

# NEW YORK SOIL HEALTH

## *Summit Presenters & Summaries*



### **Patrick Hooker**

Deputy Secretary of Food and Agriculture, Office of Governor Andrew Cuomo

In May 2013, Governor Andrew M. Cuomo selected Patrick Hooker to serve as a Deputy Secretary of Food and Agriculture. In this capacity, Pat is the Governor's liaison to the New York State Department of Agriculture and Markets, as well as the State Liquor Authority. Pat has been involved with agriculture policy his entire career, serving as the Commissioner of the Department of Agriculture and Markets, Director of Public Policy for the New York Farm Bureau, the Director of the New York State Senate Agriculture Committee and the Rural Affairs Advisor for the State Assembly Minority Leader.

Pat grew up in rural Madison County, working on a neighbor's dairy farm. In school, he was active in the Junior Holstein Club, as well as FFA, which he served as State President and received his American Farmer degree. Pat received his Associate's degree from Morrisville State College and his Bachelor of Science degree in Agriculture Education from Cornell University.

Pat and his wife Karen have two grown children, Erika and Mitchell. Together they own a 350 acre farm in southern Herkimer County where they produce maple syrup.

**Secretary Pat Hooker will be kicking off the summit with a morning welcome.**



### **David W. Wolfe**

Professor of Plant and Soil Ecology, School of Integrative Plant Science, Cornell University

Dave is the project leader for the New York Soil Health research and outreach program, and author of an award-winning popular science book on soil ecology, *Tales From the Underground: A Natural History of Subterranean Life*.

He is also a leading authority on agricultural climate change adaptation and mitigation, including soil carbon sequestration and monitoring. For more information: [www.hort.cornell.edu/wolfe](http://www.hort.cornell.edu/wolfe).

## **Soil Health: Pioneers and Emerging Frontiers**

Healthy soils have abundant soil microbial populations that benefit plant nutrition and growth, suppress weeds and pests, and improve soil structure for resilience to drought and flooding. This increases farm profitability and has many environmental co-benefits. We will discuss breakthroughs in soil biology, from Darwin's study of earthworms, to Waksman's discovery of streptomycin, to recent research on root-soil microbe interactions.

New York is at the forefront of the soil health movement, but constraints to rebuilding soil organic matter by reducing tillage, maximizing plant cover and root activity, and use of organic soil amendments persist. This Summit will gather input from a broad range of stakeholders for a visionary New York Soil Health Roadmap.

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### **Anu Rangarajan**

Director, Cornell Small Farms Program

Anu has been on the faculty of Horticulture at Cornell University since 1996. She serves as the Statewide Fresh Market Vegetable Specialist and conducts a grant-funded research and extension program focused on environmental and economic sustainability of vegetable farms in the Northeast.

Her current research focus is on reduced tillage systems for vegetables to improve soil health while maintaining crop quality and yields. She also directs the Cornell Small Farms Program: [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu).

### **Reducing Tillage on New York Vegetable Farms**

The high value of vegetable crops and priority of early harvest in our NY climate demands that tillage create a suitable seedbed for early season crop growth, support soil warming, drainage and nutrient availability, and reduce weed competition. Given the diversity of NY vegetable farm size and approach, multiple reduced tillage strategies are needed to advance soil health goals.

Zone and strip tillage, permanent beds, intensive mulching and no-till with tarps are reduced tillage approaches that we have verified under NY climate and soil conditions for several crops. These approaches provide flexibility to the grower, save labor and can be selectively applied across complex vegetable rotations.



### **Gregory Peck**

Assistant Professor of Horticulture, Cornell University

Greg is a pomologist with more than two decades of professional experience working with orchard systems in California, Washington, New York, and Virginia. His research program is designed to support and improve the sustainability, productivity, and profitability of tree-fruit producers.

Current projects focus on hard cider production, integrated soil and groundcover management for apple orchards, and improving crop-load management for apple trees through the use of a pollen tube growth model. For more information: [hort.cals.cornell.edu/people/gregory-peck/](http://hort.cals.cornell.edu/people/gregory-peck/).

### **Soil health for apple orchard systems**

Current soil health recommendations are based on annual crops that more easily accommodate soil health promoting practices such as cover crops and organic matter additions. However, apple growers typically address soil issues before planting and only apply fertilizers, such as calcium nitrate, in established orchards.

Through a series of experiments, I have found that carbon-based amendments, such as compost and mulches can provide sufficient nutrition for apple orchards while also increasing soil health and fostering microbial communities that support plant productivity. In this talk I will address the need to develop soil health recommendations for apple orchards that balance productivity with environmentally-friendly practices.

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### **Johannes Lehmann**

Professor of Soil Biogeochemistry and Soil Fertility Management, Cornell University

Johannes received his graduate degrees in Soil Science at the University of Bayreuth, Germany. During the past 10 years, he has focused on nano-scale investigations of soil organic matter, the biogeochemistry of pyrogenic carbon and the development of biochar and bioenergy systems.

He has authored more than 200 journal publications, was named Highly-Cited Researcher by Thomson Reuter in 2014-2017, and is the editor-in-chief of the journal Nutrient Cycling in Agroecosystems.

### **Upcycling of Dairy Manure as a Marketable Fertilizer**

Dairy manure increasingly poses a disposal issue due to eutrophication but also pollution of soil and water with antibiotics, hormones and pathogens. At the same time, fertilizer prices are increasing and global phosphate resources are known to be finite.

We advanced a technologically feasible approach for safe upcycling of dairy manure to a fertilizer. The manure is pyrolyzed and blended with organic materials to produce a marketable potting mix. In a second approach, we adsorbed ammonia from urine onto highly oxidized biochars and generated a material with 18% nitrogen as a possible fertilizer.



### **Matthew Ryan**

Assistant Professor of Sustainable Cropping Systems, Soil and Crop Sciences Section, Cornell University

Matt works with farmers, students, and other scientists to evaluate cropping system performance in terms of crop yield, profitability, environmental impact, and resilience.

He teaches undergraduate students about sustainability, agroecology, and organic farming and he conducts applied research on cover crops, intercropping, weed ecology, and perennial grains. For more information: [scs.cals.cornell.edu/people/matthew-ryan/](https://scs.cals.cornell.edu/people/matthew-ryan/).

### **Cover Crop Interseeding and Perennial Grains**

Protecting soil from erosion is an important first step in regenerating soil health. Cover crops are an effective tool for reducing soil erosion, but they are underutilized. Farmers report that limited time after crop harvest to establish a cover crop before winter is a major constraint.

Seeding cover crops into cash crops before they are harvested provides a number of benefits. We are also working on more transformative solutions, including perennial grains that provide year-round soil coverage. On-farm research in New York shows these new crops have potential, but more research is needed to improve performance and facilitate adoption.

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### **Paul Salon**

NE Region Soil Health Specialist, USDA-Natural Resources Conservation Service (NRCS)

Paul has initiated and worked on multiple research, demonstration and education projects on cover crops with collaborators from Cornell, Penn State, the National Soil Survey Lab and ARS.

He has organized over 20 workshops on cover crops and soil health at the Big Flats Plant Materials Center and on farms. He has coordinated the Empire Farm Days Soil Health Seminar Center.

**Paul will be serving as moderator for the grower panel.**



### **Donn Branton**

Owner, Branton Farms

Donn and his son Chad farm about 1,500 acres of processing peas, soybeans, sweet corn, grain corn, dry beans, wheat, oats and alfalfa in Le Roy, New York.

Donn has been farming since 1979 and has become a prominent conservation farmer, hosting numerous field days and featured in publications such as No-Till Farmer and the Natural Resources Conservation Service's Farmer Profile.

### **Soil Health on Branton Farms**

Donn first transitioned from full tillage to no-till 30 years ago and has since added zone-till, strip-till, cover cropping, nutrient and drainage management to the mix. Although his farm is located in a fertile area, some soils are deep while others are very shallow. Therefore a 'one size fits all' approach to improving soil health doesn't always work.

Donn views his farm as an experiment and is constantly changing to improve his bottom line and conservation outcomes. For example, the Brantons have been able to reduce nitrogen applications by half after planting a clover cover crop. They've also seen improvement in the number of worms and infiltration of their soils. Ultimately, Donn has stayed with low-till, cover crops, and other practices due to the improvement of the soil, their yields, the environment, and their bottom line. For more information: [brantonfarm@rochester.rr.com](mailto:brantonfarm@rochester.rr.com).

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### **Jean-Paul Courtens**

Owner, Roxbury Farm

Jean-Paul is a native from the Netherlands. He is a graduate of Warmonderhof (part of Groenhoust Ag College), specializing in organic and biodynamic farming. He moved to the U.S. in 1986 and founded Roxbury Farm in 1990.

He frequently contributes to educational programs on organic farming and soil health, and has had various roles as a member of the Northeast Organic Farming Association (NOFA).

### **Soil Health on Roxbury Farm**

Roxbury Farm is a 300 acre organic farm, primarily for vegetable crops. Other products include pork, beef, and lamb. We market primarily through an 1100 member CSA in NYC and counties in eastern NY. We have been using winter cover crops for 35 years. Benefits we see are less chronic compaction, less erosion, less nutrient loss, and reduced weed, disease, insect pressure. We use a roller-crimper at end of cover crop season. One challenge is the high price of organic cover crop seed.

We haven't (moldboard) plowed since 1992, and are now expanding minimum till acreage with purchase of a no-till grain and grass drill. Challenges for weed control with no-till in organic systems will be discussed. For more information: [jeanpaul@roxburyfarm.com](mailto:jeanpaul@roxburyfarm.com).



### **Dave Magos**

Owner, Morning Star Farms

Dave and Lisa Magos own and operate Morning Star Farms, a 780 cow dairy farm in Jefferson County. They currently crop 1,050 acres of corn for silage and grain, 250 acres of soybeans, 50 acres of wheat, 550 acres of alfalfa and the balance is grass hay for dry cows and heifers.

The Magos have hosted no-till/cover crop field days and were featured in a New York State Natural Resources Conservation Service's case study on the economics of no-till and cover cropping.

### **Soil Health on Morning Star Farms**

After Dave's first no-till year in 2007 he noticed the ground was looser and easier to work. They have been full no-till and planting cover crops into corn and wheat since 2009 and have also no-tilled alfalfa for the past several years. Currently cover crops are planted after harvest on all wheat acres, on corn acres that have been chopped for silage and on alfalfa acres that will be planted to corn the following year. They are still experimenting with cover crops following soybeans and corn harvested for grain.

Given the farm's proximity to Lake Ontario, Dave finds many challenges to implementing no-till including cool, damp, spring soils. However, he believes his efforts have paid off through reducing inputs and building better soils. For more information: [acd21@icloud.com](mailto:acd21@icloud.com).



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### **Rebecca Benner**

Director of Science & Strategy, The Nature Conservancy (TNC) of New York

Rebecca has worked for TNC for 8.5 years first as a global scientist in Latin America then as science director in North Carolina before New York. Rebecca also worked in natural resources at the Inter-American Development Bank.

She earned her Ph.D. in the Emmet Interdisciplinary Program in Environment and Resources from Stanford University.

### **Soil Health and The Nature Conservancy**

The Nature Conservancy works in agriculture around the world to increase investments in clean water and healthy soils while maintaining farm economic viability and productivity.

In New York, we are currently quantifying soil carbon benefits from agricultural practices, developing science and expertise around soil health, and working on statewide water quality issues. As we develop our agriculture-related strategies, our goal is to find ways to support New York's agricultural sector while continuing to conserve its rich natural resources.



### **Elizabeth Henderson**

NOFA-NY Board member, and co-chair of Policy Committee

Elizabeth farmed at Peacework Farm in Wayne County, NY, producing organically grown vegetables for over 30 years. She served as the NOFA Interstate Council representative on the Agricultural Justice Project. From 1993 – 2013, she chaired the Agricultural Development Board in Wayne County and took an active role in creating the Farming and Farmland Protection Plan for the county.

Her writings on organic agriculture appear in *The Natural Farmer* and other publications, and she is the lead author of *Sharing the Harvest: A Citizen's Guide to Community Supported Agriculture* (Chelsea Green, 2007), with a Spanish language e-book edition in 2017.

### **Soil Health and the Northeast Organic Farming Association (NOFA)**

Soil health is a top priority of organic farmers and of NOFA-NY. We have one orthodoxy – healthy soils lead to healthy crops, healthy food, and healthy animals and people.

Cooperating with the 6 other NOFA chapters, NOFA-NY has engaged in a multi-year project to identify farmer best practices/innovations in carbon farming and share them through publications, workshops, and conferences. NOFA Certification programs introduced 100% grass fed standards.

NOFA supports simple testing for soil quality that farmers can perform themselves, and advocates for legislation to create a healthy soils program in NY.

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### **David Haight**

Vice President for Programs and NYS Director for American Farmland Trust (AFT)

In David's roles he supports AFT's six regional programs and leads the organization's work to protect farmland, promote sound farming practices and keep farmers on the land in New York.

David and his wife, Suzanne, live with their children, Andrew and Julia, in Malta, and are proud owners of Balet Flowers & Design, a flower farm which has produced high quality plants and flowers since 1995.

### **Soil Health and the American Farmland Trust**

Improving soil health begins with keeping productive land in farming and slowing the spread of poorly planned development. Efforts to promote soil health practices on farmland must continue to offer practical information highlighting the economic impacts of practice adoption.

American Farmland Trust (AFT), Cornell University, and partners recently launched a 'Practical Soil Health Specialists' Program to enhance the professional support network in New York to help farmers successfully adopt such practices. Additionally, AFT is piloting new approaches to support farmers and non-farming landowners in expanding soil health and other conservation practices on rented farmland in New York.



### **David Grusenmeyer**

Executive Director of the New York Farm Viability Institute (NYFVI)

David has served as Executive Director of the New York Farm Viability Institute (NYFVI) since 2015. He started as NYFVI's Outreach Coordinator in 2005. In 2010 he became Managing Director of the organization and in 2015 was promoted to Executive Director.

Previously, David has worked with PRODAIRY at Cornell University, owned a small business in Idaho, and was an Extension Dairy Agent at Washington State University. For more information: [dgrusenmeyer@nyfvi.org](mailto:dgrusenmeyer@nyfvi.org).

### **Soil Health and the New York Farm Viability Institute**

New York Farm Viability Institute began operation as an independent non-profit in 2005, funding applied research, education and business development projects in all aspect of NY agriculture. NYFVI is an independent 501.c.3 non-profit lead by an all farmer board of directors. The board is committed to soil health and in 2005, the first year of NYFVI operation, the Institute funded three soil health related projects.

Since that time NYFVI has funded 41 soil health related projects in the areas of field crops, forage production, viticulture, vegetable production, high tunnel management, and manure application. The investment in these 41 projects totals nearly \$3.66 million. For the 2018 grant cycle NYFVI placed a special emphasis on soil health to encourage the incorporation of soil health into more application.

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### **Jeff Williams**

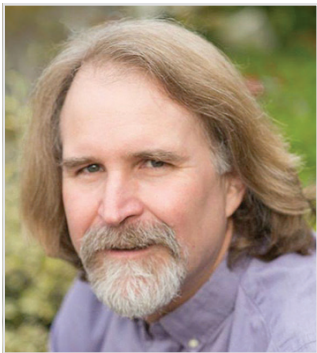
Director of Public Policy for New York Farm Bureau

At the New York Farm Bureau Jeff is principal lobbyist on all issues impacting agriculture, but specializes in environmental and business legislative and regulatory issues. Jeff also serves as the Secretary of the FARM NY PAC, New York Farm Bureau's political action committee.

In addition, he is the liaison between New York Farm Bureau and its many Agricultural Alliance association/business members. Prior to working at New York Farm Bureau, Jeff served as legislative aide and advisor to two New York State Senators.

### **Soil Health and the New York Farm Bureau**

New York Farm Bureau can play a role in linking soil health and political action. Strategies to highlight the importance of soil health for a legislative audience will be discussed – especially urban legislators unfamiliar with agriculture (... and soil).



### **David Montgomery**

Professor of Geomorphology, University of Washington

David is a MacArthur Fellow and an internationally recognized geologist who studies landscape evolution and the effects of geological processes on ecological systems and human societies.

An author of award-winning popular-science books, he has been featured in documentary films, network and cable news, and on a wide variety of TV and radio programs. His books have been translated into nine languages. He lives in Seattle, with his wife Anne Biklé and their black lab guide-dog dropout Loki. Connect with him at [www.dig2grow.com](http://www.dig2grow.com) or follow him on Twitter (@dig2grow).

### **Growing a Revolution: Bringing Our Soil Back to Life**

One of the key lessons of history is as simple as it is stark: Societies that degraded their soil failed the test of time. Visits to farmers around the world show how innovative farmers combining ancient wisdom with modern science are at the vanguard of a soil health revolution that could reverse the ancient trend and bring humanity's ailing soil back to life remarkably fast.

Combining ancient practices of cover crops and diversified crop rotations with modern methods of no-till planting cultivates beneficial soil life and allows using far less diesel, fertilizer and pesticide. These practices are good for farmers and the environment. Regenerative practices that build soil organic matter translate into farms that use less water, generate less pollution, and stash carbon underground while using less fossil fuel and agrochemicals to maintaining crop yields, build soil health, and improve farmers' bottom line.



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### **Lynn Knight**

Regional Economist with the USDA-NRCS East National Technology Support Center

Lynn is responsible for providing conservation economic technical assistance and training to 22 states, Puerto Rico and the Virgin Islands. She also is co-Director of the USDA Northeast Climate Hub. She holds a B.S. in Animal Science and M.S. in Agricultural Economics from the University of Vermont.

Prior to her work with USDA Lynn worked as an economic and policy consultant for American Farmland Trust, Winrock International, and Farm Pilot Project Coordination Inc.

### **Soil Health Economics at the Farm Scale**

This presentation will go over some examples of farm partial budget analyses and in-depth farm case studies that focus on the economics of soil health within the Northeast.



### **Cedric Mason**

Research Support Specialist with New York Soil Health at Cornell University

Cedric brings expertise in sustainable agriculture and climate change. Prior to graduate school he worked on farms in the Northeast, specializing in organic fruits and vegetables, and Christmas trees.

In 2016 Cedric completed a Ph.D in the department of Biological and Environmental Engineering at Cornell where he conducted research on perennial bioenergy crops. He began working with the New York Soil Health team in 2017.

### **Farmer Soil Health Survey on Benefits and Constraints**

A survey of over 180 farmers across NYS identified the most common costs, constraints, and benefits of using reduced tillage, cover crops, and other soil health practices. Greater yields were reported by 52% of those practicing reduced tillage, and by 50% of those who use cover crops. Reduced erosion was the most widespread advantage of both practices, with more than 80% reporting this benefit. Over 60% of farmers reported improved drought resilience and better drainage.

The survey also revealed differences between vegetable and corn-soy growers, and documented trends in benefits over time when comparing farmers with 1 - 5 years of experience with those using soil health practices for 5 - 10 years or more.

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### **Jenifer Wightman**

Research Specialist in Soil and Crop Sciences at Cornell University

Jenifer evaluates greenhouse gas emissions of agricultural and forestry projects to identify pragmatic and meaningful strategies to reduce emissions while also maximizing co-benefits.

She also teaches "Sustainable Systems" and "BioDesign" at Parsons – The New School for Design.

### **Soil Health and Climate Change**

Improved soil health has many benefits, including increased resilience to climate change. Adding double crops, cover crops, and perennial crops can sequester more carbon in soils while also reducing erosion and improving productivity, water quality, and soil health.

Other practices such as improved nutrient management, adding biochar, reducing tillage, and reforesting marginal lands can also improve soil health and reduce greenhouse gas emissions. However, there is a need to better quantify the financial and environmental benefits and costs of such practices to help farmers and policy makers make wise choices to improve productivity, resiliency, and environmental performance.



### **Peter Woodbury**

Senior Research Associate in Soil and Crop Sciences at Cornell University

Peter designs ways to improve the sustainability of agricultural and forest ecosystems and to improve agricultural and environmental management and policy.

He has expertise in how air quality, water quality, and soil quality will be affected by climate change, and as well how agriculture and forestry can become more resilient to climate change. He has researched how bioenergy, forest carbon sequestration, and agricultural practices can improve resiliency and reduce greenhouse gas emissions. For more information: [scs.cals.cornell.edu/people/peter-woodbury](https://scs.cals.cornell.edu/people/peter-woodbury).

### **Soil Health and Climate Change**

*Note: Jenifer Wightman will be presenting this topic*