

NEW JERSEY AGRICULTURAL EXPERIMENT STATION

2019 ANNUAL REPORT



RUTGERS

New Jersey Agricultural
Experiment Station

**Thomas Molnar, associate professor,
Department of Plant Biology, tends to hazelnut harvest.**



ROBERT M. GOODMAN

Executive Director, New Jersey
Agricultural Experiment Station

NJAES is committed to a viable economic and environmental outcome for agriculture, fisheries, communities, and businesses in New Jersey. To ensure results, the experiment station is first and foremost an effective steward of the annual state appropriations that support our work. Strong cooperative partnerships are carefully nurtured with statewide partners, especially the Department of Agriculture, Department of Environmental Protection, New Jersey Farm Bureau, state and county boards of agriculture, and industry associations. New Jersey counties, vital partners in the delivery of Rutgers Cooperative Extension educational programs, provide critical infrastructure support and funding to NJAES to develop practical, research-based solutions. Fruitful collaborations with municipal stakeholders help amplify NJAES programs, reaching New Jersey residents.



CHRISTOPHER J. MOLLOY

Chancellor, Rutgers
University—New Brunswick

NJAES serves as an economic engine for New Jersey across multiple sectors—from agriculture to aquaculture and technology to bioenergy. The university's food and renewable energy incubators provide critical business and technology expertise to successfully launch and sustain small and mid-sized start-up companies. NJAES farms and research centers have painstakingly developed new breeds of a wide range of commercially important, high-value products and have strategically invested in enhancing aquaculture and fisheries in the mid-Atlantic to strengthen our coastal economy. The statewide impact of NJAES is critical as it supports the promotion of sustainable business development to ensure a thriving New Jersey economy.



DOUGLAS H. FISHER

New Jersey Secretary of Agriculture

Rutgers University and, in particular, the New Jersey Agricultural Experiment Station, is a vital component in assuring the success of agriculture in the Garden State. Through research, development, monitoring, and hands-on implementation and application, the university helps our farmers to thrive, grow, and succeed. Agriculture is changing just as fast as other businesses, making Rutgers' expertise and guidance even more crucial. In order for New Jersey to remain among the 'Top-10' producers in so many agricultural categories nationwide, we must continue to rely upon the dedicated research and field staff for their work and wisdom to foster agriculture's role in an ever-changing planet.

NJAES ADMINISTRATION

ROBERT M. GOODMAN

Executive Dean of Agriculture and Natural Resources
Rutgers, The State University of New Jersey

Executive Director

New Jersey Agricultural Experiment Station

848-932-3600 | execdean@njaes.rutgers.edu

BRADLEY I. HILLMAN

Senior Associate Director

Director, Research

848-932-3777 | hillman@njaes.rutgers.edu

BRIAN J. SCHILLING

Senior Associate Director

Director, Cooperative Extension

848-932-3591 | schilling@njaes.rutgers.edu

MARGARET BRENNAN-TONETTA

Associate Director

Director, Economic Development and Innovation

848-932-3776 | mbrennan@njaes.rutgers.edu

RICHARD ALOMAR

Director, Office of Urban Extension and Engagement

848-932-5266 | alomar@njaes.rutgers.edu

SHERRI M. CIRIGNANO

Associate Director

Department Chair, Family and Community Health Sciences

908-475-6504 | cirignano@njaes.rutgers.edu

JOSEPH CRONIN

Director, Grants Facilitation

848-932-3751 | cronin@njaes.rutgers.edu

PAUL ELWOOD

Senior Associate Director

Director, Human Resources

848-932-3551 | pelwood@sebs.rutgers.edu

LISA ESTLER

Director, Planning and Budgets

848-932-3575 | estler@njaes.rutgers.edu

KATHLEEN HOWELL

Associate Director, Administration and Personnel

848-932-3581 | howell@njaes.rutgers.edu

KENNETH M. KARAMICHAEL

Director, Office of Continuing Professional Education

848-932-9271 | kenneth@njaes.rutgers.edu

RACHEL LYONS

Associate Director

Department Chair, 4-H Youth Development

848-932-3715 | lyons@njaes.rutgers.edu

MELISSA MCKILLIP

Senior Associate Director

Director, Philanthropy and Strategic Partnerships

848-932-4214 | mckillip@njaes.rutgers.edu

KAREN PLUMLEY-LUEPKE

Director

Leadership and Organizational Development

732-735-2659 | plumley@njaes.rutgers.edu

NICK POLANIN

Associate Director

Department Chair, Agriculture and Natural Resources

848-932-3590 | polanin@njaes.rutgers.edu

RACHELE SYLVAN

Director, Financial and Business Administration

848-932-3792 | rsylvan@njaes.rutgers.edu



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HISTORIC ACHIEVEMENTS

Jersey Roots, Global Reach



First bovine artificial insemination program in the nation

The introduction of artificial insemination (AI) of dairy cows in the U.S. is initiated by Enos J. Perry, extension specialist in dairy husbandry. Fresh from his observation of AI in Europe, Perry makes U.S. agricultural history by setting up the first cooperative in 1938 to provide selective breeding services by artificial insemination of dairy cattle in New Jersey. His 1945 book, *The Artificial Insemination of Farm Animals*, quickly becomes the standard reference manual. Perry is inducted into the National Agricultural Hall of Fame in 1984.



First development of the air-inflated, double-layer polyethylene greenhouse

While experimenting with an aquarium air pump to separate two layers of plastic film in a model greenhouse he was building, extension agricultural engineer William Roberts discovers the technology that leads to the first air-inflated, double-layer polyethylene greenhouse covering system widely in use today. Roberts' 1965 innovation is a boon to agriculture worldwide as it revolutionizes the use of greenhouses—traditionally made of glass and costly. The prototype, erected on the Rutgers campus, is designated a National Historic Agricultural Landmark in 2004.



Pioneers in plant breeding for New Jersey and beyond

The enduring Rutgers tomato—the preferred choice of commercial growers through much of the 20th century—makes its debut in 1934, thanks to vegetable breeder Lyman Schermerhorn. In 1960, Rutgers professor C. Reed Funk becomes the first full-time cool-season turfgrass breeder at a U.S. university. After more than a half-century of research, renowned breeder Elwin Orton is inducted into the New Jersey Inventors Hall of Fame in 2012. He is credited with “saving the U.S. dogwood industry” when diseases and insects threatened the native species of the popular flowering tree.



First to make the scientific connection between mosquito infestations and marshland breeding sites

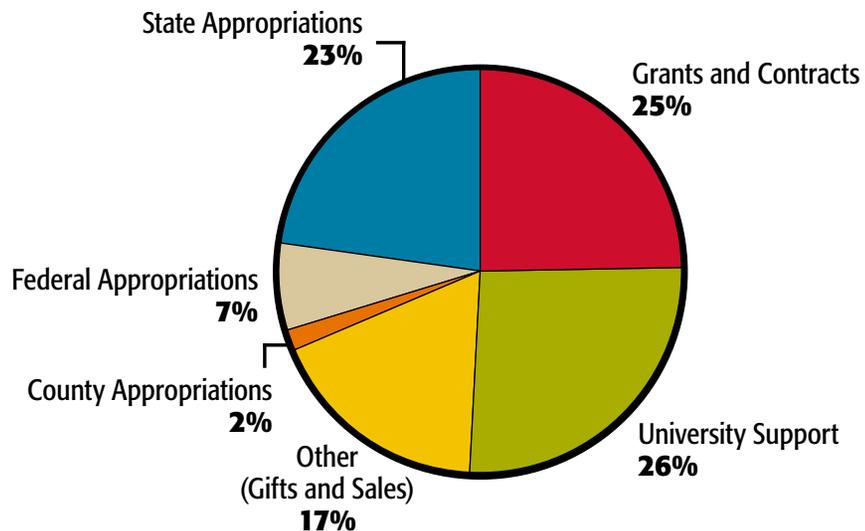
John B. Smith is hired in 1889 as the New Jersey State Entomologist based at Rutgers NJAES. His research is able to scientifically show that mosquitoes were flying long distances from their larval habitat in salt marshes, which explains the failure of local attempts at controlling the mosquito population. He convinces the NJ Legislature that control of salt-marsh mosquitoes is a state problem. In 1906, the state endorses the elimination of mosquito larval habitat on the salt marshes and mandates a statewide coordinated program of mosquito control.

NJAES FINANCIAL SUMMARY

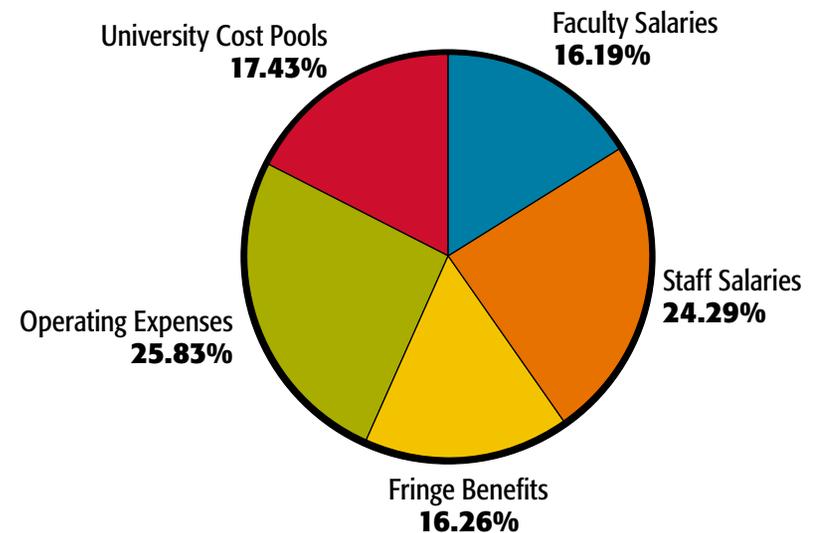
Research and Extension Funding Sources and Expenditures for 2019

NJAES relies on a variety of public and private funding sources to address critical issues in New Jersey. NJAES received \$103.1 million from grants and contracts, Rutgers University support (fringe and operational), state, federal, and local government funding, as well as gifts, endowment revenue, income from sales and service activities, and patent and plant licensing revenue.

FUNDING SOURCES



EXPENDITURES



BRIAN J. SCHILLING

Senior Associate Director, NJAES
Director, Cooperative Extension



NJAES is committed to improving the quality of life, economy, and environment of our state through the integration of applied research that meets the diverse needs of New Jerseyans and an extensive educational outreach capacity supported by a statewide Cooperative Extension system. No greater testament to the value of our core mission—and the continued relevance and impact of New Jersey's land-grant university—can be found than in the tireless efforts of thousands of dedicated volunteers who contribute their time in support of NJAES programs.

Boots on the Ground

In a modern world where people have instant access to an endless volume of online information, the New Jersey Agricultural Experiment Station (NJAES) strives to be the trusted source of timely, credible, science-based information that is needed to address issues affecting New Jersey residents, businesses, and our environment.

As the outreach arm of NJAES, Rutgers Cooperative Extension (RCE) county offices and personnel are gateways through which the knowledge, research, and expertise of Rutgers University—and the resources of the national system of land-grant universities—are made available to our state residents. However, our faculty and staff do not endeavor alone. Thousands of trained volunteers and paraprofessionals extend the impact of NJAES programs that serve agricultural producers and aquaculturalists, help people lead healthy and active lives, identify and monitor harmful invasive species, increase the resiliency of our communities and natural systems, educate home horticulturalists, and foster positive youth development.

4-H YOUTH DEVELOPMENT PROGRAM

For more than 100 years, the 4-H Youth Development Program has offered young people in grades K–13 the opportunity to learn leadership and life skills while exploring opportunities in agriculture, science, healthy living, outdoor adventure, and more. Today, the engagement of nearly 40,000 youth participants in 4-H programs, clubs, and activities is made possible by the dedicated efforts of more than 2,300 adult and 355 teen volunteers.



RUTGERS ENVIRONMENTAL STEWARDS

Since 2005, when the program was established, 696 Rutgers Environmental Stewards have been trained to tackle important environmental issues in their communities, including natural resource and ecosystem protection, habitat conservation, and climate resiliency.



*Want to get involved?
 Want to make a difference?
 We invite you to explore your passion and experience
 the rewards of volunteerism through participation in
 NJAES programs: njaes.rutgers.edu/volunteer*



NEW JERSEY WOODLAND STEWARDS PROGRAM

The New Jersey Woodland Stewards Program is an educational initiative of Rutgers Cooperative Extension, the New Jersey Forest Stewardship Program, and the New Jersey Forestry Association. It promotes sustainable stewardship of our natural resources, focusing on sound, science-based forest and wildlife management practices.



MASTER TREE STEWARDS PROGRAM

Since 1992, the Master Tree Stewards program in Union County has trained 270 volunteers who continue to educate youth about the importance and care of our community forests.



RUTGERS MASTER GARDENERS

Trained Rutgers Master Gardeners assist NJAES with the delivery of horticulture programs and information to the general public. Program volunteers play vital roles staffing "help desks" in 15 RCE county offices and field questions from the public about food safety, household insects and pests, insect-borne diseases, and other issues of concern.



BARNEGAT BAY SHELLFISH RESTORATION PROGRAM

The Barnegat Bay Shellfish Restoration Program began in 2005 and helps to restore depleted shellfish populations and improve the health of the Barnegat Bay ecosystem through educational programming and applied research. Through its volunteer education program, 385 individuals have been trained in its Coastal Stewardship class and earlier Shellfish Gardener courses.



RICHARD ALOMAR

Director, Office of Urban Extension and Engagement



As part of Rutgers Cooperative Extension (RCE), the Office of Urban Extension and Engagement is the next step in bringing science-based knowledge to the ever-growing, complex, and diverse state of New Jersey, while making Rutgers a national example for other urban extension programs. RCE has programs that address issues related to densely populated areas, along with nationally recognized educators, specialists, and agents delivering these programs to an increasingly diverse population. Our aim is to extend these resources to the larger New Jersey community.

Serving Urban Communities

For more than 100 years Rutgers Cooperative Extension has used science-based knowledge to improve the lives of New Jersey residents. As the state's needs have changed over time, so too have programs developed by NJAES to address timely issues. New Jersey communities currently face a series of complex challenges that require a robust approach to how we address economic growth, healthy lifestyles, human and community development, environment and natural resources, and food and nutrition. In densely populated counties and urban centers, those issues may require collaboration with other university units, government agencies, nonprofit groups, and community associations to share science-based knowledge and on-the-ground experience with an ever-changing diverse population.

How do we ensure healthy lifestyles in areas with limited access to healthy food? How do we extend our outreach to provide productive futures for urban youth and adults? How do we address flooding, limited access to quality open space, air pollution, affordable housing, social inequities, and communicating effectively across diverse cultures and languages?

The new Office of Urban Extension and Engagement addresses the complexity of these issues through engagement and collaboration with residents, schools, community organizations, businesses, and government agencies. The office helps to develop community-based strategies for a healthy, equitable, and resilient future for all New Jersey residents. The creation of the office engages RCE in the national conversation on urban extension and offers NJAES a prominent role in the development of operational and programmatic strategies in densely populated areas.

Communities across New Jersey will benefit from access to existing RCE programs like STEM learning, entrepreneurship training, urban agriculture and farmers markets, stormwater management, and community-based environmental planning and design. In addition, increased collaboration among the extension networks and community partners will benefit RCE by fulfilling its mission to the state across all regions, counties, municipalities, and cities.

To that end, the office is developing digital infrastructure to facilitate communication across extension and community networks. The office's website will serve as a repository of extension programs in densely populated counties and cities, and as a portal to connect New Jersey residents with program resources.



The office communicates, creates awareness, and shares information with residents to highlight extension programs through its social media feeds on Twitter, Instagram, and Facebook @RutgersUrbanExt. Its ongoing efforts involve meeting with the extension network and key stakeholders throughout the state to explore opportunities to strengthen existing partnerships and forge new community collaborations.



New Jersey's Growing Population

New Jersey is the most densely populated state in the nation.¹ The state's population is projected to continue increasing to a total of more than **9.6 million** residents by 2030.²

¹U.S. Census Bureau 2010.

²State of NJ Department of Labor and Workforce Development.



New Jersey's Schools

More New Jersey schools and youth organizations are using urban agriculture programs (like FoodCorps) as teaching tools in health, nutrition, and life sciences.



Accessing Fruits and Vegetables

A growing number of programs are linking traditional farms, urban farms, and market gardeners directly to consumers in communities with limited access to fresh fruits and vegetables.



BRADLEY I. HILLMAN

Senior Associate Director, NJAES
Director, Research



NJAES remains as relevant today as when it was established in 1880. Our research on the changing climate and its effects on the coastline, communities, and agriculture is now critical and informs our extension practitioners. For example, NJAES' expansive programs in breeding plants and shellfish for resilience against new environmental and biological challenges, and an integrated approach to mitigating the threat of invasive pests and pathogens that imperil agriculture, are more important than ever.

Formidable Foes

More than a century ago, Rutgers professors established the science of mosquito control. Following in those footsteps, Rutgers has continually been at the forefront of the fight against invasive insects and disease vectors.

SPOTTED WING DROSOPHILA

Since first detected in 2011, spotted-wing drosophila (SWD), *Drosophila suzukii*, has become the most important pest of blueberries and other small-fruit crops in New Jersey. The entomology lab at the Marucci Center for Blueberry and Cranberry Research and Extension is working towards the development and implementation of behavior-based alternatives to chemical control. The lab has tested volatiles from fermentation products, yeast, and leaves as attractants for SWD, and has also identified attractive volatiles from blueberry fruits. Currently, the researchers are testing repellents from plant-pathogenic fungi on SWD. Ultimately, the goal is to identify attractants and repellents that can be used as ongoing strategies to manage this pest.



Courtesy of Oregon Department of Agriculture

MOSQUITOES AND TICKS

The Center for Vector Biology supports the state's mosquito and vector control programs by developing and testing effective and sustainable strategies to control nuisance vectors and vector-borne diseases. The center developed and tested area-wide management strategies to control *Aedes albopictus*, the Asian tiger mosquito, an invasive mosquito and vector of deadly arboviruses. The results of that research form the basis of current Best Practices for Integrated Mosquito Management underwritten by the American Mosquito Control Association.

The center was the first to report the presence of large populations of the exotic Asian longhorned tick in New Jersey in 2017, a species of great concern because it breeds prolifically and is a known vector of deadly pathogens to humans and livestock. In 2018, in collaboration with the Monmouth County Tick-borne Disease Lab, the center leveraged the county's existing surveillance expertise to provide needed information on ticks and tick-borne diseases in a statewide "Tick Blitz." During this activity, the Asian longhorned tick was detected in new counties, demonstrating the effectiveness of the "Tick Blitz." The center helped to launch a countrywide surveillance that led to the detection of this tick species in multiple states across the mid-Atlantic region as far back as 2010. In addition, members of the center are currently developing strategies to time insecticide applications to effectively interrupt the tick life cycle and eliminate populations.



Photography by John O'Boyle and stock, unless noted elsewhere.

SPOTTED LANTERNFLY

The spotted lanternfly, *Lycorma delicatula*, has the potential to become a major threat to New Jersey agriculture—especially its vineyards—and to its forests. Rutgers researchers have developed field and lab methods for early detection of spotted lanternflies based on environmental DNA (eDNA) traces left on leaves, bark, and other surfaces. Preliminary results are promising, suggesting a higher sensitivity for this genetic test. Early detection is helping managers coordinate response strategies for combating these emerging populations before they increase further next spring.



Lawrence Barringer

BROWN MARMORATED STINK BUG AND THE SAMURAI WASP

The brown marmorated stink bug (BMSB), *Halyomorpha halys*, an invasive species from China that was introduced in the U.S. in the 1990s, continues to be a pest of tree fruit and vegetables, and a nuisance in homes and buildings across the state. Scientists in the Department of Entomology are conducting research that targets ways to reduce the use of insecticides to manage BMSB. One of these is the use of another Asian species, *Trissolcus japonicus*, the tiny samurai wasp approximately 1/8" in size, that attacks BMSB eggs. The wasp entered the U.S. in 2008 and has been found in Washington, DC, and 12 states, including New Jersey. Researchers are determining the location and spread of this wasp in both northern and southern New Jersey, and whether or not companion flower plantings can be used to increase their numbers and enhance their effectiveness with the goal of doing on-farm releases of the samurai wasp.



Chris Hedstrom

TONY BROCCOLI

Professor and Chair,
Department of Environmental
Sciences and Co-director,
Rutgers Climate Institute



Climate change is undoubtedly one of the most challenging issues of our time. Addressing, adapting to, and preparing for climate change is a daunting proposition. At Rutgers, we take a transdisciplinary approach to not only conducting rigorous natural and social science research, but also fostering real-world applications of our work to the challenges climate change brings to society, while also educating the next generation of scientists, engineers, agricultural producers, land and water managers, decision makers, and citizens.

Climate Change Planning Toolkit

NATURAL CARBON SOLUTIONS

A team of Rutgers scientists from NJAES, with support from the Duke Farms Foundation and under the direction of Rutgers Climate Institute, has embarked on a multi-year study at the 2,742-acre Duke Farms property in Hillsborough, NJ, to better understand how various land types and land management activities can act as natural solutions to climate change. Baseline monitoring commenced in 2019 to determine the storage of carbon in vegetation, roots, microbes, and soils, and the flow of carbon—including methane and carbon dioxide—in various land uses including wetlands, forests, grasslands, lawn areas, and vegetable fields. Experimental plots will explore how different types of management practices affect carbon storage. A goal of Duke Farms is to become carbon neutral or even carbon negative and the hope is that other land managers might be able to replicate and expand upon the types of practices being tested to help remove carbon from the atmosphere.

NJFLOODMAPPER

As a state outlined by ocean, bay, and river, New Jersey's 239 coastal communities are vulnerable and in many cases already affected by rising seas and coastal flooding. Planners are not left to guess the prognosis for their municipalities, thanks to a highly sophisticated tool. NJFloodMapper allows users to view exposures against data layers such as critical facilities, socially vulnerable populations, infrastructure, and natural resources. To provide a fuller picture, NJFloodMapper uses the latest New Jersey sea-level rise science and high resolution mapping of the land surface elevation to model areas vulnerable to sea-level rise. Efficacy is further enhanced by access to datasets such as FEMA Flood Insurance Rate Maps, coastal evacuation routes, state/municipal level infrastructure, and socio-demographic information. NJFloodMapper website: go.rutgers.edu/xesnj4zt.

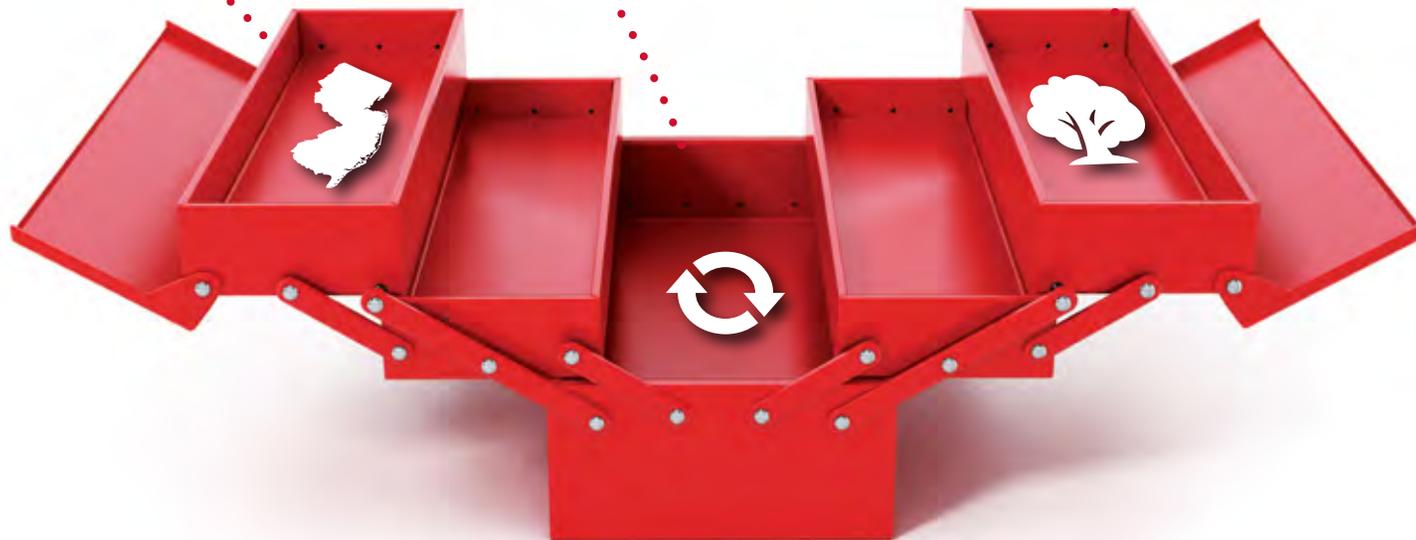


*Mean High, Mean Water (MHHW)

The data and maps in this tool illustrate the scale of potential flooding, not the exact location, and do not account for erosion, subsidence, or future construction. Water levels are shown as they would appear during the highest high tides (excludes wind-driven tides). The data, maps, and information provided should be used only as a screening-level tool for management decisions.

NJFORESTADAPT

Our resiliency to climate change is aided by the vigor of our forests. NJForestAdapt is a tool to assist in maintaining forest productivity, designed to inform forest stewardship and community forestry management plans, watershed protection, resiliency planning, and adaptive management to climate change. Users can explore maps of forest carbon, pest and disease risk, forest health, current and projected temperature and precipitation, and anticipated changes in tree species throughout New Jersey. Monitoring gradual level shifts keeps a proverbial finger on the pulse of the state's most sensitive areas. NJForestAdapt website: go.rutgers.edu/uxo4tq90.



COOPERATING AGENCIES

NJFloodMapper is a collaboration of the Grant Walton Center for Remote Sensing and Spatial Analysis, Jacques Cousteau National Estuarine Research Reserve, NJAES Office of Research Analytics, Edward J. Bloustein School of Planning and Public Policy, and Rutgers Climate Institute. Its development has been supported by NJAES, National Oceanic and Atmospheric Administration's Cooperative Institute for Coastal and Estuarine Environmental Technologies, NJ Department of Environmental Protection, NJ Sea Grant, NJ Recovery Fund, and the National Estuarine Research Reserve System Science Collaborative.

NJForestAdapt was developed by Rutgers NJAES, Grant Walton Center for Remote Sensing and Spatial Analysis, NJAES Office of Research Analytics, Rutgers Center for Resilient Landscapes, and Rutgers Climate Institute. Partners include U.S. Forest Service, NJ Division of Parks and Forestry, and the Northeast Regional Climate Center. The work was supported by a grant from the USDA National Institute of Food and Agriculture.

MARGARET BRENNAN- TONETTA

Associate Director, NJAES,
Director, Economic Development
and Innovation



Forward-looking investments by NJAES have led to the development of vital capabilities that help New Jersey businesses and communities grow and thrive. Established NJAES programs like plant and shellfish breeding, clean energy, and food incubation, are well-positioned to identify emerging issues, provide solutions, and build the economic resiliency of the state. New industries that are also being developed offer new opportunities for a better tomorrow for New Jersey farmers, businesses, communities, and residents.

Investing in a Better Tomorrow

INDUSTRIAL HEMP

Once a key regional crop in colonial times, modern production of industrial hemp in New Jersey necessitates starting from scratch. NJAES has assembled a working group of faculty to lay the groundwork for implementation of research and outreach for hemp producers under New Jersey's Hemp Farming Act. Production practices and hemp varieties will vary depending on whether the crop is grown for cannabidiol (CBD), fiber, or grain (seed). NJAES has purchased threshers and seed cleaners, and will conduct production trials and develop demonstration sites to support industrial hemp research. Fact sheets on industrial hemp FAQs and basic production agronomy have been developed and a statewide educational session was held along with smaller informative talks. NJAES stands ready to support this emerging industry.



OFFSHORE WIND

New Jersey's 2019 Energy Master Plan puts the state on the path to 100 percent clean energy by 2050, with a goal of producing 7,500 megawatts of energy from offshore wind (OSW) by 2035. Other states in the northeast are developing similar plans, inspiring expansive development of the industry in the region. Faculty and staff from several Rutgers departments and NJAES have been conducting research, education, and stakeholder engagement as the industry develops. The focus has included oceanographic and atmospheric science, engineering, marine sciences, business, and other disciplines. Scientists are conducting research on the ecology, oceanography, and available wind resources within the New Jersey location being considered for OSW development. Extension marine faculty are collaborating with fisheries stakeholders to identify their concerns and research priorities with respect to the compatibility between OSW development and fishing activity. Faculty have met with stakeholder groups on OSW development and potential concerns related to agriculture and other industries.



Photography by stock, John O'Boyle, and Nick Romanenko

AQUACULTURE

NJAES is committed to enhancing bivalve aquaculture, which is important to the socioeconomic wellbeing of coastal areas that are depressed by the decline of wild fisheries. Bivalve aquaculture in New Jersey is dominated by oyster farming in Delaware Bay and hard clam farming in coastal bays. Disease-resistant stocks have been developed for eastern oyster aquaculture, however most of the selected stocks so far are developed for low-salinity estuaries. A three-year, \$592,390 project funded by NOAA Sea Grant is currently underway by the Haskin Shellfish Research Lab to develop superior eastern oyster stocks that will survive and grow well in high-salinity environments. In addition, the project will improve growth of bay scallops to enable same-year harvest, as well as develop surfclams with fast growth and heat tolerance to enhance survival and enable early harvest. A key component of this research is to communicate the results to New Jersey and regional shellfish farmers.



HAZELNUTS

Taking the native North American hazelnut that is resistant to Eastern Filbert Blight and crossing it with disease-susceptible European species that have market-quality nuts has been a long-term investment by NJAES and our plant breeders. With the development of this low-input, high-value crop comes the beginning of a new regional industry. This requires laying the groundwork for growers to obtain the trees, as well as produce and market hazelnuts. The Hazelnut Farmer Demonstration Plot was launched this year at the Rutgers Fruit and Ornamental Research and Extension Center in Cream Ridge from a partnership between the Grown in Monmouth program and NJAES. The demonstration research orchard provides opportunities for farmers to observe how the plants are grown and managed. This is an opportunity for small farms to diversify their crops and to create a market for hazelnuts in the eastern U.S.



Hemp

Bolstered by legalization of industrial hemp and newly discovered functional properties of hemp seed and oil, the global industrial hemp market is projected to grow from **\$4.6 billion** in 2019 to **\$26.6 billion** by 2025.¹



Wind Energy

In 2016, the U.S. wind industry exceeded **100,000** jobs and generated **\$20 billion** of annual economic impacts. In the next few years, wind-related employment is projected to reach **248,000** jobs and generate **\$85 billion** in economic impacts.²



Hazelnuts

Worldwide hazelnut consumption was valued at **\$520 million** in 2018.³ Currently, hazelnut cultivars are mostly adapted to areas with a Mediterranean climate. Disease-resistant, adaptive hazelnut cultivars developed at NJAES will allow the U.S. to substantially increase hazelnut production to meet global demand.



Strategic Investment

Long-term investment in NJAES research and programming yields returns to society that last decades. For every **\$1** invested in NJAES, **\$10** in new economic development is created.

¹Global Industrial Hemp Market Overview & Forecast, 2019 to 2025: Focus on Hemp Seed, Hemp Seed Oil, Hemp Fiber, and CBD Hemp Oil. PR Newswire Association. www.prnewswire.com/news-releases/global-industrial-hemp-market-overview-forecast-2019-to-2025-focus-on-hemp-seed-hemp-seed-oil-hemp-fiber-and-cbd-hemp-oil-300879995.html.

²American Wind Energy Association, 1501 M St. NW, Suite 1000, Washington, DC 20005. March 9, 2017. www.awea.org/Awea/media/Resources/Publications%20and%20Reports/Market%20Reports/AWEAEconomicDevelopmentImpactsofWindEnergy.pdf.

³Census of Agriculture, NASS, United States Department of Agriculture. Washington, DC 20250. Issued April 2019.

MELISSA MCKILLIP

Senior Associate Director, NJAES
Director, Philanthropy and
Strategic Partnerships



Private support of innovative and impactful research and extension programs from industry partners, foundations, alumni, and friends significantly augments the funding that NJAES receives from sponsored research, as well as state and federal appropriations. From hands-on tools promoting better nutrition and health outcomes in New Jersey's vulnerable communities to practical solutions to grow start-up businesses through our incubators, the vast diversity of NJAES activities across the state provide multiple options for matching philanthropic support.

Supporting NJAES

After having spent more than 10 years being misdiagnosed, Candice Teuber, a long-time resident of Hunterdon County, learned that her debilitating pain was the result of late-stage Lyme disease and Babesiosis, a tick-borne infection that causes malaria-like symptoms. Because of the severe impact on her health and on their lives, she and her husband Peter have come to learn a lot about tick-borne diseases, including the fact that the same tick that carries the Babesia parasite is also known to carry the bacteria responsible for Lyme disease.

As Candice and Peter opened up about her health challenges, many of their friends and neighbors began to share their own stories of tick-borne illness—Lyme disease, Babesiosis, Bartonellosis, Ehrlichiosis, among them. The Teubers and their friends began to wonder about the prevalence of tick-borne diseases in their county since so many in their circle of friends and acquaintances in their community seemed to have also been directly affected.

As the chair of the Board of Trustees of Hunterdon Healthcare Foundation, Candice knows firsthand of the commitment to community health by Hunterdon Healthcare System—the only hospital in Hunterdon County. The hospital system is a key part of a healthier community initiative, a countywide coalition of more than 80 community agencies sharing a common interest in promoting the health of county residents aptly called the Partnership for Health. In 2017, Hunterdon Healthcare hosted a Lyme disease forum in the county that was overwhelmingly supported by residents.

TAKING ACTION!



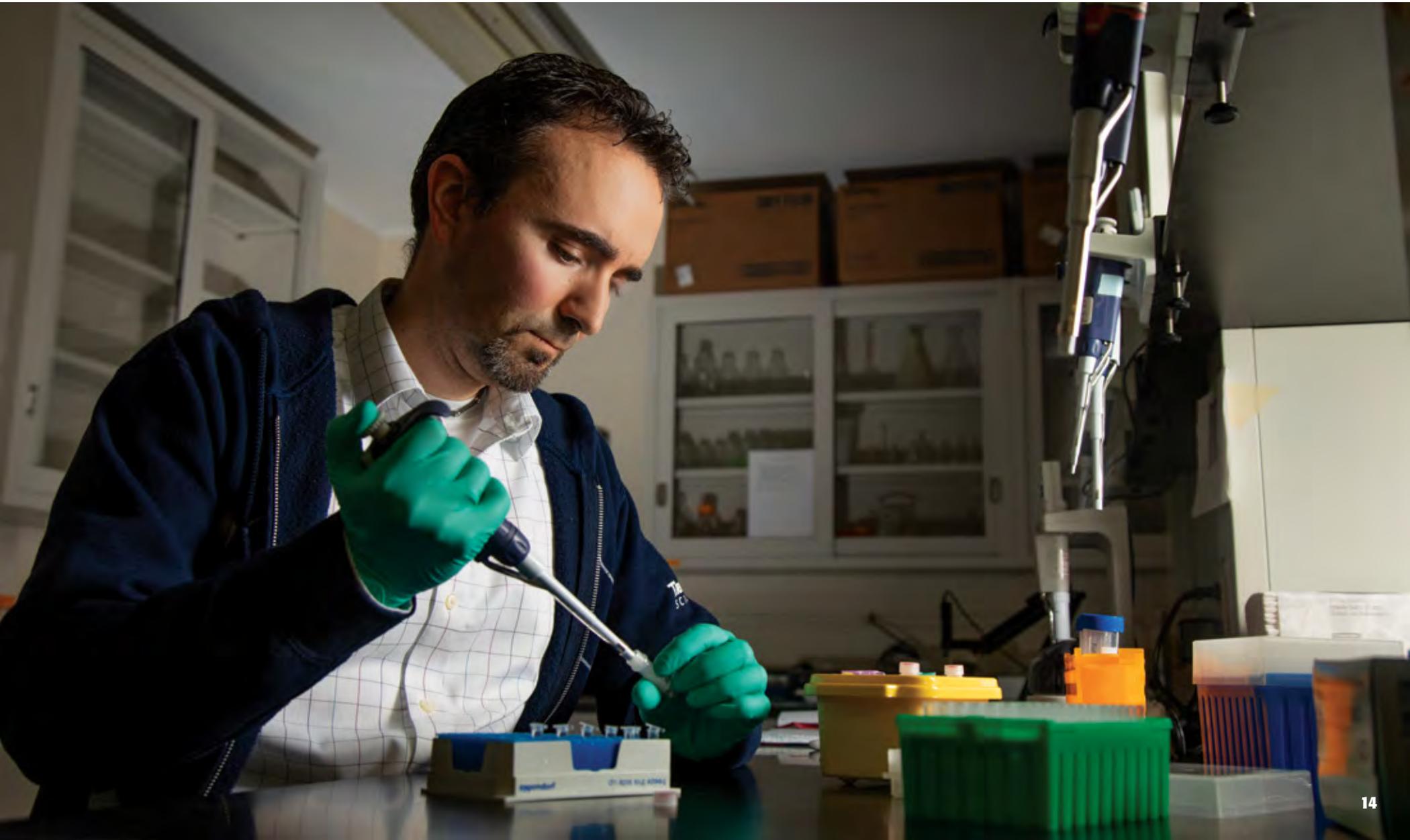
This sort of synergy motivated the Teubers and their friends to join forces to do something concrete. They approached Hunterdon Healthcare Foundation with the idea of their families funding a study of tick populations and the diseases they carry in the county, similar to a 1996 study they had learned about that compared tick populations in Hunterdon and Monmouth counties.

Entomologist Dana Price (CC'01, GSNB'15), an associate research professor with the Rutgers Center for Vector Biology and his colleagues have wanted to answer the question as to why the 1996 study found that Hunterdon County had a much higher human caseload of Lyme disease than that of Monmouth County, despite the latter's tick populations being far denser and the field infection rates of the Lyme disease pathogen being greater.

The search for an answer has come closer to reality with a generous gift from the Teubers and their friends, via Hunterdon Healthcare Foundation, to establish a research fund in Price's lab. The funding will support a new study to assess whether populations of potentially infective ticks in Hunterdon and Monmouth counties are equal in abundance. The data from this new study in Hunterdon will be compared to data generated by Monmouth County's ongoing tick surveillance program. Monmouth County operates a Tick-borne Disease Laboratory at the Rutgers center and has long been one of the few counties with a tick research and control program in the state.

The goal is to collect and test hundreds of individual ticks for both known and potentially unknown pathogens, with a subset of the collected ticks being subjected to additional genomic testing. Price and collaborators began collecting ticks in summer 2019. They continued their collections into the fall and winter since, contrary to popular belief, deer ticks are active all year long. The study is a partnership among the center, the Hunterdon County Department of Health, and the Monmouth County Tick-borne Disease Laboratory.

Thanks to this research gift via Hunterdon Healthcare Foundation, the reboot of this 23-year study will yield important findings that will be published as soon as 2020. The results are sure to advance our understanding of tick-borne pathogens and their threats and simultaneously bring us closer to eventual therapies and cures for tick-borne diseases.



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