multiple levels of defense.

"Nonhost resistance is clearly more durable than resistance based on a single gene," Mysore said. "Because it is intrinsic to the plant and will usually last much longer."

Asian soybean rust, as well as various grass rusts (e.g., wheat and switchgrass), remain the target of Mysore's nonhost resistance work. However, the concept is being applied across the spectrum of plant diseases and crops. Mysore's international counterparts are attempting to breed newly discovered genes into crops like rice.

Though Mysore estimated it would take another decade to fully realize the potential of nonhost resistance, his research has already identified multiple candidate genes, including one promising fungal defender.

"This is a huge opportunity for agriculture," Mysore said. "We have several steps to go, but giving crops broad spectrum resistance once was a dream. Now, it's becoming a reality." ■

# Rick Nelson

by Jessica Canaday

Rick Nelson knows life is a lot like golf. It's all about timing, not taking yourself too seriously and being willing to spend a little time in the rough.

After receiving his doctoral degree in biology from the University of Illinois and completing postdoctoral work at Washington University in St. Louis, Mo., Nelson came to the Noble Foundation as a professor of plant biology.

Nearly 24 years later, he's still honing his craft – more in the greenhouse and occasionally on the green. His discoveries at Noble range from deciphering the functions of virus proteins to understanding plant disease defense mechanisms against these pathogens – each success as sweet as sinking a 40-foot putt. Here, Nelson discusses his first job, his biggest lessons and how a few hours on the course helped prepare him for a lifetime in the laboratory.

## How would you describe your work to a stranger?

A portion of my work is to study how viruses move in plants and methods to prevent this from happening. Viruses are everywhere, threatening every major crop with disease. If we can prevent viruses from moving within a plant, we can block disease. Surprisingly, we can also use viruses to study how plant genes function. The other portion of my research utilizes viruses as delivery systems to study the function of plant genes during virus movement and cell wall development, the latter to improve biofuel production.

## What is the most exciting aspect of your work?

Here at the Noble Foundation, there's a potential of making a new discovery every day. You never know when another scientist will walk in and say "This is what we've been waiting for." It is exciting to be in an area where the potential exists every day of finding something no one has ever seen before, something that will help agricultural producers in the United States and the world.

## What inspired you to pursue a career in science?

I had taken plant biology courses as an undergraduate at Washington University and several of my professors, such as Virginia Walbot and Joe Varner, were wonderful inspirations for pursuing this area for my career. I think interning at Monsanto during my third year of undergraduate school also helped direct my career. That was a great opportunity and shaped my perception of agricultural research in the private sector and its relationship to public research.

## What experiences shaped your early career?

The patience and experience of my graduate school mentor, Jim

Harper, allowed me to explore plant biology research not only in the laboratory, but also in the field. While doing my postdoctoral research with Roger Beachy, I was fortunate enough to be involved in one of the first projects in the country where genetically engineered plants were being produced and tested in the field, in this case having virus resistance. It was an exciting time.

## How were you introduced to golf?

My first job was mowing my neighbor's yard on Saturdays when I was in my early teens. Mr. Haemerle was retired and also a very good golfer. Although I had been to driving ranges, he gave me my first lessons. He taught me golf etiquette and that it isn't always the person who hits the ball the farthest who scores the best. He was in his 70s, and he could barely hit the ball (bad sciatic nerve), but it was straight as an arrow and he was phenomenal on the green. I lost to him often, but I learned many traits that play into my life today. I always liked the scenery on a golf course, the greenness of it. That probably had some influence on my interest in plants.

## What has been the most valuable lesson of the game?

Learning patience and persistence on the course, watching this old retired man whip me when I was hitting the ball close to twice as far as he could muster, was a great lesson for a research science career. Experiments often fail due to technical problems or simply due to a lack of adequate understanding of how to approach the study. You have to move beyond those failures if you are to succeed in research science.

## How is virology like golf?

It's both frustrating and rewarding. Science, like golf, is all about controlling your variables. It can be full of frustrations and technical problems. Technique is everything, and if you can't perfect your swing or your methods, you won't be successful.

## How often do you play golf these days?

I don't get much of a chance to play anymore and I miss it. My golfing friends at the Noble Foundation still ask me to join them. I will get back to the course with my friends soon, but for now I still apply those lessons learned on the course to my work.

## What's one of your favorite memories on the golf course?

The Noble Foundation used to have a tournament every year, and one year I was able to play with the late Sam Noble, who was then on the Board of Trustees. He would always make sure everyone putted out – in other words, finished what they started and did it with integrity. His leadership came out even on the golf course. I always admired that about him. ■



# Envisioning Tomorrow

New President Bill Buckner discusses his life, leadership and the Noble Foundation's role in agriculture

by J. Adam Calaway

Two questions immediately surfaced last fall after the Noble Foundation Board of Trustees announced the selection of Bill Buckner as its new president.

First, "Is this the same guy who played first base for the Boston Red Sox in 1986 – the one who let the ball dribble through his legs in the World Series?" (No. That's just a coincidence.) And second: "Why did Bill Buckner come to the Noble Foundation?" That question has a much more interesting answer.

During his first few months as president and chief executive officer, Buckner hosted 30 informal get-togethers so he could interact with each of the Noble Foundation's 400 employees in small groups. On the last Tuesday in April, Buckner walked into the Noble Foundation library for his final "Meet the Prez" and began with the same statement. "I wanted to meet so we can get to know each other and discuss the

future of the Noble Foundation. I want to hear what you think about our organization, and I'll answer any questions you may have."

As with the previous 29 meetings, the first question Buckner received was a query about his desire to lead the Noble Foundation. Buckner smiled, pointed to the sizable oil painting of Lloyd Noble on the opposite wall and said: "He's why I came. I believe in his vision for agriculture. I believe in the mission he gave us and our ability to impact the lives of agricultural producers, to have tangible outcomes. He was the difference maker, and we can be difference makers as well."

Buckner assumes the mantle of leadership from the Noble Foundation's longest-tenured president, Mike Cawley, who directed the organization for almost two decades before retiring in 2011. "Bill Buckner is a proven leader with great integrity and foresight," said Vivian DuBose,

chair of the executive search committee and granddaughter of the organization's founder, Lloyd Noble. "The board is confident that he will continue the Noble Foundation's tradition of excellence and advance our mission to improve agriculture."

Buckner has spent the last 18 years with Bayer, a global enterprise focusing on health care, nutrition, agriculture and high-tech materials. He served in various leadership positions in the animal health and crop science business groups. Buckner, his wife, Kathy, and their four children globetrotted from the United States to Germany and Canada before finally making their home in Research Triangle Park in North Carolina. Last year, the 55-year-old retired as president and chief executive officer of Bayer CropScience LP, a division of the company that oversees the crop protection, biotechnology, manufacturing and environmental science groups. ▶





“My time at Bayer offered me a wealth of experience in international agriculture, outcome-based research and commercialization of products that will pay dividends for the Noble Foundation,” Buckner said. “This knowledge will be combined with the collective wisdom of our leadership team and employees as we continue to fulfill the mission and vision of our founder Lloyd Noble, taking his message of sustainable agriculture from our region to the world.”

Before his time at Bayer, Buckner spent 12 years in the agriculture-related finance and animal health industries. However, his link to agriculture extends back long before he joined the work force. Buckner grew up on a beef cattle ranch near Mexico, Mo. His mother still lives there and his children represent the fifth generation connected to the farm. “I have been in agriculture my entire life, and I have dedicated my career to the industry,” he said. “I’m passionate about agriculture, and the men and women of the world who devote their lives to feeding this

country and the world.”

Below, the Noble Foundation’s eighth president discusses everything from the crisis in agriculture and defining life moments to his iPod’s eclectic playlist and the other Bill Buckner.

**When you retired, did you expect to be involved in leadership again so soon?**

I knew I wanted to find a place where I could have a significant impact on the agricultural industry, but I thought that would take some time. I was content to wait for the right opportunity. That opportunity came along a lot quicker than I expected.

**You said Lloyd Noble’s vision drew you to the organization. What else was appealing?**

After visiting with the Board of Trustees and fully understanding the organization’s history and its role in agriculture, I knew this is where I wanted to be. The Noble Foundation is a unique organization that impacts the entire spectrum of

*(above) Outgoing President Mike Cawley passes a specially made baton inscribed with Lloyd Noble’s “charge to management” to new President Bill Buckner during the fall all-employee meeting.*

agriculture from conducting discovery science to applied research and directly interacting with farmers and ranchers. It has the potential to impact agriculture on a global scale, and that’s exciting.

**What immediate challenges do you see as president of the Noble Foundation?**

As with any successful organization, the biggest challenge is not being satisfied with current and past achievements. Additional, more specific challenges include protecting our endowment, navigating ever-evolving government (over-)regulation and agricultural policies that are often set by those who are detached from agriculture, and transforming our technologies into usable products for farmers, ranchers and consumers. As an organization, we need to learn

from our past activities and be prepared to identify new opportunities that can benefit from our programs and expertise.

**What is your leadership philosophy?**

I’ve always subscribed to the philosophy of finding the right people to do the job; have an organizational vision, provide them guidance and then stand back. The Noble Foundation has the right people and a significant mission set by the founder, Lloyd Noble. My role is to provide guidance to the Board relative to the dynamics of the global agricultural landscape, implement the direction of the Board and ensure that our research and programs are benefiting regional, national and international agriculture.

**What have you done during the first six months of your tenure?**

I’ve spent my first few months assessing the Noble Foundation’s programs and processes. With mindful regard to the direction established by the Board of Trustees, our leadership team and employee team are working to shape our institutional priorities. We’ve been working on strategic and financial planning – both keys to being good stewards of the resources given to us by Mr. Noble.

**What are the biggest challenges to agriculture?**

There is an unprecedented need in agriculture for innovation and technologies. In the next 40 years, global agricultural producers must increase food production 70 percent to meet the needs of a growing population. In addition, they must increase production while using less water and land, and using chemical inputs more efficiently. The only way to achieve this will be through advanced technologies and innovative new practices. The Noble Foundation has a rich history of agricultural innovation and improvement, so we will certainly play a role in this agricultural renaissance.

**How will you leverage your own international experience at the Noble Foundation?**

My experiences and relationships will

certainly play a complementary role; fortunately, the Noble Foundation has an international reputation and its research already has application across the United States as well as abroad. However, no one organization can understand and single-handedly address the myriad of challenges facing agriculture. Accordingly, we will leverage our existing relationships, and, when appropriate, cultivate new relationships that allow us to undertake targeted challenges, conduct efficient and productive research, and then deliver solutions to producers and others.

**What is your favorite part of being a Noble Foundation president?**

I can honestly say I love everything about being president. The totality of the job’s experiences is energizing. I get to touch every aspect of the organization. We get to create something every day. There is something special about the process of creating meaningful outcomes that benefit the bedrock of society – our farmers and ranchers.

**How was the transition from North Carolina to Oklahoma?**

Kathy and I are comfortable with the process of moving. Once you have moved your entire household to and from an international location, a move within the continental U.S. becomes less intimidating. Imagine moving four children under the age of 10 to Germany. However, this will be our first move without the added adventure of children. We’re empty nesters, and we’re looking forward to another honeymoon in Ardmore.

**We’ve talked about your current occupation, but what was your first job?**

I cleaned out dog kennels for a local vet when I was in the fourth or fifth grade. The vet would pick me up on Saturday mornings. He’d have an ice cold Coca-Cola for me. That was my treat for the day.

**What was your favorite childhood memory?**

I had the perfect childhood. We moved from the family farm to town when I was a child so I could attend “city school.”

My cousins lived on the same street. We were playmates growing up. We couldn’t wait to get out and play every day. We hated to come in. We played whiffle ball in the summers and sledged down our street in the winter. At nights, we sat on the porch and listened to St. Louis Cardinals baseball games. When I was in the sixth grade, we moved back out to the farm. Of course, we worked hard, but we also explored the woods and fished. It was like living in a Norman Rockwell painting.

**What major event shaped your life?**

There have been several – marrying the love of my life and the birth of our four children – but the first event that changed my life was my father’s heart attack. It was the summer after my sophomore year in college. He spent pretty much the entire summer in the hospital. I had to rise to the occasion. I handled his duties on the farm and helped out my mother. I truly felt his burdens for the first time. It was a sobering experience, but I knew after that summer that I had the ability to handle difficult situations.

**How did you meet your wife?**

It was a blind date. Well, a blind date for her. I saw her on the last day of classes the spring semester of my freshman year. I saw her again the following fall at a fraternity and sorority event. One of my friends was dating one of her friends and they set her up on a blind date. We went to a Missouri football game and then a dance. That was 1977.

**What did you think that first moment you saw her?**

I fell in love.

**What is something that people are surprised to find out about you?**

That I was the Central Missouri Regional duck calling champion.

**If you had a day to do anything you wanted, what would you do?**

If I’m a duck calling champion, then I’m obviously an avid hunter. So I would either spend it hunting or with my family. ▶



Bill Buckner slaps high-fives with his team during the Noble Foundation's first-ever Parkway Series softball tournament.

**What makes hunting so enjoyable?**

Hunting for me is a multifaceted experience. It's not just about the hunting. It's the opportunity to unplug and be away from the everyday distractions. Being in nature is a powerful experience. And bagging a few birds is always fun.

**What's your favorite meal?**

My favorite meal is fried chicken, corn on the cob, mashed potatoes with cream gravy and fresh tomatoes. It's the meal my mother made for the hay crew during haying season. It brings back some very good memories.

**What song did you last play on your iPod?**

I have pretty eclectic musical tastes, but the last song to pop up was "Up the Lazy River" by the Mills Brothers. They were one of my dad's favorite groups. I grew up listening to them. I love their harmonies.

**What inspires you?**

I'm inspired every time I see people doing good things for others. It always causes me to reflect and ask myself what I am doing to help my fellow man.

**What is your personal philosophy?**

I'm on a relentless pursuit of happiness. Happiness is a result of hard work and keeping life in perspective. Walt Disney once said: "All of our dreams can come true if we have the courage to pursue them."

**How do you explain your personality?**

I'm direct, open and very social. I love to be with people. I love building teams and helping them succeed; however, I have to have my quiet time.

**What does the quiet time do for you?**

We have lost the ability to reflect in our society, to unplug from the gadgets and

just think about what we're doing. It's important for us to reflect because we gain perspective and generate new ideas.

**How does that translate to leadership of an organization?**

It is important for those leading an organization to take time to reflect and ask ourselves: Where are we going? What works? What doesn't work? Why? How can we improve? If we're constantly checking email and ticking off items on our to-do list, then we lose perspective.

**Seriously, are you tired of people asking if you played first base for the Boston Red Sox?**

Not at all. It never has bothered me. It's more of a conversation starter than anything. People will come up and say, "Did you ever play baseball?" I can't tell you how many times that has happened. ■

EDUCATION

IN

ACTION

NOBLE FOUNDATION YOUTH EVENTS  
SPARK EXCITEMENT BY COMBINING  
EDUCATION AND ENTERTAINMENT  
WITH HANDS-ON EXPERIENCES.



# The Joy of Learning

Science in Ag Day brings agricultural issues to life for area students

by Robyn Peterson and J. Adam Calaway

“When I used to think about agriculture, I’d think about just animals and hay,” said Jessie Pullen, 14. “But now I see that it is so much more. It has economics, wildlife, conservation and science in it. It’s all really cool stuff.”

Pullen was one of more than 220 seventh- and eighth-grade students who participated in the Noble Foundation’s second annual Science in Ag Day.

During the two-day event this spring, students from eight southern Oklahoma school districts rotated through a series of stations designed to get youth thinking about agriculture.

Each stop featured a unique agriculture- or science-related discipline, including economics, forages, genetics, horticulture, livestock, plant breeding and soils. Each station emphasized the importance of proper management of

natural resources and demonstrated the impact the industry has on almost every facet of society from food to the economy. Each area also brought a new, hands-on experience.

At the sound of “Go,” two 14-year-old boys quickly dipped bright yellow buckets into tubs of water and dashed 15 yards, splashing their contents into a second set of bins before racing back and passing their bucket to a teammate. The students’ excitement grew more intense as each of the 20 legs of the relay race passed, all the while learning a valuable lesson about agriculture. The race ended with a final splatter of water and more excitement from the winning team.

Will Moseley and Steven Smith, wildlife and fisheries consultants at the Noble Foundation, incorporated a relay race to make their water conservation lesson fun and competitive. When asked if the students realized they use 20 gallons of water in a 10-minute shower, they became quiet. “I had no idea that I used that much water every day,” said Sierra Parker, later in the day. “It’s the small, everyday things you don’t think about that have a big impact on our world.”

At the soils station, students collected

and identified insects. A hundred yards away, another group planted strawberries to take home as part of their horticulture lesson, while others participated in a live auction that taught fundamental economic principles. “Science in Ag Day reinforces many of the lessons we’ve been teaching them,” said Wendy Russell, math teacher at Oak Hall Episcopal School in Ardmore. “We want our students to have these experiences so they can increase their awareness about the importance of agriculture, which is part of our heritage here in Oklahoma. They also get a chance to see the types of careers available.”

In addition to the hands-on agricultural demonstrations, students participated in scientific research, including a plant breeding presentation where they learned how Noble scientists improve crops and an experiment to extract the DNA of a banana. “The students think they know what agriculture is, but they’ve never considered all the science and math involved,” said Todd Vinyard, science teacher at Davis Middle School. “There are so many facets to agriculture, and Science in Ag Day gives them the opportunity to experience it all.” ■

# Safety First

Students learn invaluable tips on how to be safe

by J. Adam Calaway

Robert Wells does not usually talk about his 8th birthday. But with a dozen sets of eyes trained on him during the Noble Foundation's 5th Annual Ag Safety Day, Wells detailed his most painful childhood memory.

The Wells family had a tradition that each person was given a reprieve from daily chores on his or her birthday. But as Wells watched his sister mow, guilt drove the diligent youth to reassume the duties. When the mower bogged down in a ditch, Wells clicked off the engine and went to haul it out. The engine unexpectedly kicked on, bounced and mauled his left foot.

Wells spent that summer in the hospital, undergoing six surgeries and two skin grafts. He underwent intense physical therapy, learned to walk again and ultimately forfeited his dream of pursuing athletics. Most of all, Wells grew embarrassed about his scars, hiding his maimed foot.

Thirty-two years later, the towering livestock consultant stood at the lawn station at the Noble Foundation Ag Safety Day, the local embodiment of a national initiative designed to teach safety to children in agricultural settings. "It's as important as breathing," said Wells, Ph.D. "If you're going to be around agriculture, you must learn to respect it and understand the hazards."

Wells' story is all too common for

*During Safety Day at the Noble Foundation, area students learn about water safety from the Oklahoma Highway Patrol (top left) and chemical safety during a special relay race (top right). (bottom) Jim Johnson, soils and crops consultant, discusses the dos and don'ts of tractor and equipment safety.*

youth working in agriculture-related fields. The Centers for Disease Control and Prevention ranks agriculture among the most hazardous industries for adults and youth. More than 16,000 youth (ages 20 years and younger) are injured on the farm each year with about 110 fatalities.

The Progressive Agriculture Foundation, which is dedicated to promoting agricultural safety, trains organizations and schools to host safety day events. There are more than 400 such events in North America, and the Noble Foundation's serves south-central Oklahoma.

This year, more than 180 eighth graders experienced a mix of education, interaction and entertainment. Students learned chemical safety from David Annis, soils and crops consultant, through a relay race with personal protection equipment.

Jim Johnson, soils and crops consultant, discussed tractor and equipment safety, and then used a front end loader to squash a watermelon to demonstrate the power of the machine. Students also learned water safety from the Oklahoma Highway Patrol and weather safety from regional meteorologist Cathy Evans. "Each station has a message," said James Rutledge, safety coordinator at the Noble Foundation. "The students learn about topics ranging from chemical to lawn mower safety, and then we use a game or a visual element to seal that memory with them."

Most of the students represent regional schools where agriculture is an everyday component of their life. "They need to know this information," said Nolona Chaney, who has taught for 35 years. "But it's delivered in such a way that the students don't even realize they are

learning because they are having so much fun."

Cassandra Harwell, 11, certainly understood the value of the lessons. A few months before the Safety Day, Cassandra was in a school bus that had a power line fall on it. "We didn't know what to do," Cassandra said. "But I do now because of today."

That knowledge is translating into results. A 2010 survey by the USDA showed that injuries among youth on farms had declined by 60 percent since 1998. The survey cited safety days across the nation as a contributing factor to the decrease.

As the day ended, the event's grand finale was the classic student activity – the egg drop. Each class designed a contraption to keep their egg safe. Boxes coated with tape and bubble wrap were all loaded into the bucket ladder of an Ardmore Fire Department fire truck. The ladder stretched 40 feet into the air like a mechanical brontosaurus neck unfolding.

The firefighter called out the school's name followed by a countdown ... 3 ... 2 ... 1. Whoosh! The boxes slipped one by one through the air, hitting the concrete parking lot below; the louder the thud, the louder the corresponding "oooo" from the crowd. Once each box settled, students rushed in to see if their design had been successful.

Noah Lemons from Ms. Donna Jackson's fifth grade class in Marietta, Okla., pried open his container, a gaggle of boys pushing to peer in. Noah scooped out the untarnished egg and declared, "He's alive. He's alive!"

And at Ag Safety Day, that's what it's all about. ■



# Looking Deeper

Playing with microscopes allows students to discover more than just fun

by J. Adam Calaway

**H**ere's a secret about microscopes.

For the most part, every student in every biology class across the country that uses common light microscopes is typically looking at dead cells. Death, of course, makes biology – the study of living organisms – highly problematic.

Noble Foundation Professor Elison Blancaflor and his colleagues with the Oklahoma Microscopy Society (OMS) recently offered an interesting alternative to a group of fifth graders from southern Oklahoma: spend one evening working with the world's most advanced microscopes – instruments so powerful they can view not only living cells, but the individual elements within the cell.

For one night this spring, the Noble Foundation and OMS hosted 25 students from Lone Grove Elementary for the annual “Kids’ Night With a Microscope” event.

“This is an opportunity these students otherwise wouldn’t have,” said Amy Benson, who teaches fifth grade science

*Students from Lone Grove Elementary pose for a picture before experiencing Kids’ Night with a Microscope (top). During the event, the fifth graders were able to work with Noble Foundation Professor Elison Blancaflor, Ph.D., and a spinning disc confocal microscope (left middle), a scanning electron microscope (left bottom) and various gadgets like the Van de Graaff generator, which was a hair-raising experience (right).*

class at Lone Grove. “It’s like being a real scientist for a night. They get to dream a little.”

Clad in their pint-sized, white lab coats, the students rotated through a series of stations, each offering an activity with a new type of microscope.

At one stop, students used a tabletop scanning electron microscope to map the cellular landscape of a sample they selected from home. Some brought bugs. Another had collected the skin of a snake. Each was able to peer into a world so detailed that the crevices of a scorpion tail looked like the Grand Canyon. “We use these microscopes every day and sometimes forget their power,” said Blancaflor, Ph.D., who oversees Noble’s cellular imaging facility. “The students are so enthusiastic, it just energizes us.”

Students then piled into Blancaflor’s laboratory to Noble’s laser-capture, microdissection microscope. This particular microscope allows scientists to harvest individual cells for genomic studies. The pre-teens used it to carve their names in glass. “The students see that microscopes are not just for examining items close up, but have many other functions,” said Cindy Crane, a Noble research assistant. “They are amazing tools, and the students get to actually use each one.”

The ruckus in the laser dissection room was only matched by the stunned awe from those watching the spinning disc confocal microscope. There before them, students caught a glimpse of the

organelles inside a living cell, buzzing around like pedestrians on a busy street. “When the students see a living cell moving before their eyes, something happens,” Blancaflor said. “They just come alive with excitement.”

In the Noble library, students learned about convex and concave lenses, and explored several science-related gadgets. Parents Billy and Joyce McFatrige stood and watched their son Dylan carefully studying a lens, rolling it in his hand like a precious stone. “Science has always been about pictures in a textbook. Here they are not just reading about it, they’re experiencing it,” Billy McFatrige said. “It just triggers their imagination.”

Eventually, every student discovered the hair-raising power of a Van de Graaff generator. One by one, they placed their hands on the metallic globe, watching as a charge gave life to their follicles which was usually followed by a burst of giggles.

“The Van de Graaff may not have a lot to do with microscopes,” said Ernie Sanchez, physics outreach coordinator for the University of Oklahoma and OMS member. “But we want to get them interacting with science at a young age, to see that it is fun, to make a memory they’ll have forever.”

As the event drew to a close, 11-year-old Sam Monroe found his parents and summed up the experience by saying: “I liked science a little before tonight, but now I like it a lot. I think it’s so cool.”

Funny what one evening with a microscope can do. ■





# The Next Chapter

Newest researcher takes over Noble's most historic program

by J. Adam Calaway

**T**ry feeding a global population of 7 billion without small grains. It's impossible.

Wheat represents one of the cornerstones of the global food foundation, while barley, oats and rye are primary ingredients in everything from bread to beer.

What is often overlooked, however, is the role of small grains in livestock production. In the early 1950s, the Noble Foundation broke from traditional efforts focusing on grain yield and pioneered the use of small grains as winter pasture for cattle. The result transformed the Southern Great Plains into stocker cattle country, where – to this day – millions of livestock graze on small grains.

“Small grains are often overlooked,”

*Mark Newell, Ph.D., examines wheat as part of his small grains breeding research. Newell joined the Noble Foundation in spring 2012.*

said Charlie Brummer, Ph.D., director of the Noble Foundation's Forage Improvement Division. “But they have significant implications for this region and the world, not only as a food source, but as an economic driver.”

## The next generation

Through six decades, the Noble Foundation's small grains program has passed from one famed plant breeder to the next.

Roy Chessmore, Ph.D., initiated the program in the early 1950s. His landmark Elbon rye variety (“Noble” spelled backwards) was planted across the southern states as far as Florida. Elbon rye was so popular it became synonymous with rye, much like “Coke” is often substituted for the phrase “soft drinks.”

Richard Bates, Ph.D., assumed the leadership reins in the 1960s, offered improved varieties for three decades, greatly expanded the size of the testing plots and established the organization's

famed small grains variety trials which test commercially available type's side-by-side with Noble experimental lines. “These trials have provided production information for farmers continuously since 1966,” Brummer said. “The longevity of these evaluations and the critical data they provide are unparalleled.”

Bates was followed by Jerry Baker, Ph.D., who continued the production of new varieties through the 1990s until his retirement in 2004, then continued his contributions while working with Malay Saha, Ph.D., assistant professor.

This spring, Mark Newell, Ph.D., became the fifth generation to lead the small grains breeding program when he joined the Noble Foundation as the newest principal investigator. “Not many organizations have such a rich legacy with small grains,” Newell said. “This is a tremendous opportunity, and I'm anxious to become a part of this historical program.” ▶



### A new direction

Newell's path to small grains began with a very different plant.

A native son of Colorado and avid backpacker, the 28-year-old was working toward a degree in forest biology at Colorado State University (CSU) when he crossed paths with Mark Brick, Ph.D., who introduced the young researcher to plant breeding with a project on dry beans (better known as pinto beans).

Newell finalized his bachelor's degree in 2005, but the impact of the genetic breeding project redirected his focus. Now firmly ensconced, Newell remained at CSU to work with Mark Brick on a master's degree on dry beans breeding.

He delved into small grains – specifically oat – during his doctoral research at Iowa State University. The research used molecular data in concert with traditional plant breeding, where researchers select superior plants based on physical characteristics (phenotype) and molecular information (genotype). “This was more of the

type of research I wanted to do,” Newell said. “Combining modern and traditional techniques gives a researcher the fastest and most efficient methods for producing an improved variety.”

Upon graduation in 2011, Newell began job hunting while working on a postdoctoral fellowship. He soon found the Noble Foundation. “I've known about the Noble Foundation since I was an undergraduate,” Newell said. “I was fortunate because my background and research was a nice fit, especially when you look at how we use both genetic and traditional breeding methods. Coming here was just a very natural progression for me.”

In the spring of 2012, Noble's small grains program officially became Newell's. He has spent considerable time reviewing the historical data and decades of projects as he outlined the next chapter of small grains at Noble.

Anytime Newell has a question he has two living advantages – sitting right

*(left) Mark Newell, Ph.D., and Jerry Baker, Ph.D., examine breeder seed held in cold storage. Baker led the program through the 1990s and remains as a consultant for Newell.*

outside his door is Jerry Baker, who continues to consult since his retirement, and down the hall is Malay Saha. “Having both my predecessors handy to ask questions has been an unbelievable benefit,” Newell said. “Their assistance has made this such a smooth transition and provided much needed insights as I look at the future of our small grains program.”

### The next chapter

For Newell's research, that future will focus specifically on two species – rye and oats.

While regional producers use wheat for both grain and livestock grazing, rye and



oat are strictly grazed. “Ranchers depend on small grains for cattle production from September through May,” Newell said. “So providing them with improved varieties can have a significant impact.”

Breeding improved traits into rye is a bit trickier than other small grains. Rye is an “outcrosser” which means it must cross with another plant, which differs from a “self-pollinator,” like wheat, which can inbreed.

Additionally, Newell has decided to implement breeding processes largely different than past practices. Traditional plant breeders usually take several unique lines, intermingle them and plant the offspring in a field where the individual plants can be observed, allowing the breeder to examine the various physical characteristics. The breeder then keeps the best plants based on visual performance, discards the rest and begins the process again.

Newell will increase the efficiency by selecting the best plants based on

performance of half-siblings (multiple members of a family) rather than an individual plant. He will also make selections at “producer density.” The performance of lines, especially for rye, is usually evaluated as a single plant or by low density plots unlike on-farm production. Instead, Newell plans on making selections in higher density trials, mirroring how corn is evaluated and selected.

“There are very few breeders looking at rye as forage, maybe one other breeder in the United States. And we are certainly the first to use these breeding techniques in the small grains,” Newell said. “I believe this gives us an advantage for producing the best possible outcomes for regional agricultural producers.”

Newell will also approach breeding oats in a similar manner. “There is a pretty clean slate concerning oats,” he said. “There is not a lot of work done on oat for forage, so there is tremendous room for improvement.” Newell will be evaluating lines and germplasm

*(above) Wheat has become a major forage crop for cattle production. The Noble Foundation was an early proponent of the use of small grains, such as wheat, as livestock forage.*

to identify sources of good winterhardiness since a major challenge for oats in Oklahoma and north Texas is winterkill.

Soon, Noble's newest researcher will use molecular markers to help identify genes that play roles in target traits in both rye and oat. It is the same technology the organization has promoted in breeding improved alfalfa lines.

“Currently we select new varieties based on the phenotype,” Newell said. By looking at the genetics, we can more accurately evaluate and select plants with superior performance. Unfortunately, plant scientists have not historically devoted time to discovering and identifying molecular markers for rye and oats compared to other crops, but we'll get there. That's the next chapter of the story.” ■

## Batter up!

by J. Adam Calaway

Tom Hanks once famously told the world that there was “no crying in baseball,” but when my new president said the two most dreaded words in event planning – softball tournament – I did tear up a little.

Corporate softball tournaments conjure up two mental images: one is of stiff coworkers trying not to embarrass themselves and the other is of me attempting to play despite being the most awkward athlete since dogs were forced to surf.

It's not that I don't like sports. I love sports. More accurately, I love watching sports. It's the playing part that proves problematic. Sports and I formed a tenuous relationship around the third grade when I realized my complete lack of ability to combine coordinated movement with throwing a ball. If my athletic ability was an animal, it would be the dodo bird – rumors of its existence would persist, but no one would have actually ever seen it. But the Noble event squad had its marching orders and we began a flurry of activity. Teams were organized. Ballpark food was ordered. And the field was manicured to perfection.

Though I was hesitant, employees swarmed to sign up. Clearly, individuals I've worked side by side with every day for years have been leading double lives. By day, they are research assistants, agricultural consultants or maintenance personnel. At night, I'm convinced they're shagging fly balls in their backyard, waiting to be called up.

Fortunately, those less athletically inclined served as volunteers (I was mercifully allowed to be the announcer), assembled spirit squads or came as spectators, lugging lawn chairs and umbrellas to shade us from the scorching summer heat, which, as it turns out, was not the reason to bring umbrellas. During weeks of preparation in June, we had only one assumption – it would be hot, melt metal hot.

The morning of the tournament, the sky looked like a grey comforter pulled from the washing machine. A steady drizzle – alternating with heavy downpours – draped Ardmore, Okla., unwilling to move through. It didn't matter, though. With no lightning, we played on and enjoyed the greatest “workday” anybody can remember.

The worrisome rain turned into more of a blessing than a curse, keeping temperatures cool. The consistent rainfall transformed the hardpacked infield into a bog, and mud became the great equalizer, stripping away any pretense or athletic advantage. The event gleefully turned silly, and my coworkers played with an enthusiasm only seen in children on Christmas morning.

Each game brought its own amazing play, instant classic stories already embedded into Noble lore, like when Agricultural Economist Job Springer rounded third base and headed for home, only to find pitcher Charlie Canny waiting to tag him out. Springer dove between Canny's legs, slid through the mud



and scored, whipping the crowd into a frenzy. Then there was Cindy Crane, a research assistant, who tracked down a deep fly ball, made the greatest diving catch I've ever seen, rolled twice and sprung up throwing. This is the same woman who wears a lab coat all day.

The day also brought us a glimpse into the true personality of our coworkers. See, each team member selected a “walk up” song, usually a thumping rap or rock hit played during their stroll to the batter's box. Not Dong-Man Khu. The postdoctoral fellow (and comic genius) purposefully chose “You Raise Me Up,” a soaring, operatic ballad. While I chided his selection over the PA system, the anthem soon won over the crowd, which cheered and swayed every time Khu appeared at the plate. It became the event's theme song and a lasting joke among employees.

My favorite moment of the day, however, belongs to Fuqi Liao, a scientific data analyst, who did not let the fear – or the fact he had never played baseball – stop him from participating. On his second turn at bat, he smacked the first base hit of his life and ran to first base carrying the bat. A few hitters later, Liao was driven home and scored a key run. When he crossed home plate, the team swarmed him with hugs and high-fives. The crowd erupted with cheers. In that moment, we all won.

After the event, a Noble employee of more than 25 years came up to me and said, “This is the best event we've ever had.” And he was right. But it really had nothing to do with softball.

See, our new president already knew what softball – or our muddy version of it – could do for an organization. It wasn't about the wins and losses; it was about those few precious hours spent together. For one day, everything melted away. Emails went unchecked. Phones unanswered. Experiments put on hold. We set aside titles and duties, and we enjoyed each other as people. We grew closer, not as coworkers, but as a family. Turns out, I really do like softball. ■



(above) A young Lloyd Noble is seen with his father, Samuel Roberts Noble, in a portrait taken around the turn of the 20th century. After Lloyd gained success in the oil business and decided to set up a foundation in 1945, he named the organization not for himself, but for his father. He said at the time that

the act was “to give recognition to the most charitable individual I ever knew, my father, Samuel Roberts Noble.” Today, 67 years later, the name of Samuel Roberts Noble is associated with world-class agricultural and plant science research.

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*(below) Angus cattle on an Oklahoma ranch search for edible grass in a parched pasture. A drought that spread across Texas and Oklahoma in 2011 continues to challenge cattle operations due to a lack of pasture forages and increased costs for hay and other feed.*

