

# periodiCALS

THE MAGAZINE OF CORNELL UNIVERSITY'S COLLEGE OF AGRICULTURE AND LIFE SCIENCES

VOL. 5 | ISSUE 3 | 2015

## RESEARCH FUELS RESILIENCE:

*The Future of Energy,  
Food, Feed and Health*



Cornell University





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**LEFT:** Students can dive into aquatic research at the Cornell Biological Field Station at Shackelton Point. Located on the south shore of Oneida Lake, the 400-acre property was left to the university by Charles Brown, class of 1909, a Syracuse engineer and inventor with a strong interest in conservation and forestry. Managed by the Department of Natural Resources, today it is a hub for research on the fisheries and aquatic ecology of Oneida Lake, the Great Lakes and other New York state inland lakes. In addition to year-round research on fish, birds, zooplankton, mussels, plants and nutrient cycling, the station offers 11-week undergraduate research internships during the summer for a unique experiential learning immersion in fundamental and applied ecology. Photo: Robert Way

Cover Illustration by Olivia McCandless '17

# dean's message

"I never thought of stopping, and I just hated sleeping.  
I can't imagine having a better life."

—Barbara McClintock '23, M.A. '25, Ph.D. '27

I recently came across this quote from Dr. McClintock, a CALS alumna, professor, geneticist, and Nobel laureate recognized for her work with maize chromosomes, and it struck me how much her sentiment pervades the culture of the college's faculty, students and staff. As dean, I have the opportunity to see firsthand how much effort and passion we put into each facet of our mission—teaching and learning, research, and extension. These three purposes distinguish who we are and what we do as an institution, and that dedication to excellence in each, respectively and combined, strengthens what we deliver as part of our Land-Grant Mission.

This issue of *periodiCALS* provides fresh insights into the breadth and depth of our work across our four priority areas. The connections between our work in agriculture and the food we eat and beverages we drink are perhaps obvious, and so this issue's look at innovations in the plant sciences in support of bioenergy (see page 12) takes a new perspective by illustrating how and why discovery and dissemination in these disciplines underpins many of the solutions to the great challenges we face as a global society. The initiatives led by faculty in the social sciences are also helping to improve our lives (see page 24), individually and as communities small and large. Understanding how technologies, policies and media influence our thinking and offer the potential to inform healthier choices will help shape the world around us in

new and ground-breaking ways.

As I hope you'll see in the stories about our students and alumni in the opening and closing pages of this magazine, the dedication to knowledge with public purpose is central to who we are and what we do. With 15 departments, two schools, and 22 majors, CALS is unique, and our contributions have impact across the areas associated with an agriculture school and the life sciences, and well beyond into the environmental sciences,



Dean Kathryn J. Boor (left) and Cornell President Elizabeth Garrett visited The Great New York State Fair on Dairy Day, Monday, August 31. There, they talked with growers, 4-H students, and policy and elected officials about how CALS' research, education, and extension activities deliver on Cornell's Land-Grant Mission. Photo: Robert Barker/University Photography

information and management sciences, social sciences, and more.

As Dr. McClintock intimated, a penchant for resting and CALS just don't match. We have too much to accomplish, and on behalf of my colleagues, we appreciate your support and enthusiasm as we continue the essential education, research and outreach that are our legacy.

Kathryn J. Boor  
Ronald P. Lynch Dean of the  
College of Agriculture and Life Sciences

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## STATE SUPPORTS FOOD PROCESSING TECH WITH \$600,000 IN FUNDING

By Amanda Garris Ph.D. '04

At a Sept. 14 press conference, New York State Sen. Michael Nozzolio, R-54th Dist., announced \$600,000 in state funds to bring a new food processing technology to Cornell's New York State Agricultural Experiment Station (NYSAES) in Geneva, N.Y. The Hiperbaric 55, which captures fresh taste and extends shelf life while ensuring food safety, will make Geneva a critical part of the validation of this cutting-edge system.

"Bringing this complex high-pressure processing equipment to the New York State Agricultural Experiment Station and to Cornell University is an extraordinary opportunity to promote innovation in Geneva and job growth for New York food processors, especially in the Finger Lakes region," Nozzolio said.

Traditional food processing relies on high temperatures to kill foodborne pathogens, like *Listeria*, *E. coli* and *Salmonella*. According to Randy Worobo, professor of food science, extreme heat is particularly hard on fresh products. It can alter the texture and taste and reduce the nutritional quality. The Hiperbaric 55 uses pressures over 80,000 psi—fivefold greater than the pressure at the bottom of the Mariana Trench—to eliminate pathogens in a quick two- to three-minute treatment. And because the foods are treated inside their final packaging, there's no risk of contamination of food during packaging.

The acquisition is a boon for food producers who want to use the new technology, because FDA and USDA requirements for food safety mandate the process be tested for specific food products prior to manufacturing. Geneva will become the technology's validation site for the entire country. Much of the work ahead, Worobo said, will be to aid companies by establishing "microbial safe harbors," the safe processing parameters for amount of pressure, length of treatment, the specific food and the type of packaging.

The purchase and installation was made possible by a coalition of public and private funds. In addition to the state funds, private companies who contributed to the purchase include Wegmans, LiDestri, Suja and the unit's manufacturer, Hiperbaric.

"This exciting partnership represents the best of Cornell University's Land-Grant Mission, supporting economic vitality for those who grow and sell food products in the state of New York while ensuring

the safety of those products for consumers throughout the United States and beyond," said Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences. "CALs has long been a pioneer in food safety, and the addition of Hiperbaric's high-pressure processing equipment firmly establishes the college as the leader in this vital field of research."



New York State Sen. Michael Nozzolio ILR '73, M.S. '77, R-54th Dist., with Kathryn J. Boor (left), the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences, and Susan Brown (right), the Gochman Family Director of the New York State Agricultural Experiment Station in Geneva, N.Y.  
Photo: Rob Way

## THE DISCERNING DINER'S FACTUAL FARE

### DEFEAT STRIKES A SOUR NOTE

Defeat may not just cause a sour attitude: A new study from the lab of Robin Dando, assistant professor of food science, shows it can make sour food taste more sour, but winning enhances sweetness. Graduate student Corinna Noel studied how emotional states affect the perception of taste using a sample of 550 zealous Cornell men's hockey fans. At the end of each home game, fans were given a salted-caramel pretzel ice cream and a lemon-lime sorbet. Although caramel was generally preferred to sorbet, fans reported enjoying the sorbet as well after a win. While the flavors salty, umami (savory) and bitter were not affected by wins or losses, for embittered fans the sorbet tasted more sour. The study shows that emotions can make a less palatable food even more unappealing to taste—implying a mechanism for emotional eating and why when we lose, we reach for the sweet.

### SHORT WAIT ENHANCES FOOD SAFETY

Harnessing a combination of weather data, GIS technology and pathogen samples, research has identified a low-tech intervention that can help reduce food-borne illness from fresh vegetables: Produce farmers should wait 24 hours after a rain or irrigating their fields to harvest crops. Rain and irrigation create conditions that are more hospitable to *Listeria monocytogenes*, which when ingested may cause the human illness listeriosis. Researchers in the lab of Martin Wiedmann Ph.D. '97, professor of food science, tested fields in New York and found that after rains or irrigation, the chances of finding *Listeria* were 25 times greater. But after the fields dried at least 24 hours, the chances of detecting *Listeria* dropped dramatically, to levels similar to baseline. Currently, the U.S. Food and Drug Administration has proposed rules allowing farmers to apply "wait periods" after application of irrigation water.

### STYMIED BY STEREOTYPES

Millions of people turn to the internet and social media for health and food-related information, but stereotypes can distort their assessment of the information: People perceive the same foods as less healthy when they are recommended online by a heavier versus thinner person. Communication professors Jonathon Schuldt and Geri Gay conducted two online experiments, asking participants to judge the overall health quality of 10 meals that were ostensibly posted to a site like Pinterest or Facebook by a fictional woman named Elizabeth Jones. Some participants saw a small thumbnail image of the woman portrayed as thin, while others saw a thumbnail with her heavier. A meal posted by the heavier Jones led participants to judge the meals as significantly less healthy, a finding that held true even when objective measures of nutritional quality—calories and fat content—were also provided to the participants.

### IS JUNK FOOD TO BLAME?

Soda, candy and fast food are often painted as the prime culprits in the national discussion of obesity, but these foods are not likely to be a leading cause in the United States, according to David Just and Brian Wansink, professors in the Charles H. Dyson School of Applied Economics and Management. In a nationally representative sample of U.S. adults, consumption of soda, candy and fast food was not significantly different in overweight and healthy weight individuals. The exceptions were found on the extreme ends of the spectrum: the chronically underweight and the morbidly obese. They concluded that the overwhelming majority of weight problems are not caused by consumption of junk food alone. According to Just, diets and health campaigns aimed at reducing and preventing obesity may be off track if they hinge on targeting specific foods rather than physical activity and overall consumption patterns, such as snacking.



Bryan Danforth, professor of entomology, inspects apple blossoms and native pollinators at Cornell Orchards, which is home to at least 26 wild bee species. Photo: Jason Koski/University Photography

## LEAP OF FAITH PROVES POLLINATION CAN BE HONEYBEE FREE

As the state's Land-Grant institution, Cornell University was born to explore science for the public good—a mission that can sometimes require a leap of faith. Just such a leap paid off this year at Cornell Orchards. While crisp apples and fresh cider are no strangers to fans of the 37-acre research and outreach site, this year's crop provides an extra bonus for New York apple growers: proof that pollination can be done commercial honeybee free.

"This is a food security issue," said entomology professor Bryan Danforth. "We need to know if growers can continue to produce food in the absence of honeybees."

Populations of imported European honeybees, relied upon for centuries in American agriculture, continue to decline under pressure from an array of pathogens, parasites and other problems. After years of surveys through which Danforth's team found more than 100 wild bee species in 20 Upstate orchards—26 species at Cornell Orchards alone—Danforth and farm manager Eric Shatt conceived of a plan to fly through this springs' apple blossom season on the wings of wild bees alone.

While he's quick to concede wild bees will never replace honeybees in massive agricultural settings, Danforth said research and fieldwork is proving wild bees can play a critical role in saving growers money, easing pressure on vulnerable honeybee hives, increasing sustainability and, most importantly, enhancing food security.

"If you're an apple grower and you want to make sure you can produce apples for the next 50 years, having the insurance that you have a diverse wild pollinator fauna in and around your orchard will be important," Danforth said. "Making this industry more profitable and at the same time demonstrating the economic benefits of conserving wild pollinator diversity is a win-win situation for New York agriculture."

around the quad

## JOINERS STRENGTHEN STARTUPS

A high tolerance for risk, a need for autonomy, and a desire to bring new ideas to life—sound like criteria for an entrepreneur? New research by Michael Roach, the J. Thomas and Nancy W. Clark Assistant Professor of Entrepreneurship in the Charles H. Dyson School of Applied Economics and Management, shows that "joiners"—people drawn to startups as employees rather than founders—share these entrepreneurial characteristics but to a lesser degree than those who want to be a founder. In addition, joiners tend to be attracted to functional job roles within startups rather than the managerial role of the founder.

And there are a lot more joiners than founders. Among the 4,200 doctoral candidates surveyed, 46 percent reported an interest in joining a startup as an employee, while only 11 percent expected to found their own company. Moreover, joiner interests tended to emerge in settings that encourage entrepreneurship, while founder

interests appear to be more innate. Roach thinks this is valuable information for university entrepreneurship programs.

"Most university programs designed to foster entrepreneurship focus on training people to become founders. But founders make up a small share of the entrepreneurial workforce," Roach said. "And we do little to train the larger share of people who will work in startups as employees."



## DEVELOPMENT SOCIOLOGY CELEBRATES 100 YEARS OF IMPACT

The Department of Development Sociology kicked off a yearlong centennial celebration in September with the theme "Looking Back to Move Forward." For the past 100 years, the department has influenced the trajectory of research, teaching and outreach on development and social change. The department was founded in 1915 as the Department of Rural Social Organization in the College of Agriculture at a time when New York and most of the United States were rural and agricultural. Over time, its name and focus have evolved with changing demographics and development needs. The department was renamed Rural Sociology in 1939,

reflecting the establishment of the national Rural Sociological Society. In 2003, the department changed its name once more, to Development Sociology. This change recognized the importance of urban and rural transformations to the broader development process, expanding the focus to encompass global population and development, the politics and economics of development, environment and development, and the social organization of food systems. The department offers an undergraduate major and two minors and has produced more than 330 Ph.D.s who have gone on to distinguished careers in and out of academia.

There is only so much genetic diversity to go around. If you shuffle that deck of cards so many times, at some point, you get the same hand dealt to you twice.

—Michael Sheehan, assistant professor of neurobiology and behavior, speaking to *LiveScience* on why you have a decent chance of having a doppelgänger, or look-alike.



Photo: Jason Koski/University Photography

## REFURBISHED WARREN HALL CERTIFIED LEED PLATINUM

By Blaine Friedlander

**S**teeped in economic and social science history, Cornell's Warren Hall—refurbished, renovated and reinvigorated for teaching and research long into the new century—has added a sustainable trophy to its storied resume: LEED Platinum certification.

Featuring salvaged stone flooring, energy efficiency, corridors of daylight, natural ventilation and even gardens in the sky, the updated Warren Hall brings a modern sense to granite walls. On the Cornell campus, two new buildings have achieved platinum status, but this is the first campus renovation to reach the Platinum LEED (Leadership in Energy and Environmental Design) level, the highest certification by the U.S. Green Building Council.

"The project team's goal from the start was to deliver a modern building with a zero increase in the energy use. They accomplished this task by making some brave decisions," said Matt Kozlowski, associate manager of Cornell's Green Building Program. "To make a meaningful impact on energy use as a whole, we need to tackle the renovation and renewal of our existing building stock."

FXFOWLE Architects, known for its design excellence, social responsibility and sustainability, updated Warren Hall.

While a mechanical designer can add a traditional HVAC system, the Warren Hall project team installed user-controlled trickle ventilation into exterior windows, decoupled heating and cooling from the ventilation system, insulated and repaired the building's exterior, and found ways to bring sunlight deep into the interior, according to project manager Brian Fish.

Warren Hall's auditorium roof is covered with drought tolerant sedum plants for insulation, storm water treatment and longevity. Commonly called stonecrops, they feature succulent, water-storing leaves.

Warren Hall—originally called the Agricultural Economics Building—was built in 1932, courtesy of the New York State Legislature and New York Gov. Franklin D. Roosevelt. The building's original tenants—the Departments of Agricultural Economics, Farm Management and Rural Social Organization—remain today in their modern incarnations: The Charles H. Dyson School of Applied Economics and Management and the Department of Development Sociology.

Warren Hall was rededicated on April 24, marking the culmination of a four-year, \$51 million project that College of Agriculture and Life Sciences Dean Kathryn J. Boor hailed as a triumph of good partnerships, careful planning and good will.

"Warren Hall embodies the spirit of interdisciplinary learning, discovery and engagement that defines CALS," Boor said. "And now it also embodies the college's spirit of sustainability."

## CORNELL AND ITHACA COLLEGE OFFER JOINT AG EDUCATION MASTER'S PROGRAM

By Ellen Leventry

Cornell and Ithaca College will offer a new Master of Arts in Teaching (MAT) program to help meet the growing demand for qualified agricultural educators. Students in the graduate program will earn a degree in agriculture education from Ithaca College in collaboration with Cornell Connect, a program of the College of Agriculture and Life Sciences (CALS).

"This unique MAT program in agriculture education combines the strength of an established, highly regarded education program at Ithaca College with the internationally recognized agricultural knowledge of Cornell," said Jeff Perry '89, education specialist in CALS' School of Integrative Plant Science. "Students will graduate with a strong knowledge of the agricultural education community while also being comfortable with their general education peers."

This cross-university partnership, unique in the United States, reflects CALS' commitment to agricultural science education.

"Our goal has been to expand opportunities for Cornell students to obtain teacher certification. This innovative program is a true partnership with Ithaca College's nationally accredited, state-approved and much-respected teacher education programs," said Kathryn J. Boor, the Ronald P. Lynch Dean of CALS.

"Ithaca College and Cornell University have been collaborating in the preparation of teachers for many years," noted Linda Hanrahan, chair of graduate programs in education at Ithaca College. "The newly approved MAT program in agriculture education provides us with yet another avenue for continued collaboration."

The intensive 13-month program is an extension of other articulation agreements that exist between the two schools, including the transition of prospective teacher candidates from Cornell's education studies minor program into the M.S. in childhood education or the MAT in adolescence education at Ithaca College.

"The new program in agricultural education builds on the strengths of an already successful partnership between Ithaca College and Cornell University in other teacher certification program areas," said Jeane Copenhaver-Johnson, chair of the Department of Education and interim associate dean for the School of Humanities and Sciences at Ithaca College. "Because we are coordinating with Cornell colleagues we already know well, this agricultural education program allows us to bring the unique strengths and resources of both institutions to enrich the educational experiences of our teacher candidates."

The program comes at a time when agricultural education programs are growing in popularity in suburban and urban high schools throughout the country. According to a 2014 National Association of Agricultural Educators supply-and-demand report, more than 200 additional agricultural teachers are needed due to program growth and expansion each year.



Small insects have been big news in Albany, as lawmakers move to protect pollinators, help growers fend off a new berry pest, and educate the public about tick-borne illnesses.



## TICKS

Do you know tick species by sight, where they lurk, and how to avoid them? These are some of the essential skills for avoiding Lyme disease that Matt Frye, an educator with Cornell's New York State Integrated Pest Management Program, advocated during a community forum hosted by New York State Senator Sue Serino, R-41st District. Serino, who chairs the New York State Senate Taskforce on Lyme and Tick-Borne Diseases, hosted the June 30 forum in Hyde Park, N.Y.

"My goal is to make sure the issue really hits the mainstream, because no matter how much we think we know, there are new developments each and every day," Serino said. "If there is one thing I have learned when it comes to combating Lyme, information is power."

The information Frye provided was preventative and practical: how to identify, avoid and remove ticks. He explained that being able to correctly identify the pest is a prerequisite for proper treatment, and he recommended the TickEncounter website as a guide. He also covered tick habitat preferences and personal protective measures—including insecticidal socks—and the importance of staying on the path away from underbrush.

"Ticks are questing when they are looking for a bloodmeal," he said. "They are standing on the vegetation, with their tarsi (front claws) out, looking for you to come by. If you don't walk into them, your chances of picking up a tick are much reduced."

## SPOTTED WING DROSOPHILA

A winged newcomer is causing big problems for berries across the Northeast, according to professor of entomology Greg Loeb and Dalella M. Riggs, owner of The Berry Patch and president of the New York State Berry Growers Association (NYSBGA), who testified before the Assembly Agriculture Committee. The spotted wing drosophila, a new invasive fruit fly, has caused millions of dollars in economic damage to the berry industry in New York since its arrival in 2011, but the partnership between the NYSBGA, Cornell, Cornell Cooperative Extension, and the state has been hailed as a model for how to deal with an invasive pest.

"We have made progress in our battle against this pest and, more importantly, have given some hope to the farm community that they will be able to continue to grow berries locally," Riggs said.

Successes to date include a new statewide monitoring network and strategies for managing the pest, from netting to protect ripening fruit to frequent harvests to minimize damage, as well as sprayer systems for high tunnels. Loeb is on the forefront of developing other solutions, including repellents to drive the fruit flies away from fruit coupled with "attract and kill" stations to lure them away from the crop and identifying natural enemies—including diseases—that could be harnessed for controlling pest populations.

"Much more still needs to be done to develop a sustainable, long-term solution for this invasive pest," Loeb said.

## POLLINATORS

On August 6, Richard Ball, New York Commissioner of Agriculture and Markets, welcomed a meeting of the interagency task force charged with protecting, in his words, "a large work force in New York state that works from dawn till sundown" and without W2s: the bees. The task force, established by Governor Andrew Cuomo in April, will develop a roadmap to conserve and grow pollinator populations across the state.

Among the first to speak was Jennifer Grant, the director of Cornell's New York State Integrated Pest Management Program (NYSIPM), who included an update on pollinator research by NYSIPM and Cornell entomologists Scott McArt, Bryan Danforth and Greg Loeb. Offering a bird's eye view of Cornell research, Grant described wildflower strips to diversify bee diets and enhance their health; bee habitat in natural areas and golf courses; and transmission of pathogens among bee species on flowers. Another recent development is the establishment of a new pesticide residue detection facility at Cornell, which will help researchers identify environmental chemicals that may be affecting bee populations.

"Some things are being addressed on a very basic research level; some of it needs to be brought into the field to be tested," Grant concluded. "And then a lot of needs to be taught, to make people more aware of what's happening and what they can do to help in the bigger picture."

Photo: Senator Gillibrand



## NEW YORK FARM DAY 2015

Now in its 13th year, New York Farm Day brought the bounty of New York's farms, vineyards and orchards to Capitol Hill. The annual event, started by former Sen. Hillary Clinton and hosted by Sen. Kirsten Gillibrand (D-N.Y.), introduced hundreds of guests to the Empire State's products and the people who make them. Cornell offered samples of artisanal cheese, including the university's signature Big Red Cheddar and three cheeses from the Cornell-Wegman's partnership for training in artisan cheese: Nettle Meadow's Nettle Peaks and Consider Bardwell's Pawlet and Dorset. Left: CALS associate communications officer Chloe Starr with Sen. Gillibrand and sons at the Cornell table.

# in the marketplace



## eHUB COMING TO COLLEGETOWN AND KENNEDY HALL *By Amanda Garris Ph.D. '04*

**B**y summer 2016, student entrepreneurs will have a new home—eHub—with locations in Kennedy Hall and Collegetown.

“This is something that students are demanding across university campuses,” said Zach Shulman, director of Entrepreneurship at Cornell. “It’s not just smart on our part. Students have companies they want to start, and they need the space to do it. They can’t do it in their dorms or departments, so we need a serious, dedicated space.”

The \$4.5 million eHub has been propelled by alumni, who have contributed the majority of the funds for the project. The coalition of collaborators includes Entrepreneurship at Cornell, the Student Agencies Foundation, the Samuel Curtis Johnson Graduate School of Management, the College of Agriculture and Life Sciences, the College of Engineering, the School of Industrial and Labor Relations, and the School of Hotel Administration.

The facilities will move Entrepreneurship at Cornell one giant step closer to its goal: When students think of entrepreneurial universities, they will think of Stanford, MIT and Cornell, and “not necessarily in that order,” according to Shulman. Current students agree that eHub is a game-changer.

“It may be surprising to people that you don’t have to be in Silicon Valley to have access to this resource—I wish it had been around when I was a freshman,” said Rosie O’Regan, a senior in the Charles H. Dyson School of Applied Economics and Management. “Entrepreneurship is more a mindset than anything else, and you can see that in the many startups right on campus.”

The space will be home to programs sponsored by Entrepreneurship at Cornell, including several existing organizations: eLab, a business accelerator program offering intensive mentorship to student companies and their management teams; Student Agencies Inc., the nation’s oldest student-run business group; and POPSHOP, a community of entrepreneurially minded students. Dyson senior Gabe Polsky has spent many hours in POPSHOP, building business ideas of his own.

“It’s great to have a group of people come together, bringing their passion for creation and making things happen from all across the campus,” Polsky said. “One of the challenges I’ve faced is connecting with alumni. Mentorship is so important, but we need to think about redefining it. Sometimes we just don’t need a long-term commitment, but rather someone to touch base with on a particular idea.”

The space will ultimately help to meet those and other needs, with experiential business learning and mentors-in-residence, workshops, seminars, hack-a-thons and start-up weekends. The Kennedy Hall space will include offices for Entrepreneurship at Cornell, as well as spaces for group meetings, conferences, events, classes and presentations, and open areas for discussions and planning. Both locations will be open to all Cornell students, faculty and staff.

“This will be a place where any student at Cornell with an idea can get the resources to develop their business,” said Ross Evancoe, associate director of alumni affairs and development for CALS. “It will create more opportunities for students to connect with each other, industry leaders and guests.”



## ENOCERT

Cornell Enology  
Extension Education



From labeling laws to wine flaws, winery employees can hone their skills through the new EnoCert program launched by the Cornell Enology Extension program. Developed with input from a wine industry advisory council, certificates can be earned through a combination of classroom and online learning in four areas: harvest technology, tasting room education, wine production and analysis, and advanced winery operations. “Tasting room staff are on the front line interacting with consumers, and they need basic knowledge of enology and viticulture as well as strong sensory and sales skills,” said Anna Katharine Mansfield, associate professor of enology. “On the winemaking side, we are offering winery safety and sanitation now, with plans for advanced courses in wine microbiology and chemistry in the next year.”

## DOUBLE VISION: DOUBLE MAJORS *by Krisy Gashler*

For a select group of students, one major is not enough. Only three percent of CALS students are double majors, finding two academic homes among the 22 majors the college offers. Many are committed to meeting global challenges that defy disciplinary boundaries. For others, intellectual curiosity has developed into a quest for both depth and breadth. Meet a few of these exceptional students who have found complementary connections across the college.



Photos: Robyn Wishna

### YUNRU YU '18

In Yunru Yu's native China, some street vendors illegally gather waste oil from places like kitchen garbage disposals, slaughterhouses and rancid meats, then minimally process this "gutter oil" and sell it for human consumption. Yu is double majoring in food science and science of natural and environmental systems, with the hope of being able to address problems like this one with a whole-system view. Yu also sees the interconnections between human nutrition and environmental systems here in Ithaca, where student transportation options can impact the price and quality of foods students buy.



### ZACHARY WIELGOSZ '17

Zachary Wielgosz became interested in environmental problems in Boy Scouts; his Eagle Scout project involved removing invasive honeysuckle from the Iroquois Wildlife Refuge. At Cornell, Wielgosz has shifted his focus from the earth to the stars. Double majoring in environmental engineering and biological engineering, Wielgosz hopes to work for NASA someday and study hydroponics and life support in space, making discoveries that can help address issues of drought and water pollution here at home, too. Wielgosz is already researching hydroponics at Cornell, working with Neil Mattson, associate professor of horticulture.



### ANYA GANDY '17

Anya Gandy wants to know agriculture inside and out: from working cattle on horseback to helping address global climate change. She's double majoring in animal science and agricultural sciences. Gandy comes from a small Oregon farm with sheep, goats, geese, llamas and chickens, and she has family with large cattle ranches in Louisiana and Texas. She's already worked at the National Farmers Union in Washington, D.C., at a 24,000-acre ranch in Montana, and with the Noble Foundation, an Oklahoma-based not-for-profit that helps farmers and conducts its own research. Gandy's career dreams are as diverse as her experience: She hopes to do production ranching and to influence public policy.



### MARAJ ALAM '16

Maraj Alam came to Cornell to major in its world-class science of natural and environmental systems program. But because of CALS' flexibility in fulfilling major requirements—almost 40 credits are chosen by each student—Alam realized he could double-major in biology with only three additional classes. Alam has worked with Anthony Hay, associate professor in microbiology, studying biodegradation of the antimicrobial compound triclosan, and he plans to pursue grad school in microbiology and focus on viruses and their impact on humans and the environment. Alam was involved with Energy Corps, a Cornell sustainability project that captures savings from green energy projects and reinvests the money into new conservation initiatives.



### NANA BRITWUM '18

When she was 4, Nana Britwum moved from Ghana to the United States, but she has always retained a strong connection to West Africa. Double majoring in plant sciences and agricultural sciences, Britwum hopes to develop salt- and drought-resistant crops to help farmers in developing countries. Britwum was also a student delegate at the 2014 Agriculture Future of America conference. This summer, Britwum was chosen as a Doris Duke Conservation Scholar and spent a week at the National Conservation Training Center before she interned at Cornell's Arnot Forest, where she researched water condensation in prairie grasses, alongside Rebecca Schneider, associate professor of natural resources.



### AVERY HILL '17

Avery Hill fell in love with the natural world while growing up near northern California's magnificent redwood forests. Double majoring in biology and plant sciences, Hill was inspired by plant biology professor Kevin Nixon's Global Plant Biodiversity course, which included a two-week trip to Patagonia. Hill has continued to work with Nixon on projects involving DNA barcoding and plant species distributions, among others. He's planning for an academic career and hopes to take a holistic approach to plant biology, studying the ways in which plants interact with fungi and animals and can even define ecosystems.



## PRE-VET STUDENTS STUDY IN ARGENTINA

By Krisy Gashler



Jonathan Gorman '16 in Argentina's Iberá Wetlands, his favorite place to see wildlife, including capybaras (pictured above).

Jonathan Gorman '16 and Zachia Gray '16 are the first students to study abroad in Argentina as part of a new pre-veterinary CALS Exchange Program. The students traveled to Esperanza, Argentina, in January to study at the Facultad de Ciencias Agrarias y Veterinarias at Universidad Nacional del Litoral. They took an intensive Spanish course, followed by a semester of pre-veterinary science courses in Spanish at the university. Gray, an animal sciences major, said she was impressed by the kindness and patience of the students and professors with whom she interacted.

"Everybody was helpful, willing to help explain things to us, to speak more slowly, whatever we needed," she said.

"I think I have a better sense of independence and self-confidence now," said Gorman, a biological sciences major. "This is the first time I've had to rely on a foreign language, and it feels empowering to have that experience."

In Argentina, Gorman had the chance to go out in the field with animal science researchers, which he credits with giving him a better sense of the diversity of work veterinarians do. On one trip, the group consulted with a dairy farm coping with low milk output; at another, they studied a collar that projects when a cow is capable of conceiving, to determine the best time for artificial insemination.

Gray said the experience affirmed her desire to go to vet school after she graduates. She's hoping to specialize in wildlife health and rehabilitation.

"Having that experience of being in classes with other vet students, talking through the medical and veterinary aspects of these problems, this is definitely what I want to do," she said.



Zachia Gray '16 at the Museo de la Ciudad in Salta, Argentina.



Ian Pengra '16 looks out over Habana Vieja in Havana, Cuba.

## NEW CORNELL IN CUBA PROGRAM SENDS FIRST UNDERGRADS

By Krisy Gashler

In December 2014, U.S. President Barack Obama and Cuban President Raul Castro announced that they would normalize relations between our countries. By January 2015, Cornell's first two undergraduates were on their way to study abroad in Havana.

Ian Pengra '16 (CALS) and Wesley Schnapp '16 (Arts & Sciences) inaugurated the new Cornell in Cuba program, studying at the University of Havana and conducting research with renowned Cuban biology professor Emanuel Mora. The universities signed an exchange agreement in April 2014, initiating the process that enables Cornellians to study in Cuba and vice versa. The first Cuban student came to Cornell this summer.

For their research project, Pengra and Schnapp studied bat communication. They took pre-recorded bat distress calls and played them near a cave populated by hundreds of thousands of bats. Then, using an ultrasonic microphone, they listened in on the bats' reactions.

"They are always echolocating, but we saw that the number of 'pings' per minute skyrocketed every time we played a distress call," Pengra said. "They're either directing their calls to see why the bat is in distress, or else they just feel more distressed themselves and so are calling out more frequently."

Pengra said the experience helped him learn to develop better research questions and to appreciate supplies that most Cuban researchers have to do without, including adequate batteries and LED lights.

"It helped me realize that to be a good researcher—and Emanuel is a top-quality researcher—what you really need is to be able to ask good questions and know how to exploit what you have available to you. They have amazing biodiversity available," Pengra said.

In spite of the 50-year embargo between Cuba and the United States, Pengra said he never felt any animosity from the Cubans with whom he interacted—quite the opposite, he was impressed by their generosity.

"For one field expedition, we stayed at a water buffalo ranch, up on one of their fields near the cave. Around breakfast time, we came out and saw that the people who owned the farm had brought out bowls of chicken soup, cheese, coconut paste. They just brought out literally everything they had in their fridge to share with us," Pengra said. "The philosophy is basically, you share what you have. You'll inevitably run out, but until then, you share what you have with the people that you love. That was a really profound thing to learn."

## SUMMER SCHOLAR MAPS PATH TO ROT-RESISTANT GRAPES *By Amanda Garris Ph.D. '04*

In the final week of her internship, Anne Repka '17 set parameters, pressed go, and in less time than it takes to eat lunch, her summer's worth of field work was translated into a statistically significant genome discovery. She had identified several regions of chromosomes that can make grapevines prone to infection by a fungus that rots the berries as they ripen on the vine.

Repka was one of 25 students who spent the summer at Cornell's New York State Agricultural Experiment Station as part of the Geneva Summer Scholars Program, tackling projects from bumblebee pollination to plant viruses. The program, established in 2009, introduces top undergrads from across the country to the rigors of research on agricultural crops. For Repka, no such introduction was necessary; she is double majoring in plant science and viticulture and enology and is planning to minor in crop and soil science.

Repka worked with postdoctoral associate Elizabeth Takacs and Bruce Reisch, professor of horticulture and grape breeder in the School of Integrative Plant Science, on a vineyard challenge posed by the black rot fungus (*Guignardia bidwellii*). According to Reisch, it is nearly impossible for organic farmers to stop its spread using approved treatments, so developing resistant varieties with the help of new genetic markers is a priority for his breeding program.

To make progress, Repka collected data on the resistance and susceptibility of two populations, using lab-reared spores to inoculate developing clusters and checking the progress of disease at three-day intervals. At the end of the experiment, the clusters were collected, scored for symptoms and photographed. This field data, when combined with genetic data that had already been collected in Reisch's



Anne Repka '17 in a vineyard at Cornell's New York State Agricultural Experiment Station in Geneva scouting for evidence of the black rot fungus. Photo: Elizabeth Takacs

lab, helped them identify regions of the genome that made grapevines more susceptible.

"The experiment was so well laid out that we were able to get it done in a short time during the summer," Repka said. "It was a really good experience."

## REVAMPED FOOD SAFETY COURSE OFFERS ESSENTIAL CREDENTIALS *By John Carberry*

A team of faculty and extension experts have cooked up a new recipe for a long-running food science course, one instructors and students say will open doors to future employment.

Food Safety Assurance (FDSC 3960) has been offered every two years; it's a requirement for undergraduates and a staple for some graduate students as well. Still, food science professor and class instructor Randy Worobo said he and Gellert Family Professor in Food Safety Martin Wiedmann, Ph.D. '97, began to wonder if there was more that could be done to prepare students for a dynamic and demanding industry.

"The class was changed to focus on industry-required skills," Worobo said. "We knew it was going to be a great advantage to the students."

That big advantage comes from two acronyms—HACCP (Hazard Analysis and Critical Control Points) and SQF (Safe Quality Food), certifications that are essential credentials in safe food processing. Extension support specialist Kim Bukowski brings her SQF industry instruction to the classroom through a first-in-the-U.S. partnership between a university and the Safe Quality Food Institute.

"To our knowledge, no one in the continental U.S. is offering both certifications for undergraduate students," Bukowski said. "Having these students come out already certified, it's really valuable to them."

Food science undergraduate Avery Becker, a senior focusing on toxicology research, was among the first students in the redesigned course and predicts it will give him a leg up in the job market.

"This class takes the principles and applies them to what is actually done at the plant," Becker said. "That's why I've got a major advantage."

CALS will offer the new course every spring, and the team of instructors is working on a revised course plan that will allow them to expand enrollment to as many as 75 students per class while keeping group and hands-on elements intact.

"These kids are brilliant," Bukowski said. "They have open minds and ask very different questions. They've really opened my eyes, too."

# FORAGE AND FUEL: FEEDING *the* GLOBAL APPETITES

*By Sarah  
Thompson*

**B**y the middle of this century, the global population is estimated to reach 9 billion. There will not be just more mouths to feed: Demand will grow for animal feed, for land on which to grow feed and food, and for energy to produce it all. What if it was possible to spare cropland while simultaneously creating renewable sources of energy and feed, and improving human health? It's the holy grail of sustainability, and researchers at CALS are part of the quest to develop a portfolio of systems—based on harvests from willow, grasses and algae—that work together to satisfy anticipated feed and energy demands, while using marginal lands, finding profitable uses for byproducts, and providing a buffer against the volatile fuel market.



Larry Smart, associate professor of horticulture, examines a willow seedling from his breeding program. Photo: Robyn Wishna

## CRITICAL BIOMASS

Agricultural crops, aquatic plants, wood and animal wastes: All are biomass, the catch-all term for any renewable source of carbon-rich organic matter. The building block of life on Earth, carbon constantly cycles through the air, water, soil and all living things. The most basic way to release the stored energy in biomass is through burning it. As a renewable energy source, biomass combustion is very attractive: It can utilize a variety of waste streams, has lower emissions than coal, and is a proven, relatively inexpensive process. It's a process that Larry Smart '87, associate professor of horticulture in the School of Integrative Plant Science, is working to improve, and key players are starting to take notice.

"The industry is picking up steam. There's a lot of interest right now in burning wood chips and pellets for heating, especially in small commercial and industrial settings.

There's been a lot of grassroots enthusiasm and government support in New York, Montana, Maine, Vermont and New Hampshire," said Smart, who directs the New

York shrub willow breeding program at Cornell's New York State Agricultural Experiment Station in Geneva.

Smart's group breeds shrub willow varieties for two main bioenergy applications: biomass combustion and transportation biofuel. Shrub willow is one of a group of perennial plants, including forage grasses like switchgrass and big bluestem, which researchers think can become important bioenergy crops. As a sustainable source for wood chips, shrub

willow has several advantages over wood harvested from forests, according to Smart. It can be harvested every two to three years for at least 25 years without replanting, requires essentially no fertilizer or herbicide after initial establishment, and grows well on marginal soils that farmers aren't using for other crops.

In partnership with the Northeast Woody/Warm-season Biomass Consortium (NEWBio) and the Northeast Sun

**"There is a strong push for local production of food these days; I would love to see us make the same push for local production of renewable energy."**

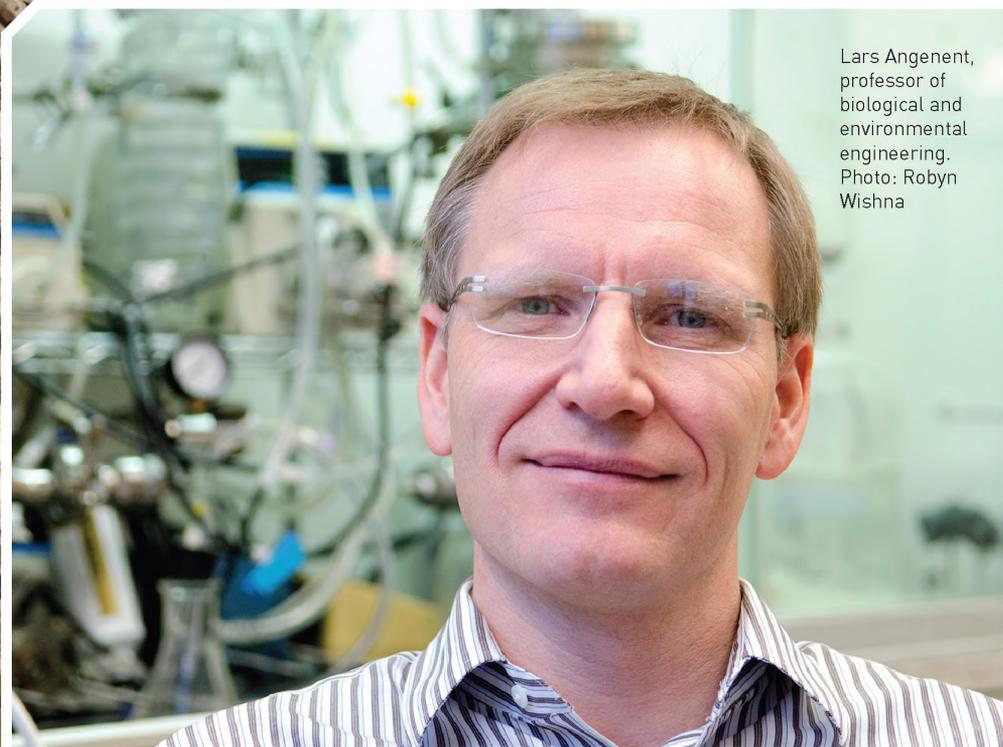
—Larry Smart '87, associate professor of horticulture in the School of Integrative Plant Science

Grant Initiative, Smart is breeding shrub willow to make it better adapted for bioenergy production. His newly patented 'Preble' variety is a prime example, bred to grow rapidly, produce nearly 30 percent more woody biomass on average than other current production cultivars, and to better resist rust disease and insect pests. 'Preble' also has been shown to have greater tolerance of salt-affected fields. And now that the U.S. Department of Energy and a group in China have

sequenced the genomes of two shrub willow species, Smart said his work on genetic marker-assisted breeding will gain even more momentum.

"It's all economics, but the main driver is yield, which is why breeding is so important," Smart said.

In the Northeast, which uses the most fuel oil in the country for heating, Smart said shrub willow can provide communities the opportunity to grow and generate their own renewable energy to offset use



Lars Angenent, professor of biological and environmental engineering. Photo: Robyn Wishna

**“Carbon monoxide is actually very useful material that can be used to manufacture many different chemicals. Bioenergy is just one outcome. With changes in economics—when petroleum fuel is cheap—it could always be used to produce other chemicals with higher value.”**

—Lars Angenent, professor of biological and environmental engineering



of more expensive fossil fuels.

“There are still a large number of rural communities without access to cheap natural gas, so they heat with oil or propane. Willow can be less expensive, and folks can be proud that their energy is produced locally,” Smart said. “There is a strong push for local production of food these days; I would love to see us make the same push for local production of renewable energy.”

## **BIOENERGY BALANCING ACT**

Smart and colleagues are also assessing willow and switchgrass to reclaim mine sites and buffer sensitive waterways from farm field nutrient runoff. Multitasking is a common theme in bioenergy, because many biofuels can’t yet compete with petroleum-based fuels on cost alone. Corn ethanol and soy-based biodiesel production have become very established sectors—and produce large quantities of animal feed as a byproduct—but they rely on large amounts of prime land, water and fertilizers.

Cellulosic ethanol, made from the cellulose that stiffens plant cell walls, is viewed as more ecologically sound because it can be derived from the non-food parts of plants, such as wood and stems, rather than kernel and bean. However, breaking down wood or grass into sugars to ferment into bioethanol is complex because the carbon is locked in large molecules that bacteria can’t access without pretreatment with acids and enzymes. Lars Angenent, professor of biological and environmental engineering, is researching an ethanol production system that instead uses pyrolysis as a pretreatment.

The process begins with organic matter—crop residue left after harvest—which is converted into gases using the combination of high temperature and low pressure in the absence of oxygen, i.e., pyrolysis. According to Angenent, who works with biochar expert Johannes Lehmann, a professor of crop and soil science in the School of Integrative Plant Science, while 50 percent of the carbon can be returned to land as biochar, a fertility enhancing, carbon-sequestering soil amendment, most of the energy and 70 percent of the mass—as carbon monoxide and oil—is suitable for making biofuel, with a bit of help from microbes.

"All that the anaerobic fermentation requires, in addition to the carbon monoxide as a food source, are some trace elements needed by the bacteria," Angenent said. "You bubble carbon monoxide gas in a system with no oxygen, and the bacteria produce ethanol that can be used for fuel."

This system, which uses a strain of *Clostridium* bacteria, also produces some acetic acid—basically vinegar—and Angenent is working to determine which parameters, such as pH, maximize the production of ethanol relative to acetic acid. Other challenges are extracting the ethanol fuel from the rest of the bacterial broth and getting the carbon monoxide into the broth and accessible to bacteria. Even with these hurdles, it's a versatile system that could be used as a platform for producing other materials as well, but that will require genetically modified bacteria.

"Carbon monoxide is actually very useful material that can be used to manufacture many different chemicals," Angenent said. "Bioenergy is just one outcome. With changes in economics—when petroleum fuel is cheap—it could always be used to produce other chemicals with higher value. If you pair it with pyrolysis, you can produce both fuel for transportation or cooking and biochar, which is a very useful soil amendment in degraded and especially tropical areas."

## MAKING THE SWITCH

Switchgrass has the potential to become a feasible source of cellulosic ethanol, and New York has the right climate to grow biomass grasses in three seasons.

"Before the interest in biofuels, there were some switchgrass breeders in the Midwest, but they bred more for quality to feed beef cows. Our goals are much different. We're growing a crop of stems," said Donald Viands, professor of plant breeding genetics and leader of the Cornell Forage Breeding Project, an ongoing perennial forage improvement program with a strong track record with alfalfa.

Viands and Gary Bergstrom, professor of plant pathology, are assessing switchgrass yields, quality and disease management to improve it as a feedstock for biomass energy. Before their efforts, Bergstrom said there were reports of more than 40 diseases on switchgrass in natural settings, but no one knew what might happen in commercial plantings.

"In New York state we identified several switchgrass diseases, but the problems weren't all that severe at

first. One lesson was that as fields of the grass become older and more numerous in the region, minor problems become more intense," Bergstrom said.

Bergstrom has identified certain diseases of switchgrass that could reduce its profitability as a biofuel crop. In particular, he's focused on a fungal disease

recently identified in New York called smut (*Tilletia maclaganii*). A systemic smut infection can cause up to a 50-percent reduction in grass biomass, which Bergstrom said "might be a deal breaker"

for the cellulosic ethanol industry and other bio-based industries, such as industrial absorbents used by the oil and gas industries, animal bedding, and bio-based plastics. Research associates in the Bergstrom lab are studying the biology of the smut infection process to develop insights that might be exploited for new disease management methods.

According to Bergstrom, diversity may be key to control, whether that diversity comes from mixed cropping of different native grasses—including Indiangrass, big bluestem, and coastal panicgrass—or breeding new varieties of switchgrass with disease resis-

tance. To that end, Viands and senior research associate Julie Hansen are helping identify diverse grass populations with disease resistance or tolerance. They are using them for selective breeding, while Bergstrom works with breeders across the United States to diagnose localized switchgrass diseases, to anticipate and



Cinnamon-colored spores of the switchgrass smut fungus are revealed when an infected seed panicle is rubbed between thumb and forefinger.

Photo: Gary C. Bergstrom





**Before the interest in biofuels, there were some switchgrass breeders in the Midwest, but they bred more for quality to feed beef cows. Our goals are much different. We're growing a crop of stems.**

—Don Viands, professor of plant breeding genetics in the School of Integrative Plant Science

assess future disease threats.

"Switchgrass remains productive in the field for 10 to 20 years, but we need to have pest and disease resistance, and the yields, to make it worthwhile," Viands said.

## **NEXT GENERATION AND NET-POSITIVE**

Even though the promise of cellulosic biofuel is great, Bergstrom said that low fuel prices are pushing researchers and biomass producers to find additional applications and markets for switchgrass, such as animal feed, industrial absorbents and plastics. It's a challenge facing every bioenergy solution.

"Biofuels are [currently] not cost competitive with cheap oil," said Beth Ahner, CALS senior associate dean and professor of biological and environmental engineering.

This is why the algal biofuel industry continues to move in "fits and starts," Ahner said, even though single-celled marine algae have many advantages over land plants used for biomass. They can be grown rapidly in reactors or ponds placed on poor soils; use less water than some agricultural crops; can thrive in salty water; and selected species can produce more than three-quarters of their weight as fuel's raw materials—oils and sugars—under optimal conditions. And, aside from dealing with its high water content, turning algae into biodiesel, diesel or aviation fuel is fairly straightforward.

Ahner is working to make algal biofuel production more efficient and, therefore, more cost competitive and attractive to potential investors. In one project, she and Ruth Richardson, associate professor of civil and environmental engineering, are working to identify biomarkers of stress in commercial algae pools, which have lower growth rates than lab populations. After reaching a certain density in these

pools, algae are “starved” of nutrients to promote natural accumulation of oils. By measuring the level of gene expression in these algae under varying stressors, Ahner and Richardson hope to find five to six biomarkers that producers can use to tweak and optimize the process.

“This work will allow us to understand the stresses going on inside these commercial systems, which are ‘black boxes’ right now,” Ahner said.

At the other end of the algal biofuel process, Xingen Lei, professor of animal science, is turning an algal biofuel byproduct into profits by testing defatted algae remaining after biofuel production as a high-nutrient, healthier and more sustainable ingredient in animal feed and potentially human diets.

“Our purpose was to see if this defatted algae is better for animal feed, if it has more protein and less fat, and how much we can use to replace the soy protein in animal feed and spare it for human use,” Lei said.

Lei’s lab has conducted 20 experiments with algae-based feed for pigs, broiler chickens, laying hens and mice, finding that defatted algal feed (DFA) has excellent nutritional quality and high protein, and can safely replace five to 20 percent of the corn and soy protein in animals’ diets. Lei’s team estimated that, based on these replacement rates, DFA could save up to 23 million tons of corn and soy for human consumption annually—and spare a land area the size of the state of Tennessee for other uses.

Lei also found that the meat and eggs of chickens fed DFA accumulated high levels of omega-3 fatty acids, a family of essential polyunsaturated fats our bodies acquire from diet alone. Lei said research continues to point to a key role for omega-3s in healthy aging and managing heart disease. In addition, Lei found that the form of iron in algae is absorbed by animals more rapidly than iron from other sources, alleviating anemia in mice and pigs at very low doses. Soon, eggs enriched with omega-3s from algae and algal iron supplements may become key tools for improving global health and nutrition.

This idea and others being investigated by CALS scientists are new twists on Earth’s constant cycling of carbon. Their goal is to hit the sustainable sweet spot: a planet fueled by complementary systems that don’t just create as much energy as they consume but have a net-positive effect on our economies, environment and health.

“That’s the beauty of science,” Lei said. “We can make all the components work together, not against each other.”



Photo: Robyn Wishna

Professor of biological and environmental engineering Beth Ahner and post-doctoral associate Lubna Richter look for algae carrying a gene that enables it to produce a high value protein.

## LIGHT AS A FEATHER?

In the United States, our collective appetite for chicken results in more than one million metric tons of feather waste per year, which ends up in landfills or incinerators. Their disposal contributes to nitrogen pollution in soil and waterways as well as greenhouse gases from burning.

“Poultry feathers are a renewable, natural resource, but they are also an environmental problem,” said Xingen Lei, professor of animal science, who is working on a new method to turn this fluff into feed for animals.

According to Lei, the value of feathers lies in their high protein content: 85% by weight. The challenge is that the protein is  $\beta$ -keratin, durable for flight but tough to digest. The high-pressure cooking process used since the 1990s to make feed from feathers results in a feed with less available protein and a poor amino acid profile. Lei is looking to bacterial enzymes and enzyme combinations that can more efficiently convert the protein in feather waste into a high-quality, more digestible protein supplement for animal feed.

Using a bacterial strain that can dissolve feathers fully within 60 hours, Lei’s lab is applying genomic, proteomic and biophysical tools to identify the unique enzymes produced by this bacterium to break down feathers. According to Lei, refining this process would allow poultry feathers to replace some of the corn and soy in animal feed and create a cost effective and sustainable source of protein for other industries, while eliminating 150,000 metric tons of nitrogen entering the environment every year.

















Photo: Rob Way

“Preliminary data show that people with depression are more concerned about how they present themselves on social media than ‘normal’ folks and they’re less satisfied with what they share, even when they get responses from others.”

Natalie Bazarova,  
assistant professor of  
communication

**A** Facebook post about a bad day, the placement of chocolate milk in the school cafeteria, taxes on sodas: Research on strategies for health and wellbeing is now encroaching on the turf of advertising, social media and behavioral economics. To understand influence—what nudges our minds and behaviors in seemingly small ways—CALs researchers are harnessing research in communication, psychology, economics and public policy to find new and inventive ways to give public health a big boost.

Assistant professor of communication Natalie Bazarova '05, Ph.D. '09, looks at how people communicate across social media and what effects this has on their lives, relationships and wellbeing. She's particularly interested in the personal information people share—and sometimes overshare—through social media applications like Facebook, Twitter and Yik Yak, as well as their goals and motivations in sharing this material.

“The technology is always changing,” said Bazarova, who directs the Social Media Lab at Cornell. “We want to understand the principles of human communication and its relationship to health that extend beyond a specific app.”

To develop the necessary tools to explore these kinds of communication, Bazarova sought out interdisciplinary partners, including Dan Cosley, associate professor of information science, and Janis Whitlock, Ph.D. HumEc '03, a research scientist in the Bronfenbrenner Center for Translational Research and director of the Cornell Research Program on Self-Injury and Recovery.

Recently the group undertook a National Science Foundation-funded study that examined mental health and how it relates to human experiences on the internet through the prism of social media. By asking subjects what they share online, how people respond to these posts, and how the sharers' sense of wellbeing fluctuates in the presence or absence of social support, Bazarova and her collaborators are finding that while social media has the potential to boost wellbeing it can also have negative consequences when people overshare personal information.

“Yes, it can help us with wellbeing, but it can also open a can of worms, from cyberbullying to silence,” Bazarova said.

Another recent study looks at the way people use social media to send distress messages and how others make sense of those messages and evaluate whether they require help. A related project examines what happens when messages are not just distressing but damaging to others and whether such displays of cyberbullying motivate people to act.

“Are we promoting a culture of bystanders because it's happening in social media?” Bazarova asked.

A study currently underway investigates people who have a history of mental health issues and how their experiences with social media differ from the rest of the population. The researchers are hoping to see if the way these people share information online could be an early indicator of distress.

“Preliminary data show that people with depression are more concerned about how they present themselves on social media than ‘normal’ folks and they’re less satisfied with what they



“When there’s a perception of abundance people take a lot because it’s suggested they should. That perception of abundance helps sell it. So making it look like ‘Well, you can take these, but we don’t have a lot of them’ was enough to change people’s behavior.”

David Just, professor in the Charles H. Dyson School of Applied Economics and Management

Photo: Rob Way

share, even when they get responses from others,” Bazarova said.

The ultimate goal is to create a more caring community in this new digital environment, one in which participants can intervene and mitigate negative consequences.

## NUTRITIONAL NUDGES

For David Just, it is the little things that have the greatest impact. Just is a professor in the Charles H. Dyson School of Applied Economics and Management and co-director of the Cornell Center for Behavioral Economics in Child Nutrition Programs (BEN), and he combines psychology and economics to understand how consumers make decisions in “food choice environments,” like the lunch line at school or a grocery store checkout.

“For the most part people don’t think very carefully about food decisions, even when they’re making them,” Just said. “They are responding to their environments and what they think is normal and acceptable. It’s pretty easy to change that up.”

The challenge, according to Just, is that the majority of food policies that encourage people to eat healthier—labeling calories, for example, or banning unhealthy items—fail to take into account the way consumers actually behave, and these policies rarely reach the people who truly need their help.

The trick is to motivate people to eat healthier foods, like fruit and vegetables, and fewer sugary snacks without overburdening them in the process.

In a recent field experiment that sought to boost fruit and vegetable consumption among the Hispanic population in El Paso, Texas, Just and his team visited a grocery store and placed six-foot-by-three-foot arrows on the floor pointing toward the produce section. The arrows resulted in a 9.5-percent bump in produce sales.

Another experiment found that consumers will purchase bottled water instead of soda if the bottled water is in a more visible and accessible location. An experiment at a food pantry revealed that if given the choice between a pile of bagels or a pile of donut holes, one-third of participants would pick the calorie-dense donut holes. But when the display quantity of donut holes is limited to a single bag of six donut holes versus a stack of many bags of six bagels, only seven percent of participants chose the donut holes.

“When there’s a perception of abundance people take a lot because it’s suggested they should. That perception of abundance helps sell it,” Just said. “So making it look like ‘Well, you can take these, but we don’t have a lot of them’ was enough to change people’s behavior.”

Through his work with the BEN Center’s Smarter Lunchrooms Movement, Just has helped bring these types of simple, yet healthy, solutions into school cafeterias across the country. Recommended strategies include providing healthy food items in “grab-and-go” lines while keeping unhealthy items in longer lines that make students wait, and placing white milk first in lunchroom coolers, which resulted in an increase of up to 46 percent in white milk sales.

“These are simple interventions, but at the same time we’re doing it in a way that doesn’t overburden them. Food pantries don’t have many resources, and schools don’t have many resources. Grocery stores actually run pretty thin as well,” Just said. “So it has to be something that’s super simple, not particularly expensive, and that actually has a measureable benefit.”

## SCALING BACK

For David Levitsky, a CALS professor in the Division of Nutri-

tional Sciences, the solution is not in the food aisle but on the scale.

Levitsky has spent his professional career studying the control of food intake and regulation of body weight, and he believes the number one nutritional problem faced by the United States—and most countries, for that matter—is rising obesity rates, which have been increasing for the last 50 years.

To slow the growth of girth, Levitsky advocates for another simple technique: frequent self-weighing.

Levitsky's research into self-weighing began about ten years ago when he started looking into the amount of weight Cornell freshmen typically gain in their first semester on campus.

"We discovered what the students knew anyway. The weight gain at Cornell is pretty hefty," Levitsky said. "It's about five pounds that first semester. And I became intrigued with this because that's exactly what's happening in the world outside of Cornell. People are gaining weight, and when you ask them 'Why?' they don't know, because that weight gain, despite being five pounds over 12 weeks, is still too small for you to see. So the scale is a way of actively visualizing it."

The basic act of stepping on a scale every morning serves as a "negative prime," countering the stimuli that lead a person to eat. And those stimuli can be quite persuasive. Levitsky's studies have shown that the mere act of discussing food, seeing a food ad on TV, or even looking at a bowl, can trigger a person to eat.

"There's this environmental structure in the food system that makes becoming overweight very easy," said Lua Wilkinson, a graduate student in the Division of Nutritional Sciences and advisee of Levitsky. "Making that system visible to the individual is very difficult, particularly when they're just inundated with unhealthy practices, including high fat, fast food, convenience food, low exercise, ads on TV. Frequent weighing helps you make these invisible forces more visible so you're able to see your weight change over time with the environment you're in."

Between the ages of 20 and 40, most people gain an average of one pound a year, Levitsky said, and it's this in-

cremental creep that can eventually lead to obesity.

The problem is even more pronounced for adolescents. In a recent pilot study in Huntsville, Ala., Levitsky focused on obese and overweight children between the ages of 8 and 11. While the amount of weight they gain is smaller, it adds up over time and becomes that much harder to shed after adolescence. Levitsky is hopeful that self-weighing each day will help the children avoid a lifetime of health issues.

"All the major pathologies, whether you're talking about diabetes, heart disease, stroke or cancer, all increase as weight increases," he said. "These are expensive diseases, and the fatter we get, the greater the expenses. It's eventually going to hit us in the pocketbook, and the medical cost of insurance will skyrocket unless we can at least stop gaining weight."

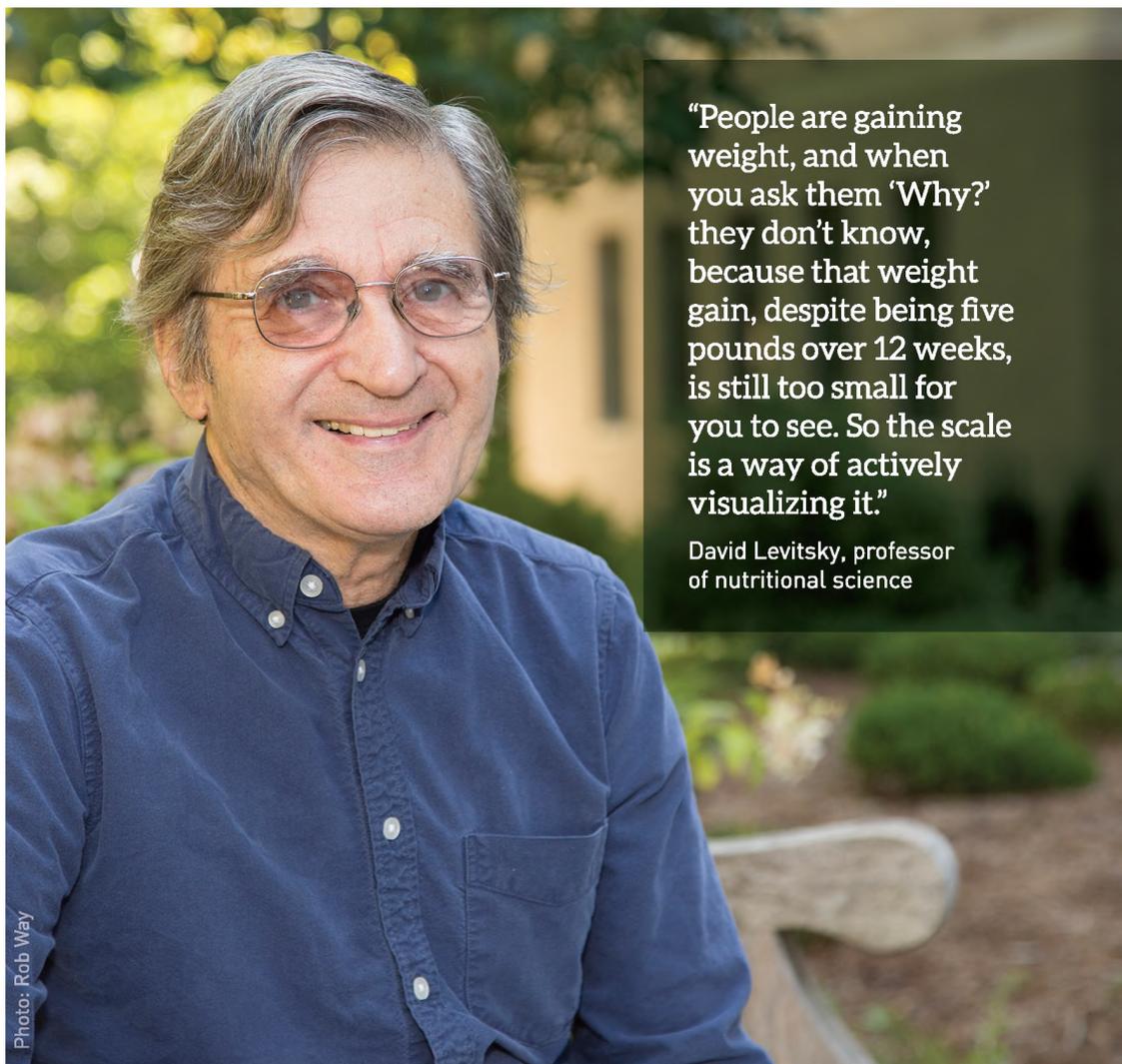
## PITCH OR POLICY

While individuals may struggle to stave off the pounds, there are also a number of anti-obesity policies that have been

proposed to help in the battle of the bulge. Harry Kaiser, the Gellert Family Professor in the Charles H. Dyson School of Applied Economics and Management, is a behavioral economist whose recent research has examined the effectiveness and impacts of such policies, like fat and sugar taxes, anti-obesity advertising, and healthy food subsidies—financial incentives such as discounts and reduced prices.

"Obesity has reached epidemic proportions in the United States, and there are a lot of theories on why that is the case," Kaiser said. "What I've been looking at is the efficacy of some of the social and economic policies that either have been implemented or are being proposed. I'm not really using traditional, economic models but more in the behavioral and experimental areas instead."

Through his experiments and a National Institutes of Health-funded field study, Kaiser found the least effective policy is the healthy food subsidy, which has a tendency to backfire on participants, who end up purchasing more unhealthy foods along with more fruits and vegetables.



"People are gaining weight, and when you ask them 'Why?' they don't know, because that weight gain, despite being five pounds over 12 weeks, is still too small for you to see. So the scale is a way of actively visualizing it."

David Levitsky, professor of nutritional science

Photo: Rob Way



Photo: Tiff Lukk

“If the labels are just the right amount of scary and they tell us how to solve the problem also, then we actually are more willing to let them in and think about how they apply to us.”

Sahara Byrne, associate professor of communication

tively seek out the banned product as a way to reaffirm their freedom of choice.

Kaiser’s studies show that the strongest policy for reducing obesity is healthy food and anti-obesity advertising, and his ideal solution would be a tag-team approach: implementing a food tax on unhealthy items, with the proceeds funding a robust anti-obesity advertising program.

“There’s a reason we have so much advertising,” Kaiser said. “Because it works.”

### MECHANICS OF MESSAGING

Given the ubiquity and sophistication of modern advertising, and how much media dominates contemporary life, Sahara Byrne, associate professor of communication, is working to help people make sense of all the health-related messaging that bombards them

every day.

“They are being exposed to messages that are contrasting, that are helping, that are hurting, and so I’m trying to help supply some clarity and some effectiveness to that daily experience,” Byrne said.

Of particular interest to Byrne are the ways that messaging efforts intended to help people can sometimes go awry and

have the opposite or unintended effect, or sometimes no effect at all.

For example, recently Byrne saw an ad in the subway that featured a drawing of an overweight man with a stomach full of visible items, including fast food, french fries, soda and donuts. An accompanying text explained how the unhealthy food had made the man fat. But for Byrne, rather than being dissuaded from buying junk food, the poster actually made her hungry. She also wondered how the poster would appear to children who could not read the explanatory text, or to women who felt the image only applied to men.

“These are all different kinds of mechanisms that might cause messaging to backfire or not work or have an unintended effect on audiences,” Byrne said.

For a recent grant from the National Institutes of Health, Byrne has teamed up with associate professor of communication Jeff Niederdeppe, dean of Human Ecology Alan Mathios and Cornell Law School professor Michael Dorf to examine the placement of graphic warning labels on cigarette packages. They are determining what such warning labels would look like, who they would be most effective for, and whether the graphic labels could backfire and instead scare people into covering them up and ignoring the message.

“If the labels are just the right amount of scary and they tell us how to solve the problem also, then we actually are more willing to let them in and think about how they apply to us,” Byrne said.

Another study, which Byrne conducted with Geri Gay, communication and

The benefits, then, are negligible.

Taxing unhealthy foods proves to be a slightly more successful tactic, although it may not be effective in the long run. In Kaiser’s experiments he implements a 20-percent tax, which causes his subjects to curtail their purchasing of unhealthy foods immediately. However, over time people will generally return to their previous pre-tax consumption habits.

According to Kaiser, this reversion is particularly true with Americans, who—due to the relative wealth of the United States—are less sensitive to price increases than other populations around the world. And although income level can affect price sensitivity, even lower income Americans tend to be fairly insensitive to price changes under 25 percent.

“When you use a fiscal type of policy like a tax or subsidy to try to change behavior, you’re already dealing with people who are not very price-sensitive anyway, so whether you increase the price or decrease the price you have to do it by quite a bit to have much of an impact,” he said.

While some regions have tried to ban unhealthy products, most notably New York City in its campaign against large sodas, those policies often trigger a backlash among consumers, who will ac-

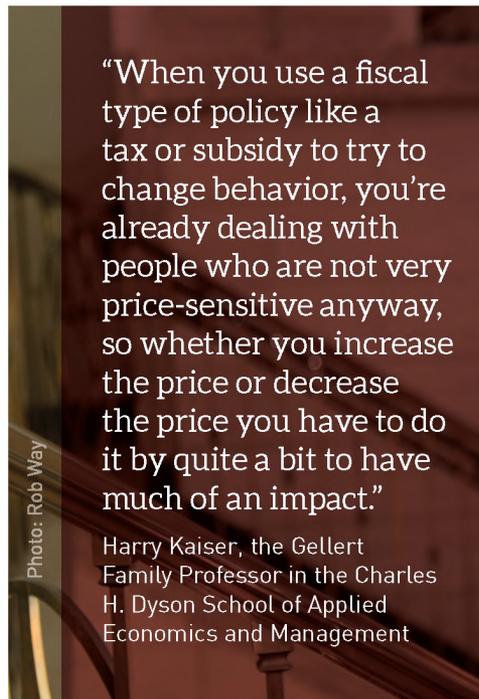


Photo: Rob Way

“When you use a fiscal type of policy like a tax or subsidy to try to change behavior, you’re already dealing with people who are not very price-sensitive anyway, so whether you increase the price or decrease the price you have to do it by quite a bit to have much of an impact.”

Harry Kaiser, the Gellert Family Professor in the Charles H. Dyson School of Applied Economics and Management

information science professor, examined the way that technology, and specifically iPhones, can deliver health messages custom-tailored to youths.

“That is going to be a huge area. Like marketing is very much tailored, so our health messaging will be,” Byrne said. “But it’s difficult to know what kind of processor a person is, if they are highly reactant or have lower cognitive ability. We are not quite there yet, but we’re getting really close.”

One constant challenge Byrne faces is that her research involves a great deal of field work, particularly with youths and underrepresented populations who are often difficult to reach. However, a recent NIH grant is funding a mobile lab equipped with experiment stations that will allow Byrne to travel to inner city neighborhoods and schools.

“That field work is about to get really interesting with this mobile lab. I’ve always had to bring all my equipment to malls, where I do a lot of research, or school grounds,” Byrne said. “Now I can bring it in its own little environment. Space is very scarce in schools and in cities. So I’ll be able to have the lab come to them.”

## STRATEGIC STORYTELLING

Sharing the grant for the mobile lab is fellow associate professor of communication Jeff Niederdeppe, whose own work measures the role of mediated communication in shaping human health behaviors and also the support such health-related policies receive.

Niederdeppe’s projects range from efforts that promote safer consumption of fish to those reducing smoking and obesity among youths to analyzing the marketing of prescription pain medication, all with an emphasis on prevention.

Recently Niederdeppe looked at the roles strategic communications play in shaping public support for policies that would create healthier environments, such as taxes on alcohol or sugar-sweetened beverages and restricting marketing to youths.

Specifically, Niederdeppe and colleagues wanted to see how various message strategies on the pro-policy side intersect with counter messages that come from industry and other opposition-minded groups. For instance, Niederdeppe compared the effectiveness of storytelling strategies that personalize issues, such as a mother with a daughter who is experimenting with cigarettes, versus an “inoculation” method that preemptively addresses the points that industry would make in opposition to

policies to restrict their marketing and promotion. Niederdeppe found that while the storytelling approach is effective, if a policy faces strong resistance from an industry willing to spend great sums of money to undermine support, then the inoculation strategy is preferable.



“You can have a message that says, ‘Look, this product kills 3,000 people a day,’ and ‘This company knows it and is promoting this product to you anyway.’ And that’s a really powerful combination.”

Jeff Niederdeppe, associate professor of communication

Niederdeppe also collaborated with Rosemary Avery, professor in the College of Human Ecology’s Department of Policy Analysis and Management, to look at what types of anti-tobacco messages have most greatly reduced youth smoking rates over the last ten years.

Using a database that Avery assembled that catalogues and classifies tobacco ads from all 50 states over the last decade, the researchers were able to isolate two types of messages most often associated with lowered smoking rates: ads that emphasize long-term health consequences of smoking and ads that emphasize the tobacco industry’s role in promoting their products.

“Both of those have a synergistic effect,” Niederdeppe said. “You can have a message that says, ‘Look, this product kills 3,000 people a day,’ and ‘This company knows it and is promoting this product to you anyway.’ And that’s a really powerful combination.”

Another project undertaken with the Department of Policy Analysis and Management examined the impact that direct-

the advertisements made the people who least needed the drugs request them more.

For Niederdeppe, this type of research may not change policy immediately but can slowly help shape it. The need is quite apparent. After all, healthier populations lead to more affordable insurance, a less strained healthcare system, and a stronger workforce. And one key to boosting collective health is to understand the messaging that supports—or sometimes undermines—it.

“Here in the United States we develop these campaigns to promote healthy behavior, and the level of exposure these campaigns receive are just drops in the bucket compared to the huge amount of health-related information we receive from big pharmaceutical companies, from fast food companies, from soda companies,” Niederdeppe said. “So we better understand what impact this other stuff is having, and if we want to compete with these messages we better understand what we’re competing with.”

# alumni notes

## A MESSAGE FROM THE CALS ALUMNI ASSOCIATION PRESIDENT

Those who know me well know that I cherish my trips back to Ithaca and that I visit as often as possible. In fact, even though I live in metro Washington, D.C., I am often asked if I live in the 14850 zip code (perhaps as a result of my enthusiastic campus photo and status sharing on Facebook?). There is just something about being back at Cornell—interacting with students and faculty, appreciating the familiar and the new aspects of campus—that has a positive, energizing effect on me.

I have volunteered as an alumna in various capacities for Cornell over the last 20 years, but only in the last few have I made my way “home” to CALS-specific volunteerism, to give back to the community which had such a formative role in my education. There is a tremendous amount of momentum in the college, from research to outreach; CALS truly is a microcosm of Ezra Cornell’s “Any



**Andrea Van Schoick, CALS '96, DVM**  
2015-16 CALS Alumni Association President

person ... any study” motto. Additionally, new developments in technology are making it easier for CALS alumni, students and faculty to connect with each other to create an even stronger synergy.

It is my honor to serve as president of the CALS Alumni Association for 2015-16. I hope that you, too, will find your way back home to CALS over the coming months and share the wisdom of your path with others (<http://cals.cornell.edu/get-involved/alumni/association/>). One of our great assets as an Alumni Association is the diversity of our collective backgrounds and experiences, which can benefit students and alumni alike. Please reach out to me if I can help facilitate these interactions in any way, or if you have suggestions for how we can serve the needs of current and future alumni. I would love to hear from you at [alv1@cornell.edu](mailto:alv1@cornell.edu).

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**MY CORNELL: LAUREN FRAZIER '15**

When I was younger I struggled with the words *mine* and *my*. I would feel almost embarrassed to claim possessions as my own. As I've grown older the things that are *mine* were earned through my own hands, my own mind, and the expression of that work is my pride. This is how I feel thinking of Cornell and every single person who walks its campus. They are mine: the people I love and those I've only glimpsed on the sidewalk; the sunsets over West Campus and the blizzards that hide the sun from view. I've earned the right to be among them, because I've stamped my love here time and time again, I've signed it into every assignment I've turned in, every hour I've spent in the library stacks, every tennis ball I've picked up at practice and every time I've

answered the question: So where do you go to school?

My senior year I spent five months at the University of Auckland in New Zealand. There, as a foreigner and outsider, my connection to Cornell became the strongest. I *was* Cornell to these people; I was the only representation of Cornell they'd ever known. I was Cornell's adventurous spirit when we pulled the car off to the side of the highway and crested an unmarked mountain to find the best panoramic view. I was Cornell's environmental voice when I spent lunchtimes washing reusable dishes that replaced the cafeteria's throwaway plastic containers, and I was Cornell's humanitarian plea when I participated in an initiative to raise money for the fight against poverty. Now when I think of *my Cornell*, it's interspersed with the newfound love I have for my semester in New Zealand, which



gave me the opportunity to really miss the campus high above Cayuga's waters.

*Lauren Frazier was a winner of the "My Cornell" Writing Contest held by the Sesquicentennial Steering Committee and the John S. Knight Institute for Writing in the Disciplines.*

**GELLERT FAMILY ENDOWS FOOD SAFETY RESEARCH CHAIR**

By John Carberry

A \$3 million gift from the George Gellert family—whose Gellert Global Group includes one of the largest collections of privately held food importing companies in North America—has created a new endowed professorship in the Department of Food Science. The position and its inaugural appointee, Martin Wiedmann, Ph.D. '97, will focus on prevention and control of bacterial foodborne illnesses and zoonotic diseases passed from animals to humans, including persistent public health threats such as *Listeria monocytogenes* and *Salmonella*.

"The association my family and I have had with Cornell has been a crucial element to our success in the food business," said George G. Gellert '60, MBA '62, J.D. '63. "It has helped us with relationships, ideas and solutions. As leaders in the food industry, it is important

to contribute to a business environment focused on food safety. It is a privilege for us to see that Cornell continues its leadership role in this discipline."

The Gellert family connections to Cornell and the food industry

started with Gellert's father, Imre Thomas Gellert '27. The Gellert-Cornell legacy continues to expand, with 15 Cornellians and 25 Cornell degrees among the family members, including 14 CALS grads.

"George and the Gellert family have been part of CALS and Cornell for many years. Their efforts and expertise have contributed so much to the very fabric of our university," said Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences. "This generous gift further extends the Gellerts' great legacy."



From left, Thomas Gellert '94, MBA '99, J.D. '00; Andrew Gellert '89; Robert Gellert '63, MBA '65; George Gellert '60, MBA '62, J.D. '63; Dean Kathryn J. Boor; and Martin Wiedmann, Ph.D. '97, the Gellert Family Professor in Food Safety. Photo: Lindsay France/University Photography



Julie Carter, HumEc '71; Professor Emeritus James White '39, Ph.D. '44; and Jay Carter '71, MEN '72.

**GIFT HONORS EMERITUS PROFESSOR JAMES WHITE**

James White '39, Ph.D. '44, first set foot in Stocking Hall when he arrived on campus as a freshman in 1934 to study bacteriology. As faculty member in the former Department of Dairy Industry, he enriched the building with his expertise in milk safety and dairy engineering—and enlivened it with his flair for storytelling—until his retirement in 1972. A gift from Jay '71, MEN '72, and Julie Carter, HumEc '71, that names a conference room for him ensures that his legacy will be honored in the newly renovated Stocking Hall. According to the Carters, who met White through his late daughter Debbie Pavelka, the gift is an expression of gratitude for the privilege and good fortune of decades of knowing him. The room was dedicated in a July ceremony, where White was hailed as a "visionary who has always been ahead of his time," a passionate advocate for the environment, and the consummate Cornellian.

Photo: Jennifer Benson

## alumni notes

### BELOVED RESEARCHER ROYALL MOORE'S GIFT TO FUND FUTURE FUNGI SCHOLARS

By John Carberry

He's remembered as a dedicated mycologist, a generous brother and a "sweet and down-to-earth" mentor—and now the late Royall Tyler Moore will be remembered by generations of Cornell students as the man who helped make their future in the study of fungi possible.

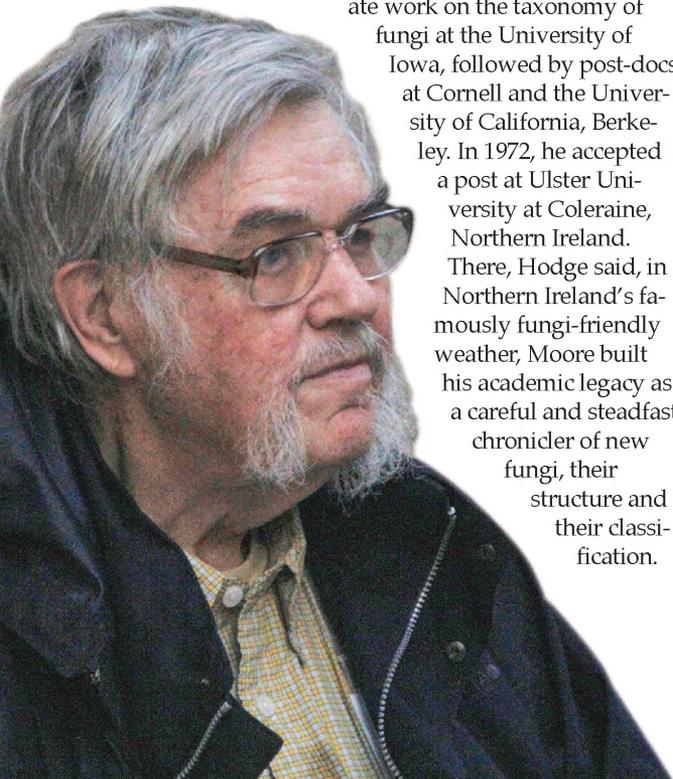
Moore, an Ithaca-area native who worked as a post-doctoral researcher at Cornell in the 1960s, died Aug. 17, 2014, at age 83 in Northern Ireland. He bequeathed almost \$500,000 to his former academic home to support graduate study in mycology, the study of fungi. The gift will be administered through the Section of Plant Pathology and Plant-Microbe Biology of the School of Integrative Plant Science.

"This was his legacy, what he wanted," said his brother Kent Moore BFA '63. "He loved it, and his idea was that the study of mycology might continue to benefit mankind."

A graduate of Michigan State College and Harvard University, Moore never received a degree from Cornell, although he came from a family of Cornellians. His mother, Frances Goodnough '25, studied English, and his father, Ulric Moore '25, earned a degree in dramatics and a doctorate in 1931. Younger brother Kent Moore earned his bachelor's in fine arts and is now an artist living and working in Ithaca.

"It just blew me away," said Kathie Hodge, associate professor of mycology and, since 2011, a digital pen pal of Moore's. "In his field, he was great, he was a pro. And he was just sweet and down-to-earth."

Moore pursued chemistry as an undergrad at Michigan State College, then began graduate work on the taxonomy of fungi at the University of Iowa, followed by post-docs at Cornell and the University of California, Berkeley. In 1972, he accepted a post at Ulster University at Coleraine, Northern Ireland. There, Hodge said, in Northern Ireland's famously fungi-friendly weather, Moore built his academic legacy as a careful and steadfast chronicler of new fungi, their structure and their classification.



### NORTHEAST AGRIBUSINESS AND FEED ALLIANCE SUPPORTS TWO CORNELL DAIRY FACULTY POSITIONS

By Amanda Garris Ph.D. '04



Northeast Agribusiness and Feed Alliance (NEAFA) leadership and Cornellians at the announcement of the faculty renewal gift. Front row: Rick Zimmerman '78, Rick Grant '65, CALS Dean Kathryn J. Boor, Danielle Penney, Bill Colten, John Clark '80, MBA '86. Back row: Craig Newton, CALS professor of animal science Tom Overton, Corwin Holtz M.S. '87, Barry Baetz, Mark Anderson '68, Ph.D. '73, and Chip Hyde. Photo: Emma Andrew

The Northeast Agribusiness and Feed Alliance, with support from the feed industry, has raised \$1 million to create two new dairy-focused faculty positions in the Department of Animal Science. The alliance, a 300-member trade organization representing animal feed manufacturers and agricultural input suppliers and distributors throughout New England and New York, rallied support from more than 45 businesses and individuals to fund the positions. Organizers see the growth in research capacity as a strategic investment that will benefit dairy scientists, producers and consumers across the region in the coming decades.

"Creation of two new positions at Cornell is a boost for all the land-grant universities in the region," said alliance president Rick Grant '65. "Support from members of the alliance to create these new positions will help farmers in many neighboring states."

The first position will focus on dairy nutrition and environmental modeling. More specifically, the faculty's research and extension program will study the biology of nutrient use by dairy cattle and its integration with forage and feeding systems into models that can be used to contribute to improved farm-level environmental sustainability.

"This position is critical for our Northeast dairy farms and allied industries to continue to lead in implementing nutritional strategies that translate to improved environmental stewardship," said Tom Overton '91, professor of dairy management and chair of the search committee for this position. "The leadership and commitment that the alliance has demonstrated exemplifies the unique partnership that Cornell faculty and feed industry professionals in the Northeast have forged over many years."

The second position will likely focus on fundamental aspects of nutrition and lactation, with an emphasis on dairy cattle. Both hires are part of the Cornell Faculty Renewal Sesquicentennial challenge, a \$100 million effort to recruit the next generation of Cornell faculty, by raising funds for salary, startup funds for laboratories, library acquisitions and research stipends.

"We are deeply grateful to the alliance for its incredible commitment to the future of Cornell—and to agriculture in the northeastern United States," said Kathryn J. Boor, the Ronald P. Lynch Dean of CALS. "This vote of faith and confidence will pay dividends for decades."

For a complete list of donors, visit [alumni.cals.cornell.edu/neafta](http://alumni.cals.cornell.edu/neafta)

# Outstanding

# Alumni

## Savneet Singh '05

*Young Alumni Achievement Award*

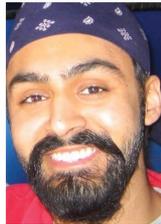
Savneet Singh credits his father with pushing him to take risks while giving him the freedom to make mistakes, a boldness that has fueled his rapid ascent from investment banking analyst to innovator in the financial marketplace. His most recent brainchild is GBI, borne out of the



need for a more democratized, electronic system for both retail and institutional investors to purchase physical gold. Founded in 2010, GBI allows consumers to purchase, sell and exchange physical precious metals

as straightforwardly as ordering a stock or bond, and the company also provides gold storage in seven countries around the world.

Prior to establishing GBI, Singh was an investment analyst at Chilton Investment Company, covering technology, alternative energy and infrastructure, and he worked in the investment banking division of Morgan Stanley. Singh's accomplishments have earned him wide ac-



claim: He has been included in the *Forbes* "30 under 30," *Impact's* "Top 100 Entrepreneurs under 30" and *Crain's* "40 under 40" lists. In addition, Singh is very active as an investor in other new businesses in finance and technology, he coaches young entrepreneurs, and he serves as an adviser to a number of New York-based technology startups.

Singh has shared his expertise with Cornell students through the Cornell Career Services' FRESH Program, where he has hosted current students as interns, as well as through his participation in career panels in New York and the Entrepreneurship at Cornell Advisory Council, where he actively worked to develop and enhance opportunities for current and future undergraduate students.

Singh lives in New York with his wife, Shaila.

## Daniel Cane '98

*Young Alumni Achievement Award*

Dan Cane launched his first business, Blackboard, with a team of roommates while still an undergrad. In the years since, he has become a visionary entrepreneur and steward of the startup community. Cane recently turned his keen eye for problems—and a



strong impulse to solve them—to improving health care outcomes. As president, CEO and co-founder of Modernizing Medicine, Cane is leading the development of technology to assist physicians in decision making,

through a new electronic medical records system that taps the collective wisdom of the medical community's real-life data.

Cane is a member of the Entrepreneurship at Cornell Advisory Council, serving as an ambassador for Cornell's entrepreneurship activities on campus and alumni engagement in his home state of Florida. A sought-after guest lecturer in classes at the Charles H. Dyson School of Applied Economics and Management, he is lending a hand to the next generation of Cornell entrepreneurs with insights and straight-talk about the keys to success, including the importance of assembling and supporting your team, which should be, according to Cane, "smarter than you are."



Cane's leadership in the business community has been noted with numerous awards, including the EY Entrepreneur of the Year award—Florida Region, *South Florida Business Journal's* Ultimate CEO, and the *Sun Sentinel* Excalibur Award—Palm Beach Small Business Leader of the Year.

The son of Edward '70 and Marilyn Cane '71, Cane and his wife, Debra, live in south Florida with their three children: Connor, 11; Elizabeth, 9; and Anya, 8.

## Elizabeth Everett '97

*Outstanding Alumni Award*

Liz Everett has been attending Cornell football games since before she learned to walk. She has subsequently become a trailblazer—the first among her dozens of Cornell alumni relatives to graduate from CALS—and she is already leaving impressive footprints through service in



leadership to the university.

A 2001 graduate of the Wharton School at the University of Pennsylvania, Everett has made a career in finance, delivering the research and resources that investors need to make sound de-

isions. She was recently promoted to head of global corporate access at Bank of America Merrill Lynch, where she previously held leadership roles heading fixed income and macro research product marketing, global research structured products, institutional fixed income middle market sales, and multi-product sales.

As an undergraduate agricultural economics major, Everett valued the connection between the academic and real world that she experienced both in the classroom and through alumni mentors. Early in her career, she gave herself a mandate to connect with current students and continue the cycle—and she's been at it for 15 years and counting.

In 2014, Everett was made an alumni-elected trustee, and she is a member of the Cornell University Council. She is also active in the President's Council of Cornell Women, the Cornell Alumni Advisory Board, the Student and Campus Life Advisory Council, the Alumni Athletic Advisory Council, and the Fraternity and Sorority Advisory Council.

The daughter of Bob Everett '65 and Mary Jansen Everett '66, Everett lives in New York and is engaged to equally zealous Columbia alumnus, Brian Krisberg.



# Outstanding

# Alumni

## Catherine Gaffney '89

*Outstanding Alumni Award*

Cathy Gaffney credits Wegmans with giving her the support to make decisions with both her mind and her heart, which has led to innovative partnerships between CALS, Wegmans and the New York dairy industry.

As vice president of the Specialty



Cheese, Deli, and Kosher Deli Departments at Wegmans Food Markets, she is responsible for sourcing the cheeses that delight and satisfy their customers. Although her position

requires significant globe-trotting, Gaffney is a strong proponent of local food and helping motivated entrepreneurs grow their businesses. She has a reputation for taking keen personal interest in producers and working hard to address any problems they are experiencing, from the details of sourcing a piece of equipment to strategies for improving their product quality.



Gaffney is uniquely positioned to build the knowledge within and opportunities for the cheese community as whole, launching a Made in NY cheese program two years ago, through which Wegmans and Cornell offered new training opportunities for large- and small-scale cheesemakers while providing a market for their products. In addition, she was behind the From Family Farms Near Our Stores program that debuted this summer. Gaffney has been a statewide leader in helping put the "big net" of CALS and Cornell to work for the cheese producers in the state.

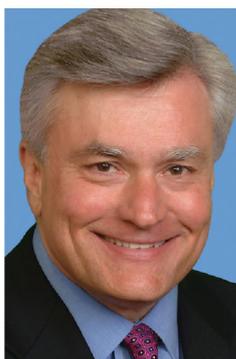
Gaffney has been active in the CALS Alumni Association and has served through the CALS Advisory Council, the Cornell Alumni Admissions Ambassador Network, and the Cornell Extern program. She lives in Upstate New York with her husband, John, and daughter, Mary.

## Michael Nozzolio ILR '73,

*M.S. '77 Outstanding Alumni Award*

As the senior Senator representing the Finger Lakes region, Michael Nozzolio has been a strong and effective leader, focusing his energy on projects that drive the economy and create jobs.

Nozzolio is responsible for significant



upgrades to the New York State Agricultural Experiment Station in Geneva, the establishment of the Ag Tech Park adjacent to the station, and the Finger Lakes Viticulture Center, which opened in 2015. He was also the driving force in the establishment of the Finger Lakes

Institute on the campus of Hobart and William Smith Colleges.

Nozzolio is a staunch advocate for applied research in New York, and he credits that research with providing the state's farmers a competitive advantage in the global marketplace. He is also a proponent of economic development partnerships between New York and Cornell University.



Throughout his tenure, Nozzolio has promoted high-tech research in an effort to position New York as an international leader. He has secured over \$10 million in capital and equipment funds for the experiment station, including the funding necessary for the renovation of the greenhouses there.

His service to the region and state has been recognized with numerous awards for dedication and service to his district. He has also served as a member of the Cornell University Council and is a board member emeritus of the Cornell Agriculture and Food Technology Park. In 2004, Nozzolio was awarded the prestigious Jerome Alpern Distinguished Alumni Award from the Cornell School of Industrial and Labor Relations.

Nozzolio and his wife, Rosemary, live in Seneca County.

## William Magee '61

*Outstanding Alumni Award*

When faced with a vote on an agricultural issue, many an urban New York State Assembly member has asked, "What does Bill Magee think?" Assemblyman William "Bill" Magee has led through legislation for more than 25 years, advocating for agricultural



research and extension while relying on research to inform policy making. His role as leader in the State Assembly in explaining food, farming, and the value of agricultural research and extension is unparalleled.

First elected to public office as the Town of Nelson representative on the Madison County Board of Supervisors in 1972, Magee has served in the State Assembly since 1990 and has been the chair of the Committee on Agriculture since 1999. There, he has championed agricultural education in high schools, Cornell Cooperative Extension, the Agricultural Land Tax Cap, the Farmland Viability Act, and expanding the Pride of New York program. His



support has been crucial for Cornell maple research and extension and the expansion of farm-based beverage businesses, among many others. For his work on behalf of the agricultural community, he received the 2015 Distinguished Service Citation from the New York State Agricultural Society and has been repeatedly named to the New York Farm Bureau's Circle of Friends.

Magee has served on the Cornell Veterinary College's Advisory Board and currently serves on the SUNY Morrisville College Foundation and the boards of directors of both Community Memorial Hospital in Hamilton, N.Y., and Crouse Community Center in Morrisville, N.Y.

Magee lives with his wife, Jeannette, in Nelson, N.Y.

## Dana Dalrymple '54, M.S. '56

*Outstanding Alumni Award*

With a career spanning more than four decades with the U.S. Department of Agriculture and the U.S. Agency for International Agricultural Development (USAID), Dana Dalrymple is both a product of and proponent for the Land-Grant Mission, whose work documented the economics of agricultural science as a public good.

While an undergrad, an agricultural geography course taught by the late professor Herrell DeGraff opened Dalrymple's eyes to the field that would become a source of lifelong fascination for him:

combining biology with policy and economics, with an international focus. He started his career in extension at the county, state and federal levels and was a senior



science adviser and agricultural economist with the USDA on detail to USAID for international work from 1972 until his 2008 retirement. An expert in Soviet agriculture, the adoption of high-yielding green revolution crop varieties, and the impact of international agricultural research, in retirement he completed a book on science, tradition and public policy with regard to *Artemisia*, a medicinal plant used in Africa for treating malaria.



With his late wife, Helen, Dalrymple was a cofounder and later co-president of the Friends of the Palisades Library in Washington, D.C. Dalrymple has participated in the Class of '54 alumni organization and the Alpha Zeta agricultural fraternity. Dozens of members of his extended family have attended Cornell, including his father, Daniel Dalrymple '27, who was given an outstanding alumni award in 1985. He lives in Washington, D.C., and is father to sons Daniel and William Dalrymple '97 and grandfather of three.

## Richard Stedman, M.S. '93

*CALS Rising Star Faculty Award*

For Richard Stedman, associate professor of natural resources, a "sense of place" transcends nostalgia. It's a measurable, predictable, potent driving force in how people respond to environmental and social change; it shapes public policy and resource management in crucial ways. His work has played a pivotal role in defining this area of inquiry.

Since completing his Ph.D. in sociology at the University of Wisconsin-Madison, Stedman has published more than 100 articles in this area of scholarship across a diverse range of topics and settings,

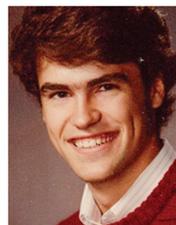
including management of invasive aquatic pests and wild-life/fishery management. His approach is highly collaborative, and he was honored with the William R. Freudenburg



Research Award of Merit from the Rural Sociological Society in 2014.

In addition to growing his signature course, *Society and Natural Resources*, now with more than 150 students per year, Stedman has embraced the role of public scholar. His commitment to the Land-Grant tradition of engagement with communities and his commitment to New York State issues have made him a valuable resource for communities, including those grappling with potential social, environmental, and economic impacts of natural gas development. He was a member of the Cornell Cooperative Extension Marcellus Shale Team that earned the 2011 Cornell University David J. Allee and Paul R. Eberts Community and Economic Vitality Award.

Stedman joined the faculty in 2007, was promoted to associate professor in 2009, and has served as the director of the Department of Natural Resources Human Dimensions Research Unit since 2013.



## Margaret Smith '78, Ph.D. '82

*CALS Outstanding Faculty Award*

A knack for finding the kernel of truth—whether in a field of potential corn varieties, as a moderator in a heated debate about genetically modified organisms (GMOs) or as a consensus builder about the future of the college—has made Margaret Smith, professor of plant breeding and genetics, a valuable scholar and public servant for the state of New York.

As a Cornell undergrad, Smith concentrated on plant breeding, a passion she still pursues as one of the few remaining public corn breeders in

the United States. She has developed hardworking hybrids adapted to New York soils and weather and conducted research to support crop sustainability internationally. Smith also



serves on the advisory committee of an international dryland cereals research program based in India.

Smith has provided college-wide leadership in applied research and extension in the Section of Plant Breeding and Genetics, as associate director for Cornell Cooperative Extension from 1998 to 2001, and currently as the associate director of the Cornell University Agricultural Experiment Station (CUAES).



Her current role requires the stewardship of Hatch federal research funding, which has provided support for hundreds of projects across the campus. In recent years, Smith has assumed a role as a trusted voice in the debate about GMOs, sharing information and insights with audiences around the state.

Her leadership in CALS was recognized with a 2012 award for Outstanding Service to the CALS Community. Smith joined the faculty in 1987 and has served as the associate director of CUAES since 2008.

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](http://cals.cornell.edu/get-involved) for more information, or to make a nomination.

# Cornerstones: Alumni share their experie



## BRAD MARSHALL '97 AND HEATHER SANDFORD '97

*Small-business owners*

We moved back to the Ithaca area 12 years ago and started homesteading and raising animals and food for ourselves, while having other jobs as well. We had the idea that there wasn't much fresh meat available at the local level—just a lot of frozen cuts. We began selling to consumers at farmers' markets and small-scale butchers, through a CSA, and even ran a small restaurant. Eventually we hit our biggest obstacle: getting access to markets. The meat industry has really small margins, so you need larger volumes to overcome that. We looked at many options to make the margins work, keeping in mind that we wanted a long-term, stable business to keep the two of us employed. Ultimately we realized we needed to expand to a larger retail space and sell wholesale. This required a major renovation to become a certified USDA processing plant, which requires daily federal inspections, just as a giant company like Tyson Foods would. We needed a \$1 million investment, a bit of a scary number for us. To overcome it, we opted to push harder and faster than we wanted to, seeking private funding and working with the bank and a couple of economic development agencies. We are really thankful, though, because now grocery stores from here to Maine are giving people access to our products, including nitrate-free deli meats, cured meats and house-made charcuterie, which is kind of unique.

**Heather Sandford** and **Brad Marshall** are the proprietors of The Piggery, a farm-to-table butcher shop located in Ithaca.

## MICHAEL VAN VALKENBURGH '73

*Landscape architect*

In the design of landscapes, creativity is nourished by obstacles. Without them the designer is tempted to repeat old strategies. So I appreciate how all landscapes I take on have a host of new obstacles: budget limitations, unique site conditions, quirky client preferences, disagreements among public constituents, unavailability or impracticality of materials, and so on. Every time I design anything from a small garden to a large public space, my goal is to make a unique landscape that poetically “sings” to the imagination while attending to the needs, complexities, and intended uses of the site. Large projects such as Brooklyn Bridge Park (BBP) or relocating the mouth of a river in Toronto present a huge range of challenges. BBP addresses 300 years of site history on a dynamic harbor edge, along with the often-clashing goals of diverse users. Projects as small as Bailey Plaza on the Cornell campus have their own set of difficulties. I always maintain optimism about finding solutions. As designers and Americans we are conditioned to believe that tasks of overwhelming complexity are accomplished by solving component challenges one by one. Sometimes in the design process I run into insurmountable obstacles that make continued progress on the path I have been taking impossible. I have to consider whether a design element is really essential, what else might work, or whether to abandon an idea and not be crestfallen about it. The poetry of a design comes ultimately from what the reality of the site tells the designer's imagination; what endures and what is let go.

**Michael Van Valkenburgh** is the president and CEO of Michael Van Valkenburgh Associates, Inc.



# Successes with obstacles and finding the path forward

## ERIC ROTHSTEIN, M.S. '95

*Hydrologist*

In school there's often a focus on technical challenges. In the work place, when I'm technically stumped, problems are typically resolved by bringing in more staff to look at things from a new perspective. But you don't get a lot of experience in school dealing with government bureaucracy and stakeholders with competing interests. When I am the most stumped is when I am standing in front of a large group of people with competing interests. At that point, it's important to keep perspective on the big picture, the overriding project objectives, and maximizing what can be accomplished. Paradoxically, as I get older, I've become more radical in my ideology while becoming more pragmatic in my work.

The ideology gives you conviction and the sense of purpose—why you do what you do—otherwise your heart is broken on a daily basis. The pragmatic side allows you to remain engaged, because if you go strictly on ideology, you risk not being involved in challenging projects at all. Being involved is better than being left out of the discussion. You have to focus not just on getting what you want but rather on how to maximize what you can accomplish. It's important to keep this larger perspective. My grander perspective is that friends and family are the most important things in life...and at work, my goal is to have the greatest positive impact on environmental issues.

**Eric Rothstein** is a hydrologist with eDesign Dynamics, working on ecosystem restoration and water resources management. He is also a co-founder of the non-profit Big Future Group.



## SMOKE WALLIN '88

*CEO*

I have worked with a lot of new brands, created brands and helped a lot of startups. The startup world is all about solving obstacles—you want to do something that doesn't seem possible, can feel overwhelming, but being stuck is only a temporary stage. It's about having a frame of mind that gives you the time to talk to the right people, and it's about knowing there's always a way around it when the timing is right. I like to think of startups as a big jigsaw puzzle: Every missing piece can be an obstacle, and if you don't solve it you can't finish the picture. For my recent project—Beach Whiskey™—one of our biggest obstacles was packaging. We wanted to put our whiskey into a bottle that looks AND feels like sea glass, but that simply did not exist. All the glass companies have spent generations making glass perfect, while what we wanted was imperfection. I had to scour the world for producers who could make it, at scale for commercial production, while retaining the glass' interesting characteristics. It seemed insurmountable as we searched in countries from Europe to Asia to the Americas. I had to give myself space and time to find the resources to think until we found the right supplier. The final result is all the better knowing what it took to get there. When you run into a big roadblock, remember, it will pass if you stick to it and keep trying. Persistence wins every time.

**Smoke Wallin** is the CEO of Taliera - Celebrating Iconic Brands, a brand creator, incubator and strategy firm, and CEO of Beach Whiskey.



## MARISA SERGI '15

*Enologist*

One of my biggest challenges as a student entrepreneur was time management in balancing classes, the work created from those classes, the many distractions of living in an apartment with three other roommates, keeping up with social media and still finding time to work on my brand, called Redhead Wine. Using social media was part of my success as well as the influence of the many amazing, brilliant students and professors at Cornell University. Many of my peers and the faculty members believed in me, so through networking I was able to pool their talent, which inspired and helped me with projects. Without that support I couldn't have done it as proficiently. I continue to focus on accomplishing small victories, which seem to lead to the bigger ones. I re-evaluate and set new goals depending on the direction and path that life brings. Now a full-time employee at E. & J. Gallo, I have handed over the Redhead label to L'uva Bella Winery to grow into a brand of wine that I hope to see distributed nationally.

**Marisa Sergi** is a new product enologist with E. & J. Gallo Winery in Modesto, Calif., as well as the proprietor of Redhead Wine.

## FULLERS ESTABLISH ENDOWED CHAIR IN ORNITHOLOGY

By Amanda Garris Ph.D. '04

A gift from H. Laurance "Larry" Fuller '60 and Nancy Lawrence Fuller '62 has given wings to a research program at the Lab of Ornithology, with the establishment of the Fuller Professorship of Ornithology. The inaugural professor in this endowed chair is Irby Lovette, the director of the Fuller Evolutionary Biology Program and a faculty member in the Department of Ecology and Evolutionary Biology.

"The program's very elegant work on the DNA of birds and other species has attracted scientists from all over campus and around the country," Larry Fuller said. "We view the Lab of Ornithology as the number one scientific enterprise in the world that

works with birds, and it's very important in the training of students, which we value tremendously."

The Fullers have demonstrated their commitment to student training with scholarship and fellowship programs across the university, including several in the Colleges of Engineering and Human Ecology, in addition to gifts for building funds and an endowed chair in the School of Chemical and Biomolecular Engineering, among many others. Gifts to the Lab of Ornithology dovetail with their personal involvement in conservation, through service to the Nature Conservancy and the LowCountry Institute in Okatie, S.C.



Nancy Lawrence Fuller '62 and H. Laurance "Larry" Fuller '60.

"The Lab has come to be the big-time leader in conservation genetics—the place to go for scientists," Larry Fuller said. "We thought this would be a great way to be sure the absolutely top scientists are attracted to the Lab of Ornithology."

According to John W. Fitzpatrick, director of the Lab of Ornithology, Lovette is a perfect example of the talent they seek to attract for endowed professorships.

"In his 13 years at Cornell, Irby has demonstrated extraordinary productivity in a diverse array of research directions within integrative evolutionary biology, regularly publishing milestone papers in top-tier journals," Fitzpatrick said. "He also is an inspiring teacher and undergraduate adviser and consistently attracts outstanding graduate students and post-doctoral fellows."

"I am deeply moved that Nancy and Larry are honoring our program at the Cornell Lab of Ornithology through this new professorship, on top of their long-term engagement in endeavors like the Fuller Postdoctoral Fellowships, the Fuller Evolutionary Biology Program at the Lab, and the Fuller Learning Center in Weill Hall," Lovette said. "Their support of our students, scientific research, and the conservation of the natural world has particularly special resonance, since they know us so well."

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## GIFTS SPUR FACULTY RECRUITMENT IN DYSON

By Amanda Garris Ph.D. '04

What started with a promise—and a challenge—recently delivered six new faculty positions for the Charles H. Dyson School of Applied Economics and Management. The latest \$6.5 million in gifts from three families has raised the total number of gift-funded faculty positions to 11 for the Dyson School.

"The surge in new positions, made possible by the generosity of these outstanding alumni and friends of the Dyson School, will help ensure that we continue to attract both emerging stars and distinguished senior faculty," said Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences.

John Dyson '65, chairman of Millbrook Capital Management, created the initial spark for the recent round of donations. In committing to a gift through the Cornell Faculty Renewal Sesquicentennial Challenge, a \$100 million effort to recruit the next generation of Cornell faculty, Dyson included a caveat: His gift was contingent on a matching gift.

The first to answer the challenge was Donald Watros '86, president of HBC International, one of North America's most extensive retail networks, which includes Lord & Taylor and Saks Fifth Avenue. Watros and Dyson sealed the agreement with a handshake, but Dyson wasn't done yet.

He would give a second gift, if a second match could be found. He even had someone in mind—his brother Rob Dyson, MBA '74, who heads the Dyson Foundation. Rob not only pledged a faculty renewal fellowship, he also raised the stakes. He would fund a second faculty renewal if another matching gift was donated.

The match came from Peter Nolan '80, MBA '82, and Stephanie Nolan '84. Peter is a senior adviser at Leonard Green & Partners, and the Nolans, who previously endowed the David



J. Nolan Directorship of the Dyson School in honor of Peter's father, funded an endowed professorship to recruit an established, prominent thinker.

These and other Sesquicentennial Faculty Fellowships are fueling steady momentum in faculty growth in the Dyson School. Margaret Bachelor Paul and Andy Paul '78, the founder and chairman of the board of directors of Enhanced Capital and managing member of Sopris Capital, and Lynn Calpeter '86, vice president and chief financial officer of GE Power & Water, provided gifts earmarked for two additional assistant professor positions. In addition, several other gift-funded positions have already been filled, including the Mueller Family Sesquicentennial Faculty Fellow in Agribusiness and Farm Management, the Zaitz Family Sesquicentennial Faculty Fellow in Agricultural Finance and Business, and the CoBank/Farm Credit East Sesquicentennial Faculty Fellow in Production Economics and Sustainability.

"The Dyson School is an exceptional place, fortunate to have extraordinary students, staff, faculty and alumni," said Chris Barrett, the David J. Nolan Director of the Dyson School. "We have been able to recruit extraordinary young faculty with these first several gifts and look forward to recruiting additional outstanding faculty who will strengthen our programs with new ideas, energy and course offerings for our students."

# Facts in Five

Fundamental research, from the inner workings of cells to the physics of food, builds towards major leaps forward in agriculture, medicine and technology. Visit the stacks with this sample of recent findings translated into succinct science.

**Borrowed Bacterial Enzyme Boosts Plant's Productivity**  
A faster RuBisCO with potential to increase photosynthesis in crops

By Maureen Hanson  
Molecular Biology and Genetics

**Antibiotic Resistance in Two Easy Steps**  
Mutations in the primary sigma factor  $\sigma^A$  and termination factor Rho that reduce susceptibility to cell wall antibiotics

By John Helmann  
Microbiology

**Blight Creates Zombie Tomato Cells, Feasts**  
Transcriptional Dynamics of *Phytophthora infestans* During Sequential Stages of Hemibiotrophic Infection of Tomato

By Jocelyn Rose  
Plant Biology

**Sap-feeding Whitefly Pilfers Bacterial Genes**  
Metabolic coevolution in the bacterial symbiosis of whiteflies and related plant sap-feeding insects

By Angela Douglas  
Entomology

**Inflammation Risk Persists After Smoking Cessation**  
Persistence of smoking-induced dysregulation of miRNA expression in the small airway epithelium despite smoking cessation

By Jason Mezey  
Biological Statistics and  
Computational Biology

## CREATING A PATH TO PURPOSE

Angie Kamath '97

The best analogy I can draw to how I have managed my career is to liken it to a “Choose Your Own Adventure” book. I recently discovered this children’s book genre with my 7-year-old daughter, and it strikes me as the perfect playbook on how one could manage their career. I am not being flip at all. In retrospect, I see how each decision related to internships and jobs at Cornell and after felt so big and high stakes. In reality, all the different decisions and paths I took landed me in the exact same spot: one focused on social entrepreneurship, but with a new skill set and a sharpened perspective each time that I applied to the work I believe I was meant to do.

As a first-generation American, my immigrant parents made two things quite clear—they moved from India to America to provide a better life and future to themselves and our family, and we had an obligation and responsibility to help others in whatever form that might take. At Cornell I experimented with topics that touched the left and right sides of my brain. I loved the exactness of my finance classes and the study of cultures in my rural sociology classes. Perhaps my favorite class was business planning and entrepreneurship, but it was rivalled by my semester and internship on Capitol Hill during my time at Cornell in Washington. Or maybe it was discovering Europe through the lens of an art history class? But then again, traipsing through the woods in a field ornithology class was pretty great, too.

My exploration of career and the interwoven path of finding my purpose carried on throughout my four years in school. In my opinion, this is Cornell and CALS’ greatest educational strength; I could get a taste of so many subjects, ideas, cultures and world views in one semester. I could master topics and fall in love with completely different disciplines. That would certainly explain my crossroads in the spring of my senior year: Do I take the Peace Corps assignment in Latin America, or do I take the banking job in New York City? While the private sector won out in 1997, I had a suspicion that my small-business classes and interests in entrepreneurship would win in the long run. And so my career has played itself out with stints in finance; turning a small volunteer organization into a fully staffed and growing nonprofit; working in government managing an

employment and job placement agency that helped thousands of jobseekers and businesses match up labor market needs and jobseekers’ interests; to my work today overseeing a nonprofit social enterprise that trains IT talent and re-shores technology jobs from overseas.



My own self-discovery along the way has been that first and foremost I love to build and create things that help people—especially those who do not have access to opportunity—to succeed. While the terms social justice and income equality were not mainstream when I was in college roaming the Ag Quad in the 1990s, I figured out that creating nimble, adaptive organizations to solve social problems was fun, entrepreneurial and rewarding, both mentally and financially. “Find a need and fill it”—this was the mantra in my small-business class, but the class might as well have been named Social Enterprise 101. I learned as an executive director to master sales, marketing, finance and product design. Or to use nonprofit-speak, I can fund-raise, advocate for policy change, balance

a budget and create a reserve fund, and design new curriculum for high-impact programs.

I feel really fortunate to be involved in the Dyson Advisory Council as an alumna of the business management and applied economics major. When I speak to students I share the advice I wish someone gave me: Don’t just take the finance classes—get out to the other colleges; don’t just do the typical internship for name-brand companies—explore smaller organizations where the impact can be greater; and working for a social enterprise does not mean you have to struggle financially. As in all labor markets, employers of any stripe will always pay for good talent. Don’t define your path to purpose by following the leader and doing the jobs that only lead to the fancy resume but an empty experience. Figure out what energizes you, enlivens you, and fires you up. My own two cents is that the world has plenty of intractable, complex problems that need enterprising, technology forward, risk-taking leaders to solve. Success is about impact, making change and following the proverbial tenet of making the world a better place. Cornell is, perhaps in my biased view, one of the best training grounds around to build the diverse and sharp toolkit that the world needs right now.

**Angie Kamath** is the New York City executive director of Per Scholas, which works to break the cycle of poverty by providing technology access and education in underserved communities. She previously spent seven years working at the New York City Department of Small Business Services, overseeing the city’s Workforce1 Career Center system, where she implemented economic opportunity initiatives focused on improving the income and advancement prospects for working poor New Yorkers. Kamath is the former executive director of StreetWise Partners, a community organization focused on training and job placement to help low-income individuals succeed in the workplace. Kamath holds a B.S. in business management from Cornell and a master’s in public policy from Harvard.

# INCOMING CALS STUDENT STATS

2015

669  
FIRST YEARS

237  
TRANSFERS

IN 2015, CALS RECEIVED  
the second highest number of  
applications in its history, with a  
**14.6%**  
ADMIT RATE



## LANGUAGES SPOKEN AT HOME:

Akan, Amharic, Arabic, Bengali, Cantonese, Catalan, Chinese, Estonian, Filipino, French, Ga, German, Gujarati, Hebrew, Hindi, Igbo, Indonesian, Jamaican Creole, Kashmiri, Korean, Malayalam, Nepali, Norwegian, Panjabi, Portuguese, Russian, Spanish, Tamil, Telugu, Turkish, Ukrainian, Vietnamese, and Yoruba.



## THE CLASS OF 2019 INCLUDES RESEARCHERS OF:

Food security, sleep disorders, bioengineering, nanotechnology, obsessive-compulsive disorder, speech language processing in autistic children, Twitter statistics, hydroponics, thyroid function, indigenous medicine in Mexico, rainforest biodiversity, drug-resistant bacteria, bed bugs, turtles, grasshoppers, mollusks, and canola oil.

## THEIR RANKS INCLUDE:

A nationally ranked mountain biker, the creators of a 3D-printed prosthetic hand and a 3D-printed ballet pointe shoe, volunteer firefighters, the designer of an online investment game, a poultry judge, the webmaster for the National Orchid Society, the inventor of a voice-activated TV remote control, the winner of the World Series of Birding, and a soldier in the National Guard.



## 22 Majors

### Agricultural Sciences

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; applied economics and management; education and communication.

### Animal Science

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 management.

### Applied Economics & Management

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.

### Atmospheric Science

Examine the behavior of weather and climate, and gain experience in the analysis, interpretation, and forecasting of meteorological events.

### Biological Engineering

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.

### Biological Sciences

Study the fundamentals of biology while concentrating on: animal physiology; biochemistry; computational biology; ecology & evolutionary biology; genetics & development; insect biology; marine biology; microbiology; molecular & cell biology; neurobiology & behavior; nutrition; plant biology; and systematics & biotic diversity.

### Biology & Society

Examine the social, political, and ethical aspects of modern biology research and practice.

### 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: environment, science and health; media studies; information technologies; 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 & Sustainability Sciences

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 & applied ecology; environmental policy & 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.

### Global and Public Health Sciences

Explore multidisciplinary solutions for population-level health issues, with a focus on disease prevention and health promotion, epidemiology and biostatistics, and resource-challenged environments.

### Information Science

Examine the cultural, economic, historical, legal, and political 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 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 winemaking, vineyard development, economics, and management.

**CHANGE SERVICE REQUESTED**

## CORNELL DAIRY GOES BIG FOR PRESIDENT GARRETT'S INAUGURATION

The creation of a unique ice cream flavor honoring an incoming Cornell University president has been a longstanding Cornell Dairy tradition. The effort to mark the tenure of President Elizabeth Garrett comes with a twist: the largest single batch of ice cream the dairy has ever produced.

The original flavor—dubbed 24 Garrett Swirl following a round of voting across campus and on social media—pulls together some of Garrett's favorite flavors in a rich medley of chocolate, caramel and mocha. It debuted at the inauguration of the university's 13th president on Sept. 18.

"On behalf of my colleagues in food science and the Cornell Dairy, we are honored to have created this new flavor to welcome President Garrett," said Kathryn J. Boor, the Ronald P. Lynch Dean of the College of Agriculture and Life Sciences.

A normal production run churns out upwards of 200 gallons of any of the favorite frozen concoctions offered daily at the Dairy Bar. For Garrett's ice cream, the dairy produced more than 450 gallons of her special flavor, packed into three-gallon tubs and doled out in 5,000 individual serving cups on the unseasonably warm inauguration day.

The presidential flavor mixes together a premium chocolate base with Kahlua flavoring that provides the ice cream a mild coffee undertone. Morsels of fudge truffles and a swirl of caramel complete the taste profile.

"It's a chocolate lover's dream, really," said Deanna Simons, quality manager and academic program coordinator at Cornell Dairy. "You have the nice, full chocolate base with a hint of coffee with the mocha. The caramel kind of pulls it all together."

The creation of the special flavor involved a covert planning operation started in the summer. Garrett offered a list of her favorite flavors, and from there it was up to Simons and production manager Tim Barnard to devise a recipe blending the ingredients into a singular, creamy whole.

For months, Simons received daily urgings to divulge the contents of the ice cream, a secret she said she dutifully kept. She called it an honor to devise a flavor expressing the tastes of the new university president, and a challenge to create it in seclusion.

"We have never made a batch this big of any ice cream. It's really exciting," Simons said. "It's a proud day for the dairy to do something like this."

