Cultivate Fall/Winter 2017

Utah State University

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The year’s end is always a time for reflection on the personal and professional highs and lows of the previous 12 months. Likewise, the end of each semester finds some students struggling, others reaping the rewards of their efforts, and leaves faculty members hopeful that we have made a positive difference in the lives of our students and contributed to the world’s collective knowledge.

Periodically there are events that are not tied to the calendar, but that bring our lives and goals into sharper focus. In the past few months, events related to two distinguished alumni have had that effect.

In June, I was honored to represent Utah State University in Frøya, Norway, at the dedication of a statue celebrating the life of John A. Widtsoe. He was a remarkable man in many respects. He was a big influence on higher education in Utah at three universities, and is one of my predecessors as director of the Utah Agricultural Experiment Station. His research still impacts dryland farmers around the world. You can read more about John Widtsoe and the events in Frøya on page 16.

In September, alumnus Alan Luke passed away, leaving a legacy of service to the dairy industry and to the college. Learn more about Alan Luke on page 20.

Thinking about these men’s lives has made me pause to consider how I use my time, invest my energy, what impact my life and work have on people, and what my legacy will be. I hope the coming year will be one of growth and joy for all of us.

Kenneth L. White
Dean, College of Agriculture and Applied Sciences; Vice President, Extension and Agriculture

CAAS Alumni Council President

Fall is a busy time in the College of Agriculture and Applied Sciences. This year was no exception with the start of the new semester, the CAAS Awards and Honors Banquet and the Utah Ag Products BBQ. At the CAAS Awards and Honors Banquet, Dr. Paul Larsen was named this year’s inductee to the CAAS Alumni Hall of Honor for his lifelong dedication to agriculture in Utah and abroad. Dr. Larsen’s impressive record reveals his selfless attitude and dedication in sharing his vast knowledge and experience with people in agriculture worldwide. (See page 18)

This year’s Utah Ag Products BBQ attracted over 1,300 people and raised $12,000 for future scholarships for CAAS students. The generosity of the ag producers and commodity groups from throughout Utah who provided excellent food to make the BBQ a success is just overwhelming. Perhaps you have attended the BBQ and did not realize that the food and the labor to prepare and serve it are all donated. This event speaks so much about our state’s agricultural community and the dedication producers demonstrate as they provide food for others. THANK YOU ag producers for helping raise these funds for our students!

The CAAS Banquet puts scholarship donors together with scholarship recipients to mingle and talk about donors’ personal reasons for giving back and students’ aspirations and plans for the future. Guests at the banquet have endowed scholarships, or represent businesses and family trusts that have created scholarships in the college. Not everyone has the means to endow a scholarship, but you can play an important part in supporting our great students by making a tax-deductible contribution to the CAAS Alumni Scholarship. I encourage all CAAS alumni to consider becoming part of this great program either online or by contacting Brandon Monson, (435) 797-2208, brandon.monson@usu.edu.

Robert Adams
CAAS Alumni Council President
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ON THE COVER: Cupid, one of alumnus Dr. Issac Bott’s reindeer, takes a break from being the center of attention at The Reindeer Express, an event recently hosted by Utah State University’s School of Veterinary Medicine. Photo by McKay Jensen.
All animals, including reindeer, need veterinarians to help keep them healthy. It just so happens that Isaac Bott, a veterinarian in Springville, Utah, and a Utah State University alumnus, is a leading authority on reindeer health. He brought his expertise to Logan in early December for the USU School of Veterinary Medicine’s first ever Reindeer Express event to help Santa prepare his reindeer for their Christmas Eve flight.

Bott has gained international attention as he is currently the only veterinarian in the world who provides reproductive services for reindeer. He still remembers the exact day his work with reindeer began: March 28, 2010.

“I was just driving down the road one day, and I got a random phone call from a guy,” Bott said. “He said, ‘Hey Dr. Bott, I have a reindeer I think is pregnant and I wondered if you could come check her out.’ I thought, ‘Why not?’”

When Bott visited the farm, the reindeer was indeed pregnant – in fact she was in active labor. Thanks to his training and experiences growing up on a farm, Bott was able to successfully deliver the baby. When the owner later approached him with the idea of starting an artificial insemination program for reindeer, Bott didn’t hesitate.

“I just knew that was something I would absolutely love to do,” Bott said. “We had our work cut out for us. Up to the point when I started, there had been just one reindeer baby ever produced by artificial insemination. We definitely had some failures, and it was a trial and error process.”

In the spring of 2011 – almost exactly 1 year after his first encounter with reindeer – Bott successfully produced the world’s first female reindeer calf through artificial insemination. The calf’s name, Mira, stood for miracle.

Bott’s said his career has “been quite a fun adventure” and has led to opportunities he never imagined while in vet school. Bott has traveled across the world and, in addition to reindeer, has worked with other exotic animals, including water buffalo, mountain sheep and African lions.

As a full-time veterinarian and president of The Society of Theriogenology (veterinarians who specialize in reproduction), Bott rarely has time to take his reindeer to events like The Reindeer Express, but tries to provide educational opportunities whenever he can.

“I want people and vet students to learn about animals like reindeer and not be afraid to work with them,” Bott said. “They are just another mammal and species that I don’t think a veterinarian should be scared of working on. When they get a call for help, I want students to be able to say ‘Yes! Absolutely!’”

Bott also serves as the director of admissions for USU’s School of Veterinary Medicine and said one of his favorite things to do is talk to students. Vet school is demanding and one of Bott’s goals is to keep students excited about their future, even when they are bogged down with the stress that comes along with school.

To share his passion for veterinary medicine, Bott recently launched his own TV show, DocBott, that follows his adventures as a veterinarian. Viewers can see Bott work with puppies, llamas and everything in between.

“I want to share just as much as I can about veterinarians in general,” Bott said. “It’s not just about me, that’s something different about this show. What I really try to convey is how important it is to have a personal relationship with your veterinarian and trust in your veterinarian.” △

Watch episodes of DocBott at tinyurl.com/docbott.
Students and faculty from the Utah State University School of Veterinary Medicine, accompanied by two USU Extension faculty members, traveled to the Utah-Arizona border this spring to provide valuable service to a community in need, hone their medical skills and learn important lessons about communicating with clients.

Karl Hoopes, assistant professor in the School of Veterinary Medicine and USU Extension equine specialist, organized a horse castration clinic at the old Mexican Water Chapter House because he saw an opportunity for students to help make a difference, while gaining important skills.

“People were very excited and very welcoming to us on the reservation,” Hoopes said. “I knew there was a need there. They have a hard time getting any veterinarians to come to the reservation and out to the different farms, and the veterinarians on the reservation typically stay near the larger populations.”

San Juan County Extension faculty members Karah Nay and Jim Keyes helped organize the clinic. Nay said in addition to the lack of veterinarians, the problem of free-ranging horses provided some of the inspiration to hold the clinic on the reservation.

“There are no fences down there,” Nay said. “Everything just kind of runs wild and free. No one there typically castrates their horses, so there was a huge demand and they could really benefit from that type of help.”

To make the clinic a reality, Hoopes partnered with the Unwanted Horse Coalition, a collection of equine organizations that joined together to educate the equine industry about the problem of unwanted horses. Through an Unwanted Horse Coalition program—Operation Gelding—Hoopes was able to provide the service at no cost to owners and receive a $100 reimbursement per horse to help cover the travel and medical supply costs. The clinic was by no means a money maker, it was all about the vet students gaining experience.

Six, second-year vet students from USU’s student chapter of the Association of American Equine Practitioners participated. Through 2 days of hard work, and under Hoopes’ careful supervision, the vet students castrated 15 horses, ranging in age from 2 to 18 years and in a variety of breeds, from miniatures to draft-influenced.

Students also got instruction and experience in performing field anesthesia and learned about potential complications, administered tetanus vaccinations and some antibiotics. The tribal veterinarian also microchipped every horse that was castrated.

Lindsey Cheetham, a vet student who plans to specialize in horses, said this first experience with castrating horses was valuable because students usually don’t get this opportunity until their third or fourth year in school.

Hoopes said many of the students were so focused on anticipating the med-
A team of students in Utah State University's Department of Landscape Architecture and Environmental Planning (LAEP) created a plan to convert the Hinckley Ranch, located in Ogden Valley, into an ability center with facilities for equine therapy and community gatherings.

The Hinckley Ranch Mountain Ability Center project recently received an Achievement Award from the American Planning Association Utah Chapter—the organization’s highest honor—for being an outstanding student project.

Associate Professors Caroline Lavoie and Todd Johnson led the project, and LAEP students Haley Borden, Spencer Burt, Nelson Champion, Margie Haight, Emmeline Hoover, Tyler Knab, Tyson Murray, Steve Ormsbee, Alonzo Rhodes and Skyler Smith conceptualized and designed the proposed changes to the ranch.

“These types of endeavors offer more than just a real-life project experience, they teach students that any project they complete has the potential to improve the common good of all community members and next generations to come,” Lavoie said. “This shows that landscape architects play an important role in making positive changes.”

The students produced a 47-page document outlining proposed changes for the ranch. The students suggested the construction of equine facilities, including a 20,000-square-foot indoor riding arena. The facilities would mainly be used for equine therapy, involving interactions between patients and horses. Equine therapy is used to treat physical ailments and also many mental conditions, such as depression and PTSD. The students also suggested a community center that includes an art studio and an indoor climbing wall.

“My favorite part of the project was the amount of creative freedom and ability to collaborate with real-world professionals,” Knab said. “We really came to understand the rich context of the site, and then we were able to make informed and unique design choices.”

Conservation of the surrounding landscape was also a priority for the students. The students’ designs focus on preserving the natural context of the Ogden Valley. According to Lavoie, this focus on conservation is one of the main reasons the project was chosen for an Achievement Award.

“To communicate the importance of any issue, you need to be able to illuminate that importance and why it matters to your audience,” Murray said. “We did this with the Hinckley Ranch project by showing the threats to Ogden Valley, like suburb encroachment and population inflation, and then showed how it would affect important wildlife corridors and the rural feel of Ogden Valley.”

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Dietetics students visited the island of Crete last summer to learn more about local foodways and healthy lifestyles.

Dietetics Professors Janet Anderson and Tamara Steinitz led six students on the 10-day study abroad experience that included visits to archaeological and historic sites, nature reserves, farms, vineyards, fishing docks, farmers markets and artisan food production facilities.

“My favorite part of the trip was watching students absorb their experiences,” Anderson said. “They were able to think about the experiences critically and consider how they could apply these Mediterranean diet and lifestyle principles in their lives and share the practices with others.”

Steinitz added that students appreciated the simplicity and flavors of the traditional foods, particularly the liberal use of olive oil and abundant, local produce. Favorite meals were incredibly simple to make, so students stocked up on ingredients to re-create the dishes at home.

The students participated in hands-on cooking demonstrations and classes from a number of resident specialists. In addition to learning from experts including botanists, herbalists, farmers, and historians, students had the opportunity to share several meals with them, which student Jaylen Hinckley found especially rewarding.

“I learned how close you can grow to people in just a short while over the dinner table and a home-cooked meal,” Hinckley said. “It inspired me to help others have a healthy relationship with food, and to be kinder and share a meal with someone more often.”

Zoe Biggs, another student who participated in the trip, believes it’s important for students to have opportunities for international travel and study.

“The things I learned on this trip could not have been learned any other way but to be there and experience it,” she said. “I really enjoyed just spending time with native Cretans and hearing their views on life, food, and living. There’s just nothing like immersing yourself in another culture.”

Explore an interactive map with photos and journal entries from students’ experiences in Crete on the college’s website at: caas.usu.edu/news/ndfs/Greece.
AG COMMUNICATION CLUB
IS TOPS AT NATIONAL SUMMIT
BY AUBREE THOMAS

Members of Utah State University’s Agricultural Communication Club attended the 2017 Ag Media Summit and the club was recognized by the National Agricultural Communicators of Tomorrow as the Chapter of the Year in Educational Activities for the second year in a row.

“Our club members really do deserve the chapter of the year educational award and I’m glad they were recognized for their work,” said Kenna McMurray, club president. “We have amazing team members who dedicate so much time and effort to this club to make it worthy of a national award.”

The summit provided numerous opportunities for students to network with industry professionals and other students, but club members left with more than just new connections.

They also competed in the National Agricultural Communicators of Tomorrow Critique and Contest. Work submitted by students was judged by industry professionals and compared with submissions from students across the nation.

McMurray placed fourth with her short video package in the electronics division and club member Bronson Teichert, took first place in the news story category and third with his short video package in the electronics division. Read his award-winning story online at TinyURL.com/AgTradeStory.

Teichert said he was initially more confident with his video submission, but knew his writing skills had improved over the last year.

“So it was definitely a surprise when I took first place in the news story division.”

During the conference, students participated in workshops that helped develop their skills in writing, public relations, design and networking. They also learned about current issues in the agriculture industry. The USU students had previously won a scholarship from Yamaha Motor Corporation, U.S.A., that paid for their participation in the conference. Members of the club created a winning social media campaign, blog post and infographic for Yamaha that focused on ATV safety awareness in agricultural settings.

In addition to Teichert and McMurray, club members Emma Lane, Katlyn Ulhart, Terence Larson, Aubree Thomas, and Assistant Professor Kelsey Hall, attended the conference. 🌻
USU PROFESSOR WINS OUTSTANDING EDUCATOR AWARD

By Shelby Ruud-Jarman

Brian Warnick, professor and associate dean of Utah State University’s College of Agriculture and Applied Sciences, recently received an award recognizing his outstanding teaching and commitment to agricultural education.

The Outstanding Agricultural Educator Award, presented by the Western Region of the American Association for Agricultural Education, is based on excellence in teaching undergraduates and graduate students, significant research in the field of agricultural education, scholarly writing pertaining to education, and service to agricultural education.

Warnick believes that well-prepared agricultural educators can make a positive impact on all students.

“I still get excited when I can see by the look on a student’s face the moment when they make the connection between a new concept or skill and their own prior experience,” Warnick said.

Of all the great experiences being an educator brings, Warnick’s favorite part is when a former student comes to visit and shares their success. Warnick credits his love for education to the teachers he has had throughout his life, and he finds it very rewarding to know he is influencing his students in the same way.

“Agicultural educators play an important role in helping young people develop the desire to seek careers in agriculture and to be successful in those careers,” Warnick said. “They also help provide information about agriculture to those who aren’t planning for a career in agriculture. Everyone is impacted by agriculture on a daily basis in very personal ways, through the food we eat and the clothes we wear.”

Warnick has been teaching for more than 23 years.

The new Bachelor of Science in Technology Systems allows students who have received an approved 900+ hour certificate from a technical college to obtain 30 credits at USU. Students can then work toward their associate of applied sciences degree in General Technology and eventually toward the new bachelor’s degree. Students can choose an emphasis in information and computer technology; product development; robotics, automation and control; or technical management.

“This new program allows students to get a bachelor’s degree without going the traditional route,” said Trina Nye, the program director. “They can start or stop the process at any point, or leave for a few years if they need to. It’s also a great option for people who already have certificates and good jobs, but who need the 4-year degree to move up the pay scale or into management positions.”

Another advantage of the degree is the hands-on nature of the coursework, according to Nye.

“Many students go to their first year of college and realize that sitting in a classroom is not for them,” Nye said. “This degree gives them the opportunity to work with their hands and the chance to enroll in classes that are interesting to them right away.”

Faculty member Steve Williams, who teaches in the program, explained, “We worked with industry partners to identify what knowledge and skills they were looking for in employees. With the idea of stacking onto a technical certificate, we were able to build a degree that meets those needs.”

High school students who are interested in the degree can begin working on their certificate at a technical college while still in high school. Additionally, USU is creating more online and night classes so it can become an easily accessible, statewide degree.

For more information about this and other degrees in USU’s College of Agriculture and Applied Sciences, visit caas.usu.edu. 

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**Human Health in the Lab and on the Farm**

Exploring ways to improve human health is a driving force for many researchers in the College of Agriculture and Applied Sciences, which is not the place many people would expect to find biomedical research. There are more projects going on than can be covered here, but take a look at some of the work going on in CAAS that could impact your family’s health. Read more about these researchers’ work on the Cultivate website CAAS.usu.edu/alumni/cultivate.

The Institute for Antiviral Research is a team of faculty, technicians and student researchers in the Department of Animal, Dairy and Veterinary Sciences (ADVS) focused on understanding and combating viruses that have significant impacts on human health, including Zika, West Nile, influenza, Middle East Respiratory Virus and SARS. Since its founding in 1977, institute researchers have been awarded more than $100 million in grants and contracts from agencies such as the National Institutes of Health and from private companies.

**An**imals are important to researchers in their efforts to understand how diseases work, an important step in prevention or developing treatments. But animals’ physiology and chemistry isn’t always a good match for how humans will react to a virus, bacteria or to potential treatments. Associate Professor Zhongde Wang and his research team genetically engineered the first hamsters to be useful as models for many human diseases that previously had no animal models, or models that were severely limited.

**A**trial fibrillation is the most common type of irregular heartbeat, affecting more than 2.7 million adults in the United States. “A fib” causes chest pain, fainting, rapid heartbeat, stroke, heart failure and other serious health problems. A team of researchers in ADVS have genetically engineered goats to help determine what makes some hearts more susceptible to atrial fibrillation, which could pave the way for developing better treatments.

Learning how mothers’ diets and the environment may contribute to the number of babies born with cleft palate has long been a focus of Professor Ron Munger’s work as he explores links between nutrition and public health. The research has taken him to a number of developing countries, but his work is just as important at home because Utah has the highest incidence of cleft palate in the United States.

**Above:** CAAS alumnus Eddie Sullivan with Dean Ken White and Professor Irina Polejaeva. Read about their current collaboration on page 14. Photo by Dennis Hinkamp.
Feeding Mice
About 5 years ago Robert Ward and Korry Hintze, researchers in the Department of Nutrition, Dietetics and Food Sciences, started wondering if research mice were being fed too well. After all, if they are supposed to be stand-ins for humans, shouldn’t they be eating a diet closer to that of the average, typically somewhat unhealthy, human?

“We are feeding them the equivalent of what a health nut would eat in terms of optimum vitamins and minerals,” said Hintze. “This diet emerged in the late 1970s when researchers realized feeding mice random diets compromised research results. They needed a diet that would be identical in Phoenix or Boston.”

The team that created that standardized diet for lab mice worked from experience with large farm animals. Of course you want beef and dairy cows to have the best possible diet for health and productivity, Hintze said. Similarly, they designed a mouse chow that would promote the healthiest possible mice, not necessarily the best model for human therapeutics research.

You have probably noticed that your fellow humans don’t always make the best food choices, but how can you mirror that in mouse diets? Your first impulse might be visions of mice stopping at tiny fast food drive-through windows and heading home for an evening of Netflix and video games in the mouse hut. It’s not quite that simple, but you would not be far off.

If you put out a bunch of fast food for them, the mice will eat it and get fat, Ward said. Giving them a mouse version of the stereotypical American diet high in fat, sugar and salt is good for modeling obesity, but not great for modeling other research on nutrition and disease. Nobody had taken a holistic approach in terms of micro- and macronutrients.

Ward, Hintze and cancer researcher Abby Benninghoff, associate professor in the Department of Animal, Dairy and Veterinary Sciences (ADVS), examined national food intake databases and took the 50th percentile amounts of the most common nutrients and distilled those into mouse pellets. The result was the “Total Western Diet.” To adjust the diet for tiny mice, they normalized nutrients per calorie to make it equivalent to human consumption patterns. Similar to the previous version of mouse chow, standardization is important to the experimental process, Ward said. The interdepartmental collaboration with Benninghoff allowed the new diet to be tested in her lab.

Initially, there was some resistance to this re-think of mouse diets, but 5 years into the Total Western Diet project, Ward and Hintze said they are starting to see more interest and results. There are seven or eight other universities using the diet and several papers have been published.

“The mice are definitely getting more cancers while eating the Total Western Diet,” Ward said. “The question is why? Is it because they are eating too much fat? Not enough calcium?”

This improved animal model allows researchers such as Benninghoff to more confidently introduce nutrients to mouse diets to see if there is a reduction in cancers.

“In our lab we have a strong interest in cancer prevention,” Benninghoff said. “We are interested in ‘functional foods’; those that have substances that promote health. There are a lot of substances other than the usual calcium, B12 and others that you see on a product label that interact with our bodies. These are called ‘bioactive food chemicals’ that help promote health.”

Among these bioactive food chemicals are catechins found in green tea that have anti-inflammatory, antioxidant and anticancer properties, Benninghoff said. Green tea is the second most-consumed beverage worldwide, but it is not significant in the American diet. Introducing green tea into the diets of mice being fed the Total Western Diet should allow researchers to draw conclusions and make recommendations to Americans. The team is also looking at the effects of black raspberries in the diet.

Still, mice are not tiny humans and vice versa. Mice have different metabolisms and much shorter life spans than humans. There are more complex mathematical models that help determine how much a gram of something in a human diet equates to in a mouse diet.

According to Benninghoff, the next step is to look at the purified diet versus a whole foods version of the Total Western Diet. The purified Total Western Diet is great for consistency, but it lacks some of the complex fibers that come with whole foods from the grocery store. This limits the comparison with humans because of the role the microbiome, or gut bacteria, plays in interactions with food. Hintze explained that the new mouse diet is “purified” in the respect that it’s made from generic components such as sugar, vegetable oil, milk protein and a vitamin and mineral mix.

“For the whole foods version we are using the 25 most consumed commodities that can be bought at the grocery store,” Hintze said. “We then cook,
Working with antibodies to fight diseases has been going on since the 19th century, but genetically designing large animals to produce fully human antibodies is a promising new technology and it has reconnected one College of Agriculture and Applied Sciences alumnus with the college.

Eddie Sullivan earned a Ph.D. in animal science at Utah State University, working with then-associate professor Ken White. Sullivan has since built a career in the biotechnology industry and is currently president, co-founder and CEO of South Dakota-based SAB Biotherapeutics, and also serves on the executive committee of the Biotechnology Innovation Organization, the world’s largest biotech trade association.

SAB Biotherapeutics uses gene editing to locate specific molecules that produce a cow’s immunoglobulin and replace them with a DNA sequence that creates fully human immunoglobulin. This kind of editing is sometimes described as the biological version of a word processor’s “find and replace” tool, so once the new DNA sequence is inserted, it continues to replicate. That means that when an animal with this precisely modified DNA is injected with a specific disease-causing agent, it produces freeze dry and pulverize them into a bank of powders such as meats, dairy, flours and high fructose corn syrup.”

The big difference between the purified diet and the whole foods diet is the amount of fiber, Hintze said. The additional fiber in the whole food diet supports the growth of different gut bacteria that may be very beneficial for health. As part of the quest to understand the effect of the Total Western Diet on gut health, the researchers have transferred the bacteria of a human microbiome to mice so the mouse model more accurately reflects what goes on in humans.

“We are only just beginning to understand all the implications of microbiome health on human health,” Ward said.

What’s the future of the Total Western Diet? Hintze and Ward said there is no reason that one couldn’t design a Total Asian or Total French Diet. You could also design specialty diets such as a Paleo diet or a Mediterranean diet to test purported health benefits.

Mice are also used in many experiments other than in studies of human nutrition, Ward said. They are used by psychologists in pain and addiction behavioral studies. These researchers could also benefit from a mouse diet that is closer to what their human subjects eat. Mice eating the Total Western Diet might be faster or slower at solving mazes.

If it works for the mouse model, the Total Western Diet could also enhance studies with large animal models. A small study done in collaboration with Clay Isom, a reproductive physiologist in the ADVS department, found that pigs fed the new diet became overweight and showed early signs of diabetes. According to Isom, the Total Western Diet is a suitable diet for inducing obesity in pigs, similar to what is observed in humans, but different from what is observed in mice. The impact that the diet had on reproductive tissues may also shed light on how obesity, and diet in general, can impact reproductive performance in a wide variety of species, including humans.

There is one thing left out of the Total Western Diet: broccoli. It constitutes less than one percent of the American diet. Hintze said it is also the only food he has seen a mouse spit out. So apparently mice really are similar to the average American. △
human antibodies against it, and plasma from the animal can be purified and used to enhance a human body’s own ability to fight disease. Immunotherapy is promising for treating cancers, infectious diseases, autoimmune diseases and inflammation.

Transferring immunity from animals to help a human fight disease has been going on for centuries. There are downsides, though, as some people have adverse reactions to animal antibodies, but human antibodies cannot be created in a laboratory. SAB’s approach aims to avoid that pitfall because the engineered animals produce human antibodies. The company has a herd of cattle at its South Dakota “pharm” and two of its treatments are in clinical trials. In addition, an off-shoot of the company is now in Utah.

“As we looked at expanding our technology to goats, the collaboration with Utah State University was a natural fit to work with their researchers based on their deep expertise in genetic engineering that I’ve been very familiar with,” Sullivan said. “We also believe Utah is the right place to commercialize products from the platform with the regional specialty in medical testing and diagnostics.”

Irina Polejaeva and Zhongde Wang in USU’s Department of Animal, Dairy and Veterinary Sciences are collaborating with SAB Capra, LLC, the Utah-based subsidiary, and USU is currently home to one very special goat that produces human antibodies. Lilly Star is a little goat with an important job: proving that goats can be genetically engineered to produce human antibodies and being the start of successful embryo transfers that will produce clones with her unique genes.

“Goats are cheaper to produce, have a shorter gestation period and shorter time for the immune system to mature compared to cattle,” Polejaeva said. “Therefore, they can produce therapeutic products faster. Goats are also desirable for products that require smaller volumes, such as producing a treatment specific to one person.”

Goats are routinely raised in many countries where emerging infectious diseases are a concern, making them potentially important contributors to global public health. The potential for genetically engineered animals to play a role in fighting disease was recognized by the World Health Organization, which selected SAB Biotherapeutics as having one of the top approaches to develop in preparation for managing and treating infectious diseases that could cause epidemics.

“Our platform is gaining traction with several treatments in clinical trials,” added Sullivan. “We also have several other immunotherapies for disease targets in development with collaborators around the globe; and our first production pharm under construction. We’re well on our way to the clinic and making a significant impact for patients.”

Right now Lilly Star looks like just another little goat, but she could be the start of something big.
Little about John Andreas Widtsoe’s early years makes it seem likely he would grow up to have an impact on people around the world—and especially on Utah State University—yet he did. Now a statue of Widtsoe stands in Frøya, Norway, where his remarkable life began, in the hope it will inspire others to aspire to careers in science and to make discoveries that could change lives.

Widtsoe was just 5 years old when his father died, leaving his mother, Anna, to care for him and his younger brother on her own. She immigrated with her young sons to Utah in 1883 when John was just 11. He graduated from the Brigham Young Academy in Logan and went on to graduate with honors in chemistry from Harvard University and then to earn a Ph.D. at the University of Göttingen in Germany.

He returned to Logan in 1900 as director of the Utah Agricultural Experiment Station, an important milestone in the foundation of research at Utah State University. His work as a chemist focused on agriculture, and especially on the challenges of managing soil, water and crops in dryland farming in arid and semi-arid regions. Though he had the mind of a scientist, he was determined that new knowledge about agriculture had to be communicated to farmers, and he founded The Deseret Farmer, a magazine designed for farmers rather than other scientists.

After a few years away from the Utah State Agricultural College (USAC), teaching at Brigham Young University where he had substantial impact on the school’s biology and agriculture programs, Widtsoe returned to Logan as the president of the USAC. Even while serving as president, Widtsoe’s inquisitive mind kept working at research and writing and he authored one of the 29 books he would write in his lifetime, *Dry Farming: A System of Agriculture for Countries Under Low Rainfall* (1911) and *The Principles of Irrigation Practice*, which he wrote in 1920 while serving as president of the University of Utah, are still available in print and are referenced in agronomy textbooks to this day.

During his 9-year tenure as president of the USAC, he remained passionate about his commitment to get information directly to farmers, and created the college’s “Extension Division” within the experiment station, long before the U.S. Congress passed legislation that created the Cooperative Extension Service. He left academia, after having profound influences on the course of Utah’s three major universities, when he was named a member of the LDS church’s Quorum of the Twelve Apostles.

USU Emeritus Professor Charles Gay wrote of Widtsoe, “Those of us

“IN THE END, ALL MUST BE EXPLORED, AND WHETHER ONE BEGINS IN THE EAST OR WEST CANNOT MATTER MUCH. THE BIG CONCERN IS THE EXTENT TO WHICH A MAN OFFERS HIMSELF, MIND AND BODY, TO HIS WORTHWHILE WORK. UPON THAT WILL GROWTH DEPEND.”

- John A. Widtsoe
privileged to have traveled around the world observing and assisting in arid land agricultural production have seen John Widtsoe’s impact on humanity. With more than two-thirds of the earth’s surface located in semi-arid to arid zones, his work feeds the world.”

In June, a 3-day event to celebrate Widtsoe’s contributions to people around the world was hosted by the Historical Society of Frøya on the island where he was born. The statue of Widtsoe, created by Utah sculptor Dennis Smith, was unveiled in a ceremony attended by American and Norwegian government and education leaders, many of Widtsoe’s descendants, representatives of the LDS Church and local residents.

The statue, a gift from the Frøya Historical Society to the county council, depicts Widtsoe as a young chemist at work in the lab. Local leaders hope learning more about Widtsoe will inspire Norwegian youth to pursue higher education. Part of the celebration included discussions with administrators from USU, the U of U and BYU about establishing a student exchange program and a John A. Widtsoe scholarship program.

Ken White, who serves as dean of the College of Agriculture and Applied Sciences and as the current director of the Utah Agricultural Experiment Station and vice president of USU Extension, represented USU at the event. White said he is frequently mindful of the fact that he occupies a position Widtsoe once held.

“He was a remarkable man whose work still has an impact on people all over the world,” White said. “I think about all John Widtsoe did in his lifetime and wonder what he would think about the experiment station and university now. And I ask myself whether the things I do as a scientist and administrator will have the kind of positive impact he had.”

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<th>2017-2018 CAAS AWARD RECIPIENTS</th>
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<td>Each year, the College of Agriculture and Applied Sciences honors outstanding members of the college community at the CAAS Awards and Honors Banquet and CAAS Faculty Retreat. A collection of videos about each of this year’s award winners and their accomplishments can be viewed on the college’s website at caas.usu.edu/awards.</td>
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<td>Congratulations again to this year’s honorees!</td>
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<td>Paul Larsen, Alumni Hall of Honor Inductee</td>
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Paul Larsen was known around the world long before there was a World Wide Web. Because of his visibility as president of The American Society for Horticultural Science and columnist for *The American Fruit Grower* for 25 years, Larsen was sought out by people in Japan, Italy and China for his expertise.

“I was visiting Holland in 1988 and came across an orchard that looked interesting,” Larsen recalls. “I knocked on the owner’s door to ask permission to take a look around. I introduced myself and the owner said, ‘I know you. I read your articles in *The American Fruit Grower*. You can do anything you want in our orchard.’”

Larsen’s biography and long-time column are both titled “Out on a Limb.” He still has a photo of himself dressed in overalls and posing for a class picture with his fellow second graders in Vineyard, Utah. That was in 1933, which makes him 91 years old now. Years later, a high school teacher helped shape Larsen’s life.

“I had a high school agriculture teacher and FFA leader who took us to Logan for a tour of Utah State University and that is when I decided to go to college and get a degree in dairy science,” he said, but that choice didn’t last long.

“I decided it was a lot easier to pick apples in September than it was to milk cows all winter, so I switched majors,” he said. “My junior year I married a beautiful girl named Lorna who really pushed me to spend more time in the library than the pool hall. The first thing we bought when we got engaged was a portable typewriter.”

In addition to raising their four children, Lorna supported his career by putting all his words into print including his thesis, dissertation, hundreds of journal papers, columns and several books. Lorna Anderson Larsen passed away in early 2017.

“I never learned to type,” he said. “I showed up for a typing class once when I was young and there weren’t enough
seats for everyone, so they told all the boys to go away since only girls needed to know how to type.”

Though everyone associates him with apples, Larsen’s doctoral research was actually on grapes. He attributes his transition to apple research with working in research and Extension for 30 years divided between Michigan and Washington, two of the largest apple producing states in the country. He also attributes some of his success to luck and timing.

“Theodore Schultz, a Nobel prize-winning economist, once told me that during the 50 years following WWII there were more scientific advances in agriculture than in all the millennia since man scratched the earth with a stick,” Larsen said. “I was fortunate to be among those doing research during those 50 years. I was lucky in everything I ever did, I just had great teachers and mentors.”

The fruit industry changed enormously during those years, he said. At the time he graduated from college, apple trees were big and inefficient. Apples had to be harvested using 30- to 40-foot ladders. There were twice as many acres in production growing half as many apples as are produced now.

His relatively brief time away from research was when he accepted the position of vice president for Extension and Continuing Education at USU.

“Why did you go into administration?” people ask, and that’s a good question,” he said. “As it turned out, it was a good move. A fella has to move every once in a while to stay fresh.”

Larsen has had an entire second career since retiring from USU more than 25 years ago. He and Lorna did volunteer work to help rebuild the fruit industry in troubled countries such as Armenia, Macedonia, Yugoslavia, and for 12 years they traveled back and forth between their Utah home and Lebanon, staying there 3 to 6 weeks at a time.

“There was a Lebanese family of four brothers who wanted to revive the apple industry,” he said. “Lebanon was once the largest producer of apples in the Middle East, but due to wars and economic instability, they had fallen 50 years behind the U.S. So they asked me to help revive their apple industry. We air shipped root stock from Seattle to Beirut totaling nearly one million trees over the years.

“They took good care of us in Lebanon. Some of the growers were probably Hezbollah fighters, but we felt like they respected us because we were there to help.”

It hasn’t been all work in retirement. He and Lorna had a second home in St. George for 20 years and he estimates they spent 300 days at sea on various cruises. He said they enjoyed being retired in Logan except for, well, you know, the winters. △
H. Alan Luke—

the namesake of Luke's Cafe and the largest conference room in the Albrecht Agricultural Sciences Building—died September 20, 2017, just 6 months short of his 100th birthday.

Luke earned a degree in agricultural economics at the Utah Agricultural College in 1941 and went on to complete a master's degree and Ph.D. at Cornell University. He made a fundamental difference in agriculture for many years, restructuring the Federal Marketing Order system so dairy farmers are paid for milk quality as well as milk quantity. The long-time Extension economist's research for the USDA has proved to be priceless to dairy farmers all over the country. For many years, Luke worked with industry groups to argue on behalf of voluntary component pricing plans, succeeding in 1985 by prompting change in a federal order. The plan allowed milk prices to be based on fat content, protein content, and a differential value. Luke was honored with the USU College of Agriculture's 2011 Distinguished Service Award for his impact on American agriculture. △
A few years ago we were introduced to the College of Agriculture by our uncle and aunt, Dale and Adele Young. Their motto: "Education is the key to a better world."

After Dale and Adele passed away, we decided to donate scholarship money to the college because of the great people we had met there. Donating for scholarships is an appropriate way for us to give back to USU for the scholarships our own children have received in years past.

We are true Aggies. Our family has 21 degrees from USU. Some of our grandchildren are attending USU at this time. We are awed by the excellent students we have met who have received scholarships from the Youngs, and from us. Those students are the reason we continue to contribute. We are amazed at their accomplishments, their qualifications, and the goals they have set.

"WE ARE TRULY HONORED TO BE PART OF THE AGGIE FAMILY AND THE COLLEGE OF AGRICULTURE AND APPLIED SCIENCES."

— Ron and Linda Mortensen

We had a young family while my husband was working on his master's degree at USU. We certainly appreciated the extra help that came from scholarships that were awarded—it's how we were able to manage our finances during those lean years. I love being able to help others who are in the same circumstance and might be struggling financially.

"IT'S ALSO A WAY FOR ME TO HONOR MY HUSBAND'S LEGACY OF WHAT HE ACCOMPLISHED AT USU AS THE STATE EXTENSION WEED CONTROL SPECIALIST."

— Jeanie Chase
When I tell people that I teach a class about chocolate their first question is: “The whole semester?” Followed by: “What can you possibly talk about for the entire semester?” I have always been amazed by this reaction since I can assure you that an entire career could be spent studying, researching, and understanding chocolate.

As a food scientist, I find chocolate to be a fascinating material. Chocolate products that we consume today are very different from those that the Olmecs, Mayans, and Aztecs prepared thousands of years ago. While pre-conquest civilizations consumed a grainy chocolate mixed with corn and spices, modern chocolate has evolved over the past 100 years into a sweet, smooth, and delicious confection. Changes in chocolate products were possible thanks to the dedication and perseverance of many scientists who have been captivated by chocolate’s complexity. Millions of farmers in West Africa and in tropical areas grow the cocoa tree, Theobroma Cacao, harvest the seeds called cacao beans, and ensure proper fermentation and drying which are vital steps for flavor development. Chocolate scientists have optimized the processes of roasting, grinding, and refining of cocoa beans to obtain the chocolate product with which we are familiar.

Our laboratory in the food science program at Utah State University studies crystallization of fats, such as cocoa butter, which is a primary component of chocolate. The way cocoa but-
ter crystallizes impacts the flavor and mouthfeel of chocolate as well as its shelf life. Perhaps you have noticed a “white dust” on top of older chocolate. This is called fat bloom and is caused by unwanted transformation of cocoa butter crystals. Fat bloom is a significant problem for the confectionery industry and many scientists around the world are working toward solving this problem.

Utah has a vibrant confectionery industry with more than 50 confectionery companies registered in the state, and over 60 percent of these are chocolate manufacturers. I am fortunate to share my passion for the topic of chocolate with hundreds of students enrolled in the course Chocolate: Science, History, and Society. Students learn the history of chocolate, the role that science and technology plays in the development of chocolate, and how chocolate is tied to societal issues and world politics. The course began fall semester of 2015, with the goal of not only inspiring future food scientists but also educating students about the chocolate industry. Few higher education institutions offer courses pertaining to chocolate science, especially in the western United States. The food science program at USU has a vision to offer a comprehensive, university-level, confectionery program that will train students in all aspects of the industry.

Chocolate is a sweet treat that we often take for granted and that many consume on a regular basis. Next time you indulge in a chocolate treat, I hope you will think about the complex process that brought that product to market and the millions of people involved worldwide.
Endowing a college scholarship is a wonderful way to leave a legacy that serves bright and dedicated College of Agriculture and Applied Sciences students, but the sum of money necessary to establish an endowment is not within the financial reach of many alumni and friends of the college.

The CAAS Alumni Council has created the CAAS Alumni Scholarship, bringing together donations of any amount to build a new scholarship endowment that will serve students for decades to come. All alumni and friends of the college are invited to make tax-deductible contributions to the scholarship either online at caas.usu.edu/giving or by contacting Brandon Monson, CAAS Director of Development, Brandon.Monson@usu.edu, 435-797-2208.

Thanks to these donors:

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