Dear Friends,

“The overlooked economic engine”—that’s how a 2012 Farm Credit East study describes the status of agriculture in the northeastern United States today. This statement is a powerful reminder that we live in a time of extraordinary challenge and opportunity for those who grow our food.

Today, New York’s food and agricultural economy generates family incomes, profitable businesses, employment, and entrepreneurial opportunities, thanks in large part to the New York State Agricultural Experiment Station (NYSAES).

Here at NYSAES, Cornell University’s upstate plant and food science technology campus in Geneva, faculty and staff focus their knowledge and experience on collaborative work to solve problems, add value to agricultural products, and introduce innovative technologies.

Our programs represent a purposeful blend of applied and basic research with targeted outcomes intended to grow New York’s economy. The Station’s 900 acres of research fields, orchards, vineyards, and carefully maintained laboratory and research space are part of a profound commitment by Cornell’s College of Agriculture and Life Sciences to fulfill the land grant mission as defined by 21st century needs.

In a region in which more than 52 million people demand abundant, affordable, and nutritious food and beverages, NYSAES faculty and facilities are readily accessible to producers and consumers alike. Our research and extension programs are unmatched in the northeastern United States, and we foster productive collaborations across academic disciplines and with leaders of vital food and agricultural industries. We place primary research emphasis on fruit and vegetable production systems—major enterprises in our diverse agricultural state—and on the science of producing wine, beverages, and food products that contribute significantly to economic opportunity in New York State.

Over the next 30 years we will face the enormous global challenge of feeding nine billion people—nearly 30 percent more than are on the planet today. We must do so in ways that defeat hunger, promote a vital, healthy world community, and preserve and sustain our environment. The Station is a linchpin in the College of Agriculture and Life Sciences’ mission to lead the way in meeting this global challenge while improving the well-being of New York State citizens.

This publication offers a glimpse into the ways our faculty and staff have already stepped up to solve major problems facing food and agricultural producers and consumers. We promise to join you in meeting the next big challenges and pursuing the extraordinary opportunities that lie ahead.

Sincerely,

Dr. Thomas Burr
Associate Dean and Director of the New York State Agricultural Experiment Station
Throughout New York State, growers are producing fruits, vegetables, and bioenergy crops that drive economic activity, and their impact is multiplied as industries from equipment manufacturing to transportation to tourism also realize benefits from agricultural innovations.

But coming decades will bring new challenges, including greater competition for land and water, climate change and volatile weather, and a growing world population hungry for a nutritious, affordable food supply.

With over 130 years of experience helping growers and food businesses solve problems, NYSAES is ideally poised to mobilize research and extension to help them increase efficiency, sustainability, safety, and profitability in today’s marketplace.

The New York State Agricultural Experiment Station is a leader in science-based, solutions-oriented food and agricultural research. Our mission is simple: We pioneer new technologies, develop advanced plant varieties, and help New York farmers and food businesses generate profits.
Strategies for Success

As growers and food businesses contend with climate and environmental pressures, increased production costs, and shifts in consumer tastes, NYSAES is developing varieties that offer disease and pest resistance, tolerance to environmental extremes, and the choices, quality, and nutritional value consumers expect. Our breeders are committed to releasing new varieties of apples, apple rootstocks, grapes, berries, cabbage, beans, broccoli, and tomatoes that help to ensure the continued prosperity of New York farms and food businesses. On site, the USDA Agricultural Research Service (ARS) Plant Genetic Resource Unit maintains national collections of vegetable seed and field specimens of grapes, apples, and tart cherries that represent extremely valuable genetic resources for breeding the crops of the future.

Global competition now sets the bottom line for farm economics and pressures farmers to produce more food more efficiently than ever. How crops are grown—the planting density, the timing, fertility management, and the use of energy and water resources—directly affects a farm’s profitability and, ultimately, the consumer’s grocery bill. NYSAES researchers rigorously evaluate the profitability of production systems for diverse crops—including apples, grapes, vegetables, and berries—providing information growers need to make sound financial decisions.

Balancing crop health with environmental health requires precision. With accurate disease forecasting, decision-support systems, and greener, more efficient spray equipment developed at NYSAES, growers can control pests and diseases with fewer spray applications and at lower cost. Our researchers are also broadening the spectrum of pest and disease control options available to organic farms, a rapidly growing sector in New York. Research on pheromone-based mating disruption, weed control using cover crops, insect control with predators and parasites, new resistant crop varieties, and less toxic, naturally-derived crop protectants is quickly putting new tools into the hands of New York farmers.

In recent years, deadly outbreaks of food-borne illness have made food safety a national priority. NYSAES researchers continue to develop fruit and vegetable processing safeguards, including ultraviolet light treatments and novel, naturally produced anti-microbial agents that are effective against *Listeria monocytogenes* and *Escherichia coli*. The Station is also a national leader in food safety education: In 2011, the National Good Agricultural Practices Program based at NYSAES was chosen by the U.S. Food and Drug Administration to lead the development of the first nationally-mandated education and training program for farmers, packers, and regulatory personnel.
Expanding Entrepreneurship

Value-added products can spur local economic development and help food businesses and farms increase profits. Two NYSAES facilities provide invaluable support to food and beverage start-ups. The New York State Food Venture Center helps entrepreneurs across the Northeast ensure the safety, regulatory compliance, and quality of their products. The New York State Wine Analytical Lab offers new and established wineries, cideries, distilleries, and other beverage producers access to quality assurance, troubleshooting advice, and technical analyses. Entrepreneurs seeking the competitive advantage of Cornell research and resources can also launch their businesses at The Technology Farm, a business incubator adjacent to campus.

Discovering Renewable Energy Opportunities

According to a recent Northeast land use assessment, over 6.9 million acres of idle or surplus agricultural land are suitable for bioenergy crop cultivation without encroaching on land needed to produce food or feed. NYSAES faculty and their colleagues on Cornell’s Ithaca campus are helping New York farmers seize this opportunity with research on bioenergy crops and seed coating technologies that facilitate the growth of perennial grasses. Our shrub willow breeding program—the largest in North America—includes research plots and a prototype heat-generating boiler that provides a working model for businesses, municipalities, school districts, farms, and landowners interested in this exciting new technology.

Delivering Knowledge, Driving Innovation

Turning knowledge into economic development requires putting information into the hands of the people who can profit from it. NYSAES faculty fulfill this mission by making knowledge accessible through on-farm meetings, frequent communication with growers and grower associations, extensive web-based resources, and even mobile apps that allow farmers to make decisions from the seat of a tractor.

Training Future Agricultural Leaders

In the fields, labs, and greenhouses of NYSAES, we are cultivating another high-value crop: future leaders in agricultural science. Our faculty help Cornell graduate students pursue real-world solutions to agricultural problems. Meanwhile, our Summer Scholars program welcomes elite undergraduates from across the U.S. for internships, providing a proven tool for recruiting talented graduate students. Still younger scientists experience agricultural research through the Elementary Science Outreach Program, a hands-on program developed with the Geneva City School District that brings NYSAES faculty into local classrooms. In operation since 2004, the program is credited with increasing scores on the state-mandated science test.
Our Advantage

Tools and Technologies for Every Farmer

When NYSAES was established in 1882, horse-drawn farm equipment was the norm. Today, the latest technology keeps highly diverse New York farm and food businesses competitive in the global marketplace. Extraordinary discoveries that have emerged from NYSAES include the gene gun, ultraviolet pasteurization of cider, more than 50 vegetable crop genes that confer resistance to destructive viruses, and pheromone structures in insects that led to the use of sex attractants in pest management. Today, these advances are crucial to large, small, and medium-sized farms using an array of conventional, Integrated Pest Management (IPM), and organic production systems, as well as a range of planting, harvest, post-harvest, and food processing practices. We are committed to arming all farmers and food businesses with the technologies they need to compete locally and around the world.

Capacity on Call

When a problem arises in agriculture, economic losses can be rapid and unexpected; a fast and effective response requires ready-to-go expertise and infrastructure. Recent years have seen severe frosts and droughts; the invasion of new insect pests, such as spotted-wing drosophila and brown marmorated stink bug; and the introduction of new, damaging strains of Phytophthora blight in vegetables, cucumber mosaic virus complex in snap beans, and streptomycin-resistant fire blight in apples. To tackle these threats, our 41 faculty members in Geneva, along with other highly skilled staff, utilize almost 900 acres of cropland, an acre of greenhouse space, and more than half a million square feet of laboratory space to do cutting-edge research. We also extend our reach through two other New York field stations: the Hudson Valley Laboratory in Highland and the Cornell Lake Erie Research and Extension Laboratory in Portland.

A Culture of Collaboration

The complex challenges facing our society and our food system require a network of researchers, business owners, and government officials working together toward solutions. Our scientists collaborate with members of the agriculture and food industries as well as public and private organizations locally, regionally, and nationally. On-site collaborators include the New York State IPM Program, the Technology Farm, and the USDA ARS, whose Grape Genetics Research Unit provides valuable genomics links with the Station’s breeding, viticulture, and enology programs. The Station and College of Agriculture and Life Sciences are guided by food and agricultural leaders on our NYSAES Advisory Council, who invest their time, energy, and ideas for the continued success of our national food system.