

College of Agriculture and Life Sciences

CALS

magazine



2018



COLLEGE OF
AGRICULTURE AND
LIFE SCIENCES
VIRGINIA TECH.



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from the dean



As we prepare to turn the calendar to a new year, I find myself reflecting on the many successes we have realized over the past 12 months. For the college, 2018 was a year of firsts.

In April, we held the first Agriculture and Natural Resources Summit, during which participants formulated a vision for Virginia to serve as a model community with diverse and thriving agriculture and natural resources industries at the core of innovation and economic vitality. One of the key recommendations — the development of a SmartFarm Innovation Network — is now taking shape.

We also welcomed new faculty and staff and celebrated promotions, including Vernon Meacham's well-deserved appointment as the college's chief advancement officer. On a personal note, another first was moving my son into college. Andrew is now a first-year student at Virginia Tech, marking a proud moment for our family.

CALS Magazine is another proud first. Replacing the Innovations newsletter, our brand-new annual publication celebrates the college, our accomplishments, and our Hokie family. I hope you enjoy reading about our exceptional alumni, who include two first-generation female farmers, along with the SmartFarm and other notable news and research projects.

Thank you for supporting our college and university. Because of you, we have much to celebrate.

FIRST IMPRESSIONS

Meeting new friends. Waking up for 8 a.m. classes. Learning how to use Canvas. For the newest members of the Hokie Nation, there is much to learn. We caught up with first-year students to get their impressions as they navigated the first few weeks of school.



stevensindle

FOLLOW



"There's no place I would rather be!"

Steven Sindle | Environmental Science



hannahbanna

FOLLOW



"I love the diversity here and all the options of things to do. I never get bored."

Hannah Browne | Corps of Cadets
Life Sciences Undecided



laurakiesel11

FOLLOW



"Everyone is super welcoming. I love that there are a lot of activities where you can get to know people."

Laura Kiesel | Environmental Science



Lindsay.paynee



jesslogann



"I love that there's always something going on." - Lindsay.
"The first week was better than I thought because everyone was really understanding of the transition to college." - Jess.
Jessica Logan and Lindsay Payne | #samemajor #bff
Animal and Poultry Sciences



adinaa_22

FOLLOW



"I picked Virginia Tech because it has a beautiful campus, a top food science and technology program, and is ranked really high in a lot of areas."

Adina Arshad | Food Science and Technology



kyle.tye

FOLLOW



"I think one of the coolest things about being here is how nice and polite everyone is."

Kyle Tye | Environmental Science



ross.tiaba

FOLLOW



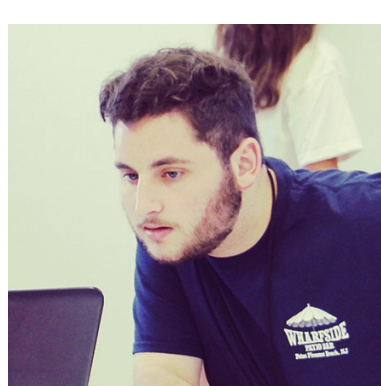
"CALS allows me to take my agricultural technology focus in turfgrass and pair it with agribusiness management."

Ross Tiaba | Corps of Cadets
Agribusiness



matt

FOLLOW



"I like being a peer mentor because I have the chance to help out my fellow students and provide the guidance that I received when I first started here."

Matt Tumminello (peer mentor) | University Studies



vtcals

FOLLOW



Follow CALS students throughout the year on the college's Instagram page.

[instagram.com/vtcals/](https://www.instagram.com/vtcals/) #Class2022 #IAMVTCALS
#FirstYear #HokieFresh



GIVING BY THE NUMBERS

your gifts add up

CALS MENTORING PROGRAM

est.
2015

\$50K
endowment



54
students



53
mentors

BEIER AND ANDERSON EXCELLENCE FUNDS

for experiential learning

est.
2011

\$25K
each



13
students



Awarded for
travel and
study abroad

PRATT ENDOWMENT

research funding

\$7.1M
graduate
support

\$2.2M
undergrad
support

\$3M
equipment

\$1.9M
technicians

\$1M
visiting scientists
and reports

1999 endowment

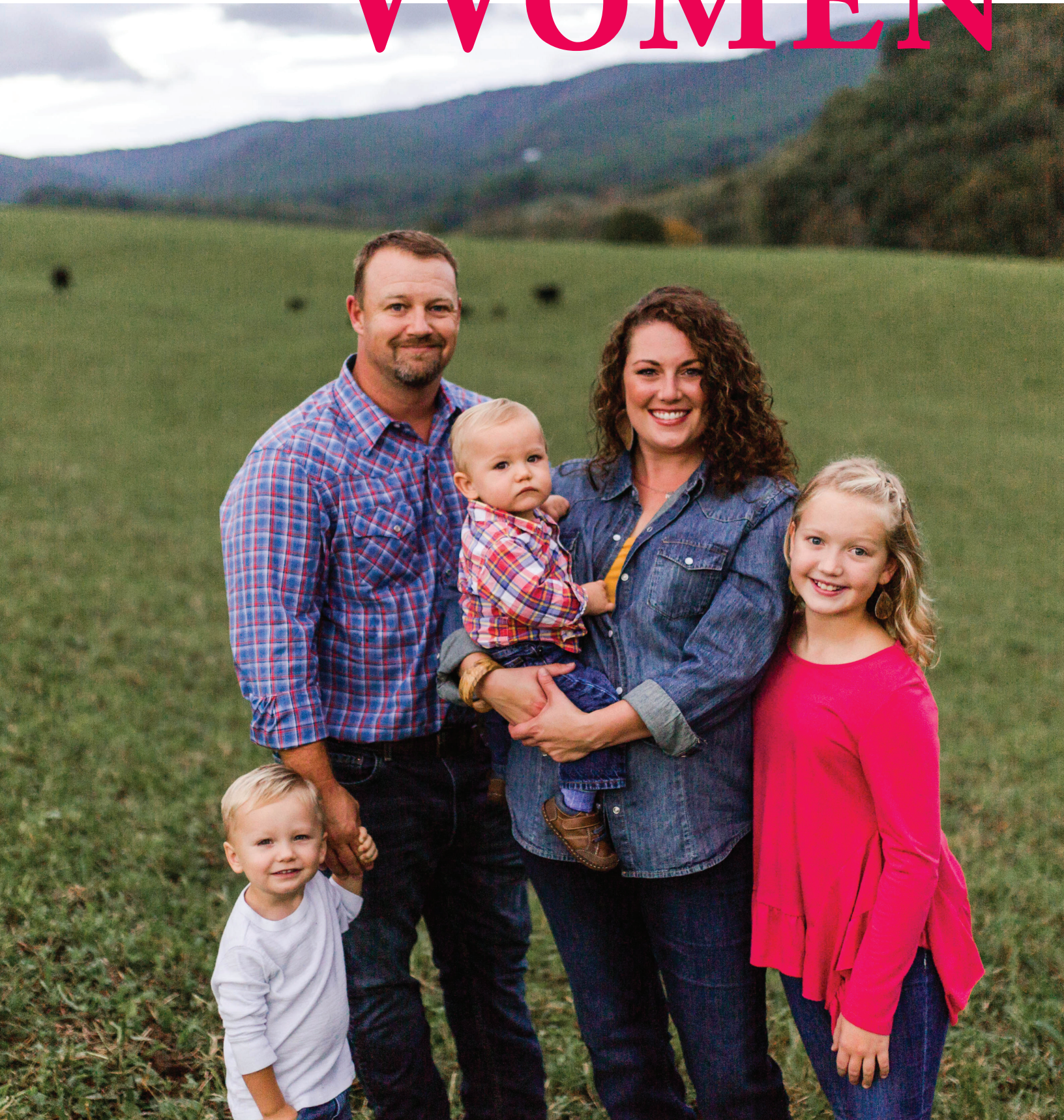
\$5.75M

2018 market value

\$24.4M



WOMEN



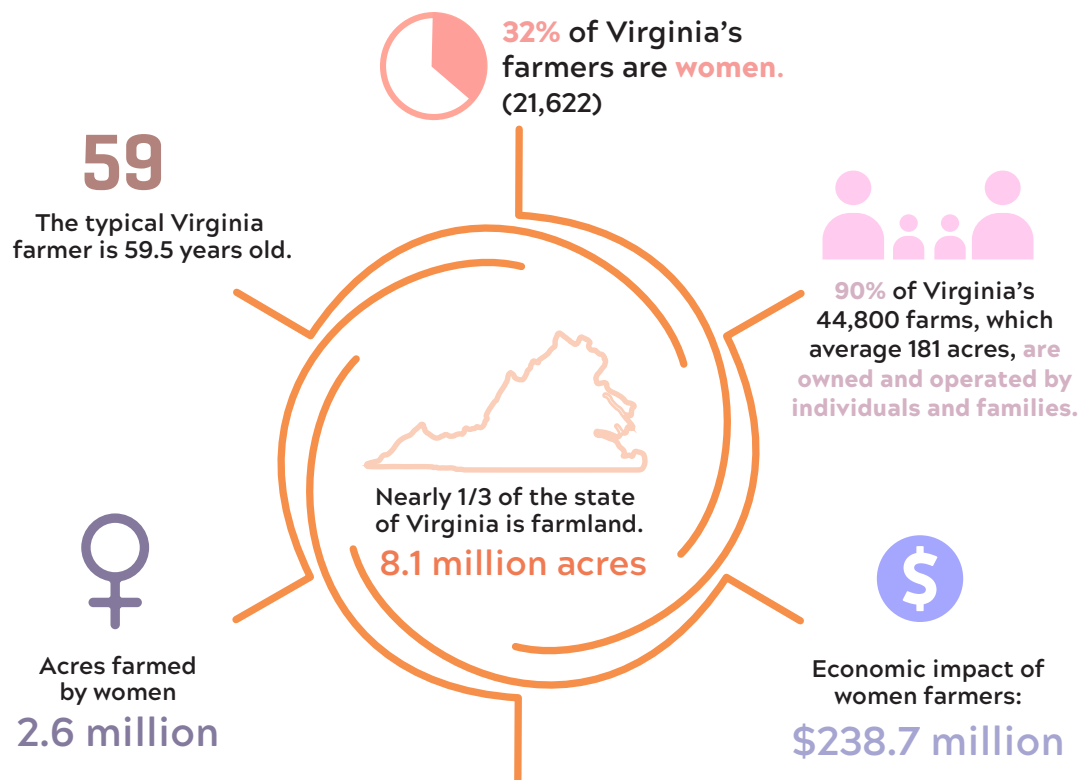
IN

FARMING

by Amy Painter

Courtney Umbarger '08 (agricultural technology) and Laura Flory '09 (dairy science) have much in common. Engaging and authentic, they are dedicated practitioners committed to agriculture as a vocation and a way of life.

A voice for women in agriculture and a source of inspiration to aspiring first-generation farmers, Umbarger and Flory represent a new generation of millennials who are integrating technology, passion, and purpose to reimagine the agricultural landscape. Their initiative and bold decisions have redefined their businesses and impacted their communities.



Like many working mothers, Courtney Umbarger '08 has a gift for navigating the details and to-do's of her life with diligence and care while maintaining an unwavering focus on the big picture. A passionate advocate for farmers and children, she exemplifies an agricultural model that is inclusive, equitable, and educational, and she is beginning to see the seeds of her vision take root.

Umbarger and her husband Seth '03 (dairy science) live on some 370 acres of family land in Virginia. "Our farm was the oldest dairy in Smyth County," she said. "Seth is a fifth-generation dairyman. He milked for 10 years until 2013, when he and my father-in-law decided to sell out. Seth had always had a beef herd on the side, so it made sense to expand that venture."

Today, the Umbargers farm 1,100 acres, of which roughly 66 percent is rented. Their operation, Laurel Springs Farm, is also a value-added small business. The couple offers all-natural, pasture-raised, grain-finished beef, much of which is sold to a Whole Foods Market supplier. Laurel Springs beef is also marketed in the Umbargers' farm store, at three local farmers markets, and to Virginia restaurants.

Umbarger also hopes to bring beef and other locally grown foods into the school system. In what she considers her biggest project, Umbarger has been working with the Virginia Department of Education to change schools' food purchasing practices. Although a small percentage of the state's budget is allocated for local foods at public schools, Umbarger believes that encouraging school systems to purchase more locally sourced proteins and produce will have wide-ranging impact, stimulating local economies, supporting farmers, and educating children about the sources of their food.

Recently, Umbarger's efforts earned her designation from the National Farm to School Network as an area farm-to-school leader for her region. This fall, 13 public schools in Smyth County will serve beef patties from Laurel Springs Farm.

"This was a huge partnership and success," Umbarger said. "We are constantly building relationships with school systems to promote education on where students' food comes from and to encourage them to provide fresh, local beef. We hope this will open more doors to provide children throughout the state with nutritious, locally raised proteins."



1. Umbarger is deeply committed to children's education and is an active volunteer in her community.

2. Umbarger during a visit to Virginia Tech

3. The Laurel Springs farmers market cornucopia

4-7. Scenes from Umbarger's Laurel Springs Farm

8. Umbarger received the 2017-18 Outstanding Departmental Recent Undergraduate Alumni Award from the Agricultural Technology Program last spring. She is shown with Alan Grant, Dixie Watts Dalton '86, '89, and Pavli Mykerezzi.



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**"Our industry
will always need
and welcome
forward-thinking,
innovative, hard-
working women."**

Courtney Umbarger '08



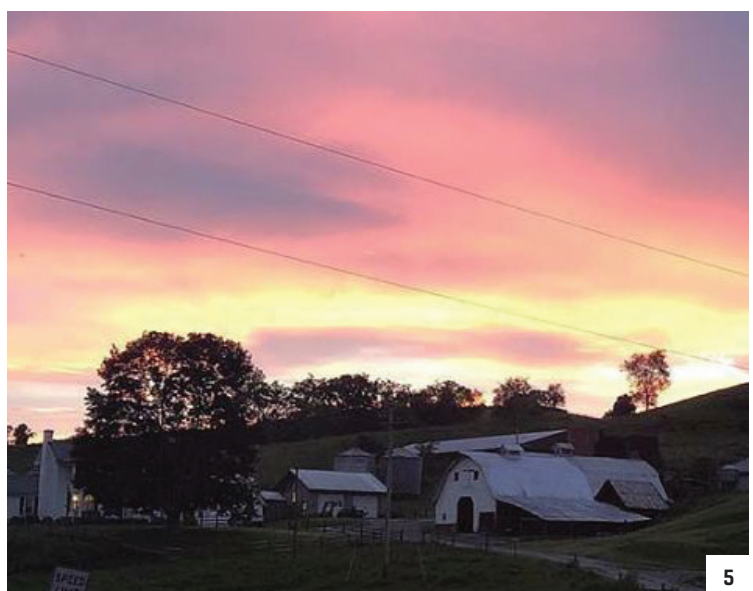
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6



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The mother of two sons, Corbin and Henry, and Seth's daughter, Addie — whom Umbarger affectionately refers to as her "bonus daughter" — the 30-year-old knows a thing or two about beef, business, and family.

"I maintain the accounting, marketing, and wholesale accounts and share the responsibilities of retail sales with Seth. I wrangle our children and also oversee our goats, Lucy and Ethel, and a flock of laying hens. We host field trips for elementary schools, and I organize a farm-to-table fundraising dinner in Marion, Virginia, each year to benefit the farmers market."

Despite her range of responsibilities, Umbarger is modest about her contributions to the farm's success, contributions defined by early mornings and long nights, her commitment to pursuing business training and entrepreneurial opportunities, and the challenges of maintaining balance — as a mother, business owner, housekeeper, chef, taxi driver, philanthropist, and jack-of-all-trades.

"I wear many hats, as we all do, and each day is unexpected. I'm a planner, but being a mother and a farmer is hard on a planner. The weather alone makes this nearly impossible. Sometimes, I feel like if everyone is fed and bathed and we sold some beef, I'm absolutely winning. I have struggled with being treated as inferior because I'm a woman in agriculture. Luckily for me, it has been limited, and I have been able to rally with a fantastic support system of farmers, women and men alike."

Generous in her praise of those whose guidance and inspiration have eased her journey, Umbarger believes that "all women in agriculture are inspiring, no matter what their role. They all are working towards a common goal — preserving and promoting agriculture." In particular, Umbarger credits her former teacher Rachel Kohl '00, '02 (animal and poultry sciences, dairy science; dairy science), a senior instructor in CALS's Agricultural Technology Program, with playing an instrumental role in shaping a solid understanding of agriculture.

"She demanded effort and attention to detail and taught hands-on experiences that have been key in my life to this day," said Umbarger. "She brings her beef and sheep management class to visit our farm. I love it when life comes full circle!"

Learning has long defined Umbarger and influenced her business decisions. A small business boot camp course led to a farm business plan that earned her a start-up grant. Subsequent courses through Virginia Farm Credit and

Virginia Cooperative Extension have helped garner additional funding and have shaped Laurel Springs' value-added offerings. But what really fuels her is a passion for sharing her lifestyle with others and a commitment to making life better for local families.

After learning that 18 percent of her community lives in poverty, Umbarger and a fellow mom brainstormed a farm-to-table event, now an established tradition that brings together Smyth County residents to raise money for the Marion Farmers Market. Following this success, Umbarger and several partners implemented a children's program modeled after similar initiatives at Virginia's Fauquier County and Abingdon markets.

"On the second Saturday of every month during the market season, we put together an educational program that is free for kids under 12," Umbarger said. "If they participate, they receive \$5 in tokens that can be spent on produce, proteins, and canned goods. We are promoting purchasing locally and seasonally and making healthy choices at a young age — at no cost to the child or parent."

Her efforts continue at Laurel Springs where the family hosts field trips to show children where and how their food originates. "They get to plant a seed and to pet a goat," Umbarger said, "and they can see that eggs come from chickens, milk comes from dairy cows (we have one left, Henrietta), and beef comes from cows — all of whom live on a farm."



Pastoral and plain from a distance, Laura Flory's dairy farm in Pulaski County, Virginia, is virtually indistinguishable from any other.

A handful of sizeable — though otherwise unremarkable — red barns crest a rolling green landscape that folds into the foothills of the New River Valley. But inside the largest barn, a cacophony of whirring, clicking, and mooing heralds great progress and promise. Several hundred dairy cows in various states of repose line one side; and on the other, rows of titan-sized computers flank robotic milking systems. Ignore the mooing, and the scene conjures up Willy Wonka's chocolate factory, stocked with some of the finest technological wizardry the Silicon Valley has to offer.

Much like her family's 800-acre farm, there is more to Laura Flory '09 than meets the eye.

A dreamer by her own admission, Flory grounds her aspirations with a business acumen and abiding pragmatism that enable Hillside Farm to thrive. Determined and wise, warm and mindful of people and animals, the first-generation farmer is an engaging spokesperson for the modern world of

dairy, and she's committed to changing the face of agriculture — one glass of milk at a time.

"I would love to be able to incorporate storytelling into our business model, moving more into an agritourism venture," said Flory, whose marketing savvy is underscored by a respect for her dairy farming forebears. "Whether people buy our milk or someone else's, I want them to know where their food comes from.

"Our tours show that farming is not what it used to be — it's that, and so much more. People get to see the breadth and depth of what farmers do and to know why we are here and what we contribute," Flory said. "My overarching dream is to combine my love for people and storytelling with my love for business, keeping it real-life and true. It's all about connection, and that includes knowing which cows are which."

With her husband, Scott '08 (dairy science), and his parents, Dale '78 (dairy science) and Janet '79 (animal and poultry sciences), the Florys oversee a milking herd of 240 Holstein cows on 500 acres, leasing another 300. Four years ago, they implemented free-choice robotic milk systems, eliminating manual milking and allowing the family

Laura Flory '09 with one of her favorite heifers



"You have to balance the flow of information coming 24/7 with analysis. To do this job, you have to be a jack-of-all-trades, which includes everything from barn cleanup to accounting decisions to punching in numbers to public relations to animal husbandry to parenting."

Laura Flory '09

to double its herd without increasing its workforce. Since the transition to robotics, Hillside — one of 11 farms in the state to have adopted the technology — has seen a 15 percent increase in milk production.

"Farmers are at the forefront of technology and environmental stewardship, and we don't get credit for it," said Flory. "Those who came before us made it possible for us to sit here and to push the cutting edge. So, there is a legacy to honor. At the same time, being open to change is critical in the current marketplace. This new, fancy equipment costs a lot, so you have to use it wisely."

To that end, the Florys use technology and engineering to support maximum energy efficiency. Fans and curtains guided by heat and humidity sensors keep the barn cool, turning on and off as needed. An automated flush system sweeps away debris and manure, which then fertilizes fields. A large spherical robot named Juno glides down the aisles, organizing feed for the animals. Sand is recycled as bedding in resting stalls.

And the animals? Computer chips monitor benchmarks for each cow's health, including how much she eats, how many times she has given milk, and her body temperature. The technology allows





Flory to quickly identify and dedicate time to the cows who require attention.

“We get 100 data points per cow per day,” said Flory. “You have to balance the flow of information coming 24/7 with analysis. To do this job, you have to be a jack-of-all-trades, which includes everything from barn cleanup to accounting decisions to punching in numbers to public relations to animal husbandry to parenting. The later includes teaching our two-year-old daughter, Sophie, how to live on a farm, as well as normal preschool parenting.”

Unlike many of her dairy science peers, Flory did not grow up in a farming family. The daughter of a banker, she was raised in nearby Draper. In the county’s 4-H program, she was given the opportunity to connect with animals and, it turns out, her future husband, Scott.

“I came out here with him and began working at Hillside Farm part-time. I started feeding calves and grew in my responsibilities along the way,” said Flory.

She later attended the Governor’s School for Agriculture program, completing her first year of college while in high school, and then earned an undergraduate dairy science degree in two years.

“I took what I was learning in the classroom and absorbed it right away because I could practice it,” said Flory. “This changed my outlook about how learning happens. My experience at Virginia Tech also provided me with people and resources. If I didn’t know the answer, I had someone I could email or call. Being part of a larger knowledge base was really important.”

It’s a lesson that Flory has taken to heart.

“Motherhood taught me that I can’t do it all, be it all. I get now that you have to lean on other people,” said Flory. “Scott and I have become good learners together. We both bring our best skills to the table, and we complement each other well. We are also blessed to have the support of our families. It’s hard to balance what the priorities should be. Since our daughter was born, we have to be more conscious of when work ends and when the fun, family time begins. At the same time, these things are beautifully intertwined.”

1. Juno the robot journeys up and down aisles organizing feed for the herd.

2. A view of a robotic milking system

3. A heifer enjoying a back scratch from an automated brush system

4. The view from the entrance of the Flory’s Hillside Farm

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NEW SCHOOL OF PLANT AND ENVIRONMENTAL SCIENCES CULTIVATES CREATIVE COLLISIONS

The best scientific ideas aren't necessarily born in a laboratory or a classroom. They sometimes emerge when two people meet in a stairwell or engage in conversation while topping off their coffee mugs. In such serendipitous moments, like-minded individuals may exchange ideas that help to resolve a shared problem.

"When you bring people together, you get something new called 'creative collisions.' These intersections lead to innovation on a level that changes the paradigm of what is possible," said Mike Evans '85 (horticulture), director of CALS's new School of Plant and Environmental Sciences.

The school combines three former departments – horticulture; crop and soil environmental sciences; and plant pathology, physiology, and weed science – under one administrative roof. The majors or degrees offered by the three former departments have not changed, but the school plans to explore new majors that build upon faculty expertise and meet the demands of students and industry.

To illustrate how collaborations in the school will generate greater impact, Evans points to his own

AROUND THE AG Qu

"When you bring people together, you get something new called 'creative collisions.' These intersections lead to innovation on a level that changes the paradigm of what is possible." Mike Evans '85, SPES Director

experience as a horticultural researcher, where teamwork between disciplines made a solution possible.

A few years ago, while researching how to best grow lettuce in a controlled environment using hydroponics, Evans began talking with a plant pathologist seeking a defense for powdery mildew on spinach. Soon, the two were collaborating on ways to grow the spinach in a greenhouse, which allowed for faster growing cycles – and for the plant pathologist to conduct scientific trials more quickly than would have been possible in the field.

"I believe that by creating a space in which new relationships can form and risk-taking in the name of innovation is encouraged, we have unlimited potential to make a lasting impact in plant and environmental sciences," Evans said.

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EXPANDING OUR RANKS

Susan Campbell was appointed assistant professor of animal and poultry sciences. Joseph Oakes was named superintendent of the Eastern Virginia AREC earlier this year. To learn about the many new faculty and promotions in the college, visit cals.vt.edu/magazine.



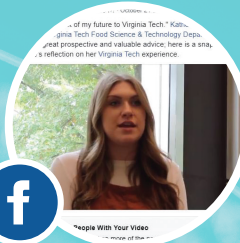
CAMP FANTASTIC GIVES CANCER PATIENTS HOPE

Camp Fantastic is a special gathering place for youth who are battling cancer or have survived the illness. Established in 1983, the camp is held at the Northern Virginia 4-H Center and hosts children from across the country.



FAMILIES RECLAIM THEIR HOMES AND HEALTH

A Virginia Cooperative Extension specialist conducted a year-long experiment in two states that could all but eradicate German cockroach infestations in multi-unit housing communities and transform standard pest-management protocols. This innovative assessment-based, decision-making methodology has dramatically improved the lives of residents in three Housing and Urban Development communities.



TUNE INTO SOCIAL MEDIA FOR SENIOR SUNDAYS

Meet CALS seniors, and learn a little about who they are and what they love most about Virginia Tech in an engaging series of videos available on our Facebook page most Sundays. The videos are created by CALS student and social media intern Ashley Yanego. Visit facebook.com/VTcals.



A BIG THANKS TO OUR HOKIE FAMILY AND VOLUNTEERS FOR YOUR SUPPORT

This fall, the CALS community came together to participate in a variety of events, including pre-game tailgates. Thank you for your enthusiasm and support! To keep up with special moments in the college, follow us on Twitter at twitter.com/VTcals and like us on Facebook at facebook.com/VTcals.



ALCE TURNS 100

The Department of Agricultural, Leadership, and Community Education's 100th anniversary event attracted alumni from around the country. Watch a video on the history of ALCE at alce.vt.edu/100-yr-celeb.html.



VCE FIGHTING OPIOID CRISIS

Virginia Cooperative Extension received a series of large grants to help fight the opioid crisis, which claims the lives of more than 42,000 people annually. Extension is hiring new staff to work with communities and partnering with local agencies to uncover ways to combat the drug's impact.

a full plate

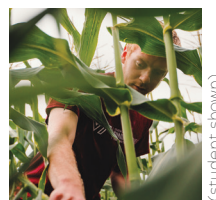
by Amy Painter

FARM-TO-CAMPUS FOODS FULFILL THE LAND-GRANT MISSION

In partnership with Dining Services, CALS is serving up healthy, Virginia Tech-grown fare for students and diners campus-wide. Meet several of the forward-thinking individuals responsible for bringing this successful farm-to-campus venture full circle.

PRODUCE Alex Hessler

DIRECTOR, HOMEFIELD FARM,
SCHOOL OF PLANT AND
ENVIRONMENTAL SCIENCES



A small educational farm, Homefield is a partnership among CALS, the college's School of Plant and Environmental Sciences, and Virginia Tech Dining Services. Through his sustainable agriculture practicum course and dining service menus, Hessler is a natural at getting students excited about growing and eating vegetables, from tomatoes and watermelon to carrots, power greens, fingerling potatoes, peppers, and beets. The farm's vegetable plots benefit from research conducted by faculty and graduate students from multiple departments, while local farmers, master gardeners, and school groups visit the 6-acre farm to learn about sustainable production practices and farm-to-campus dining.

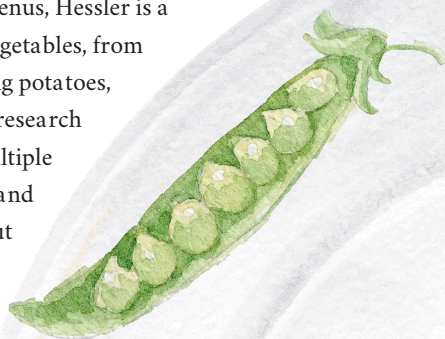
MILK

Shane Brannock '76
(animal science)

DIRECTOR, DAIRY SCIENCE
COMPLEX, KENTLAND FARM,
DEPARTMENT OF DAIRY SCIENCE



Brannock oversees students from three CALS departments and the Virginia-Maryland College of Veterinary Medicine, along with a herd of 270 milk cows at this spacious state-of-the-art facility. Milk is picked up every day by the Virginia Department of Corrections' agribusiness operation. Then, after pasteurization, roughly 1,000 gallons of whole and chocolate milk are returned each week to Virginia Tech, satisfying students at D2 and Deet's Place. The remainder is distributed to prisons around the state, while cream is sold to private businesses for Virginia residents to enjoy as cheese, yogurt, and butter.



"I have witnessed several students filling their plates entirely with our vegetables. Add to that a steak from the Meat Center, a glass of milk from the Dairy Science Complex, and a Virginia Tech egg, and you have a complete campus-grown meal! These experiences serve as powerful lessons to students about the capacity of universities and communities to feed themselves."

Alex Hessler,
Director, Homefield Farm



MEAT

Jordan Wicks

doctoral student (meat science)

**MANAGER, MEAT CENTER,
DEPARTMENT OF ANIMAL AND
POULTRY SCIENCES**

In this USDA-approved facility, Wicks and a team of students process meat to teach students from the college's Department of Animal and Poultry Sciences, among other departments and colleges, and to help the industry make improvements. Cattle are sourced from the Kentland Farm Beef

Center, while hogs and sheep come from Plantation Road; all are tagged and traceable through the entire process. Ground beef, pork shoulders, and other student favorites are shipped to the Southgate Food Center warehouse that distributes the meat to D2, Owens Food Court, and West End Market. Fresh meat and smoked jerky made on-site are sold at the Virginia Tech Meat Center store on Fridays, 2-5:30 p.m.



SERVING UP HOMEGROWN FOODS

Anthony Purcell

**ASSISTANT DIRECTOR,
DINING SERVICES**

CALS and Dining Services have collaborated for nearly a decade, expanding a small Kentland Farm herb plot into what is now Homefield Farm. Today, chefs and production teams from Dining Services work with Hessler to identify produce needs that meet demand and minimize waste. Similarly, the Meat Center offers its fresh cuts, while Kentland Farm's milk has become a D2 staple. Along with providing fresh meals, each partner in the university's farm-to-table venture is dedicated to experiential learning. Purcell and his colleagues educate students about this process through signage, promotional work, and outreach opportunities. To meet a growing demand for organic homegrown food, Dining Services opened Farms and Fields, the newest shop in the Owens Food Court.

Go online to find Alex Hessler's favorite way to prepare butternut squash, Anthony Purcell's chili recipe, and other student favorites that incorporate homegrown ingredients.

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alumna profile

Virginia Tech Entrepreneur of the Year

Portia Moore '08

B.S., human nutrition,
foods, and exercise

Since Portia Moore's graduation a decade ago, this energetic alumna has channeled her initiative and horsepower into an innovative business venture that is positioning children for educational success. Moore is founder of STEM Preschool LLC, a unique early-childhood development enterprise with locations in northern Virginia and the District of Columbia. STEM Preschool teaches students science, technology, math, and engineering principles through their early development, helping them to cultivate confidence and competence in these subject areas by the time they enter elementary school. Last spring, she earned the Virginia Tech Alumni Association's Entrepreneur of the Year Award during the university's Black Alumni Reunion.

How did you decide to work in the field of early childhood education/development?

My educational background and early work experience inspired and qualified me to pursue my dream of owning and developing what is now a STEM preschool. While finishing my bachelor's degree, I worked at a day care center caring for and teaching young children. Afterwards, I pursued my master's degree in education at Marymount University.

Why is it important to you to teach a STEM-based curriculum to children early in their development?

It is my opinion that children who are exposed to STEM early are better prepared for kindergarten and can continue to enjoy these subject areas throughout life.

What do you love most about your job?

I love to see the development of children as they navigate this world as tiny humans. One can learn so much from children at this age because their perspective is untainted and genuine.

How did your education prepare you for this work?

My education at Virginia Tech was diverse and difficult, which I believe made a huge impact on my ability to keep growing, learning, and navigating the more complicated circumstances that adulthood and business ownership can bring.

Who are your role models?

My parents and my grandmother are my role models because they have always put healthy pressure on me to succeed at whatever I set my mind to. Their enormous support and encouragement allowed me to quit a teacher's aide position to pursue my dream of owning a preschool.

Have your students surprised you in some way?

They surprise me daily because one day does not look like the next. A parent was proud that their son graduated from STEM Preschool and was the only kid who knew states of matter. He was able to teach his kindergarten class the difference between solid, liquid, and gas. Those kinds of stories really surprise me and keep me going. I thought, 'Wow! This is happening at STEM Preschool!'

Do you connect with other alumni?

Yes, I do. I was humbled and surprised by the Entrepreneur of the Year award nomination because a lot of the time you're doing your thing, and you have no idea who is noticing your work. I look forward to being able to share that same energy with other alumni to keep the *Ut Prosim* (That I May Serve) energy alive and well in all of us! Let's go, Hokies!

*Interviewed by Ashleigh Anderson, former advancement associate,
College of Agriculture and Life Sciences.*

The incidence of Lyme has increased more than 6,000 percent in the past 10 years.

Lyme disease is now the most-reported vector-borne disease in the United States; in the state of Virginia, the incidence has increased more than 6,000 percent in the past 10 years.

Lyme disease is transmitted by the bite of a tick infected with the spirochetal bacterium *Borrelia burgdorferi*.

“Warming temperatures are playing an important role in this increase. Not readily killed due to warmer winters, ticks are coming out earlier in the season and feeding almost all year round. Another factor likely playing a role in the increase is public and physician awareness,” said Brandon Jutras, a Lyme disease researcher in the College of Agriculture and Life Sciences.

Four major species of ticks are capable of transmitting the bacteria that causes Lyme disease, only one of which is found in our area: the blacklegged, or deer tick, *Ixodes scapularis*.

Jutras, a new assistant professor in the Department of Biochemistry, is discovering new biology that underlies the pathogenesis of Lyme disease. His lab is using cutting-edge quantitative microscopy and molecular techniques to discover new targets in the diagnosis and treatment of Lyme disease.

Fundamental to the success of all bacteria is their ability to grow and divide. The largest class of drugs used to treat bacterial infections target bacterial growth. *B. burgdorferi*, the bacterium that causes Lyme disease, grows in such a way that it is fundamentally different from other bacteria. The Jutras lab is leveraging this unique biological feature to find drugs that will specifically kill the bacterium that causes Lyme disease.

“One of the poorly understood and controversial aspects of Lyme disease is some of the late stage complications, such as Lyme arthritis,” said Jutras, an affiliated faculty member of the Fralin Life Science Institute.

The Jutras lab is evaluating the role of bacterial cell components driving the complications of Lyme arthritis.

B. burgdorferi is the quintessential member of a poorly understood phylum of bacteria, the spirochetes. In a broader sense, Jutras’ findings extend well beyond just Lyme disease and have implications for the bacteria responsible for syphilis, relapsing fever, and leptospirosis. His research provides a fundamental framework with direct translational implications for many important human and animal diseases. △

Uncovering new biology in the diagnosis and treatment of

Lyme disease

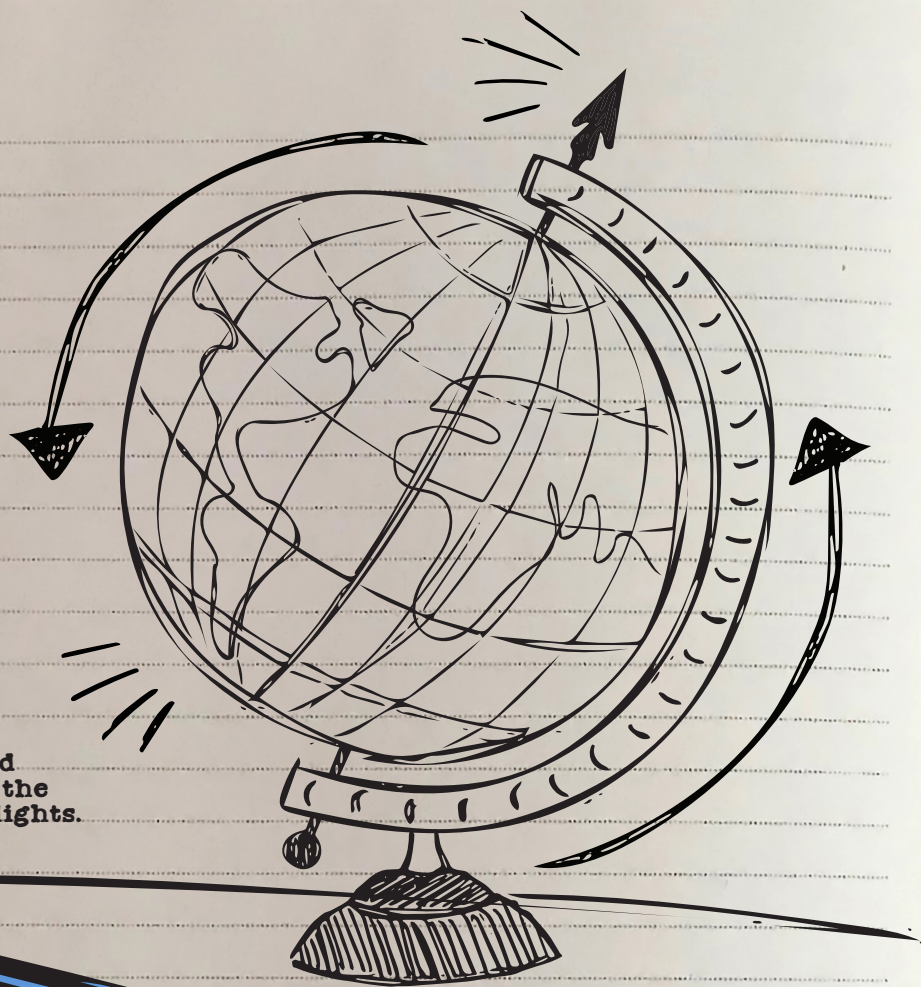
by Kristin Rose and Amy Painter

Kristin Rose is communications and assistant proposal coordinator at the Fralin Life Science Institute.



CALS AROUND *the* WORLD

Our students and faculty engage in international research and study abroad opportunities throughout the year. Here are some highlights.



Illustrations by Robin Dowdy

cals.vt.edu/global.html



PERU

Students traveled to Cusco, Peru, in May to learn about health care in a developing country. Shadowing doctors at the Hospital Regional del Cusco, a government-funded institution serving uninsured and unemployed residents, the students were able to observe how doctors work to provide quality care with limited funding and resources.



➤ AUSTRALIA ⚡



School of Plant and Environmental Sciences Professor Ozzie Abaye led a study abroad program in Australia in September. Members of the Agronomy Club toured canola and wheat fields, judged crops, estimated yields, and gained insight from industry experts.

CUBA ⚡



Thirteen undergraduate and graduate students traveled to Cuba to explore food security and technology, land rights and distribution, gender and racial equity, and community mobilization for a just food system. The republic's complex history and proximity to the U.S. made it an ideal case study. The group was impressed by the Cubans' resource-intensive, low-input agricultural production processes.

GERMANY ⚡



Students in the Food Science and Technology Fermentation Program traveled to Germany to TUM-Weihenstephan in Freising. In addition to studying brewing yeast strains and spoilage microbes, they learned about cleaning, sanitizing, and hygienic design in breweries and enjoyed brewing beer during the trip.

BRAZIL ⚡



The Virginia Tech Soil Judging Team was well represented at the Third International Soil Judging Contest in Seropédica near Rio de Janeiro, Brazil. School of Plant and Environmental Sciences Professor and Coach John Galbraith's team earned the overall team championship. Ben Smith, a junior majoring in biological systems engineering, took home second place in the individual competition.

KENYA ⚡



The first cohort of the college's Global Opportunity Initiative traveled to Kenya for two weeks to collaborate with colleagues at Egerton University. The trip was the pinnacle of a yearlong program in which five faculty fellows learned how to form global networks, map research challenges, understand the global agricultural innovation system, and successfully compete for funding.

The future of farming

by Erica Corder '16



Ron Burleson '81 is able to continue farming with the help of his all-terrain wheelchair, developed through the AgrAbility program.

Ron Burleson loves his job.

"You gotta like what you do. You ain't gonna get rich," said Burleson, a beef and landscape flower farmer from Unionville, Virginia. "You gotta really enjoy it and not mind working hard."

A 1981 graduate in animal science, Burleson and his wife, Sue, who graduated in 1981 in agricultural and applied economics, have had to work even harder lately, he said. Five years ago, Burleson suffered a stroke that severely limited his mobility.

He has found ways around these restrictions with the help of technology like his Trackchair, an all-terrain wheelchair that helps him navigate his field and greenhouse. Through a national USDA program, AgrAbility, he was even connected directly to an engineer who custom-designed a lift to get the 6-foot-5-inch farmer in and out of his tractor safely.



AgrAbility connects farmers in need of assistance with appropriate resources, such as physical therapists and university researchers. In Virginia, a National Science Foundation grant funds the Partnership for Innovation, a collaborative effort among the AgrAbility Virginia Program, the

Blacksburg company TORC Robotics, and Virginia Tech faculty in the College of Agriculture and Life Sciences and the College of Engineering.

The partnership has one goal: To design assistive technology for 12 volunteer farmers with disabilities throughout the state — and to do so across disciplines.

Both colleges are working on myriad ways to advance technology in agriculture. CALS is launching a new SmartFarm Innovation Network that will use technology such as drones, biodesign, cloud computing, and big data to help produce food for a growing global population (see sidebar). At the same time, the College of Engineering is developing new technologies to tackle the problem. The AgrAbility project is just one example of how the two colleges are working together to solve challenges facing the agriculture industry.

AgrAbility Virginia's director, Kim Niewolny, a co-principal investigator of the NSF grant and a CALS associate professor in the Department of Agricultural, Leadership, and Community Education, researches the role of participatory and cultural community development for farmworker care and dignity. She said technology plays a vital role in the future, as long as context and personal experience are factored into decisions.

"One of the most important things when integrating new technologies is to listen to the farmers and understand their needs so that we create meaningful opportunities that seamlessly support their quality of life," Niewolny said.

Not surprisingly, Niewolny's sentiment speaks to a great number of U.S. farmers. Throughout the country, an aging demographic of small- to midsize-farm owners and workers is responsible for a sizeable portion of the country's agricultural activity. According to U.S. Department of Agriculture data, nearly 96 percent of farms in the U.S. fall into this category, which accounts for just over 45 percent of agricultural production output.

On top of an already tough economic climate, farmers themselves are aging, with the average producer at 58.3 years old, a figure that has risen every census based on a 30-year trend. The most-recent USDA data available show that more than one third of principal farm operators are at least 65 years old.

With Virginia Tech's help, new assistive technologies and life-changing innovations could help Burleson and others continue to do what they love for years to come. △

Erica Corder '16 is communications manager in the College of Engineering.

Building the farm of tomorrow – today



Imagine a farm 20 years from now. Drones fly overhead monitoring the nitrogen content of the crops below while tractors piloted by onboard robots harvest crops at peak production. Livestock sensors integrated with cloud computing allow producers to make decisions based on big data. The farmer's most powerful tool is not a tractor, but an iPad.

This technology is designed to increase productivity, to produce higher yields, and to spark a new agricultural and natural resources economy. But Virginia Tech isn't waiting decades to see it unfold.

This year, CALS launched the SmartFarm Innovation Network, a collection of interconnected centers across the commonwealth where Virginia Tech's interdisciplinary researchers and

Virginia Cooperative Extension specialists can partner with industry to develop and deploy innovative technologies.

An outgrowth of the Virginia Agriculture and Natural Resources Initiative, the SmartFarm Innovation Network features multiple interconnected locations, including the Blacksburg campus, along with 11 Agricultural Research and Extension Centers and 108 VCE offices located around the state. The network will serve as a portal to Virginia Tech expertise and a platform for innovation and collaboration.



alumnus profile

WILLIAM PARK '84, '86

B.S., animal science

M.S., applied economics

Despite numerous accomplishments, awards, and philanthropic endeavors, William Park is unfailingly gracious and humble about his achievements. The Charlottesville, Virginia, resident is president of Pinnacle Construction and Development Corp., a company known for its 28-year commitment to providing quality, affordable housing to the elderly and to underserved residents in rural Virginia. He is also an active, visionary alumnus who proposed that Virginia Tech combine CALS' assets with five other colleges to create an academic program addressing all elements of real estate development. Since the Program in Real Estate's inception, Park has served as the first chair of the Industry Advisory Board, mentoring student interns and providing endowments to enhance the quality of the program. The real estate major, now in its fifth year, has nearly 200 students and continues to grow. Last spring, Park earned the Department of Agricultural and Applied Economics Distinguished Alumni Award.

How did you become interested in helping the elderly and other underserved populations find affordable housing?

Our first project was the rehabilitation of the elementary school that my brother and I attended. In prior years, it had served as the high school for my mother and father. We were able to have the building included on the National Register of Historic Places while converting it into 26 affordable units for the elderly. It was very rewarding to save a building that was the focal point of the community while providing much-needed housing to an underserved segment of the population.

How do you remember your college years?

Overall, a great experience. Growing up in a rural area, I was fascinated to meet people from all over the world. I made many lifelong friends and met my wife, who is also a Hokie. I worked hard and played hard. I would not trade my six years on campus for anything.

Where did you spend your time on campus?

I should probably say in the library studying, but that would be a stretch. I must admit that I spent a lot of time in the gym and on the softball fields – also at the barns as I was on the livestock judging team.

What was your favorite course?

Commodity futures with Wayne Purcell, Alumni Distinguished Professor Emeritus of Agricultural and Applied Economics.

What do you love most about the college?

The people.

What music, movies, and/or books do you enjoy?

I'm still a country and rock guy. I enjoy any type of spy movie. Currently, I'm reading several books, including "The Presidents and the Pastime" by Curt Smith.

What advice do you have for students?

Don't limit yourself. There are so many opportunities out there. Put down your iPhone, and pay attention to what is going on around you. Get involved, and make lasting friendships. You will probably never again be in a place with this many people your own age.

What are you most excited about right now?

Regarding Virginia Tech, the real estate program. Overall, just the opportunities that we have in this country.



Under the microscope

Research from around the college

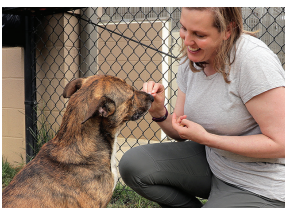
Digital cadavers

The Department of Human Nutrition, Foods, and Exercise purchased a new anatomage table (above) that enhances traditional anatomy instruction with modern computer and imaging capabilities. Using real medical imaging scans, the table provides a look inside the human body, a look that is unmatched by cadavers or textbooks. The technology helps students grasp the spatial relationships of anatomy and the locations of hard-to-identify structures.



Milk protein alleviates chemotherapy side effects

Susan Duncan, associate director of the Virginia Agricultural Experiment Station and a professor in the Department of Food Science and Technology, and graduate student Aili Wang discovered that lactoferrin, a protein found in milk, may bring relief to cancer patients who lose their sense of taste and smell when undergoing chemotherapy.



Man's best friend benefits from \$1.7 million grant

Erica Feuerbacher, an assistant professor of animal and poultry sciences, is an expert in anthrozoology, the study of human-animal bonding. She recently received part of a \$1.7 million grant to evaluate and help improve pet-fostering programs at animal shelters.



Computer simulation to understand Alzheimer's

A biochemistry research team has discovered insights into the stabilizing forces of amyloid fibrils that are associated with Alzheimer's disease and Type 2 diabetes. The research focuses on applying computer simulations to understand mechanisms of protein aggregation that are difficult or even impossible to re-create in a laboratory setting.



George Washington Carver fellows

Dez-Ann Sutherland, a George Washington Carver Assistantship fellow and animal and poultry sciences doctoral student, co-authored multiple peer-reviewed publications, engaged in collaborative research, and pursued a study abroad opportunity in Sweden. The Carver program enables underrepresented students to pursue graduate degrees and provides a nurturing environment of financial, academic, sociological, and psychological support.

Spot the spotted lanternfly?

AREC researchers and VCE agents are tracking the invasive spotted lanternfly and developing ways to fight the bug responsible for the destruction of agricultural crops along the East Coast.



Watch a video about this pest, and report sightings at



cals.vt.edu/magazine

Alumni highlights

2017-18 Hall of Fame



Delbert O'Meara, of Walters, Virginia, a 1962 graduate of animal science and a 1967 graduate of agricultural education, was inducted into the Virginia Tech College of Agriculture and Life Sciences Hall of Fame at the annual college alumni awards ceremony. O'Meara began his career in Virginia Cooperative Extension in 1962 with the Nansemond County office and later worked in the Southeast District office in a variety of positions until his retirement in 1991. Throughout his career, O'Meara has been a mentor, working with both the Virginia and the National County Agents associations. He helped establish the Prince William County Fair, the Fredericksburg County Fair, and the State Fair of Virginia. In addition to his contributions

of time and effort to the college, this generous alumnus has made a number of philanthropic gifts to Virginia Tech and is a Distinguished Benefactor in the university's Ut Prosim Society.

Meet all of our 2017-18 Alumni Award recipients at cals.vt.edu/get-involved.

2018-20 CALS Alumni Organization officers

The College of Agriculture and Life Sciences Alumni Organization is led by President **Rachel Kohl '00, '02** (animal and poultry sciences, dairy science; dairy science), a senior instructor and advisor in the college's Agricultural Technology Program since 2005. Vice President **Elizabeth Galbreath '17** (agricultural science) is in the Agricultural Sales and Marketing Professional Development Program at BASF in Research Triangle Park, North Carolina. Past president **Dixie Watts Dalton '86, '89** (agricultural economics; agricultural economics) is the dean of humanities, social sciences, and business at Southside Virginia Community College, where she also serves as the director of the agribusiness program.

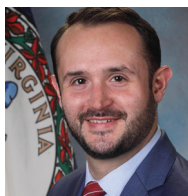


From left to right: Dixie Watts Dalton '86, '89, Rachel Kohl '00, '02, and Elizabeth Galbreath '17

To learn more about our board members and to find out how you can get involved, visit

cals.vt.edu/get-involved

Hokies in the news



Brad Copenhaven '12 (political science, agricultural economics) was appointed deputy secretary of agriculture and forestry for the Commonwealth of Virginia. He is the former director of government affairs for the Virginia Agribusiness Council.



Heidi Hertz '04 (human nutrition, foods, and exercise) was appointed Virginia's assistant secretary of agriculture and forestry. She formerly served as obesity prevention coordinator with the Virginia Foundation for Healthy Youth and has held roles in the office of the former first lady of Virginia Dorothy McAuliffe and in the Virginia Department of Health. Hertz serves as a director on the CALS Alumni Organization board.



Vernon Meacham '83, '87 (animal science; animal science) was named chief advancement officer in the Virginia Tech College of Agriculture and Life Sciences. In his new position, Meacham, who has worked in CALS since 2005, leads the college's advancement team, comprising development, alumni relations, and communications and marketing professionals.



2019 upcoming events

- Feb. 7** Hokies in Sustainability
- March 22** CALS Alumni Organization Celebration of Ut Prosim
- April 24** CALS Alumni Organization New Alumni Launch Party
- May 22-24** Virginia Tech Alumni Association Old Guard Society of Golden Alumni Reunion
- June 6-9** Virginia Tech Alumni Association Reunion 2019

#CALSCaption



Illustration by Steven White '92

Want to win a Virginia Tech sweatshirt? Write a caption for this cartoon, and post it to CALS social media using #CALSCaption.



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i am VTCALS



A cowgoyle watches
over the Ag Quad.