A CAUSE IN COMMON
From the grocery store to the gut microbiome, CALS scientists are tackling diabetes from the ground up.

MILESTONES TO MARVELS
A sampling of findings and facts from our first 150 years.

A PRACTICAL SCIENCE: AGRICULTURAL BIOTECHNOLOGY IN FOCUS
From sustainable pest management to safety, CALS researchers are addressing the questions surrounding genetically engineered foods.

DEPARTMENTS
02 DEAN’S MESSAGE
03 AROUND THE QUAD
07 IN THE CAPITOL
08 IN THE MARKETPLACE
09 STUDENT LIFE
30 ALUMNI NOTES
36 GENERATIONS & INNOVATIONS
38 FACTS IN FIVE
39 ONE MORE THING
40 ENDNOTE

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LEFT: A view of Houston Pond at the F.R. Newman Arboretum of the Cornell Plantations. In 1935 men of the Civilian Conservation Corps began to transform a pasture that was home to the Department of Animal Science’s herd of black Angus cattle. Six years, 200 men, and $200,000 yielded a cleared and graded arboretum site, four miles of roads, eight miles of paths, and thousands of trees and shrubs. Today the Plantations encompasses 4,000 acres, including a mature botanical garden, an arboretum, and a diverse network of nature preserves. Read more about the Cornell Plantations at www.cornellplantations.org. Photo: University Photography

Cover Rendering: MKW + Associates
The College of Agriculture and Life Sciences has sustainability as a core value. This magazine was printed virtually all chemical, paper, and metal waste. An eco-friendly process that recycles post-consumer fiber paper certified for maximum value. This magazine was printed using soy-based inks, on post-consumer fiber paper certified by the Forest Stewardship Council, in an eco-friendly process that recycles virtually all chemical, paper, and metal waste.
BREAKING NEW GROUND FOR PLANT AND SOIL SCIENCES
By Stacey Shackford

Plant and soil scientists at the College of Agriculture and Life Sciences have been sowing the seeds of sustainability, food security and improved human health for more than a century.

A new initiative will help position the college for the future and create a unified face for the plant and soil sciences at Cornell by integrating five departments–Plant Biology, Horticulture, Plant Breeding and Genetics, Crop and Soil Sciences, and Plant Pathology and Plant-Microbe Biology–in one administrative unit.

“This is a step toward increasing the impact–that is already enormous–of the very high level of expertise that CALS has in this area,” said Cornell University President David Skorton at the June 6 launch of the School of Integrative Plant Science. “Through the new school, CALS aims to strengthen its teaching and research and extension work in plant science and to attract more students to the field–students who will be future leaders in these vital areas.”

Skorton was joined by Kathryn J. Boor, the Ronald P. Lynch Dean of CALS; David Stern, president of the Boyce Thompson Institute for Plant Research (BTI); and Alan Collmer, the Andrew J. and Grace B. Nichols Professor of plant pathology, who has been appointed as the school’s first director.

CALS will be teaming up with BTI and the U.S. Department of Agriculture to invest $35 million in the new school over the next decade for faculty hiring, research and student support.

“It’s an investment in addressing the big challenges,” Boor said. “Whether it’s creating a more secure, nutritious and sustainable food system to feed a rapidly growing global population; devising new plant-based medicines, materials and sources of bioenergy; or ensuring the biodiversity and health of the ecosystem that supports all life on Earth, basic and applied plant and soil sciences provide the very foundation upon which our society will build enduring solutions to a wide range of challenges facing the world today.”

The School of Integrative Plant Science will offer a plant sciences major with concentrations that include plant genetics and breeding; sustainable plant production and landscape management; evolution, systematics and ecology; plant physiology and molecular biology; and plants and human health. School faculty members also contribute to several other undergraduate majors, such as agricultural sciences; viticulture and enology; biology (with a plant biology concentration); and international agriculture and rural development, as well as many minors, such as horticulture, crop management and soil science.

Kathryn J. Boor, the Ronald P. Lynch Dean of CALS, congratulates the first director of the School of Integrative Plant Science, Alan Collmer, the Andrew J. and Grace B. Nichols Professor of plant pathology.
LIVESTOCK LOSS SHARING

After a dry season that decimated livestock, Kenyan herders recently received some welcome relief familiar to American farmers but far less common in Africa—insurance compensation for their losses. More than 100 Muslim pastoralists are the first beneficiaries of Index-Based Livestock Takaful, a livestock insurance program led by Chris Barrett, the David J. Nolan Director of the Charles H. Dyson School of Applied Economics and Management, and Stephen DeGloria of crop and soil sciences.

The program combines state-of-the-art satellite imagery with the Islamic principle of takaful, a cooperative system for sharing losses. It is the latest rendition of the index-based livestock insurance tool launched in 2010 as a way to reduce the impact of extreme weather on some of the developing world’s most vulnerable populations. By basing predictions of livestock losses on satellite imagery that measures the condition of grazing lands, researchers can accurately predict average herd losses and eliminate the need for costly verification of individual loss claims. They are also using the technology to assess the ecological effects of livestock movement and behavior.

SAUTÉED IN SPACE

How mein on Mars? Moo shu on the moon? What would it be like to stir-fry in space? A bit messy, according to Apollo Arquiza (middle) and Bryan Caldwell (right). The postdocs in the lab of biological and environmental engineering associate professor Jean Hunter recently conducted the first partial gravity cooking on record. Aboard a low gravity G-Force 1 space simulator plane, they tossed tofu and shredded potatoes into pans of sizzling red oil and documented the resulting splatters as the plane climbed and dove in parabolic paths. Under low gravity conditions, the food settled more slowly into the pan, and more oil appeared to fall outside of it.

A NOD to NAMESAKES

ROBERTS HALL
He never went to college, but Isaac Roberts (1833-1928) made quite a mark at Cornell nonetheless. After working as a farmer and school teacher, he became a professor in Iowa. He was recruited by Ezra Cornell and A.D. White to become the first director of the Faculty of Agriculture’s new land grant university and director of its experiment station.

FERNOW HALL
The namesake of Warren Hall was so prominent that he once graced the cover of Time magazine. George F. Warren’s (1874-1938) sound economic advice helped the U.S. recover from the Great Depression. The former sheep herder became a revered teacher and studied with Liberty Hyde Bailey, who noted, “a few words from him might change the course of a man’s thinking.”

WARREN HALL
The administrative center at Cornell’s New York State Agricultural Experiment Station in Geneva was named after the man who helped raise the station’s profile and prominence. Whitman H. Jordan (1851-1931) was a chemist who became the station’s third director in 1896. He was an outspoken advocate for agricultural research and a national adviser on domestic food production during World War I.

JORDAN HALL
Ulysses Prentiss Hedrick (1870-1951) was a fruit breeder who appreciated the art of horticulture as well as its science. He came to the New York State Agricultural Experiment Station in Geneva as head of the Department of Horticulture, and he became its sixth director in 1928. His legacy is captured in several monographs and books, including The History of Agriculture in the State of New York.

HEDRICK HALL
Albert R. Mann (1880-1947) died shortly before the completion of the library that bears his name. The former secretary of Liberty Hyde Bailey rose through the ranks to hold several esteemed positions at Cornell, including professor, registrar, extension director, experiment station director, CALS dean and the first university provost. He also served as federal food administrator for New York state during World War I.

MANN LIBRARY
Albert R. Mann (1880-1947) died shortly before the completion of the library that bears his name. The former secretary of Liberty Hyde Bailey rose through the ranks to hold several esteemed positions at Cornell, including professor, registrar, extension director, experiment station director, CALS dean and the first university provost. He also served as federal food administrator for New York state during World War I.

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In a plant science version of “keep your friends close but your enemies closer,” Cornell researchers are working with a common potato pest to see if they can activate the natural defenses of potato plants by managing the bugs, rather than eradicating them. Working with farmers in the Andes, Jennifer Thaler, associate professor of ecology and evolutionary biology, learned how local scoureges of tuber moths actually seemed to help potato plants produce up to twice the usual yield. Her team identified a Colombian potato variety that responded to a moderate infestation by “overcompensating” and ramping up production, as well as another variety that acted as an effective trap crop. By growing a decoy plant that the moths especially like to eat alongside the potato with powerful natural defenses, farmers are able to control the amount of damage to the majority of their crop—enough damage to activate the extra growth without excessively taxing the plant. This push-pull strategy could help farmers around the world get bigger harvests from each acre of existing farmland without pesticides, the researchers said.

A SPORTING CHANCE

So you weren’t team captain and the Tinytown Tigers never led the league—no matter. Just by participating in competitive team sports, you are a winner in the competition for better jobs, according to Kevin M. Kniffin, a postdoctoral research associate in the Charles H. Dyson School of Applied Economics and Management. In a study of what current workers expect from potential new hires, former student athletes are expected to possess relatively greater leadership ability, more self-confidence and heightened self-respect compared to people who didn’t play a varsity high school sport, he found.

AVIAN ITINERARIES

In one of the greatest feats of endurance in the biological world, millions of tiny songbirds—many weighing less than an ounce—migrate thousands of miles to Central and South America from North America each year. Now scientists are finding out how these featherweights do it: They use elliptical routes helped by prevailing wind patterns to save calories. Most of what we’ve known about migration routes comes from ducks and geese, but leg band recoveries, hunter records and other techniques used to study those birds don’t work for small songbirds that fly at night. So researchers at the Cornell Lab of Ornithology used a fresh approach, crowdsourcing data from the Lab’s citizen science eBird project between 2004 and 2011 to determine songbird migration routes and plugging it into computer models to sort species with similar movement patterns into groups. Whereas waterfowl follow a set north-and-south pattern along the same relatively narrow routes, like tractor-trailers on an interstate, songbirds are more like passenger cars touring back roads, fanning out across the continent.

TELLTALE TWEETS

If nationally televised candidate debates are supposed to stimulate critical thinking and individual expression among the social media set, it’s not happening. In an analysis of 290,119,348 tweets from 193,522 “politically engaged” Twitter users during the 2012 presidential campaign conventions and debates, assistant professor Drew Margolin, the Geri Gay Sesquicentennial Faculty Fellow in Communication and Technology, found little creative thinking and a slavish blitz of retweeting “elites” like @billmaher and @seanhannity.

NEW STRATEGIC PLAN DEFINES CALS GOALS AND OBJECTIVES

This fall marks the launch of the new CALS strategic plan. Based on the understanding that a full research spectrum, from the most fundamental to applied is needed to address many of the grand challenges facing society today, the plan has been developed through the efforts of a faculty and staff committee as well as feedback from students, alumni, Cornell Cooperative Extension directors, state stakeholders and others. The goals of the plan emphasize that CALS must remain nimble and proactive in its efforts in order to align with available resources and meet the ever-evolving needs and aspirations of our students and many stakeholders.

Through this productive and insightful planning process, CALS leadership has identified 10 overarching aspirational goals. Faculty, students and staff will pursue these aspirations by achieving more than 50 objectives over the next five years. In this 2014-15 academic year, CALS leadership, in partnership with department chairs, school directors and others, will directly address 20 specific objectives as the first step in a five-year plan of action. To learn more, visit strategicplanning.cals.cornell.edu.
GO TAKE A HIKE! CASCADILLA GORGE TRAIL REOPENS

By H. Roger Segelken

Closed for six years of storm-related repairs, the Cascadilla Gorge Trail—from College Avenue to Treman Triangle Park in downtown Ithaca—reopened Monday, Sept. 15, with the ceremonial exhortation: “Go take a hike!”

Henry Sackett, Class of 1875, originally funded the trails in the Fall Creek and Cascadilla gorges, and the $2.8 million in repairs aimed to restore the 1930’s appearance and function of the steep, water-level trail, including naturalistic stone staircases, more durable railings, reinforced gorge walls, storm water management and elevated trail surfaces.

An eager crowd of hiking-boot-clad community members was on hand for remarks by university and city officials. Many had waited years to traverse the full length of the trail.

Master of ceremonies Christopher Dunn, the E.N. Wilds Director of Cornell Plantations, said Tropical Storm Lee sent destructive torrents and massive boulders down the gorge in 2011, forcing the trail’s prolonged closure to the public. The university’s $2 million commitment to the restoration project, Dunn said, “speaks to the significance Cornell places on this trail” as a connection to the community. Cascadilla, he added, is not just a passageway to the university and to the city, “but a gateway to nature for so many people.”

Beyond the university’s contribution, some $880,000 came from the Federal Emergency Management Agency and state of New York emergency funding. Kyujung Whang, vice president for facilities services, credited former Rep. Maurice Hinchey (D-22nd Dist.) for helping secure FEMA funds.

Former Ithaca Mayor Carolyn Peterson, who partnered with Cornell in grant applications, said she’s been hiking Cascadilla for 40 years for its “health benefits ... that can enhance creative thinking and problem solving.”

Mayor Svante Myrick ’09 said he was a 17-year-old college-bound youth touring the Cornell campus when he discovered something neither Princeton nor Tufts could boast: scenic gorges where “you can walk out your door and in five minutes be in a 10,000-year-old reminder that the problems you face today are not the end of the world, that there were problems before and that this community has endured.” The mayor thanked “most of all Cornell University for keeping that reminder alive for so many of us.”

As spectators edged toward the trail’s award-winning entry gate, crafted by local metal artist Durand Van Doren, Dunn had one more piece of business. He presented Myrick with a commemorative walking stick to lead the procession up the gorge.

“Now,” Dunn recommended, “go take a hike!” And so they did.

Ithaca Mayor Svante Myrick ’09, left, receives a commemorative walking stick from Cornell Plantations Director Christopher Dunn.
Photos: Robert Barker/University Photography

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 WHICH WAY WILL CONSUMERS GO ON GMOS? By Stacey Shackford

Given the choice between buying foods produced in the conventional manner or buying products containing genetically modified plants or animals, would consumers always prefer the former?

Not necessarily, according to behavioral economics expert David Just, a professor in the Charles H. Dyson School of Applied Economics and Management who shared some of his research with members of the U.S. House of Representatives Committee on Agriculture Subcommittee on Horticulture, Research, Biotechnology, and Foreign Agriculture during testimony at a July 9 hearing on the “Societal Benefits of Agricultural Biotechnology.”

He has found that when the choice between conventional and GMO foods is presented in such a way that consumers can understand the reasons for genetic modification, they overwhelmingly choose GMOs. For example, consumers would rather buy poultry that has been genetically modified to resist diseases than chicken that have been fed antibiotics to accomplish the same purpose. In fact, almost 85 percent prefer genetic modification in this case.

“In consumer studies, we find that people tend to lump food that is labeled as having been genetically engineered together with categories of foods such as those that contain chemical preservatives or other ingredients with long names that sound overly technical, or foods that are highly processed and factory produced,” Just told the legislators.

Consumers often associate GMOs with some unquantifiable health risk, similar to that posed by untested or poorly tested drugs or medication, though some also express minor concerns about environmental impacts, he said. They also consider GMOs as a monolithic technology with a single set of characteristics, rather than the thousands of differentiated modifications that now appear in the market.

“They tend to regard them in comparison to some hypothetical alternative food that is pristine and presents no perceived health risk,” Just added. “In reality, the non-GMO alternative generally presents a greater and quantifiable health risk. GMOs are often introduced specifically to eliminate the use of pesticides or other chemical treatments that can present a health risk. This is the case with Bt corn, one of the products consumers are most likely to encounter.”

D.C. TRADITION FEATURES FARE FROM CALS

The Empire State’s agricultural bounty was on display for the nation’s leaders during the annual New York Farm Day in Washington, D.C., on July 29, an event hosted by U.S. Sen. Kirsten Gillibrand (D-NY). The Cornell connections were conspicuous, reflecting the vital role CALS plays as a support system for the state’s $5.7 billion agricultural economy.

Members of Congress and administration officials nibbled on artisanal cheeses, products of a partnership between Wegmans and food science extension associates to support the growth of artisan cheese businesses in New York and the Northeast. The champagne strawberry ice cream from Mercer’s Dairy in Oneida County—the only ice cream in America which requires an ID to purchase—was created with the help of Cornell food scientists who developed a novel manufacturing process that preserves the wine’s alcohol content.

“The Cornell connections should be no surprise, according to Jan P. Nyrop, senior associate dean of CALS. The same is true for virtually any New York crop or food product, from beef cattle to maple syrup.

“Agricultural research and outreach have been core components of Cornell’s mission ever since its founding in 1865,” he said. “Cornell’s continuing involvement in agriculture—in New York and globally—is rooted in the fact that meeting the nutritional needs of humanity will continue to be one of the grand challenges facing society.”

INVESTING IN THE FUTURE OF NYSAES

The Fruit and Vegetable Processing Pilot Plant at Cornell’s New York State Agricultural Experiment Station in Geneva is set to get a state-of-the-art upgrade, thanks in part to efforts by Sen. Michael Nozzolio (R-54th Dist.). It was announced in June that Nozzolio secured $3.4 million in state funding toward a $13 million modernization of the facility, where the New York State Food Venture Center carries out much of the product and business development operations that help hundreds of food entrepreneurs each year. The work is Phase I of a proposed $47 million Agricultural Science Research Laboratory project.
GRAPE EXPECTATIONS

Cheers! Two Cornell grape varieties are key ingredients in new beverages in the marketplace. Goose Watch Winery (Romulus, N.Y.) announced the first commercial, single varietal wine made with Aromella in August. Aromella, named in 2013, boasts a Muscat aroma and the tenacity to survive cold winters. Saranac Brewing Company (Utica, N.Y.) tapped the 2006 release Corot noir for its special Tramonay Rouge. A spin on a classic Belgian Saison, the limited-edition, small-batch brew gets its fruity aroma from the Corot noir juice added during fermentation. Professor of horticulture Bruce Reisch developed both varieties at Cornell’s New York State Agricultural Experiment Station in Geneva.

The program, a partnership between Cornell and the U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS), is led by Gennaro Fazio, a USDA-ARS plant geneticist and Cornell adjunct professor of horticulture. Through a breeding process started in the 1970s by Cornell faculty Herb Aldwinkle, James Cummins, and Terence Robinson, the program has released 13 rootstocks in the past five years. Nurseries have prepared over two million apple trees on Geneva rootstocks for planting next spring, but according to Fazio most nurseries are already sold out for the next three to four years.

“It’s worth the wait for growers,” said Fazio. “The choice of rootstock is a major decision, made only one time in the lifetime of an orchard. The right match between apple variety, rootstock and orchard management system can enhance or shatter the potential yield of an orchard.”

The demand for Geneva rootstocks is driven by their unique strength, and all are variations on a theme. They have been selected for high levels of pest and disease resistance, including tolerance to apple replant disease, and resilience to the woolly apple aphid, Phytophthora root and crown rots, and fire blight.

“Fire blight can cause 10 to 20% loss in an orchard, but it can be much higher in some varieties. Losses of 10 to 50 million dollars a year are not uncommon,” said Fazio. “I actually call some of our rootstocks immune. It takes four to six different genes to accomplish that.”

In addition to disease resistance, the rootstocks boost tree productivity through several mechanisms, including modification of branching patterns in the scion, root architecture, and tree height. The program is complemented by Fazio’s research into the genetics of dwarfing as well.

“In apples, there are two genes involved in dwarfing, which are together worth half a billion dollars to the apple industry in the United States,” said Fazio. “Dwarfing rootstocks have enabled a 20 percent increase in yield, so the New York growers can harvest 100 tons per acre thanks to rootstocks that induce the tree to produce fruit, not wood.”

The program’s success in moving the new rootstocks into the marketplace was acknowledged with an award for technology transfer from the USDA-ARS North Atlantic Area on Sept. 9, given jointly to the breeding program and the Cornell Center for Technology Enterprise and Commercialization, Cornell University’s technology transfer office.
often linked to deforestation, habitat degradation, displacement of native peoples and pollution, palm oil production has been widely vilified in the press. But as I discovered during an eye opening internship in Indonesia, the reality is not as clear cut as the forests the media portrays.

When I was offered the opportunity to work at PT Hindoli, an oil palm plantation and crude palm oil refinery in Sumatra, I wasn’t sure I should take it. I was afraid of tainting my friendships with people who were against the idea at the time. But I knew that the hallmark of a good education—a CALS education—is being exposed to many different ideas and realities, and there is no substitute for experiencing them firsthand. I also knew how much the industry has benefited many communities and bolstered the economy of my native Indonesia, which is the largest producer of palm oil in the world. So I took my chances and ended up learning a lot more than I bargained for.

The 50 million tons of palm oil produced globally every year supply more than 30 percent of the world’s vegetable oil and make it into approximately 40 to 50 percent of our households, in everything from confectionery to cosmetics. Calls from environmentalists, animal activists and, increasingly, consumers, have led to efforts to produce palm oil without causing deforestation or harming people. This sustainable palm oil vision was, to me, a very new and exciting concept. I knew the moment I heard about it that taking this internship would give me valuable firsthand insights into how the system works and what solutions are needed to improve it.

My job in the Corporate Affairs Department at PT Hindoli involved working on corporate social responsibility projects such as community schools and bridges. I also worked with corporate communications to develop newsletters, charity events and a documentary on sustainable palm oil plantations, and I was afforded a glimpse into the management and production side of the business as well.

One of the first things I learned was that the company acknowledges many of these concerns and is taking steps to lessen and mitigate its impact. For instance, PT Hindoli has vowed not to burn forests or grow palm on peatlands. It purchases land legally and sets some aside for subsistence farmers and conservation to help preserve habitats for tigers, crocodiles (I’ve seen many!), birds and orangutans. In its mills, all parts of oil palm are used; the waste is treated and does not leak out to the local water source. The company has been able to create more jobs for Indonesians, which has improved their lives significantly. It also shares its expertise with local farmers to equip them with the tools to make their own smallholdings more productive. It partners with community groups to support schools, build facilities and infrastructure. And it invites NGOs to monitor its work.

Of course, I can’t attest to the same levels of corporate responsibility at every company in the industry, and I suspect these practices are not universal. However, to abolish the industry altogether or raise taxes on it would not only be harmful to thousands of businesses and millions of people, it also would not solve the underlying issues. Corporate responsibility is an important part of the solution but it is not the only one. Change needs to come from committed people across the industry as well as within indigenous and international communities, and the government.

My internship changed my opinions about the industry I once regarded with skepticism. To my fellow students, I say: If you have the opportunity to do a new thing out of your comfort zone, do it! If it’s a controversial field, don’t be afraid! Remember, we are here because we want to learn.

Bagas Yoga Danara is a student majoring in development sociology.

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THE PALM OIL INDUSTRY: A STUDENT’S PERSPECTIVE

By Bagas Yoga Danara ’15

It’s back! The Farmers’ Market at Cornell returned to the Ag Quad this fall, featuring local vendors of food, beverages and locally grown fresh produce. Since 2011, this student organized and run market has provided an invaluable source of healthful, sustainably grown produce to the entire Cornell community. Photo: Reed Newman
AG QUAD RENOVATION PLANNED FOR 2015

Students, faculty, staff, and visitors alike can look forward to a renovation on the Ag Quad next summer. The project, by MKW + Associates LLC, will address lighting, paving and pedestrian flow. Plans include expanded seating in front of both Roberts Hall and Mann Library to promote a sense of community in the central outdoor space of the college.

In addition to this effort, LA2010, a sophomore studio course taught by Marc Miller in Landscape Architecture, is exploring the future addition of an installation—possibly plaques, statues or other public art—that would highlight a selection of historic figures, discoveries and accomplishments made by CALS faculty and alumni. The class’ first assignment was to experience the space in the context of the distractions—including phones, water bottles, headphones—that will influence how the installation’s future visitors could experience it. Their findings and draft project plans will be submitted to the Dean for consideration as this portion of the project takes shape in coming years.

ELLEVATE CORNELL

By David Nutt

A networking group for women in business is seeking to build career connections on campus and beyond.

Ellevate Cornell, formerly named 85 Broads, draws its members from the whole academic spectrum, even those who do not have any background in business at all.

“We provide the springboard to launch into a very well-connected network that is not only national, but international,” said Maria Jiang ’16, Ellevate Cornell’s vice president of marketing and communications. “We’re comprised of well-respected women in all professional fields: CEOs, academic professors, entrepreneurs, board members for nonprofits, head directors of financial services companies. It’s really a wide range.”

The group’s parent organization, the Ellevate Network, boasts a membership of 30,000 women worldwide. In addition to creating opportunities for its members and boosting their professional skills, Ellevate Cornell also focuses on personal development.

“We’re building a lifelong network, not only of leadership but also of friends,” Jiang said. “We’re a huge support system for each other.”

SESQUICENTENNIAL SCOOPS

By David Nutt

Flavor of the month? This ice cream is the flavor of the last 150 years. In what has long been a tasty tradition, students in Cornell’s introductory food science course develop a new ice cream flavor for their final project. This year’s theme is the Sesquicentennial, and it promises to be one for the ages.

Creating custom-made ice cream for the course stretches back at least 70 years, when students were experimenting with strawberry mousse, banana and pineapple, and other bold blends. After Alicia Orta-Ramirez, senior lecturer in the Department of Food Science, took over the class in 2010, she decided to add a new twist to the project, with students addressing a different theme every year. Last year’s theme, Stocking Hall, resulted in Cookie Dough Remodeled, with its dark chocolate base, sugar cookie pieces and white chocolate chips. In honor of the 150th anniversary of Cornell’s founding, this year Orta-Ramirez selected the Sesquicentennial as the theme. But there’s more on the class menu than just cobbling together treats. Food Science 1101 students learn the processes behind making the ice cream while also building up their marketing and teamwork skills, and they delve into the university’s history, too, so that they can craft a thoroughly Big Red-centric concept.

Four teams will ultimately present their Sesquicentennial concoctions to a group of judges that includes Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences, and Olga Padilla-Zakour, professor and chair of the Department of Food Science.

The winning flavor will be dished out at the Dairy Bar as well as at 2015 Sesquicentennial events on the Ithaca campus and in New York City, so everyone can get a taste of history.
“Leadership is a result of good service and will come as a natural consequence. Whatever the problem and no matter how small it may seem to you, if you solve it greater opportunities await you.”

— Liberty Hyde Bailey, first Dean of the New York State College of Agriculture at Cornell University

Student leaders in the College of Agriculture and Life Sciences are a driving force for change on campus and in the community, making an impact through entrepreneurship, philanthropy, government, and research.

ALEXA DAVIS ’16

As senior editor of The Cornell Daily Sun, Alexa Davis certainly has her finger on the pulse of the Cornell community. She is also the vice president of professional activities for the business fraternity Delta Sigma Pi, treasurer of her social sorority, and former teaching assistant for AEM 1200: Introduction to Business Management, and she is organizing the university’s first ever Entrepreneurship and Technology Summit to connect Cornell students with business professionals. A double major in communication and applied economics and management, Alexa combined her interests this summer as a reporter at Forbes Media in New York City. This year she will also help Cornell celebrate its sesquicentennial by creating a student magazine to commemorate the occasion.

AMANDA MORETTI ’15

Amanda Moretti, a former dairy princess from the coast of California, is passionate about promoting agriculture. The animal science major also has a firm foot in business, studying the economics of the dairy industry through the rigorous Farm Credit Fellows and Cornell Dairy Fellows programs. As president and past fundraising chair of the Cornell University Dairy Science Club, she has also participated in the Young Farmers and Ranchers annual conference as a member of Cornell’s Collegiate Farm Bureau, where she serves as an executive committee member. A Meinig Family Cornell National Scholar and teaching assistant in several classes, Amanda also focuses on philanthropy as chair of the Meinig program’s Town Gown Awards food drive and through her Kappa Delta sorority.

KENDRICK COQ ’15

Kendrick Coq has his sights on success—both his and his fellow students. The applied economics and management major, co-president of SWAG (Scholars Working Ambitiously to Graduate) and co-chair of Black Students United has led efforts to give voice to black students at Cornell and increase their graduation and retention rates. Kendrick is also the secretary of the Sigma Phi Society, a commissioner on the Class of 2015 Convocation Committee and the Student Assembly Finance Commission, and the diversity outreach chair for the Class Council of 2015. The aspiring media mogul has been pursuing his passion in the entertainment industry through internships in Los Angeles and New York City. Together with friends, he has also launched his own clothing line, LGND Supply Co.

CASEY CHAMBERLAIN ’15

For many prospective students, Casey Chamberlain is the friendly face of CALS. A CALS Student Ambassador and external committees liaison for the group, Casey helps new and aspiring Cornellians navigate campus and the college. Casey also leads philanthropy efforts at Delta Phi, including events like Shave a Brother to Save a Brother, which raised more than $6,000 for the Leukemia and Lymphoma Society in honor of Kevin Ballantine ’10. The science and natural environmental systems major has also helped his fraternity and others strive toward sustainability as part of Greeks Go Green. The aspiring environmental consultant has conducted research into woody biofuel with the Department of Natural Resources and delved into marketing as an intern at the Hotel School.

SARAH BALIK ’15

Her campaign slogan was “Veterinarian—Not a Politician”—but Sarah Balik’s three years of experience in Student Assembly, University Assembly and the SUNY Student Assembly means the animal science major knows how to get things done. As the new Student Assembly president, she hopes to flex her political muscle to secure fair funding for student groups and to address campus safety concerns such as sexual assault and bias. The champion of campus sustainability served as chair of the Student Assembly’s Environmental Committee and helped establish the $1 million Green Revolving Fund to support student-led energy efficiency projects. Sarah is active in the Alpha Epsilon Phi sorority, the Cornell Raptor Program, and the National College Health Improvement Program and Council on Sexual Violence Prevention.

SALMAAN QADIR ’16

Salmaan Qadir knows how to network, and he’s using that experience to help connect his peers to CALS graduates around the world. The Dyson School star is a student director of alumni affairs and has launched headfirst into alumni engagement efforts, including an alumni-student mixer at Homecoming 2014. Salmaan is a Hunter R. Rawlings III Presidential Research Scholar, a Dyson Leadership Fellow and vice president of the Ho-Nun-De-Kah honor society. He has already invested heavily in his own career in finance, as an analyst for the Mutual Investment Club of Cornell and the Cornell Venture Capital Club, as well as The Benchmark Group and JPMorgan Chase & Co., and he recently became a student ambassador for Google.

Students United has led efforts to give voice to black students at Cornell and increase their graduation and retention rates. Kendrick is also the secretary of the Sigma Phi Society, a commissioner on the Class of 2015 Convocation Committee and the Student Assembly Finance Commission, and the diversity outreach chair for the Class Council of 2015. The aspiring media mogul has been pursuing his passion in the entertainment industry through internships in Los Angeles and New York City. Together with friends, he has also launched his own clothing line, LGND Supply Co.
A CAUSE IN COMMON

Text by Krisy Gashler • Photos by Justin Bastien
Type 2 diabetes is a diagnosis handed to more than 1.7 Americans every year. Like cars with their gas tanks sealed shut, their cells cannot take up the glucose needed as fuel. When the body responds by raising blood sugar levels, detrimental effects are widespread throughout the body. If current trends continue, an estimated one-third of Americans could have diabetes by 2050, making this chronic and complex disease an important research priority beyond the labs of medical research institutions. Individual and community health are at the heart of the land-grant mission, and CALS experts in fields from plant breeding to biological and environmental engineering are making strides to bolster prevention, develop novel treatments and answer fundamental questions about what genetic and environmental factors increase the risk of diabetes.
PREVENTION AND INTERVENTION

A diet rich in vegetables and fruits is often the first prescription following a diabetes diagnosis. Michael Mazourek Ph.D. ’08, the Calvin Noyes Keeney Assistant Professor of Plant Breeding and Genetics, has come up with some new vegetable varieties to entice people to eat their five-a-day.

From miniature striped peppers to polka-dotted watermelons, he develops “gateway vegetables” for children that are eye-catching as well as flavorful. Other creations such as the ‘Habanada’ pepper, which has all the zest of a habanero, but none of the heat, appeal to more mature palates. Mazourek’s sweet butternut squash is a perfect individual serving size. Beyond mini veggies, larger versions of the squash are in the field this year that will boost the quality and flavor of economical and long-lasting frozen purees. Chefs appreciate his ‘Silver Slicer’ cucumber, which gives them a new, mild flavor. His purple-podded snow peas are not only visually attractive, they also have nutrients you’d expect to find in blueberries.

But form and function aren’t his only considerations.

“We’re trying to look at the whole system—the way a healthy soil can truly affect the flavor of a vegetable, how disease resistance can lower costs, how we can breed produce to be easier and more convenient for consumers to prepare,” Mazourek said. “It all helps to support community health.”

Chronic diseases can have wide impact on a community, particularly where prevalence is high. Native Americans have the highest rates of diagnosed diabetes—15.9 percent—among all ethnic groups in the U.S., according to a 2014 report.

Angela Gonzales, associate professor of development sociology, is hoping to address that disparity among Hopi Indians. In the capstone course she offers for development sociology majors, teams of undergraduate students work with not-for-profit organizations on the Hopi reservation in northern Arizona.

In spring 2014, students collaborated with the Hopi Special Diabetes Program on two projects.
focused on diabetes prevention. Tasked with developing new nutritional and wellness policies for Hopi schools, one team of students created a nutritional toolkit for cafeteria staff and teachers that included culturally relevant nutritional information for parents as well, providing cultural context and interesting facts in the lunch menus sent home each week.

“On days when corn is included on the menu, there could be a message about the importance of corn to Hopi culture. The menu would also include Hopi words for different foods and also games such as word finders on food and nutrition,” Gonzales said. “Part of this is about feeding students, but part of it is about educating parents in culturally relevant and meaningful ways.”

The second team of students helped develop a text messaging campaign. Although most homes on the large rural reservation lack phone service, most residents have cell phones, and the diabetes program wanted to take advantage of the technology to encourage healthy diet and exercise behaviors.

Participants in the text messaging campaign will receive daily messages such as “walking briskly for a half hour every day reduces the risk of developing type 2 diabetes by 30 percent.”

“I’m excited about the service we were able to provide our partner organizations, and the opportunity for students to apply their knowledge and training to help address important community needs,” Gonzales said.

**PROTECTIVE PACKAGING**

While prevention and lifestyle changes can have a large impact on the health of adults with type 2 diabetes, type 1 diabetes means a lifetime of injections and pumps to provide the insulin needed throughout the day. Minglin Ma, an assistant professor of biological and environmental engineering, is developing an alternative to insulin injections through smart packaging of insulin-producing cells.

A treatment strategy involving the transfer of pancreatic islet cells—the cells that produce insulin—from a healthy donor to someone with diabetes has shown great promise, but it is fraught with two problems: there aren’t enough donors, and patients need to take immunosuppressive drugs to avoid immune attack against the foreign islet cells.

**VITAL STATUS UPDATES**

Successful management of a chronic diseases like diabetes requires healthy lifestyle changes, but sufferers also need consistent emotional support, according to Geri Gay MPS ’80, PhD ’85, the Kenneth J. Bissett Professor of Communication and director of the Interaction Design Lab. The lab has developed a variety of communication tools to help people manage their health, including a phone-based social networking application to boost emotional awareness. Users of the application Vera are encouraged to capture their emotional state with pictures and short captions, which they share with an online support network whose members respond with their own comments. “Emotion is a ubiquitous aspect of humanity that governs behavior in a number of ways and is linked inextricably with health,” Gay said. “Social expression of emotion has been shown to directly improve health outcomes.” The lab is now exploring the tool’s use in a host of health settings, including weight loss, smoking cessation and management of other chronic diseases.
Minglin Ma believes he can overcome both hurdles by encasing islets—from a wide range of sources, including a patient’s own healthy cells, stem cells or cells transferred from pigs—in semi-permeable “cell packages” that allow oxygen, glucose and nutrients to enter and exit, but prevent attacks by the body’s immune system.

“It’s like a screen on a window—it lets the fresh air in, but it keeps the bugs out,” Ma said.

CASTING A WIDE NET FOR CAUSES

Future advances in treatments for diabetes will arise from closing in on the cause—or causes—of diabetes. Ruth Ley looks to the intersection of our genes and the gut microbes that influence metabolism and obesity.

The associate professor of microbiology studies the unique collections of microbes that come to populate our stomach and intestines by age 2 or 3.

As a postdoctoral researcher at Washington University School of Medicine eight years ago, Ley discovered that differences in the gut microbiomes of mice caused some to be fatter than others. Ley and her colleagues took microbes from lean and obese donor mice and gave them to germ-free mice, which had been kept in isolation and fed specialized food to prevent them from developing their own gut microbes. Though they had exactly the same diets, the mice given microbes from fat donors became fatter than the mice given microbes from lean mice. That study, published in 2006 in Nature, quickly gained global attention.

Today, Ley is expanding on that work, exploring the way genetics may influence the gut microbiome and, in turn, obesity and the diseases that can stem from it. In collaboration with Andrew Clark, the Nancy and Peter Meinig Family Investigator in Molecular Biology and Genetics, Ley is exploring the differences between the gut microbes of fraternal and identical twins.

Because babies are born without any bacteria in their guts—the womb is a germ-free environment—and twins living in the same home generally eat similar things, researchers believed their gut microbes would be similar, but identical twins, who have identical genomes, would have even more similar microbiotas compared to fraternal twins. Ley’s team sequenced the microbiota of 500 pairs of identical and fraternal twins, and found that identical twins do indeed have more similar gut microbes than fraternal twins; genetics do influence the gut microbiome.

ENLISTING THE INTESTINE

When diabetes causes a patient’s pancreas to stop functioning properly, doctors have several treatment options at their disposal, including insulin injections or patches to mimic pancreatic function, and cell transplants to introduce healthy tissue back into the pancreas. But what if scientists could avoid dealing with the pancreas altogether? John March, associate professor in biological and environmental engineering, and his team of post-docs, technicians and graduate students, are working on a way to coax the intestine to do the work that a diseased pancreas won’t. March’s lab is engineering bacteria that can induce intestinal cells to make pancreatic-like cells in the intestine. March’s bacteria “reprogram” these cells, which are actually intestinal endocrine cells, to make insulin in response to glucose in a patient’s blood. “The result is that the center of glucose regulation moves from the pancreas, which is non-functioning in many diabetics, to the intestine,” March said.
**AND Marvels:**

*University’s Sesquicentennial*

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**MILESTONES AND Marvels**

*Celebrating Cornell University*

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**A Practical Science: Agricultural Biotechnology in Focus**

Is a genetically engineered poppy’s food to be feared or the best hope for a tropical industry? Would you try a French fry made with potatoes genetically modified to resist a devastating blight?

In the race to stay one step ahead of crop pests and diseases that threaten farmers and food supplies around the world, scientists across Cornell’s College of Agriculture and Life Sciences (CALS) use every available tool, including genetic engineering. The technology was in its infancy 30 years ago when two CALS scientists made biotech breakthroughs that shaped the future of fighting plant disease; today, CALS scientists use genetic engineering to study the molecular mechanics of plant disease resistance and as one tool for sustainable pest management. CALS faculty are also playing an equally valuable role by evaluating the safety and effectiveness of genetically engineered crops, enabling farmers, regulators, and consumers to make well-informed decisions.

**FROM DIABETES TO CANCER**

Jason Locasale, an assistant professor in the Division of Nutritional Sciences, is using information gained from diabetes research to tackle another big target: cancer. After 20 years of routine use of Metformin as a drug to treat type 2 diabetes, researchers have found that it also dramatically decreases incidences of cancer, but they have no idea why. One leading hypothesis is that it aids the fight against both diabetes and cancer because it affects metabolism specifically, changing, in the case of cancer, the cells’ metabolism to one that is not conducive to cancer’s prolific cell growth. In his quest for answers, Locasale has collaborated with practicing physicians. "We are working on this drug being used in adult mice, but we have no idea what might have on the liver, or the immune system, or the body and what effect that might have on obesity and diabetes, but we have no idea how it’s doing this."

"Is it changing the immune system? Could it be changing the way the body processes carbohydrates? Is it changing the way the body processes really any of the other systems? How does it help people?" Ley said. "We know we have this drug that seems to be modifying a metabolic circumstance in the body, but we don’t know what else it might be doing and how it might be changing the immune system, how it might be changing the way the body processes carbohydrates."

That’s why scientists are working hard to answer a big question: Could there be a cancer drug that also helps fight diabetes? In their bid to find the answer, Ley and visiting food science fellow Suzanne Snedeker published a 2013 paper that explored the promising role of Metformin in cancer and diabetes treatment. In their search for answers between drug metabolism and drug effectiveness in cancer, the scientists found that Metformin might help patients suffering from both ailments and that the drug could help in the prevention and treatment of cancer among healthy people.

"We found evidence that variation in the gut microbiome is one firmly linked to leanness versus obesity. Furthermore, the team found that the microbe that was most likely to be associated with obesity was also the one most strongly affected by their human host’s genetics," Anthony Hay, also associate professor of microbiology, said. "We know that arsenic can be transformed by the gut microbiome. That’s what my lab is working on now."

In discussions with Ley, Hay began to wonder what role the gut microbiome might play in degrading pollutants within the body and what effect that might have on obesity and diabetes. Lest they make the mistake of overlooking the potential of the microbiome, the scientists published an influential paper in 2012 that reviewed numerous studies and suggested researchers take a closer look into the potential to develop diabetes.

"We know that arsenic can be transformed by the gut microbiome, but we have no idea how that might affect the interaction between the gut microbiome and environmental pollutants. We are working on this drug being used in adult mice, but we have no idea what might have on the liver, or the immune system, or the body and what effect that might have on obesity and diabetes, but we have no idea how it’s doing this."

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In the race to stay one step ahead of crop pests and diseases that threaten farmers and food supplies around the world, scientists across Cornell’s College of Agriculture and Life Sciences (CALS) use every available tool, including genetic engineering. The technology was in its infancy 30 years ago when two CALS scientists made biotech breakthroughs that shaped the future of fighting plant disease; today, CALS scientists use genetic engineering to study the molecular mechanics of plant disease resistance and as one tool for sustainable pest management. CALS faculty are also playing an equally valuable role by evaluating the safety and effectiveness of genetically engineered crops, enabling farmers, regulators, and consumers to make well-informed decisions.

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Anthony Hay, also associate professor of microbiology, studies the biodegradation of environmental pollutants, including pollutants that have been linked to diabetes. One powerful compound that’s known to be associated with increased risk of diabetes is arsenic, which naturally occurs in high levels in the soil and water in some parts of the world. Arsenic is strongly affected by their human host’s genetics, and the team found that the microbe that was most active in the soil and water in some parts of the world was Christensenella, a bacterium that is known to be the internal and environmental factors that increase the risk weight gain and raise the risk of diabetes,” Hay said. “On the other hand, a greater emphasis on multifaceted approaches to understand the interaction between the gut microbiome and environmental pollutants that have been linked to diabetes will require further research to understand how this interaction affects the gut microbiome and its impact on the body and what effect that might have on obesity and diabetes.

The following pages highlight just a sampling of findings and facts to illustrate the expanse of the impacts emerging from these first 150 years. Photo: Robert Way

Marvels:

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CALS scientists use genetic engineering to study the molecular mechanics of plant disease resistance and as one tool for sustainable pest management. CALS faculty are also playing an equally valuable role by evaluating the safety and effectiveness of genetically engineered crops, enabling farmers, regulators and consumers to make well-informed decisions.

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Locasale says, “We know that arsenic can be transformed by the gut microbiome, and this is one firmly linked to leanness versus obesity.” In discussions with Ley, Hay began to wonder what role the gut microbiome might play in degrading pollutants within the body and what effect that might have on cancer and diabetes.

ANTHONY HAY

Anthony Hay, also associate professor of microbiology, director of the Microbial Ecosystems Laboratory and chair of the Department of Microbiology and Molecular Genetics, has been involved in experiments on giving patients Metformin before surgery and seeing how the Metformin interacts with the biopsied tumors. “We are working on how this drug affects cancer in cell lines, tumors in mice and biopsies of patients with cancer. We’re studying the microbiome to determine its role in metabolizing pollutants.”

Hay and visiting food science fellow Suzanne Snedeker published a study in 2017 that explored the potential of using the gut microbiome to remove pollutants from food and drinking water. “We found evidence that variation in the gut microbiome is significantly affected by their human host’s genetics,” Hay said. Furthermore, the team found that the microbe that was most likely to carryout this job was Christensenella, a microorganism that naturally occurs in high levels in the soil and water in some parts of the world. “We’re looking at the differences that might be driving its success,” Hay said. “We’re looking at how it might interact with the environment and what factors might be influencing its activity.”

Ley added, “The microbiota that are found in the gut are set up to help the human host process the foods that we eat, but sometimes they can also help protect us against disease. The potential of using the gut microbiome to remove pollutants from food and drinking water is a prime example of this.”

The success of this work is largely due to the unique collaboration between the Division of Nutritional Sciences and the Department of Microbiology and Molecular Genetics at Cornell University. “We’re able to bring together experts in nutrition, microbiology, genomics and environmental health to tackle some of the biggest issues facing humanity,” Hay said. “We’re working on understanding the complex interactions between the gut microbiome and environmental contaminants, and how this knowledge can be used to improve public health.”

In discussions with Hay, Ley began to wonder what role the gut microbiome might play in degrading pollutants within the body and what effect that might have on cancer and diabetes. “We’re looking at how this drug affects cancer in cell lines, tumors in mice and biopsies of patients with cancer. We’re studying the microbiome to determine its role in metabolizing pollutants,” Hay said.
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BY SARAH THOMPSON

As you set out for Ithaka,” writes C.P. Cavafy in his poem of the same name, “hope the voyage is a long one, full of adventure, may there be many a landmark to make the way more pleasant.” As Cornell University’s Sesquicentennial approaches, the campus is bustling with activity as the university preps for the milestone anniversary. The expanse of the impacts emerging from these first 150 years. Photo: Robert Way

Marvels:

Milestones and Celebrating Cornell University

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“Biotechnology is a new tool layered on top of a long history of crop genetic changes. The origins of all traits bred into plants and animals are mutations. These are naturally occurring mistakes when DNA is copied. Random mutations happen all the time. Most are not really useful.”

—Margaret Smith, Professor of Plant Breeding and Genetics.

A NEW TOOL WITH A PIONEERING CALS HISTORY

Margarite Smith ’78, Ph.D. ’82, corn breeder and associate director of the Cornell University Agricultural Experiment Station, doesn’t use biotechnology in her breeding program, but you wouldn’t guess that from her speaking schedule. She frequently talks about the science of plant breeding and genetic engineering at regional extension offices, industry trade meetings and even garden clubs. Her goal is to help people understand what biotechnology is, who is using it, and what scientists currently know about it, from the unique perspective of a knowledgeable observer.

“Biotechnology is a new tool layered on top of a long history of crop genetic changes,” Smith said. “The origins of all traits bred into plants and animals are mutations. These are naturally occurring mistakes when DNA is copied. Random mutations happen all the time. Most are not really useful.”

Farmers have been exploiting these mistakes for thousands of years, selecting and replanting plant varieties they found to have useful mutations, like bigger fruit size or disease resistance, Smith said. In conventional crossbreeding, breeders use the pollen from selected plants to produce hybrids, offspring that tend to be more vigorous and have better yields than their parents.

It’s not an exact science because so many genes are involved. The genomic complexity is a contrast to genetic engineering.

“With genetic engineering, you have a plant variety and a gene donor and are moving one or a few genes from the donor into a plant,” Smith said. “DNA inserted into plants is read as just part of the plant’s genetic instructions.”

The ability to express foreign DNA inside a plant’s genome offers Marc Fuchs a promising avenue to combatting viral plant diseases, especially in woody fruit crops where growers need varieties that can thrive for decades. Fuchs, an associate professor of plant pathology and plant-microbe biology at Cornell’s New York State Agricultural Experiment Station in Geneva, is using the technology as a tool to engineer virus resistance in fruits using genes from the pathogens themselves.

“It’s crucial for plants to have this resistance genetically because no chemical

Q: Am I eating genetically engineered food?

The answer is mostly likely yes, but it depends on how you purchase your food. About 60 to 70 percent of packaged foods in the supermarket—products that come in boxes and cans—contain ingredients derived from genetically engineered plant varieties. Products made from corn and soy are the obvious ones, because 90 percent of the U.S. acreage of these crops is planted with genetically engineered varieties. There are a whole slew of additional products that have corn or soy derivatives in them.

—Margaret Smith, Professor of Plant Breeding
works against viruses. Genetic engineering is the only approach to achieve resistance in some crops,” Fuchs said.

A pioneering CALS scientist first proposed pathogen-derived resistance in 1984. Geneva-based horticulturalist John Sanford was investigating the molecular basis of a phenomenon that biologists and breeders had noticed for years: the ability of plants to develop some resistance after exposure to weak versions of viruses in the field.

Sanford and Stephen Johnston, a plant geneticist at Duke University, proposed that inserting a weakened segment of viral DNA into a plant’s genome could trigger its defense mechanism and confer resistance, roughly analogous to how vaccinations work in humans. A year later, their theory was validated and demonstrated by another scientist, who used the method to confer virus resistance in tobacco.

Fuchs’ mentor Dennis Gonsalves, emeritus professor of plant pathology and plant-microbe biology, was eager to test Sanford’s theory in the field using Sanford’s groundbreaking 1987 invention of the biolistic gene gun, capable of inserting a target gene into living cells. At the time, Gonsalves was working against the clock to help papaya farmers on Hawaii’s Big Island fight the devastating papaya ringspot virus, which had destroyed the industry on Oahu 30 years earlier.

With the help of Sanford’s gene gun, and after years of field trials and federal testing, Gonsalves and colleagues at the University of Hawaii created the first virus-resistant transgenic papaya. In 1997, the ‘Rainbow’ papaya gained deregulated status in the U.S.; the following spring, free seeds were distributed to Big Island growers. The variety is now grown on the Big Island, Oahu and Kauai, and it was approved for sale in Japan in 2011.

“The industry was in trouble. We had a solution,” Gonsalves said. “This was about the public sector doing the work, not big companies.”

DISARMING PESTS, STUDYING EFFECTS

Today, Fuchs continues Gonsalves’ work, partnering with him to test resistance of transgenic papaya to different strains of the papaya ringspot virus. Recently, Mexican papaya growers approached them to help develop engineered virus-resistant hybrids using the country’s most popular papaya varieties.

Fuchs also is working to engineer resistance to the grapevine fanleaf virus, which is transmitted by soil-borne nematodes.
that feed on a grapevine’s roots, moving the virus along the root system to infect healthy vines, causing poor fruit set, low yields and eventually death. For more than a century, grape growers around the world have relied on vineyards composed of grafted plants; the scion is the familiar fruiting variety, such as ‘Chardonnay’ or ‘Thompson Seedless,’ and the rootstock is a variety selected for disease resistance rather than flavor. This system offers the opportunity to genetically engineer the rootstock and leave the scion—and its genome—unchanged.

“There is no natural resistance to this virus in grapevines, but if we can protect the rootstocks, we can protect the scion,” Fuchs said. “Only the rootstock will be genetically engineered; the fruiting part will be the grower’s favorite variety.”

Fuchs’ work aligns with other projects underway at CALS to find alternatives for managing plant pests and diseases in vegetable crops, like potatoes. Late blight is a disease that strikes both potatoes and tomatoes, caused by a pathogen that travels quickly via wind and water to wipe out entire fields in days. It has been making headlines since the Irish Potato Famine in 1845.

“It’s one of the most devastating diseases of potatoes worldwide. When it comes, it’s crushing,” said CALS potato breeder Walter De Jong.

The solution in the U.S. is to apply fungicides to seeds or use frequent sprays throughout the growing season. In the mid-1990s a more aggressive Mexican strain of late blight migrated to the Northeast, and now some prevalent strains are immune to the widely used fungicides.

“It takes 25 percent more fungicide now to get the same level of control as it did before the migration,” said plant pathologist Bill Fry Ph.D.’70.

Fry would like to help farmers get better control using fewer fungicide applications. He’s teamed up with several CALS colleagues on USAblight, a multi-institutional, interdisciplinary USDA National Institute of Food and Agriculture-funded project to thwart late blight outbreaks through enhanced monitoring, communication and development of more disease resistant plant varieties, including both conventionally bred and genetically engineered varieties.

Recently, Fry pinpointed the geographical origins of late blight in Mexico, and he is now experimenting with transferring resistance genes identified in a wild potato into commercially valuable potato varieties. “These will not be permanent solutions because pathogens continue to evolve. But they allow quicker development of new resistant cultivars,” Fry said.

Tony Shelton understands the serious threat of pests evolving resistance to pesticides and genetically engineered crops. Shelton, a Geneva-based professor of entomology and associate director of CALS International Programs, studies the evolution of pesticide resistance in insects and makes recommendations to growers on the most effective and sustainable integrated pest management programs, which provide farmers with a range of least toxic biological, mechanical, organic and chemical pest controls.

The goal, Shelton said, is to produce a crop that’s safe for the environment and consumers while simultaneously delaying the evolution of insect resistance to any control tactic.

“Rather than relying on one pest management tactic, we try to integrate lots of them,” Shelton said.

For more than two decades, Shelton has been studying the evolution of insect resistance to Bacillus thuringiensis or Bt, a common soil-borne bacterium that produces its own insecticide. After caterpillars ingest Bt, the crystals become toxic when activated inside their alkaline guts.

Bt has been available as an insecticidal spray for organic and conventional farmers, as well as home gardeners, for decades. In 1996, the private sector introduced genetically engineered Bt corn and cotton that produce the Bt protein as a self-defense from certain insects. With the potential to use Bt on a wider scale, there was concern about possible insect resistance that would render the Bt—whether deployed as a spray or as a genetically modified variety—less effective. The Environmental Protection

**Q:** Are they safe to eat?

**A:**

Food safety assessment follows the principle of ‘substantial equivalence.’ That means that the new product in a genetically engineered variety is evaluated very thoroughly, the same way you would evaluate a new food additive or a new dye. In addition, the composition of everything we know to be nutritionally important is compared to non-genetically engineered varieties. If there is not any difference between them, they are considered to be substantially equivalent. Safety testing is only required if they are not substantially equivalent or if they contain new antibiotic resistance markers that are part of the genetic engineering process, uncharacterized genetic elements (bits of DNA with unknown function), or any higher toxin levels or potential for allergenicity. These trigger mandatory food safety testing. For products that have been commercialized already, I have not seen any evidence of risks to food safety. They’ve been looked at pretty thoroughly. As new products come through the pipeline, we will need to look at them on a case-by-case basis and use our best science and our best understanding to make sure that we are being thoughtful about what any particular risks may be.

—Margaret Smith
Agency decided to require all Bt crops, but not Bt sprays, to have strategies in place to delay the evolution of resistance. Four years before the approval of Bt corn and cotton, Shelton was already doing foundational research that would inform regulators and scientists about potential strategies to manage resistance. This work became the basis for many of the EPA’s requirements regarding insect resistance management in Bt crops.

Today, Shelton is particularly concerned about farmers in developing countries who lack access to the latest pest-resistant technology and rely heavily on traditional chemical pesticides to control pests in staple crops like eggplant, bananas and potatoes.

“There’s a need for these genetically engineered products out in the world. Fruits and vegetables worldwide account for about 45 percent of all insecticides used, and we can reduce that through GE crops,” Shelton said.

Through CALS International Programs, Shelton is part of a public-private consortium funded by the United States Agency for International Development (USAID) to help developing countries make informed decisions about biotechnology and, where there is demand, facilitate the safe development and commercialization of genetically engineered crops. These efforts will be expanded significantly through a new $5.6 million grant to CALS International Programs to build information-sharing efforts through a new global network linking scientists, regulators and farmers (see sidebar).

**BETTER COMMUNICATION, BETTER DECISIONS**

Outside the lab, CALS plant and social scientists also work together to provide the public more direct access to the latest evidence-based information on genetic engineering in agriculture because, ultimately, consumers will determine the fate of genetically engineered crops in the marketplace and grocery aisles.

In addition to Smith’s talks, Fuchs and Shelton periodically offer local high school students a hands-on forum for learning about and discussing the science of biotechnology. And researchers are also looking deeper to understand what affects a consumer’s support or rejection of genetically engineered foods.

Christine Smart, Geneva-based associate professor of plant pathology and plant-microbe biology and the coordinator of USAblight’s outreach component, enlisted the help of Katherine McComas Ph.D. ’00, professor of communication, to better understand how people communicate about new technologies and how that might impact their acceptance of such solutions.

McComas and colleagues surveyed a sample of more than 800 grocery shoppers with a questionnaire designed to shed light on attitudes toward genetically modified foods, from specific foods like French fries to specific contexts like drought or diseases. They then looked for what influences these attitudes: Was basic knowledge about the facts of biotechnology important? Were people swayed by information about past famines or the regulatory pipeline that determines what is safe for human consumption?

McComas found that consumer attitudes about biotechnology are based on the perceived trustworthiness and fairness of scientists and decision-makers, not necessarily on people’s knowledge of genetic engineering or a tale of famine.

“People want to have a voice in decisions that affect them, and when you’re talking about the food they eat, they want to know that scientists and decision makers are being transparent about who benefits, as well as respectful of consumer concerns and open about their findings.” Shelton agrees.

“Science is not done in a vacuum,” he said. “It has political and societal consequences.”

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*Q: What role do you see for scientists in the dialogue about genetically engineered foods?*

Some questions and concerns we can address as scientists. We can address how widely used they are, look at environmental impacts and test food safety. But as far as labeling of genetically engineered foods, concerns about consolidation in the agriculture industry and profits, and ethical and religious beliefs, these are societal values. How we choose to address these concerns can be informed by science, but value judgments factor in as well.

—Margaret Smith

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“People should take a closer look at the evidence and start asking the tough questions.” Shelton said. “There’s a need for these genetically engineered products out in the world. Fruits and vegetables worldwide account for about 45 percent of all insecticides used, and we can reduce that through GE crops.” Shelton said.

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NEW CORNELL ALLIANCE FOR SCIENCE GETS $5.6 MILLION GRANT

A new international effort led by Cornell will seek to add a stronger voice for science and depolarize the charged debate around agricultural biotechnology and genetically modified organisms (GMOs).

Supported by a $5.6 million grant from the Bill & Melinda Gates Foundation, the Cornell Alliance for Science will help inform decision makers and consumers through an online information portal and training programs to help researchers and stakeholders effectively communicate the potential impacts of agricultural technology and how such technology works.

The project will involve developing multimedia resources, including videos of farmers from around the world documenting their struggles to deal with pests, diseases, crop failure and the limited resources available in the face of poverty and climate change.

“Proponents and opponents alike speculate whether biotech crops are of benefit to farmers, but rarely are those farmers engaged in the biotech discourse or their voices heard,” said Sarah Davidson Evanega Ph.D. ’09, senior associate director of International Programs in Cornell’s College of Agriculture and Life Sciences (CALS), who will lead the project.

“Our goal is to depolarize the GMO debate and engage with potential partners who may share common values around poverty reduction and sustainable agriculture, but may not be well informed about the potential biotechnology has for solving major agricultural challenges,” Evanega said.

“For instance, those who support the use of genetic engineering in agriculture share a lot of the same anti-pesticide, low-input, sustainable-agriculture vision as the organic movement.”

Davidson Evanega and her team hope to help engage such potential partners and foster more constructive policies about biotechnology as a useful tool to address major agricultural challenges.

The grant will allow the Cornell Alliance for Science to host annual conferences, short courses and semester-long CALS certificate programs in biotechnology leadership, among other activities.

“Biotechnology is a potential game changer for farmers in less developed countries and an important tool in the toolbox for addressing global challenges, such as persistent poverty, a changing and erratic climate, and the challenge of feeding 9 billion people by 2050,” said Kathryn J. Boor, the Ronald P. Lynch Dean of CALS. “Improving agricultural biotechnology communications is a challenge that must be met if innovations developed in public sector institutions like Cornell are to reach farmers in their fields.”

“There’s a need for these genetically engineered products out in the world. Fruits and vegetables worldwide account for about 45 percent of all insecticides used, and we can reduce that through GE crops.”

–Tony Shelton, Professor of Entomology
I am an unlikely candidate to be serving you in this role. As a student, I did not distinguish myself as a scholar, an athlete or a leader. I was not exceptional in any way. I considered myself lucky to graduate.

Upon graduation, I quickly moved on to the world of work. My CALS experience became part of my personal history, a chapter closed. Decades elapsed. I neglected my relationship with the college and the university. I know many of you share this experience.

A few years ago, thanks to the Office of Alumni Affairs and Development, I was located and became reconnected. Subsequently, I was invited to join the CALS Alumni Association Board of Directors. My service to the Alumni Association has allowed me to renew my CALS experience and gain a new appreciation for a remarkable institution that is uniquely positioned to address the world’s most challenging problems.

Peter Schott, CALS ‘81
2014-2015 CALS Alumni Association President

The university’s sesquicentennial is naturally a time to reflect on the accomplishments of the past and the legacy we have inherited. As beneficiaries of this legacy, we have a special responsibility to help secure its continuity for our successors. The Alumni Association provides many ways to participate. You can learn more by visiting cals.cornell.edu/get-involved/alumni/be-involved/.

As it turns out, graduation was not the final chapter of my CALS experience. In this role, the Alumni Association is giving me the opportunity for an encore. You have the same opportunity. The college gave each of us the graduation gift of a lifetime: a dues-free membership to the Alumni Association. Let’s make the most of it. Let’s be exceptional.

Every CALS alumna and alumnus has a story to tell. What’s yours? I’d love to hear from you. Please contact me at peters.schott@gmail.com.

On April 27, 1865 the governor of New York State signed the bill that officially established Cornell University’s charter. Now, 150 years later, join the Cornell community in a four-day weekend commemorating our founding.

Learn more at 150.cornell.edu
MEDIA MAVEN KNOWS WHAT VIEWERS WANT

By Andrea Alfano ’14

I f you watch television, chances are high that you’ve experienced some of the fruits of Colleen Fahey Rush’s efforts. As executive vice president and chief research officer for Viacom, Fahey Rush ’86 seeks to understand what consumers want from each of the global mass media company’s varied brands, including MTV, Comedy Central, VH1, Spike, TV Land and Nickelodeon. That insight informs the company’s creative and business operations, from programming and digital strategy to ad sales, content distribution and marketing.

“We’re really talking directly to consumers in focus groups, ethnographies, journals, and also vigorous surveys to find out what they think, what their experience is—what it’s like for them,” she said.

She also helps develop new media opportunities for consumers, such as content availability through Netflix or Amazon Prime.

For Fahey Rush, her work is not only a way to increase consumer satisfaction, but also a deeply satisfying way for her to think critically and creatively.

“It’s great when research can inspire, as opposed to just testing something that someone already came up with. That’s when it’s really powerful and gratifying,” Fahey Rush said.

When she’s not tracking the tastes of young MTV audiences, Fahey Rush is busy doing her other equally important job: tracking the tastes of her own teen daughters, Delia and Gillian. She was recognized for her inspiring efforts to balance work and family with a feature in Working Mother magazine as Working Mother of the Year in 2009.

Fahey Rush began her career at CBS, then served as director of research at Telemundo before becoming associate partner and director of research at J. Walter Thompson. But she got her start as a communication major at Cornell, and her involvement in the department has continued. She recently returned to campus to attend an advisory council meeting and mentor students at a JobCAMP event.

“The faculty, the leadership and the students are excellent,” Fahey Rush said. “I’m so proud and it really makes me want to participate and give back even more.”

AN AWARD WINNING VINTNER

O ne of the first graduates of Cornell’s Viticulture and Enology program, Nova Cadamatre ’06 is already making her mark in the world of wine. Cadamatre, a winemaker for Robert Mondavi Winery, was named one of ‘40 under 40: America’s Tastemakers’ in the October issue of Wine Enthusiast magazine and praised for refreshing the iconic brand.

She discovered her passion for winemaking while working a harvest—without pay—in several vineyards in Pennsylvania. When Cornell announced the new program in Viticulture and Enology, it was an easy decision to enroll. She credits her instructors in grapevine biology, soil science and enology for providing her with a strong understanding of how grapevines function and how to draw out quality wine, as well as the “unique ecosystem that exists inside a wine fermentation.”

“Cornell offers an incredibly well-rounded program for students seeking to go into the wine industry, preparing them for both small wineries and large companies,” Cadamatre said. “It is uniquely situated in one of the most challenging growing climates in the world, which gives grads a leg up when it comes to understanding what to do in challenging climatic situations.”

While still a student, Cadamatre got her start in the industry through an internship with Constellation Brands that was offered through a partnership with the Department of Applied Economics and Management. After moving to California in 2006, she rose through the ranks to become the winemaker at Mission Bell Winery. In 2013, she joined the Mondavi team, focusing on Pinot Noir and red Bordeaux varieties.

Also on a mission to demystify wine for consumers, Cadamatre gives an inside look at winemaking through her blog (www.novacadamatre.com), and has developed her own wine ranking system. Her Personalities of Wine descriptors help consumers connect with varieties and styles they will enjoy, from the “dimly lit jazz clubs and Cuban cigars” of Bordeaux wines to the “straight shooting” Riesling.
He is best known for introducing the world to the wonder of whale song and triggering an international campaign to save the majestic sea mammals. Recently, he has become a crusader for “green chemistry,” which uses bio-inspired design to synthesize new benign molecules to replace some of the toxic ones polluting ocean life.

After an undergraduate career at Harvard exploring echolocation in bats, Payne came to Cornell to study owls. With a $300 grant from the American Museum of Natural History, Payne built an “owl house” a 40-by-12-foot building that remained at Sapsucker Woods for 40 years. In it Payne discovered that owls actually use auditory cues to locate their prey in the dark with astounding accuracy.

While at Cornell, he also served as night watchman at the Lab of O, which suited his nocturnal study schedule. The Lab allowed him to build a bedroom in its garage. Payne later lived in the laundry room of his mentor and lifelong friend, the late professor Thomas Eisner, before eventually renting a house across Cayuga Lake with a fellow graduate student. Even then, he took his work home with him.

“We lived in one room, the owls lived in another room, and my roommate’s wood rats lived in a third,” Payne said.

A realization that the wilderness was at risk because of the effects of civilization spurred his turn from the avian to the aquatic.

“I began to try to figure out what someone who only knew bioacoustics might do to help reverse that, and that’s when I thought of whales,” Payne told an audience at a TEDx talk in 2013. “Having never even seen a whale, I decided one morning that I was going to study them for the rest of my life.”

After several years working as a postdoctoral researcher and assistant professor at Tufts University, Payne traveled to Bermuda, where he chartered a boat, listened through an underwater microphone and first heard the sounds that would launch his love affair with the sea.

Two years later, in 1967, came the discovery that would make Payne and fellow researcher Scott McVay famous: the long, complicated progression of sounds made by humpback whales are actually rhythmic, repeated sequences, or songs. Payne was also the first to suggest that fin whales and blue whales can communicate across whole oceans.

Hoping the allure of whale songs would inspire others to action, Payne released recordings, including the LP Songs of the Humpback Whale, which helped spur the Save the Whales movement. He has also published books and films—including the popular IMAX movie Whales—that have received seven major awards, including two Emmy nominations. The former assistant professor of biology at Rockefeller University and research zoologist at the Institute for Research in Animal Behavior has received many other honors, including a knighthood in the Netherlands, a MacArthur Fellowship, the Lyndhurst Prize Fellowship, the Joseph Wood Krutch Medal of the Humane Society of the U.S., The Albert Schweitzer Medal of the Animal Welfare Institute, and a United Nations, UNEP, “Global 500″ Award.

Since the international ban of commercial whaling in 1986, the mammal’s biggest threat is pollution, with the collective contamination of environmental toxins posing significant risks to both aquatic and human health. Ocean Alliance, the research and advocacy institute Payne founded in 1971, has conducted studies into the nature and scope of this problem worldwide, and it is huge, he says.

While some say “the solution to pollution is dilution” and that the persistent organic compounds found in insecticides and many other products pose little harm once discharged into the ocean, scientists discovered the chemicals can get reconcentrated by moving up food chains and fed back to us at toxic levels in our favorite seafoods—it’s tuna’s ultimate revenge on the billion people who depend on seafood as their principal source of animal protein, Payne says.

“As it becomes too toxic to eat safely and humanity loses access to seafood, the stress that causes can be expected to shorten millions of human lives,” he added.” It’s hard to avoid the conclusion that because pollution of seafood affects so many people, it is the most serious health threat humanity faces. And yet it is not on the radar of any government.”
**Miguel Gómez**  
*CALS Rising Star Faculty*

Are your shelves stocked with Empire apples, Cayuga Lake Rieslings and Ontario County maple syrup, in addition to items from farther afield? You may want to thank Miguel Gómez. His research into sustainable supply chains is making it possible for producers to get local food into major markets.

The associate professor in the Charles H. Dyson School of Applied Economics and Management has developed models that consider social and environmental impacts, as well as economic ones, when evaluating supply chain performance. He also analyzes retail relationships by studying factors such as price transmission and customer satisfaction, and he applies what he learns through extensive extension efforts that have benefited food producers, processors, distributors and consumers alike.

His efforts have enhanced communities both at home and abroad. In New York, for instance, he is working with horticulturists to develop an East Coast broccoli industry, and with viticulturists and plant pathologists to explore entrepreneurial and ecological challenges in emerging cool-climate grape regions. In Latin America, he is studying the sustainability impacts of smallholder farmer participation in specialty coffee value chains and the adoption of integrated pest management technologies among potato growers in the Colombian Andes.

As a scholar, Gómez has built a formidable reputation in the 15 years since he received his Ph.D from the University of Illinois, amassing a publication and funding record comparable to that of a full professor with decades of research. He has placed papers in Science and all the major journals in his field—48 publications overall, with more than 750 citations—and his external grants have totaled more than $2 million in the past five years.

The Colombia native came to CALS as a research associate in 2001 and has contributed extensively to the Cornell community ever since. He is a member of the University Faculty Senate, a faculty adviser for the Cornell Colombian Graduate Students Association, coordinator of the Arthur Thomas Memorial Internship, and a discussion facilitator for the Book Reading Project. He has served on several search committees and is a member of the Cornell University Applied Research and Extension Program Council and the New York State Local Food Systems Advisory Panel.

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**George Hudler**  
*CALS Outstanding Faculty*

When it comes to teaching, George Hudler is a wizard. The plant pathologist has dazzled thousands of undergrads who flock to his popular Magical Mushrooms, Mischievous Molds course. And his alchemic mix of science, humor and spore lore has cast a spell on hundreds of others, of all ages, whom Hudler has reached through a book of the same name, plus extensive outreach and public engagement activities.

Hudler’s inspiration and innovation in the classroom has been recognized with several awards, including the State University of New York Chancellor’s Award for Excellence in Teaching, the USDA Northeast Region Award for Teaching Excellence, the Excellence in Teaching Award from the American Phytopathological Society, a Stephen H. Weiss Presidential Fellowship, a Menschel Distinguished Teaching Fellowship, and the CALS’ Innovative Teaching Award, Professor of Merit Award, and Edgerton Career Teaching Award. He was recently recognized as a Fellow of the American Phytopathological Society, home to dozens of other instructors, including a number of his students, who have followed his model to teach similar courses at other institutions.

He is also well respected for his research, which focuses on diseases of trees in residential landscapes, parks, historic sites, city streets and college campuses, from Christmas trees in the Adirondacks to oak wilt in Albany and the tar spot fungus in Ithaca. His work on lethal bleeding canker of European beech has helped save North American stocks of the valuable tree, and recent research into willow leaf rust aims to assist a burgeoning New York biofuels industry.

Through active outreach and research programs, including publication of the biweekly pest management newsletter BRANCHING OUT, Hudler equips plant health care professionals and master gardeners with tools for successful disease identification and management.

He has received awards from the New York State Arborists Association, the USDA-National Institute of Food and Agriculture, the New York State Integrated Pest Management Program, the International Society of Arboriculture, and the New York State Nursery and Landscape Association.

Hudler joined the faculty in 1976 and served as chair of the Department of Plant Pathology and Plant-Microbe Biology and director of the Northeast Regional Center for the National Plant Diagnostic Network for seven years.
Jim Alves ‘01
Young Alumni Award

Jim Alves’ passion for Cornell and CALS drew him to alumni events even before he graduated. As an undergraduate, he joined the local CALS leadership team in Northern California, assuming the director-at-large position for Northern California in 2005. In 2009, he became the youngest alumnus to serve as president of the CALS Alumni Association.

The first in his family to graduate from college, Alves is committed to helping other youngsters achieve their Cornell dreams, volunteering countless hours to recruit the brightest students on the West Coast. Local alumni also look forward to the annual winery picnic he helps organize, which has become a signature event in Northern California.

His devotion to Cornell has been rewarding in many ways, most notably in the form of Lenora Lee ’03, whom he met at an alumni function in Sacramento and married in 2011. They have one son, Ashton Alves, who was born in 2013.

Following graduation from Cornell with a degree in applied economics and management, Alves worked in operations for an investment bank before entering the government sector. He served as assistant secretary for the California Health and Human Services Agency in Governor Arnold Schwarzenegger’s administration and had appointments in the Corrections Department and the Department of Finance.

Alves currently focuses on attracting, retaining and growing businesses in the Sacramento area as a program manager of economic development and partnerships for the Sacramento Municipal Utility District. The Sacramento Business Journal recently highlighted him as one of its “40 under 40” leaders.

Peter Baccile ‘84
Outstanding Alumni Award

As one of the Big Red’s star place-kickers, Peter Baccile helped the football team to victory on many occasions. He now helps clients score big as a successful real estate investment banker, and he ensures his alma mater achieves continued success as an active alumni leader and philanthropist.

Highly regarded in the real estate investment banking industry, the agricultural economics major is currently joint global head of real estate, lodging and leisure investment banking at UBS. He previously had a distinguished 26-year career at J.P. Morgan. Known as someone who can both close deals and lead people, he frequently can be found speaking at industry conferences and meetings.

He has served on the CALS (Dean’s) Advisory Council and its executive committee, as well as the Athletics Alumni Advisory Council, the Charles H. Dyson School’s Undergraduate Program Advisory Council, and as chairman of the Cornell Football Association. He is serving his second term on the Cornell University Council, and he participated in the Class of 1984’s Reunion Campaign Major Gifts Committee. Baccile has also been active with the Cornell Real Estate Council as a participant, speaker and member of the organizing committee.

Baccile’s generous Cornell philanthropy has benefited the CALS Annual Fund, the Dyson School, and the Dyson School’s Undergraduate Accounting Program. For Cornell Athletics, he has provided essential support for the football program, Schoellkopf Hall renovations, the new Schoellkopf scoreboard and softball facility improvements.

Baccile and his wife, Katherine, have four children, including sons Nicholas ’14, Alexander ’16, Caroline, and James.

Godfrey Malchoff ’43
Outstanding Alumni Award

Have a question about pesky pests in your peaches or a mysterious blight in your apple trees? “Doc” Malchoff may be able to diagnose the problem. Professors and professionals alike have been turning to the co-founder of the Ag Chem Service Corporation for decades, for both products and advice.

Malchoff and a co-worker launched Ag Chem in 1963, and it became one of the region’s most successful distributors of pesticides, fungicides and insecticides.

Throughout his career, Malchoff worked closely with research faculty and college leadership, both in Ithaca and at the New York State Agricultural Experiment Station in Geneva, to develop and test new methods to improve fruit production.

When Malchoff suspected that the apple scab fungus had developed resistance to a “proven” fungicide, for instance, it was met by disbelief and caused an uproar in the industry. But Cornell plant pathologists confirmed his suspicions, and they worked together to combat the problem.

The retiree is a regular attendee at Reunion and many Cornell events. He is a life member of the CALS Alumni Association and a member of its Rochester leadership team, as well as the Liberty Hyde Bailey Leadership Society. He is also the proud patriarch of a legacy family—his two sons, two nephews, one niece and four grandchildren all have degrees from Cornell, and they can be found tailgating together at the first home football game each fall. Together they created a Malchoff Family Visiting Lectureship in the Charles H. Dyson School of Applied Economics and Management.
Jane Wigsten McGonigal Crispell ’50, Ph.D. ’84
Outstanding Alumni Award

Jane Wigsten McGonigal Crispell has been supporting farm families ever since leaving her own family farm in Horseheads, N.Y., to follow her parents’ footsteps in pursuit of a Cornell education.

A founder of FarmNet and former chair of its steering committee, McGonigal’s leadership is a legacy of service to farm families as they face financial challenges and interpersonal difficulties. McGonigal worked with Cornell Cooperative Extension, both as county and administrative staff, until her retirement half a century, and she helped position CCE to enter the 21st century. A visionary in distance learning, McGonigal launched the use of satellite technology and polycom service to keep CCE associations connected to each other and the public. She continues her support with financial gifts for a distance learning room at Roberts Hall and the CCE Innovation Fund.

In addition, she funds critical pieces of CCE work as well as student internships, and she was honored in 2009 with the NYS Friend of Extension Award.

The alumna has been active in her class council for many years, including as chairwoman for five. She is equally active in her community, especially within her church and the Protestant Cooperative Ministry Board, where McGonigal led a three-year endowment campaign to secure its financial stability. She is also a fundraiser and debate moderator for the League of Women Voters.

George Mueller ’54
Outstanding Alumni Award

George Mueller has learned a lot about creating a sustainable dairy operation in his 57 years of farming, and he enjoys sharing that knowledge.

As the “Dear Abby” of American Agriculturist, he has shared his insights into farm management through the “Profit Planners” column for the past 15 years. He also supports the education of future generations of dairy producers, both in the classroom and in the field. As avid supporters of Cornell’s Dairy Management and Dairy Fellows programs, the Mueller family often hosts farm visits from Cornell students, and they recently endowed a professorship in farm business management.

Proud to have graduated from “the best ag college in the world,” Mueller credits professors Stan Warren and Herrell De Graff with helping to shape his personal and professional worldview, which embraces the free enterprise, free market, capitalistic system. On-farm experience and the services of Cornell Cooperative Extension accentuated that education, as did informal research and a bit of luck.

Shortly after graduating from Cornell, Mueller founded the 2,400-acre Willow Bend Farm in Clifton Springs, N.Y., with his wife, Mary Lue. In January 2003, they joined forces with neighbors Kevin and Barb Nedrow to build Spring Hope Dairy, a satellite dairy farm with 2,700 acres.

The couple has five children, and son John followed in his father’s footsteps—to Cornell (Class of 1986) and to the farm. After three years with Agway, John returned to Willow Bend and helped expand it from 600 to 3,000 cows.

Peter Pamkowski ’74
Outstanding Alumni Award

Not only was Peter Pamkowski the consummate leader of the CALS Alumni Association from 2001 to 2002, his enthusiasm, passion and friendly support has inspired a whole generation of leaders.

From regional phonathons to national committees, Pamkowski’s commitment to CALS has been varied and extensive. He has served in leadership roles on the CALS Alumni Association, as well as an active member the Cornell Club of the Greater Capitol District, the Class of 1974, and the Liberty Hyde Bailey Leadership Society. He has also helped organize the Pride of New York annual dinner in Albany for several years, and he has been an active participant at the National Agricultural Alumni and Development Association, where he represents Cornell and serves on a variety of committees.

He frequently can be spotted at alumni events along with his wife, Mary, and two daughters, Amy and Julie.

But it is the personal connection he has made with so many alumni that prompted his multiple nominations, with several praising his open-mindedness, inclusivity and generosity of time and spirit.

The agricultural economics major and graduate of LEAD NY started his career as a farm planning analyst with Agway Inc., in Syracuse, and a credit representative with Farm Credit Service. As manager of the Agricultural Producers Security Program for the Division of Agricultural Development at the New York State Department of Agriculture & Markets, he has promoted policies to ensure that New York producers are provided some measure of financial protection in the marketing of their farm products.

The Outstanding Alumni Awards honor CALS alumni who have achieved success in their professional fields, demonstrated commitment to the college, and contributed to the betterment of society through humanitarian and charitable endeavors. Outstanding faculty and staff are also recognized for significant contributions in teaching, research, extension or administration. Visit the CALS Alumni Association site cals.cornell.edu/get-involved for more information, or to make a nomination.
WARRENS, WHITSONS AND HERFORTHS
The blood of few Cornellians runs as Big Red as that of Anna Whitson Herforth ’02, Ph.D. ’10. One of 32 members of her family to study at Cornell, Herforth can trace her CALS lineage back more than a century to great-grandfather George F. Warren, Class of 1903, Ph.D. 1905, the namesake of Warren Hall and first chair of the department that would become the Charles H. Dyson School of Applied Economics and Management.

As Herforth states, “CALS was quite literally a formative experience for me.”

Warren met Herforth’s great-grandmother Mary Whitson, Class of 1905, who was studying botany with famed illustrator and educator Anna Botsford Comstock, Class of 1885, during a student reception hosted by CALS’s first dean Liberty Hyde Bailey in 1904. Their son, Stanley Warren ’27, Ph.D. ’31, who taught farm management and agricultural economics in CALS for 40 years, met Herforth’s grandmother, Esther Young ’29, MS ’31, when they were both Cornell graduate students in the early 1930s. Her parents, Boyd Herforth ’67 and Martha Warren ’68, met during a concert at Bailey Hall in 1966, and in 1998 she met husband Daniel Kim, a physicist then doing doctoral research at Wilson Lab, during Cornell Symphony Orchestra rehearsals, also at Bailey.

CALS’s formative influence on Herforth has extended to her career as a consultant in the field of agriculture and nutrition in international development. Working with global agencies including the World Bank, the

THE VERGARAS
When Walter Vergara, MS ’77, came to Cornell to pursue his master’s degree, there was no environmental engineering program. So the chemical engineer forged his own path, enrolling in food science and cobbled together classes from several departments to study the causes of water pollution and the environmental impacts of industrial activities.

“It was a fantastic experience. I don’t think other universities would have let me do that,” Vergara said.

Considered one of the world’s leading experts on climate change, the Colombia native went on to spend 24 years at the World Bank, including several as leader of the Climate Global Expert Group, before becoming chief of the Inter-American Development Bank’s Sustainable Energy and Climate Change Unit. Now retired, he is currently a senior fellow at the World Resources Institute.

He was often accompanied on his global journeys by his wife, Isabel, MA ’77, Ph.D. ’88–an associate professor and director of Spanish literature at George Washington University—and their children, Sintana ’04 and Andres.

Sintana said her father inspired her sense of environmental stewardship and the belief that anything was possible. But it was a class at Cornell helped steer her on an unexpected course: garbage.

“I would definitely not be doing what I am doing if it were not for the Solid Waste Engineering class I took my final semester from Professor Douglas Haith,” Sintana said. “It made me rethink every item in my life as something temporary, with a whole life before it came to me—in its design, production, transportation—and after, in its collection, treatment and disposal. And it made me realize that working to improve the phases of consumption, from production to disposal, could have a great environmental impact.”

The quest to improve waste management has taken Sintana to many corners of the globe. She studied informal recycling practices in Latin America on a Fulbright Fellowship, worked on the design of home-based water treatment in Bangladesh, and, as a junior professional associate at the World Bank, helped implement an improved waste management system in Palestine.
U.N. Food and Agriculture Organization, and USAID, she is a leading advocate for updating the way food sufficiency is measured globally, by shifting from current, calorie-based metrics to those that more accurately reflect holistic nutrition.

“I am increasingly working on areas of the agriculture-nutrition linkage where little accessible data exist, such as affordability of diverse nutritious foods, and measures of dietary quality,” Herforth said. “More facts will help to advance our understanding of the connections between agricultural decisions about which crops are cultivated and their subsequent impact on nutrition.”

For Herforth, being a student at Cornell provided a unique opportunity to come face to face with her family’s distinguished CALS legacy.

“During my dissertation analysis I was amazed to stumble across a photo hanging in Warren Hall of one of George Warren’s farm survey teams,” she said. “He was one of the first to do surveys of farms, mostly in Upstate New York, to gather data on farm economics. It bore a striking resemblance to the farm survey I had just completed in Kenya and Tanzania for my dissertation research, a century later. That’s 100 years of field-based agricultural learning sponsored by CALS.”

Different path. The entrepreneur left his first postgraduate job as a marketer at Unilever to focus full time on two projects: NATIVE(X), a fashion collaborative with Native American artists that he started while still a student at Cornell, and Wool&Prince, a line of button-down wool shirts launched with Cornell friend Katie Elks ’12 in April 2013 after a successful Kickstarter campaign.

“Selling 3,000 shirts in 10 days was overwhelming,” Mac said. “Having my dad and sister giving me advice was very helpful.”

Mort, an emeritus trustee, tries to make at least one return trip to Ithaca each year with his “honorary Cornellian” wife Mary Lang.

“I didn’t know what I wanted to do, and I knew at a place like Cornell I could find it,” he said. “It was a wonderful experience–very varied, and the true embodiment of Ezra Cornell’s vision of ‘any person, any study.’ I developed the left side of the brain and the right–with practical skills from the pragmatic agricultural economics curriculum and imaginative skills from the liberal arts program. I feel the real beauty of Cornell lies in the intersections of the colleges.”

THE BISHOPS

Regaled by tales from Eloise Bishop ’34 about life “Far Above Cayuga’s Waters” since he was a young boy, Cornell was a natural choice for her godson, Mort Bishop ’74. Now the Big Red has become woven into the fabric of the Bishop family—and its fifth-generation family business, Pendleton Woolen Mills—with Elizabeth Bishop ’07 and Mac Bishop ’11 joining the alumni ranks.

“It was very special to me to attend Cornell, and I never dreamed I could experience Cornell a second and a third time through my children,” Mort said.

Elizabeth was a volleyball star at Cornell and a member of the Cornell Design League, and she has explored the corporate side of fashion since graduating with a degree in applied economics and management. After stints with Polo Ralph Lauren and Gap, she now works as a merchandiser for sports performance clothing company Athleta.

Brother Mac also ended up in fashion, but on a slightly different path. The entrepreneur left his first postgraduate job as a marketer at Unilever to focus full time on two projects: NATIVE(X), a fashion collaborative with Native American artists that he started while still a student at Cornell, and Wool&Prince, a line of button-down wool shirts launched with Cornell friend Katie Elks ’12 in April 2013 after a successful Kickstarter campaign.

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Beverages are big business in New York state. With ingredients sourced from vineyards, hop yards, grain fields and apple orchards, new products are flourishing under Albany’s entrepreneur friendly policies. Imbibe a flight of facts about the science in each sip.

**REDOLENT RIESLINGS**

Fancy the distinctive whiff of petrol in your Riesling? Associate professor of horticulture Justine Vanden Heuvel found that a key ingredient is light. Riesling berries that bask in the sun develop higher levels of several aroma compounds—including the fuel-like TDN—than their shady counterparts.

**GRIP IN THE GLASS**

Astringent tannins from grape seeds and skins give Cabernet a drying grip on the tongue, but the wines made from some grape varieties vexingly lose their tannins between harvest and bottle. Associate professor of food science Gavin Sacks and Ph.D. candidate Lindsay Springer recently identified the grape proteins that pilfer the tannins during winemaking, setting the stage for better control of wine mouth feel.

**CIDER SOURCES**

Tannins also give hard ciders their bitterness, astringency and body. Ciderists often scramble to obtain sufficient quantities of the tannic bittersweet and bittersharp varieties needed for traditional cider. Horticulture professor Susan Brown is exploring the diversity within her breeding program to see if tannic—and possibly disease resistant—selections can be a shrewd substitute.

**FROTHY FOUNDATIONS**

Does your foam fall flat? Food science professor Karl J. Siebert has been investigating the properties of the optimal brew head. He discovered that the bitter compounds in hops (isoalpha acids) interact with barley lipid transfer protein No. 1 to form the foam backbone and that the right ratio of the two helps beer hold its head up high.

**BOOZY BULBS**

Horticulture professor Bill Miller and undergraduate researcher Erin Finan ’05 discovered that watering emerging shoots of forced narcissus (daffodils) with a solution of four to six percent alcohol will result in shorter stems and beautiful, fragrant flowers. Any type of hard liquor will do; for 40 percent distilled spirits like gin, vodka, whisky or rum, add one part liquor to seven parts water.
AG SECRETARY BRIEVED ON NUTRITION, DAIRY, CLIMATE RESEARCH

By Blaine Friedlander

U.S. Secretary of Agriculture Tom Vilsack met with Cornell faculty members July 29 to learn about solutions in the realm of dairy, nutrition and climate change. Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences (CALS), organized the event.

More than two dozen faculty members and scientists from the U.S. Department of Agriculture (USDA) Agricultural Research Service met with Vilsack to discuss dairy herd health, dairy and food processing, workforce development, and Cornell’s teaching, research and extension missions.

In the afternoon briefing sessions, Michael Kotlikoff, the Austin O. Hooey Dean of Veterinary Medicine; Daryl V. Nydam, associate professor; and Craig Altier, chair of population medicine and diagnostic sciences, explained the college’s diagnostic work to ensure bovine herd health. There are more than 600,000 dairy cows in New York, the third largest dairy state.

After Boor’s introduction of Jason Huck MS ’06, Cornell’s dairy plant manager, Vilsack created a lighthearted moment when he asked: “Is this the guy responsible for Cornell’s chocolate milk?”

Instantly, Boor replied, “Yes, he is.”

“That was the best chocolate milk I have ever tasted,” Vilsack said.

In the roundtable discussion on researchers’ work in climate change and nutrition, Vilsack learned from Wendy Wolford, the Polson Professor of Development Sociology and associate director of the David R. Atkinson Center for a Sustainable Future, how the center operates and takes multidisciplinary approaches to solving problems. Vilsack was intrigued to learn about the center’s model to fund research through its Academic Venture Fund program.

Disciplinary barriers are hard, Wolford explained, but “we know multidimensional approaches work. The projects get major funding later,” she said.

“For any approaches that you have figured out, I’d be very interested,” Vilsack replied.

During the nutrition roundtable, Brian Wansink, the John S. Dyson Professor of Marketing and director of the Cornell Food and Brand Lab, with extension support specialist Kate Hoy, presented an extensive checklist that would spur children to more frequently choose healthy and nutritious food in school cafeterias.

BOOR JOINS BOARD OF FOOD, AGRICULTURE RESEARCH FOUNDATION

Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences and a professor of food science, has been appointed to a five-year term on the inaugural board of directors of the new Foundation for Food and Agriculture Research (FFAR), an independent nonprofit corporation created under the 2014 Farm Bill to oversee national research into food, agriculture and some other sciences.

It will leverage public and private resources to increase the scientific and technological research, innovation and partnerships critical to boosting America’s agricultural economy.

“I am pleased to serve in this exciting new initiative,” Boor said. “Our charge encompasses some of our world’s most pressing challenges, and that knowledge makes our work, and its part in fostering real progress, unquestioningly crucial.”

Authorized by Congress as part of the 2014 Farm Bill, the foundation will seek and accept private donations to fund research activities that focus on problems of national and international significance. Congress also provided $200 million for the foundation that must be matched by nonfederal funds as the foundation identifies and approves projects.

The research funded by FFAR will foster collaboration among agricultural researchers to meet research needs through grants, contracts, cooperative agreements and memoranda of understanding. FFAR will complement the U.S. Department of Agriculture’s research, education, extension and economics activities, which are conducted by various agencies, such as the National Institute of Food and Agriculture and the Agricultural Research Service.

FFAR’s board is composed of 15 directors selected from a variety of universities and private companies nationwide, with the top five government agriculture and science leaders—such as the U.S. secretary and undersecretary of agriculture and the director of the National Science Foundation—serving as ex-officio members.
**MY CORNELL STORY**
Michelle R. Adelman ’89

My normal status on Facebook, WhatsApp, Skype and other social media is “I cannot make this stuff up.” When I was a fresh-faced Cornell agricultural, environmental and biological engineering (ABEN) graduate on my way to New York City, I never would have imagined the foundation I built at Cornell would lead me to southern Africa, where I would use my engineering and business skills to tackle food security and energy access issues in Botswana and the region.

I was quite committed at graduation to becoming a leader in corporate America. With the good fortune of landing a job at the global consulting giant Accenture, I was off to a fast start. Armed with some subway tokens, a couple pairs of high heels, two tailored skirt suits (and two more I was able to borrow from my roommate on a rotational basis), I dove into corporate America.

Accenture proved to be a great place to tune the analytical skills I learned as an engineering student together with the negotiating skills I learned in my favorite ILR collective bargaining class and to apply them to real-life business problems. I learned over the years that most problems, whether they be technical or business, are relatively easy to solve with a little technology and analytical thinking. It is the implementation—a.k.a. the people—that is the real challenge.

After 22 years on the corporate ladder, I decided to take a run at being an entrepreneur and was recruited by a private equity firm. On a whim, I went on a safari vacation to southern Africa before I started my new job. It was a truly different world from the one I came from, and I was captivated. I became fascinated with how business was conducted. It seemed that most of it involved “trade” (buying and selling stuff, not the Wall Street type) and digging natural resources out of the ground. Few fundamental business problems were being tackled—like how to grow food consistently or how to get a dairy cow to produce more than 1.3 gallons of milk a day. I observed how people could survive on less than $4 per day—and actually be happy about it! I also witnessed the impact the HIV/AIDS crisis had on hundreds of thousands of children left orphaned in its wake.

I began a foundation called The Constellation Education Fund to focus on orphaned children and early childhood education. But as we raised money and began to design programs, we came across a bigger obstacle: without real economic development and resulting employment, especially for “youths” (under 30) who make up the largest portion of the population of southern Africa, our efforts to support children would ultimately end in failure.

So I decided to use my years of corporate and entrepreneurial experience and return to my Cornell ABEN foundation to tackle the root problem, by creating businesses that would transform traditional trading supply chains and develop community-based employment. I founded an investment firm, Accite, sold my apartment on Park Avenue, and moved to Botswana. I know, I cannot make this stuff up!

We started investing in businesses that solve basic problems for consumers such as access to food, housing and energy. These businesses use technology to fundamentally transform industries and create much-needed jobs for unskilled youths and women.

Our work has resulted in several satisfying successes over the past two years. In a country where up to 80 percent of food is imported, we’ve built 14,800 square feet of controlled-environment greenhouses that produce 700,000 pounds of fresh vegetables annually, using 2 percent of the water of traditional irrigation farming. We also grow barley sprout animal fodder hydroponically, predictably, 365 days a year, at 80 percent less cost than buying feed, using 1 percent of the water and 1,000 times less land than growing alfalfa in an irrigated field. We have created 100 new entry-level jobs and now almost exclusively employ single mothers in our greenhouses.

Economic and environmental sustainability are also at the core of our current projects. We have a license to build 5MW of solar energy in Namibia, and we are introducing fiber-cement insulated panel housing that enables us to build environmentally efficient, durable homes in four weeks, at 30 percent of the cost.

My work with The Constellation Education Fund has also continued, and the foundation now works hand-in-hand with the Accite businesses, promoting early childhood education through pre-school scholarships, for instance, and providing renewable energy solutions such as solar lanterns for employees without electricity at home.

As a biological and environmental engineering student, I never wanted to be a farmer. Nevertheless, I hung up my high heels and now I drive a pickup truck. Cornell gave me the credentials, the skills and the confidence to tackle some of the biggest agricultural and consumer problems in southern Africa. I cannot make this stuff up.

**Michelle Adelman ’89** is the founder of project development and private-equity investment firm Accite. She previously worked as a managing director for the global consulting firm Accenture and as chief executive officer of U.S.-based home health services company Accelion. She is also chair of The Constellation Education Fund and serves on the board of directors of property management company Turnstar Holdings Botswana, Africa Energy Corporation Namibia, and Bana Ba Letsatsi Trust Botswana.

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Biometry & Statistics
Apply statistics, mathematics, computing, and other methods to solve problems in diverse fields, from the life and social sciences to business and finance.

Communication
Study communication processes and put theory to use in understanding audiences, shaping messages, and interacting with individuals and technologies. Focus areas include: communication, environment, science, and health; communication media studies; communication and information technologies; and communication and social influence.

Development Sociology
Contribute to understanding societal development and factors to solve social problems, both local and global, in a program that is well known for international, domestic, rural, environmental, agricultural, and population studies.

Entomology
Get an education in biological and environmental sciences, with a special emphasis on insects—the most diverse group of organisms on Earth. The Department of Entomology was the first of its kind in the U.S., and remains one of the largest programs in the nation.

Environmental Engineering
Prepare for careers in the technical management of natural resources, including work in water, soil, and air quality, in a program that incorporates engineering and the study of the natural environment.

Environmental Science & Sustainability (Science of Natural and Environmental Systems)
Gain a comprehensive and integrated view of the biological, physical-chemical, ecological, and social dimensions of environmental and natural resource issues. Concentrations include: environmental biology and applied ecology; environmental policy and governance; environmental economics; biogeochemical sciences; or a student-designed concentration.

Food Science
Explore food systems from processing and packaging to distribution, evaluation, and safety, and solve real-world problems by combining chemistry, microbiology, nutrition, and engineering. Focus on food science or food operations and management.

Information Science
Examine the cultural, economic, historical, legal, and social contexts in which information systems are employed and understand their impact on individuals and institutions. Areas of study include: human-centered systems; social systems; and information systems.

International Agriculture & Rural Development
Learn about the challenges and opportunities that exist in less-developed countries, with concentrations in economics and development; agricultural and food systems; and environment and ecosystems. Overseas experiences and studies are incorporated into the major.

Landscape Architecture
Design outdoor areas including parks, restored wetlands, urban plazas, historic sites, and botanical gardens. Also work in urban development, land use planning, conservation, historic preservation and ecological designs.

Nutritional Sciences
Understand relationships among human health and well-being, food and lifestyle patterns, food quality and agricultural systems, and social and institutional environments, while drawing on chemistry, biology, and social sciences. Focus on: human nutrition; community nutrition; international nutrition; and molecular nutrition.

Plant Sciences
Study the biology, growth and development of plants, as well as the use of plants for food, fiber and ornamental purposes. Concentrations include: evolution, systematics and ecology; plants and human health; plant genetics and breeding; plant physiology and molecular biology; and sustainable plant production and landscape management.

Science of Earth Systems
Build the foundation for the future management of our planet by studying the Earth’s system, with a focus on understanding and managing the resources of the lithosphere, biosphere, hydrosphere, and atmosphere.

Viticulture & Enology
Prepare to become a leader in the wine industry. The program includes coursework in grape growing, winemaking, vineyard development, economics, and management.

### 21 Majors

<table>
<thead>
<tr>
<th>Agricultural Sciences</th>
<th>Get a broad overview of agriculture, as well as more intense study and hands-on experience in one of five concentrations: animal science; crop production and management; sustainable agriculture; business; education and communication.</th>
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<tbody>
<tr>
<td>Animal Science</td>
<td>Prepare for study in veterinary medicine or careers in animal production, biotechnology, and conservation, in a program that has been nationally recognized in animal breeding and genetics, nutrition, physiology, growth, behavior, and dairy management.</td>
</tr>
<tr>
<td>Applied Economics &amp; Management</td>
<td>The Charles H. Dyson School of Applied Economics and Management provides management education and the opportunity to specialize in accounting; agribusiness management; applied economics; entrepreneurship; environmental and resource economics; finance; food industry management; international trade and development; marketing; or strategy.</td>
</tr>
<tr>
<td>Atmospheric Science</td>
<td>Examine the behavior of weather and climate, and gain experience in the analysis, interpretation, and forecasting of meteorological events.</td>
</tr>
<tr>
<td>Biological Engineering</td>
<td>Integrate engineering and biology to solve some of the challenges facing our world, such as ensuring an adequate and safe food supply, protecting natural resources, and developing systems that monitor, replace, or intervene in the mechanisms of living organisms.</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>Study the fundamentals of biology while concentrating on: animal physiology; biochemistry; computational biology; ecology and evolutionary biology; genetics; genomics and development; insect biology; marine biology; microbiology; molecular and cell biology; neurobiology and behavior; human nutrition; plant biology; and systematics and biotic diversity.</td>
</tr>
<tr>
<td>Biology &amp; Society</td>
<td>Examine the social, political, and ethical aspects of modern biology, research, and practice.</td>
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### RESEARCHERS OF:
- wetlands restoration, day lilies, silk spiders, endangered bird populations in Argentina,
- food packaging and shelf life, Blanding’s turtles, Costa Rican coffee, Alzheimer’s, and
- air quality.

The national high school champion in discus, an author of a science fiction novel, a finalist in the National Spelling Bee, a certified severe weather spotter, a member of the National Guard, a licensed wildlife rehabilitator, and musicians who have performed at Carnegie Hall.

### THEIR RANKS INCLUDE:
- 44% men
- 56% women

### LANGUAGES SPOKEN AT HOME
- Afrikaans
- Arabic
- Bengali
- Chinese
- Croatian
- Dutch
- Farsi
- Finnish
- French
- German
- Greek
- Hebrew
- Hindi
- Hungarian
- Italian
- Japanese
- Korean
- Kurdish
- Latvian
- Lithuanian
- Norwegian
- Polish
- Portuguese
- Romanian
- Russian
- Spanish
- Swedish
- Taiwanese
- Turkish
- Urdu
- Vietnamese

### INCOMING CALS STUDENT STATS
- 678 FIRST YEARS
- 273 TRANSFERS
- CALS Admissions Office | 607-255-2036 | cals_admissions@cals.cornell.edu | www.cals.cornell.edu/admissions
Comstock, Stone, Roberts, and East Roberts halls (shown, left to right), were the first four buildings on the Ag Quad, built between 1905 and 1913. The construction boom continued for a decade, culminating in nine major buildings and transforming the fledgling college into a powerhouse for agricultural education, research and extension. By 1913, The College of Agriculture was the largest college at Cornell, with 129 faculty offering a total of 225 courses to more than 2,500 students. Stone, Roberts and East Roberts were razed in the 1990s, but “old” Comstock, now known as the Computing and Communications Center, remains a tangible connection to the earliest days of CALS.

Calling all Cornellians: students, families, alumni, friends, faculty and staff. Soon, around the globe, we will be celebrating our phenomenal university’s first 150 years. Visit 150.cornell.edu to get involved.