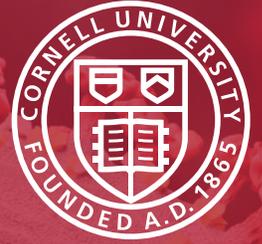


# Cornell Food Science Extension Programs



## 2020 ANNUAL REPORT

*Delivering Extension During  
the Coronavirus Pandemic*

Cornell **CALS**  
College of Agriculture and Life Sciences



# Cornell Food Science Extension Programs Deliver During the Pandemic

*“There is no excellence without labor. One cannot dream oneself into either usefulness or happiness.” – Liberty Hyde Bailey*

**On March 23, 2020**, within days of the initial COVID-19 shutdown in New York, the Institute for Food Safety at Cornell University (IFS@CU) hosted their first *Food Industry Virtual Office Hours* in collaboration with government and industry partners. These weekly Q&A sessions continued with over 40 sessions and 2,500 participants through the end of 2020. In the weeks and months that followed the initial shutdown, Cornell Food Science Extension team members continued to quickly respond to evolving needs, which included developing a webpage for sharing COVID-19 related resources; shifting in-person food industry short-courses and workshops to online formats; and developing new webinars and videos on pandemic-related topics, ranging from safe reopening of craft beverage tasting rooms to bilingual safety training for food processing environments.

The breadth and scope of these new activities is remarkable, but their descriptions cannot capture the extraordinary labor and dedication necessary for their rapid implementation. We will remember this pandemic period for its challenges, but also for revealing our extension colleagues' extraordinary capacity for excellence, no matter the circumstances. We hope you feel similarly as you read this annual report.

Sincerely,



**Carmen I. Moraru**  
Professor and Chair  
Department of Food Science  
Cornell University



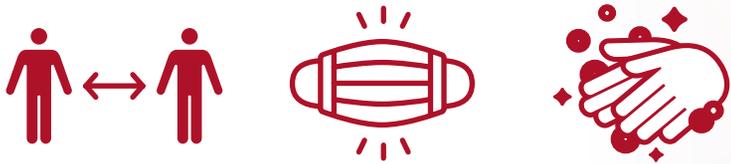
**Gavin Sacks**  
Professor and Associate Chair  
Department of Food Science  
Cornell University

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# Cornell Food Science Extension Programs Deliver During the Pandemic



*In extension, our work is grounded on connecting with the industries we serve* by delivering in-person training, workshops and consultations; providing lab-based and pilot plant services; and conducting applied field and product research. The COVID-19 pandemic forced us to reimagine how we would maintain connections with the people and industries we serve and continue to provide them with the information, services and research they have come to trust us to deliver. We also recognized that the industries we serve needed our support, more than ever, in responding to the pandemic. Here are some of the highlights of what our extension programs achieved in a year like no other.

## Providing COVID-19 Support and Resources

Cornell Food Science Extension Programs partnered with the New York State Department of Agriculture and Markets to create a COVID-19 *Rapid Response Task Force* to lead a coordinated response to meet the needs of the food industry during the pandemic. Here are a few examples of how the task force provided COVID-19 support and resources.

**Launched and delivered a series called *Food Industry Virtual Office Hours***, a facilitated Q&A co-hosted by the Institute for Food Safety at Cornell University (IFS@CU) and the New York Integrated Food Safety Center of Excellence to address questions from the food industry related to COVID-19. In 2020, they hosted a total of 40 sessions of virtual office hours with over 2,500 attendees.

**Developed general food industry resources including educational and training videos**, infographics, guidance, checklists, and FAQs. The COVID-19 *Rapid Response Task Force* curated this content as well as other COVID-19 guidance and resources for the food industry and consumers on the IFS@CU website, which received more than 107,000 visitors from March 2020 through the end of the year.

**Provided commodity-specific support.** For example, the Cornell Craft Beverage Institute (CCBI) developed guidance and assisted distilleries in converting their operations to make and distribute hand sanitizer, fulfilling a major gap in the supply chain at the onset of the pandemic.

The CCBI also hosted several webinars for the craft beverage industry on how to adapt their businesses to meet COVID-19 policies, including a webinar on *Reopening Craft Beverage Tasting Rooms*, which had more than 300 attendees.

**Responded to media requests to promote safe food practices.** Interviews of Cornell Food Science Extension team members were featured in newspapers, magazines, radio, and televised local and internet news outlets. Notably, CNET produced the short video “*Best practices for safe shopping, delivery and takeout in the age of coronavirus*,” which features Dr. Laura Acuna-Maldonado from the Produce Safety Alliance (PSA) and received over 138,000 views.

### Delivering Online and Remote Training

The Cornell Food Venture Center (CFVC), CCBI, Dairy Foods Extension, PSA, and New York Sea Grant (NYSG) transitioned in-person training and workshops to either self-pace online or remote instructor-led courses. Collectively, the extension programs offered 65 courses in 2020, reaching 3,425 attendees.

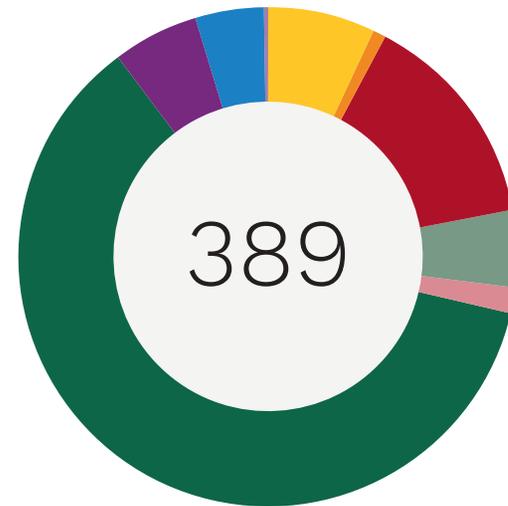
### Continuing Client-Based Services

All client-based services were temporarily suspended when the University made the decision to have faculty and staff work remotely. However, providing services to the food industry was deemed essential work and several programs were the first to return to campus during the pandemic. The CFVC, CFVC Pilot Plant, CCBI, CIFS-IPP, Dairy Foods Extension, Food Microbiology Lab, Food Processing Development Lab (FPDL), and HPP Validation Center resumed their work and provided services to more than 1,050 businesses in 2020.

### Combined Accomplishments in 2020

Despite the many challenges that presented themselves in 2020, the extension programs showed resilience and continued the work to connect with the industries they serve. Collectively, they instructed or participated in 389 meetings, trainings, workshops, demonstrations and programs. In 2020, team extension faculty and professionals delivered over 72,579 hours of training, engaging more than 23,914 stakeholders at these events.

### Events Hosted/Delivered, 2020



- CCBI (22)
- CFVC (17)
- CIFS-IPP (1)
- Dairy Foods Ext. (28)
- Food Micro Lab (3)
- IFS@CU (55)
- National GAPs (19)
- NYSG (7)
- PSA (237)

### Hours of Training Delivered, 2020

7,116	Cornell Craft Beverage Institute
1,993	Cornell Food Venture Center
708	Cornell Institute for Food Systems
13,978	Dairy Foods Extension
3,555	Food Microbiology Lab
11,891	Institute for Food Safety at CU
390	National Good Agricultural Practices
13,465	New York Sea Grant
19,483	Produce Safety Alliance
<b>72,579</b>	<b>Total Hours</b>

# Institute for Food Safety at Cornell University

(IFS@CU)



**The Institute for Food Safety at Cornell University (IFS@CU)** takes a comprehensive approach to providing training and conducting applied research to support the food industry in reducing foodborne illness risks. With expertise in fresh produce, dairy, juice and food processing, the IFS@CU aids the food industry in complying with federal regulatory requirements in the Food Safety Modernization Act (FSMA) and addresses food safety challenges that stretch from farms to consumers' tables.

In 2020, the IFS@CU not only continued to deliver food safety curricula through in-person workshops (hosted before the pandemic) and the *GMPs Part 117 Online Course*, but also directed a significant effort toward supporting the food industry both domestically and internationally in response to the COVID-19 pandemic. The IFS@CU hosted the series *Food Industry Virtual Office Hours* to address questions on COVID-19 in the US and mentored international colleagues in Bangladesh, Cambodia, Kenya, Nepal and Senegal to support the development of multi-lingual web-based resources and the launch of a *Food Industry Virtual Office Hours* series abroad.



55 Events Hosted/Participated in  
3,397 Total Attendees/Viewers  
11,891 Total Contact Hours



GMPs Part 117 Online Course:  
585 Participants  
8,424 Training Hours

# Cornell Institute for Food Systems Industry Partnership Program

(CIFS-IPP)



**The Cornell Institute for Food Systems Industry Partnership Program (CIFS-IPP)** is a public-private partnership that expands and enhances the engagement of Cornell University faculty, staff and students with industry scientists, engineers, and business leaders across complex global food systems. By combining expertise in scientific research, business economics and industry practice, CIFS-IPP has a long history of finding solutions to today's food systems challenges and shaping tomorrow's discoveries.

In many ways, 2020 highlighted the risks of food system disruptions and the critical need to put our science to work for the food industry to help ensure that people everywhere have access to nutritious, safe, and affordable food. CIFS-IPP continued to work virtually during the pandemic to advance industry practice with cutting-edge science to propel our food industry partners to the forefront of research, development, and technology.

Some program accomplishments from the year include a record attendance at the *CIFS-IPP Annual Symposium*; implementation of new virtual program content to help prepare students for industry careers and the challenges imposed by the pandemic; and continued growth of the program's industry membership.



CIFS Annual Symposium:  
118 Total Attendees/Viewers



15 Corporate Partners

# National Good Agricultural Practices (GAPs)

Implementing food safety practices to minimize microbial risks is important at all stages of production, including at planting.

**The National Good Agricultural Practices (GAPs) Program** has helped to ensure the safety of fruits and vegetables since 1999, by working with growers and packers to reduce microbial risks during growing, packing, storage, and transportation. Through a comprehensive education and extension program, National GAPs Program personnel facilitate the development of farm food safety plans to increase understanding and implementation of GAPs, as well as how they align with FDA's regulations under the Food Safety Modernization Act (FSMA) Produce Safety Rule and third-party audit requirements.

Program personnel focus on in-person and online training to small and mid-sized farm and packing house owners, farm workers, beginning farmers, socially-disadvantaged farmers, small processors, and small fresh fruit and vegetable wholesalers. In addition, National GAPs Program personnel conduct needs-based research including evaluating microbial risks associated with soil amendments and water used during fresh produce production. Supporting growers, packers, and farm workers to effectively implement food safety practices helps to keep safe and wholesome produce available for consumers and maintain farm economic viability.



19 Events Hosted/Participated in  
511 Total Attendees/Viewers  
390 Total Contact Hours



5 Produce Safety Courses Offered:  
85 Participants

# Produce Safety Alliance

(PSA)

*A farm employee does his part to implement food safety practices by washing his hands to ensure the safety of the crops he is harvesting.*



**The Produce Safety Alliance (PSA)** provides fundamental, science-based, on-farm food safety knowledge to fruit and vegetable growers, packers, educators, regulatory personnel, and others interested in the safety of fresh produce. Established in 2010, the PSA is a collaboration between Cornell University, FDA, and USDA to prepare produce growers to meet the regulatory requirements in the Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR). The PSA team trains and mentors PSA Trainers and Lead Trainers to ensure high quality courses are available globally so that growers can comply with the FSMA PSR training requirement in § 112.22(c).

In addition to its focus on effective training, the PSA team also provides technical assistance to growers and trainers. These efforts include the development of English and Spanish novel educational materials, supplementary training information, and one-on-one bilingual consultation. Helping the produce industry implement food safety practices protects consumers and ensures the economic viability of farms and rural communities. Recognizing that the produce industry is comprised of diverse growers from all over the world, the PSA team continues to expand accessibility to information through additional translations of its training manual including Chinese and Portuguese, the development of illustrations for low literacy individuals, and the development of policies that allow trainings to be extended to growers that are literate in languages not yet available through current translation efforts. *Note: the data below represents training activities conducted by the PSA team, along with their national and international cadre of trainers, as a cumulative total since September 2016.*



**2,741 Grower Training Courses Offered:**  
**62,532 Participants**  
**598,208 Training Hours**



**101 Train-The-Trainer Courses Offered:**  
**3,191 Participants**  
**57,526 Training Hours**

# Cornell Food Venture Center (CFVC)



**Cornell Food Venture Center (CFVC)** provides comprehensive assistance to new and established food entrepreneurs, processors and farmers to enhance food safety, satisfy regulatory compliance and promote economic development. Services include scheduled process and process review validation for processed foods, laboratory services and consultation for product safety and stability, reduced oxygen packaging hazard analysis and validation, heat penetration studies, food classification letters, and training. The CFVC Pilot Plant assists entrepreneurs, small business owners, and established food companies with product development and process scale-up efforts in a newly renovated facility with state-of-the-art technology and equipment.



17 Events Hosted/Participated in  
2,422 Total Attendees/Viewers  
1,993 Total Contact Hours



558 Clients/Businesses Assisted  
1,715 Samples Analyzed for  
Safety & Stability  
1,583 Scheduled Processes for  
Value-Added Food Products

# CFVC Pilot Plant

George Howick, Pilot Plant Technician, operates the Turbo Extractor Pulper/Finisher.

**The Cornell Food Venture Center (CFVC) Pilot Plant** is a newly renovated facility that has the perfect combination of established food processing and preservation technologies with innovative equipment to promote the development and production of healthy, high quality foods. With a variety of equipment available, the CFVC Pilot Plant grants clientele the ability to make their final food product in the same location, from starting materials to the final packaged product. It also provides a unique setting allowing the comparison of different equipment and technologies utilizing the same materials to address the final quality and stability (shelf-life) of the food produced and to determine the best manufacturing process that meets the needs of each particular client. The CFVC Pilot Plant assists most clientele with research and development, scale-up trials, and start-up runs.



17 External Clients/Businesses Assisted

9 Internal Clients (Cornell University)

# Dairy Foods Extension

Dairy Foods Extension provides food safety and food processing training to processors both large and small. Pictured to the right is James Munn of Black River Naturals.



**Dairy Foods Extension's** mission is to provide comprehensive training and consulting to the dairy industry to assist in the sustainable manufacture of safe, quality dairy products. Courses provide training to dairy processors in vital topics including milk and dairy product quality and safety, basic dairy microbiology, GMPs, unit operations, sanitation, food safety plans, audits, and state and federal regulations. Our program offers an extensive set of live and virtual workshops that lead towards certificates in fluid milk production, cheese production, ice cream production, and production of yogurt and other cultured dairy products.

In 2020, the Dairy Foods Extension team developed 13 new online courses and continued to offer 4 existing online courses. As a notable example, they developed a fully online *High Temperature Short Time (HTST) Pasteurizer* course that has since been delivered 3 times to a total of 135 attendees.



28 Events Hosted/Participated in  
1,297 Total Attendees/Viewers  
13,978 Total Contact Hours



20 Courses Offered:  
787 Participants  
11,665 Training Hours

# Cornell Dairy Plant

Half gallons of Cornell Dairy reduced-fat milk ready to be packed into cases and distributed to the Cornell community.



**The Cornell Dairy Plant** is an IMS rated, New York State Department of Agriculture and Markets licensed, Kosher certified facility with 4,760 sq. ft. of processing area and over 10,000 sq. ft. of climate controlled refrigerated and frozen storage. Capabilities include: fluid transportation, raw and pasteurized fluid milk storage, a computer generated batching system, HTST pasteurization, a homogenizer two-stage system, a cold-milk separator, a yogurt room (minimum batch size 50 gal.), ice cream production and packaging (minimum batch size is 100 gal.), fluid packaging, and butter production and packaging (minimum batch size is 10 gal.).

In addition to producing products for Cornell and other campuses, the plant is designed to support Dairy Foods Extension efforts by providing a hands-on training facility to more than 200 industry professionals and students during an average year. Specific trainings that take place in the Dairy Plant include *Dairy Science and Sanitation*, *Fluid Milk Processing for Quality and Safety*, *HTST and Vat Pasteurizer*.



60,375 gal. of Milk Bottled

54,674 lb. of Yogurt Produced



16,245 gal. of Ice Cream Produced

1,700 lb. of Butter Produced

# Food Processing Development Lab

## (FPDL)

Artisan cheesemakers are separating curds and whey, and salting cheese that is being made in the Food Processing Development Lab.



**The Food Processing Development Lab (FPDL)** is a 6,000 sq. ft. pilot plant that serves as a statewide center for food and dairy processing education and training, product development, and cutting-edge food processing research. The facility is ideal for manufacturing test runs of new formulations, producing consumer samples, and testing the shelf-life of samples on a scale that mimics real production.

The FPDL is a licensed New York State dairy plant and meets all state and federal regulatory requirements for processing food for human consumption. It is equipped with a wide selection of pilot-scale equipment with capabilities including drying, evaporating, HTST and Vat pasteurizing, separating, and packaging. The FPDL also maintains a cheese making area with various equipment. Experienced full-time professionals are able to assist in all aspects of development and processing.



27 Internal Clients (Cornell University):  
2,100 lb. of Big Red Cheddar Produced  
5 External Clients/Businesses Assisted:  
40,000 lb. of Other Cheeses Produced



FDSC 1101: Science and  
Technology of Foods:  
25 Participants

# Cornell Craft Beverage Institute

## (CCBI)

Chris Gerling, Senior Enology Extension Associate, punches down the cap on a fermenting research wine in the Cornell Vinification & Brewing Technology Lab.

**Cornell Craft Beverage Institute (CCBI)** provides resources to help winemakers and cider makers with important decisions from fruit sourcing and fermentation techniques to quality assurance and regulatory compliance. Cornell staff translate research, tools, and extension support into research-based innovations and technologies that benefit growers, producers and consumers.

In addition to training and workshops, the extension program also offers services through the Cornell Craft Beverage Analysis Lab. Services include chemical, microbiological and sensory analyses of juice, wine, cider, beer, and distillates for quality assurance, troubleshooting and regulatory compliance.



22 Events Hosted/Participated in  
3,054 Total Attendees/Viewers  
7,116 Total Contact Hours



252 Clients Serviced  
2,067 Samples Analyzed  
2,801 Individual Tests Conducted

# Food Microbiology Lab



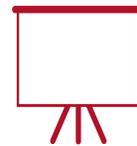
**Cornell's Food Microbiology Lab** specializes in evaluating the microbial safety of fruit and vegetable processed foods and beverages. They offer services to conduct UV validations, product shelf-life studies, and microbiological analyses. In addition to analytical services, the team provides training and assistance to the food and beverage industries as well as state and federal inspectors. In 2020, they taught 2 *Juice HACCP* courses, training 142 participants and a *Food Safety Modernization Act (FSMA) Current GMPs* course, training 83 participants.



141 UV Validations

82 Product Shelf Life Analyses

184 Microbial Analyses



2 Juice HACCP Courses Offered:

142 Participants

FSMA Current GMPs Course:

83 Participants

# High Pressure Processing Validation Center

(HPP)

*As an alternative to thermal processing, HPP offers a solution to keep food products safe while maintaining freshness, delivering superior sensory quality, and preserving nutritional characteristics.*



**The High Pressure Processing (HPP) Validation Center** conducts cutting-edge research and tests HPP processed food products requiring a validation to establish processing conditions that meet regulatory requirements. HPP is a non-thermal alternative to thermal pasteurization, allowing food products to maintain sensory qualities and nutritional characteristics that are often diminished in heat-treated products. The HPP Validation Center offers three types of customized services, including validation studies to provide HPP processing conditions that meet regulatory requirements for pathogen inactivation; physicochemical evaluations to detail color, texture and overall product quality after varying HPP treatments; and microbiological shelf-life studies to evaluate variable HPP treatments of packaged products for spoilage bacteria, yeast and molds.



67 HPP Safety Validations

6 HPP Shelf Life Analyses

# HACCP Training for Food Processors

**Principles of Hazard Analysis and Critical Control Points (HACCP)** is a systematic approach to identify, assess and control the risk of hazards from a food production process. HACCP is a preventive strategy to ensure safe processing of food, especially meats, seafood, dairy and juice. FDA and USDA have issued regulations specific to juice, seafood and meat processing in response to concerns about foodborne illness outbreaks and securing the US food supply. Trainings are designed to provide industry and inspectors with the knowledge they need to develop or evaluate HACCP plans and practices. The curriculum for the FSPCA's *Preventive Controls for Human Food Course* also incorporates a HACCP review as it is part of the preventive controls process.

This data represents the *Accredited Basic HACCP* course and the *Preventive Controls for Human Food Course* offered by Dairy Foods Extension as well as the *Juice HACCP* course offered by the Food Microbiology Lab. Data for *Seafood HACCP* are reported on the following page under New York Sea Grant: Seafood Safety Training.



3 HACCP Courses Offered:

184 Participants

4,144 Training Hours



4 Preventive Controls for  
Human Food Courses Offered:

139 Participants

2,780 Training Hours

# New York Sea Grant: Seafood Safety Training

(NYSG)

**The New York Sea Grant (NYSG)**, a cooperative program of Cornell University and the State University of New York (SUNY), is one of 33 university-based programs under the National Oceanic and Atmospheric Administration's National Sea Grant College Program. Since 1971, NYSG has represented a statewide network of integrated research, education and extension services promoting coastal community economic vitality, environmental sustainability, citizen awareness and understanding about the State's marine and Great Lakes resources. The NYSG: Seafood Safety Training Program works with the seafood industry to promote safe, sustainable production of high quality seafood by providing training and resources for consumers, producers, processors and fishermen.

In 2020, NYSG worked with the Seafood HACCP Alliance to develop a protocol for virtual *Seafood HACCP Segment Two* courses, allowing all HACCP trainings to be offered virtually. NYSG led 3 *Seafood HACCP* courses and also assisted colleagues in the northeast to deliver an additional 3 trainings, which resulted in a total of 88 participants earning their *Seafood HACCP* certification.



Seafood HACCP Online Course:

1,223 Participants

12,842 Training Hours



88 Participants Earned  
Seafood HACCP Certification

623 Training Hours

## FOR MORE INFORMATION

Department of Food Science Extension Programs  
[cals.cornell.edu/food-science/outreach-extension](https://cals.cornell.edu/food-science/outreach-extension)

Institute for Food Safety at Cornell University  
[instituteforfoodsafety.cornell.edu](https://instituteforfoodsafety.cornell.edu)

Cornell Institute for Food Systems Industry Partnership Program  
[foodscience.cals.cornell.edu/industry-partnership-program](https://foodscience.cals.cornell.edu/industry-partnership-program)

National Good Agricultural Practices  
[gaps.cornell.edu](https://gaps.cornell.edu)

Produce Safety Alliance  
[producesafetyalliance.cornell.edu](https://producesafetyalliance.cornell.edu)

Cornell Food Venture Center  
[cfvc.foodscience.cals.cornell.edu](https://cfvc.foodscience.cals.cornell.edu)

Dairy Foods Extension  
[cals.cornell.edu/dairy-extension](https://cals.cornell.edu/dairy-extension)

Cornell Craft Beverage Institute  
[cals.cornell.edu/cornell-craft-beverage-institute](https://cals.cornell.edu/cornell-craft-beverage-institute)

High Pressure Processing Validation Center  
[cals.cornell.edu/hpp-validation-center](https://cals.cornell.edu/hpp-validation-center)

HACCP Training for Food Processors  
[cals.cornell.edu/food-science/outreach-extension](https://cals.cornell.edu/food-science/outreach-extension)

New York Sea Grant: Seafood Science and Technology  
[seagrant.sunysb.edu/articles/t/seafood-science-and-technology](https://seagrant.sunysb.edu/articles/t/seafood-science-and-technology)

## TO CONTACT US

Sarah Lincoln  
Cornell AgriTech  
125 Food Research Lab  
Geneva, NY 14456  
[sjl38@cornell.edu](mailto:sjl38@cornell.edu)  
315.787.2255

Mandy Kafka  
M10 Stocking Hall  
Ithaca, NY 14853-5701  
[ajk287@cornell.edu](mailto:ajk287@cornell.edu)  
607.255.7900

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