



PRINCETON  
UNIVERSITY

# FOOD AND AGRICULTURE INITIATIVE

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The initiative explores global food and agriculture as a subject of critical inquiry and applied knowledge to address social and environmental challenges in service of humanity.



# FOOD & AGRICULTURE

— I N I T I A T I V E —

# LEARNINGS REPORT

APRIL 2018

*Launched in April 2017, the Food and Agriculture Initiative explores food and agriculture as a subject of critical inquiry and applied knowledge to address social and environmental challenges in the service of humanity.*

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## Reflection

We launched the Food and Agriculture Initiative in April 2017.

What started as a meeting between four colleagues representing Ecology & Evolutionary Biology, Office of Sustainability and Campus Dining has evolved into a truly transdisciplinary program that places Princeton University in a leadership position on one of the greatest challenges facing humanity.

As the world population hurtles towards 9 billion, food and agriculture systems will need innovation.

In the past year, there have been a number of outcomes that resulted either directly or indirectly from the Food and Agriculture Initiative. These are based on five key pillars: academics, research, global collaboration, physical spaces, and experiential learning. Each is explored further in this report.

Each day, Campus Dining focuses on the practical application of applied knowledge. This is notable in the Princeton earth-forward food program—where culinary teams explore the full bounty of the earth; design healthy and sustainable menus that follow scientific- and evidence-based principles; and celebrate the diversity of the Princeton community with menus that reflect specific cultures or regions of the world.

As part of the initiative, we have also supported research ranging from the effects of palm oil to the potential for virtual reality to influence dietary choices. We hosted business leaders, scientists, global policy leaders, and a head of state as guest speakers or collaborators. We also launched a new course, ENV303: Agriculture, Diets and the Environment, that takes students on a journey from theory to hands-on application within a three-hour weekly class and from prehistoric diets to menus of the future during the semester.

And that's just the beginning.

**DANIEL RUBENSTEIN**

CLASS OF 1877 PROFESSOR OF ZOOLOGY.  
PROFESSOR OF ECOLOGY AND EVOLUTIONARY  
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# WHY FOOD? WHY NOW? WHY PRINCETON?

## Why Food? Why Now? Why Princeton?

### A GLOBAL CHALLENGE

The Food and Agriculture Initiative operates under the belief that all persons deserve access to healthful food produced in a sustainable manner.

Yet with a population approaching 9 billion by 2050, access to healthy, sustainable food will be limited.

Today's youth can reverse this trend by 2030 through actions and policy.

Princeton—with its mission to serve humanity—is in a unique position to effect change.

Through the Food and Agriculture Initiative, the University takes an active role in educating future world leaders on the topic of global food and agriculture systems.

## Overview

### LAUNCH

The Food and Agriculture Initiative launched in April 2017 after discussions among faculty and administrators about environmental challenges facing a growing human population. Estimates suggest an increase of 2.5 billion more people in the next thirty years and an unsustainable shift in diet habits with increasing affluence.

Agriculture alone currently contributes approximately 30 percent of greenhouse gas emissions, 70 percent of freshwater consumption and 30 percent of biodiversity loss, while covering 38 percent of the ice-free surface of the planet. Together, agriculture accounts for the largest contribution to climate change.

Further, food that will never be eaten accounts for concerning environmental impacts. Estimates suggest that uneaten food leads to as much as 66 trillion gallons of water lost and 3.3 billion tons of CO<sub>2</sub> emissions. Small improvements in global food operations are critical to initiating a wave of reforms to reduce and reverse current negative trends.

As a USD 7.8 trillion industry, the food and agriculture sector represents 10 percent of the global gross domestic product. The resulting demand for cropland area and productivity threatens to greatly accelerate environmental problems from local to global scales, resulting in ground water depletion, water and air pollution, greenhouse gas emissions and losses of biodiversity.

Reversing these trends requires a rigorous analysis of potential trajectories for the future development of the food system that seeks to optimize food production while safeguarding the impacts on the environment, as well as local social-economic dynamics of human populations.

With this in mind, the Food and Agriculture Initiative explores food and agriculture as a subject of critical inquiry and applied knowledge to address social and environmental challenges in the service of humanity.

### A CROSS-DISCIPLINARY APPROACH

Princeton University is positioned to capture unique and world-class leadership in this area by drawing upon strengths in humanities, natural sciences, social sciences and engineering. Princeton brings fundamental and quantitative knowledge of hydrological-biogeochemical systems with strength in human and socio-ecological dynamics through humanities.

# OVERVIEW

The initiative seeks to build an intellectual platform that allows for the emergence of collaborative projects that combine and generate new knowledge in the field while taking a global leadership position to shape the field of food systems with the goal of evaluating potential pathways for a sustainable food system.

Central to the initiative is the intra- and inter-collaboration among divisions and across scientific colleagues around the world while leveraging existing international academic relationships.

The initiative will support rigorous quantitative analysis, modeling and optimization analysis of future trends and their likely impact on water, land and biodiversity. A novel component will be a focus on human behavior—diets, farming models, and cultural relationships to the land—and how optimal pathways interact with socioeconomic constraints that will differ across regions and cultures.

The inclusion of diet as an explicit component provides a link between the theoretical and the practical and will encourage questions that scale from individual to global properties of future food systems.

## RESEARCH, EXPERIENTIAL LEARNING AND PRACTICAL APPLICATION

Food fuels us and connects us with nature. Yet for most, how food is produced and how production processes impact diets, health, livelihoods and the environment is poorly understood.

Through teaching courses and an experiential learning approach, students will better understand the ethical, environmental, economic, social and medical implications of their food choices. Food production methods ranging from hunting, fishing and gathering to small- and large-scale crop and animal farming will be examined through the lenses of ethics, ecology, evolutionary biology, geography, political economy, social dynamics, physiology, climate change and sustainability. Courses and research will allow students to conduct field work and explore areas of managing tradeoffs between food, fertilizer, water and climate.

Princeton University will provide a living-learning lab where faculty and administration collaborate to test, pilot and implement actual solutions for a healthy planet.

## KEY FOCUS AREAS

The Food and Agriculture Initiative aligns to the University's mission to serve humanity. It further ties to several key projects from the strategic planning framework, including the School of Engineering and Applied Science (SEAS), Environmental Studies, Undergraduate Population and Innovation.

# OVERVIEW

These are reflected in the following pillars of the initiative:

- **Academics:** A new course, ENV 303/EEB 303, was introduced in the spring that analyzes global food production and how it affects humanity (*Environmental Studies, Undergraduate Studies*).
- **Research:** Continue to research the effects of palm oil on the planet and health and apply findings directly to Campus Dining operations (*Environmental Studies, Undergraduate Studies*).
- **Global Collaboration:** University faculty are working with the Stockholm Resilience Center of Stockholm University to explore the topic, “the Earth in 2050: boundaries, obstacles, and opportunities” (*Environmental Studies*).
- **Physical Spaces:** Strengthen and utilize learning environments, teaching kitchens, sustainability lab, innovation spaces (SEAS, Undergraduate Population, Innovation).
- **Experiential Learning:** Generate new knowledge and solutions, hold outcome-oriented working sessions, redesign the built environment (*SEAS, Undergraduate Population, Innovation, Environmental Studies*).

## CORE TEAM

Smitha Haneef, Assistant Vice President, University Services (co-chair)

Daniel Rubenstein, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology, Director, Program in Environmental Studies (co-chair)

David Wilcove, Professor of Ecology and Evolutionary Biology and Public Affairs and the Princeton Environmental Institute

Shana Weber, Director, Office of Sustainability

Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology (advising on global partnerships)

# YEAR ONE IN REVIEW

## Year One in Review

- April 2017 First working meeting among Daniel Rubenstein, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology, Director, Program in Environmental Studies; Smitha Haneef, Assistant Vice President, University Services; David Wilcove, Professor of Ecology and Evolutionary Biology and Public Affairs and the Princeton Environmental Institute; and Shana Weber, Director, Office of Sustainability.
- May Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology, joins the initiative to provide a global perspective.
- July Farm visits led by Haneef and the Campus Dining procurement team provide insights into the agriculture sector that may inform future research and purchasing decisions.
- September Campus Dining partners with Adam Lerner, Postgraduate Research Associate, to kick off research into the psychology of consumer food choices. Diana Tamir, Assistant Professor of Psychology at Princeton University, serves as faculty advisor.
- October Sasan Amini, Princeton Graduate School alumnus and founder of Clear Labs, Inc. holds a lecture at Princeton on genome sequencing of food ingredients.
- October Ameenah Gubrib-Fakim, president of Mauritius, visits Princeton to meet with students, faculty, and staff and give a lecture on the importance of biodiversity in environmental protection efforts.
- October Partner farmers visit Princeton on World Food Day to share insights into local agriculture practice.
- November Learnings from October speakers featured and discussed at Google Food Lab.
- November Princeton University welcomes researchers from the Stockholm Resilience Centre (SRC) of Stockholm University to collaborate on key areas related to the environment in the global context.
- December David Wilcove, Professor of Ecology and Evolutionary Biology and Public Affairs and the Princeton Environmental Institute, and Princeton undergraduate student Artemis Eyster begin research into palm oil with support from Campus Dining.

# YEAR ONE IN REVIEW

- December Princeton University chefs visit local schools to share their knowledge and skills with students from pre-K to grade 5 as part of ongoing efforts to extend culinary education across the spectrum of life.
- December Elke Weber, Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs, Princeton University and Smitha Haneef, Assistant Vice President, University Services begin advising undergraduate student Cecilia Shang on her thesis project titled, “The Red Meat of the Matter: Food policy nudges toward a more sustainable diet in the U.S. and Canada.”
- January 14 culinary labs are announced for the spring semester as experiential learning complements to academic courses. Campus Dining partners with the Ecology and Evolutionary Biology, Near Eastern Studies, History and English departments.
- February A new course, ENV 303/EEB 303: Agriculture, Human Diets and the Environment, explores the intersection of food and a growing human population.
- February A series of teaching kitchens connects students and staff to food.
- March Marina Rustow, Khedouri A. Zilkha Professor of Jewish Civilization in the Near East and Professor of Near Eastern Studies and History, holds a one-day exploration into the quotidian life of ancient Cairo.

## Academics

### ENV 303/EEB 303: AGRICULTURE, HUMAN DIETS AND THE ENVIRONMENT

Daniel Rubenstein, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology, Director, Program in Environmental Studies

#### Description

Food fuels us and our diets connect us with nature at many scales. Yet most of us poorly understand how food is produced and how production processes impact our diets, health, livelihoods and the environment. By the course's end, students will better understand the ethical, environmental, economic, social and medical implications of their food choices. Food production methods ranging from hunting, fishing and gathering to small and large-scale crop and animal farming will be examined through lenses of ethics, ecology, evolutionary biology, geography, political economy, social dynamics, physiology, climate change and sustainability.

#### Logistics

The course will consist of one 180-minute class and one 50-minute precept per week. Readings will be drawn from books and the primary literature and each week. If a movie is assigned, it will be previewed prior to class. Class will involve a mix of lectures, interactions with foods, role playing, writing and number crunching, and discussions of the movies via Skype video conferencing with authors of the assigned texts or key papers. Precepts will allow students to engage with the literature and issues in more depth and will provide time to work on their independent projects. Many of the independent projects will emerge from analyzing data gathered from the different experimental farms located on Princeton University Land.

#### Weekly Themes

- 1) *Origin and diversification of agricultural systems*: understanding why traditional peoples ate the foods they did in the places they inhabited.
- 2) *Transitioning from subsistence farming to industrial agriculture*: linking the industrial revolution, the demographic transition, the advent of fertilizer and the green revolution to the rise of agribusiness.
- 3) *Farming and deforestation, fishing and overfishing*: understanding how human foraging alters biodiversity and ecosystem function.
- 4) *Herders, herding and overgrazing*: understanding the causes and consequences of the 'tragedy of the commons' and what can be done about it.

- 5) *Agriculture, climate, water and energy*: dissecting the vexing nexus of problems limiting agricultural sustainability.
- 6) *Diets and health*: understanding how food, nutrition and diets collide for better and worse.
- 7) *Food production and disease risk*: understanding the slippery slopes of tradeoffs—GMOs, antibiotics and biodiversity.
- 8) *Food and labor*: understanding how mechanization and the labor of a few, feed the many and impact society and the environment.
- 9) *Big food and food choice*: understanding how corporatizing food shapes modern diets.
- 10) *Psychology of eating*: understanding how human thinking influences how and what we eat.
- 11) *Farming with the wild*: understanding vegetarianism and animal welfare and the lure of alternative agricultures that are local, organic, till-free and free-range.
- 12) *Farms of tomorrow*: exploring how links among innovations in animal husbandry, aquaculture, greenhouse technologies and other breakthroughs will influence future food and environmental resilience.

## NES 390: MEDIEVAL CAIRO, A SURVIVAL GUIDE

Marina Rustow, Khedouri A. Zilkha Professor of Jewish Civilization in the Near East and Professor of Near Eastern Studies and History

### Description

Princeton University and the Princeton Food and Agriculture Initiative invite students on a journey to study history at the micro level—through food, clothing, shelter, patterns of behavior. The laboratory for this investigation will be the medieval twin cities of Fustat-Cairo, a burgeoning metropolis astride the Mediterranean, Indian Ocean and trans-Saharan trade routes and an excellent place to get take-out food. The full-day session includes a class, a guest lecture by food historian Charles Perry, and a communal dinner in the style of the times.

Cairo between the tenth and sixteenth centuries is unusually well documented. But its written sources and material culture alike still await study. Through the study of primary sources and hands-on creative and sensory experiments—including recreating and eating medieval dishes, smelling perfumes and medicinals, handling original artifacts and hand-making paper—students have the opportunity to contribute to an evolving state of knowledge.

## Research

### SEPTEMBER 2017: COGNITIVE SCIENCE AND DIET

Adam Lerner, Postgraduate Research Associate

Advisor: Diana Tamir, Assistant Professor of Psychology at Princeton University,

#### **Investigating the Role of Perspective-Taking in Moral Judgment with Virtual Reality: Cognitive Science Program Research**

What leads people to make more sustainable food choices? In this study, we aim to reduce people's consumption of beef and milk by using virtual reality to cultivate empathy for cows. With the assistance of Princeton Campus Dining, we will measure how consumption of beef and milk in dining halls changes depending on whether students learn about the lives of dairy cows via virtual reality rather than other formats. While most studies of dietary choice require participants to report their own choices, collaborating with Campus Dining will provide us with a more accurate measure of consumption: the amount of milk taken out of dispensers and the number of hamburgers ordered at the grill station. In addition to directly testing a novel intervention for increasing sustainable eating, this study will shed light on theoretical controversies in cognitive science regarding the nature of social cognition, moral judgment, and behavior change.

### DECEMBER 2017: BIODIVERSITY AND PALM OIL

Artemis Eyster, Undergraduate Class of 2019

Advisor: David Wilcove, Professor of Ecology and Evolutionary Biology and Public Affairs and the Princeton Environmental Institute

Advisor: Smitha Haneef, Assistant Vice President, University Services

#### **Using Princeton University's Campus Dining as a test of consumer-driven methods to reduce demand for unsustainably grown palm oil**

The cultivation of oil palm (for palm oil) is widely recognized as one of the major drivers of deforestation in Southeast Asia and, increasingly, the New World tropics. Millions of acres of tropical forests have been cleared and replaced with monotypic stands of oil palm, resulting in tremendous losses of biodiversity.

In response to growing international pressure, the Roundtable on Sustainable Palm Oil (RSPO) was formed in 2004 to promote the production of sustainable palm oil. Participating growers agree to abide by a set of environmental safeguards designed to ensure that current plantations reduce harmful practices such as pesticide use and to abide by safe labor practices; in addition, they pledge to minimize any future deforestation resulting from expansion of their oil palm plantations. In return, the palm oil produced by participating growers receives RSPO certification. Although not without its critics, the RSPO has been a force for good in an industry otherwise linked to massive environmental harm.

But how easy is it for buyers of products containing palm oil to find out if that palm oil is indeed RSPO certified? Unlike other certified products, such as dolphin-safe tuna, palm oil is used in thousands of food products. Purchasers may not even be aware of which products contain palm oil, much less whether that palm oil is certified. Princeton's Department of Campus Dining provides a rare opportunity to test how easily an environmentally responsible purchaser (in this case, Princeton University) can identify the sourcing of food products containing palm oil and replace unsustainable sources with certified sources.

Campus Dining has already identified (via its online database) over 80 line items containing palm oil that it regularly purchases. We intend to follow the supplier chain for every one of these items to determine: (1) the source of the palm oil and whether that source is an RSPO-certified plantation; (2) the availability of RSPO-certified substitutes for products containing unsustainably-grown palm oil; and (3) the cost differential of using the RSPO-certified substitute compared with the unsustainably-grown version. To the best of our knowledge, no university has done such an analysis of its supply line, and we believe the results will be beneficial not only to Princeton but to other institutional purchasers who wish to abide by a sustainability ethos with respect to palm oil. We intend to publish the results of our work in a peer-reviewed journal and to provide a set of recommendations to food service operations.

## DECEMBER 2017: SUSTAINABILITY AND RED MEAT IN U.S. AND CANADIAN DIETS

Cecilia Shang, Undergraduate Class of 2018

Principal Investigators: Elke Weber, Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs and Smitha Haneef, Assistant Vice President, University Services

## **The Red Meat of the Matter: Food policy nudges toward a more sustainable diet in the US and Canada**

Current levels of global population growth and meat consumption are putting unprecedented demand on agriculture and natural resources. From a sustainability standpoint, the environmental impacts of excess meat consumption, coupled with the need to feed a rapidly growing global population on a finite planet make it necessary to shift dietary choices. This thesis explores how aspects of behavioral science can be leveraged to facilitate more sustainable diets by reducing excess meat consumption, with a specific focus on conventionally produced beef in developed countries such as the US.

To contribute to the field, I conducted two experiments (one in a restaurant and one in a University dining hall) to examine the impact of choice architecture nudges on food choice. Specifically, I hypothesized that a combination of behavioral science-informed nudges in the restaurant and dining hall setting using (i) defaults, (ii) traffic light labeling and (iii) social norm messaging would decrease choosing of red meat dishes and increase choosing of plant-based dishes compared to baseline consumption. Results and data analysis show that in both settings the choice architecture interventions have a significant impact on increasing choosing of the default, labeled plant-based dishes, as hypothesized. In the University dining hall, the interventions reduce the probability of choosing the beef dish as hypothesized. However, in the restaurant setting, there was a price-dependent effect on beef dishes that increased consumption at low prices but decreased consumption at higher prices. Manipulation checks show that in both experiments, the labeling and social norm messages were not perceived by most diners.

Taken together, the results of the two experiments provide evidence that behavioral science nudges can impact food choice to facilitate a shift toward a more sustainable diet. The findings also imply that it matters how choice architecture interventions are implemented and that defaults may be one particularly easy and/or effective intervention to reduce meat consumption in a range of settings. I discuss potential implications and opportunities for policy-makers and practitioners to nudge food choices in the real world using defaults, traffic-light labeling, and social norms. The thesis concludes by addressing possible concerns and critiques and briefly provides perspectives from beef producers.

## Global Collaboration

### NOVEMBER 2017: STOCKHOLM RESILIENCE CENTER (SRC)

#### **Princeton, Stockholm University team up to explore 'Earth in 2050' global environment**

Princeton University welcomed researchers from the Stockholm Resilience Centre (SRC) of Stockholm University from November 12–14 to collaborate on key areas related to the environment in the global context.

The meeting, “Earth in 2050: Boundaries, Obstacles and Opportunities,” was sponsored by the Princeton International Fund, the Princeton Environmental Institute and the Andlinger Center for Energy and the Environment.

Presentations sparked conversation about feeding the world, urban infrastructure, biodiversity and conservation biology, human behavior and water quality. The symposium was held in the Julis Romo Rabinowitz Building and Louis A. Simpson International Building.

Professor Simon Levin, the James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology at Princeton, serves on the SRC board and led the event.

Levin emphasized the potential of the collaboration: “SRC is the leading institute in the world focused on what makes socioecological systems robust and resilient in the face of a changing environment, and their expertise is complementary to Princeton’s in our quest to build a sustainable future for all humanity,” he said. “There was great enthusiasm on both sides, and we look forward to productive partnerships.”

The University has identified environmental studies as an opportunity for academic leadership as part of its strategic planning framework. Reflecting that opportunity, a committee made up of several Princeton departments planned the workshop with the SRC to help shape new directions in environmental studies and research.

<https://www.princeton.edu/news/2017/12/07/princeton-stockholm-university-team-explore-earth-2050-global-environment>

## MARCH 2018: BIODIVERSITY, SUSTAINABILITY AND LIVESTOCK IN AFRICA

### **Assessing a transformed livestock system that is more sustainable for people, their health and livelihoods while sustaining the environment and protecting biodiversity**

Conserving biodiversity, sustaining ecosystems and improving livelihoods of pastoralist herders is a triple challenge that our research is trying to solve. On Africa's arid and semi-arid lands livestock herds and herds of wildlife co-exist. In the past when human populations numbers were much lower, co-existence was easier than it is today. Today livestock owners often begrudge the existence of wildlife since they see every blade of grass consumed by wildlife as a blade of grass denied to their precious herds. Our research, however, has shown that at both high stocking levels of pastoralists and low stocking levels of commercial ranchers, zebras—as typified by their close evolutionary kin, donkeys—facilitate cattle growth by consuming the tough, less digestible plant parts that cattle struggle with. As a result, the forage cattle prefer becomes easier to access and this increase cattle growth rates. And the surrogate zebras also grew faster in part because the rangeland was improved by the elimination of tough forage, but also because cattle removed parasitic worm larvae, thus improving overall health and vigor of these equids. In addition, we have also shown that by bunching cattle herds and forcing them to be less selective in what they eat, rangelands improve which in turn also increases cattle as well as sheep and goat growth rates and milk yields. Overall, land sharing between cattle and wildlife leads to improved rangeland, faster growth of livestock, increased income and health of pastoral people and healthier wildlife. To a great extent research on better farming practices is turning the triple challenge into a triple win.

## Physical Spaces

### JULY 2017: FARM VISITS

Smitha Haneef, assistant vice president, University Services and Linda Recine, assistant director for procurement in Campus Dining, begin tours to local farms to better understand the local agriculture systems and how they might be influenced by University purchasing decisions.

Collectively, the work also contributes to ongoing research into the similarities and differences among local food systems and those in other parts of the world.

### OCTOBER 2017: WORLD FOOD DAY BREAKFAST

#### **Partner Farmers Share Insights at World Food Day Breakfast**

As part of a celebration of World Food Day, local farmers and Campus Dining staff met in Rockefeller College to discuss the state of local and domestic food systems as well as opportunities for collaboration.

“This breakfast is our way to express our gratitude to the farmers, fishermen, ranchers and care takers of our food systems around the world,” explained Smitha Haneef, assistant vice president, University Services. “We are grateful to them for all they do to nourish us and our community.”

Much of the conversation focused on systemic challenges facing local producers. Increased regulations have led to cost increases that price out local farmers, especially against large-scale, mono-crop operations. A few participants mentioned the need to educate consumers about the value of locally produced items as a way to shift behavior.

Campus Dining committed to helping to close the gap between producers and consumers by sharing stories with campus members—both about the farmers and about local ingredients used throughout campus.

The breakfast was part of Princeton’s Food and Agriculture Initiative, which explores global food and agriculture systems as a subject of critical inquiry and applied knowledge.

Special thanks to the following attendees: Scott Morgan from Morganics Family Farm, Samantha Jany from Brown Dog Produce CSA, Beth Roberts from Cedar Lane Farm, Catherine Marchese from Marchese Farm, Yusha Hu from Local Bushel and Allegra Lovejoy ’14 from Northeast Organic Farming Association of New Jersey (NOFA-NJ).

<https://dining.princeton.edu/news/partner-farmers-share-insights-world-food-day-breakfast>

<http://www.fao.org/world-food-day/2017/events/events-details/en/c/1052842/>

## FEBRUARY 2018: PRINCETON TEACHING KITCHENS

### **Princeton teaching kitchens warm up a brisk Wintersession**

As the temperatures dropped outside, Princeton students and staff turned up the heat inside. And it was not just the thermostats. Across campus, Campus Dining chefs and cooks led four sessions for 100 participants on culinary approach and technique.

“Engaging our community in this way is a key part of our vision to support our students, faculty, and staff to be their healthy best,” says Smitha Haneef, assistant vice president, University Services. “Food brings everyone together and we all walk away having learned something new.”

At Whitman College, Senior Operations Manager Greg Billows, Chef de Cuisine Jared Gierisch and cooks Fredy DeLeon, Rudy Natareno-Urizar, Ervin Soto, Dennis Stewart and Alex Lopez offered three different lessons to three groups of students. One group learned how to prepare fresh Italian sausage—from the casing to the cooking. Another rolled fresh gnocchi. The third group created chicken parmesan. Students then joined staff for a family-style meal to show off their efforts.

“It was a wonderful experience for staff and students,” says Kristin Frasier, Whitman College program administrator. “We love creating an environment where learning like this can happen.”

At Forbes College, Chef de Cuisine Alex Trimble and cooks Abdel Moukkad, Sundown Lightner, John Studwell and Mike Valencia worked with three groups of students to create garlic knots, pizza and penne with broccoli rabe. Chef Trimble ended the lesson with a demonstration on making bread pudding, including how to crack two eggs at once without leaving any shell in the creamy mixture.

Up the hill inside the Rockefeller and Mathey servery, Executive Chef Rick Piancone and Chef de Cuisine Michael Gattis shared secrets on transforming cauliflower into pizza crust and fried “cauli-rice.” Students learned the versatility of cauliflower and tried their hands at cooking the crust before sitting down to eat their delicious creations.

Students were not the only ones having fun. Inside Café Vivian, Piancone, Gattis, and Senior Operations Manager Matthew Smith led a team-building program for a dozen staff members in the Academic Manager’s Group (AMG). This was the second session between the AMG and

## PHYSICAL SPACES

Campus Dining. Together, the teams prepared fresh ginger ale, a kale and cabbage salad, vegetable stromboli, seared chicken with white wine and herbs and a ricotta dessert.

“It was an amazing opportunity to work with colleagues in a different setting,” says Kathleen Applegate, department manager, Mathematics. “With limited time and a specific task, you learn to communicate and work together effectively. It was great to work with these incredibly talented chefs and get to know colleagues better. Everyone who attended thought it was an extremely worthwhile event.”

Campus Dining is part of the Teaching Kitchen Collaborative, which seeks to advance personal and public health through culinary literacy and integrative lifestyle transformation.

<https://dining.princeton.edu/news/princeton-teaching-kitchens-warm-brisk-wintersession>

## Experiential Learning

OCTOBER 2, 2017, GUEST SPEAKER: SASAN AMINI, FOUNDER AND CEO, CLEAR LABS, INC.

### **Revolutionizing Food Safety and Quality through Genomics and Data Science**

What is really in the food that we eat? We cannot always be sure, according to Sasan Amini, CEO and co-founder of Clear Labs, Inc.

During a presentation in the Lewis Science Library earlier this month, Amini explained how next-generation sequencing can significantly improve food safety, compared to conventional technologies.

“The magnitude of this problem is pretty huge,” Amini explained. “The estimate from the UK authorities is around a \$10-15 billion impact on an annual basis on the global food industry.”

Amini was invited to Princeton as part of the University’s Food and Agriculture Initiative. The Initiative—a partnership among faculty, Campus Dining, and the Office of Sustainability—explores global food and agriculture systems as a subject of critical inquiry and applied knowledge.

Amini earned his PhD in Molecular Biology at Princeton University and his B.Sc. in Biotechnology from the University of Tehran, where he entered as a gold medalist in the International Biology Olympiad.

<https://dining.princeton.edu/news/clear-labs-ceo-explores-next-generation-food-safety-testing>

OCTOBER 5, 2017, GUEST SPEAKER: AMEENAH GURIB-FAKIM, PRESIDENT OF THE REPUBLIC OF MAURITIUS

Princeton University welcomed Ameenah Gurib-Fakim, president of Mauritius, on October 5 for a day of discussion with students, faculty and staff about the state of global food systems.

“Biodiversity is the basis of life and central to human existence,” she said during an afternoon lecture in McCosh 50. “Over millennia, humans have depended on plant diversity, both wild and cultivated, to meet their needs. Biodiversity is a critical resource not only to address sustainable agriculture, but also for sustaining our ecosystems.”

# EXPERIENTIAL LEARNING

Yet today the delicate balance of food ecosystems is under threat as the human population grows to an expected 9 billion people by 2050.

“Food production will need to increase at least by 50 percent and more in the populous parts of Africa and Asia,” she said. “Today, according to the FAO [Food and Agriculture Organization], over 812 million people go to bed hungry every day. Sadly, hunger amid plenty is the tragic leitmotif of our times.”

In addition to hunger, Gurib-Fakim noted that more than 2 billion people suffer from micronutrient deficiencies, where their diets lack key vitamins and minerals necessary for growth and development and for fighting disease. Children, she said, bear a disproportionate share of the burden of malnutrition.

“Increasing the sustainable use of agricultural biodiversity in production and consumption systems will be an important part of the solution to the challenge of meeting future food and nutrition security,” she said. “Conservation of biodiversity must span the entire spectrum of activities and locations, on-farm, off-farm, in seed banks, all the while drawing on the wealth of local, indigenous knowledge.”

During her visit, Gurib-Fakim also shared her message directly with President Christopher L. Eisgruber, who expressed his support for the University community to engage and explore the issues further.

She also met with students throughout the day, including juniors Jordan Salama and Dan Sullivan, who were inspired to take action.

<https://www.princeton.edu/news/2017/11/02/princeton-welcomes-mauritian-president-explore-challenges-facing-global-food>

## DECEMBER 2017 TO MARCH 2018: SERVING UP CULINARY EDUCATION IN LOCAL SCHOOLS

Throughout the year, Princeton University chefs and staff visited local schools to share their knowledge and skills with students from pre-K to grade 5.

In December, chefs designed programs as part of the Garden State on Your Plate program. Garden State on Your Plate, run by the Princeton School Gardens Cooperative, brings fresh produce and products from local farms into schools’ cafeterias, where local chefs prepare recipes for tastings for the students, parent volunteers and school employees.

# EXPERIENTIAL LEARNING

This year's session focused on carrots—prepared in a variety of ways to encourage students to try healthy wholesome food while expanding their taste buds and culinary skills.

Students in pre-K to grade 1 learned about numerous ways to cut a carrot and how different cuts affect different recipes. Older students in grades 3 to 5 also explored sustainability and food waste reduction concepts, ensuring that all parts of the carrot can be used.

Rick Piancone, Executive Chef at Rockefeller and Mathey Colleges, gave one example of how the greens of carrots—parts normally discarded—can be used to create an Italian-style pesto sauce.

Whether learning how to craft a flower-shaped carrot or how adding lime to the carrot changes the flavor profile, students were encouraged to explore food outside the cafeteria. They are also building positive food memories with healthy, wholesome ingredients, which can support a healthy relationship with food.

The program sought to educate, engage and empower students to make healthy, sustainable food choices that benefit themselves, their families and ultimately their communities.

In March, as part of National Nutrition Month, Campus Wellness Dietitian Melissa Mirota visited the local preschool, University Now Day Nursery, with a Charlie Cart. The Charlie Cart Project seeks to integrate food and cooking with lessons in math, English language arts, science and social studies.

Mirota, along with Princeton Assistant Vice President Smitha Haneef and undergraduate students Alice Wistar and Selina Pi, led children in pre-K and kindergarten classes through a hands-on nutrition program where children made a mango and cucumber salad.

<https://dining.princeton.edu/news/serving-culinary-education-local-schools>

## JANUARY 2018: 14 CULINARY LABS ARE ANNOUNCED

For the spring semester, Princeton Campus Dining partners with the Ecology and Evolutionary Biology, Near Eastern Studies, History and English departments to design and execute culinary labs that support students' academic experiences.

A dozen of them are connected to a new course that launched in February, "ENV 303/EEB 303: Agriculture, Human Diets and the Environment". The course tracks humans' relationship to food from prehistoric times through to the year 2050. The labs tie directly to each week's topic of study and offer students the opportunity to engage hands-on with relevant foods and culinary techniques.

# EXPERIENTIAL LEARNING

Another culinary lab was tied to “NES 390: Medieval Cairo, a Survival Guide.” After a lecture on the quotidian life of Cairo in the fifteenth century, students worked in a kitchen to prepare a menu using only techniques and ingredients available at the time. Later, students and instructors gathered together for a formal dinner that also reflected the experience one would have had in ancient Cairo.

The final culinary lab, planned for May, explores the topic of risk and privilege within the context of food. Anne Cheng, Professor of English, Director of American Studies, is coordinating the one-day program, with Angela Creager, Thomas M. Siebel Professor in the History of Science, Allison Carruth, Associate Professor of English at UCLA, and Chris Lentz, Associate Director of Marketing and Community Engagement in Princeton Campus Dining, serving as principal investigators.

## Culinary Labs

<b>Date</b>	<b>Lecture Topic</b>	<b>Culinary Lab</b>
2/5/18	Tastes of Hunter-gatherer, Agricultural and Industrial Civilizations. Inspecting and tasting preserved meats and plants from early domesticated species.	Food Systems Relationship map Smoke: meat; Salt crusted fish; Pickled vegetables
2/12/18	Grains, Grains, Grains: The Old and New of the tried and true dietary staples. Tasting breakfast fare as it has evolved from heritage grains to industrial varieties.	Ancient grains, cooked cereal, spooned bread, three sisters salad, popular brand cereal
2/19/18	Food Forensics: From ingredients to DNA. Determining what makes up the foods we are eating and how do they taste.	Campus Dining will send seafood samples to Sasan Amini, display of popular fish and unpopular species, what came from the dayboat, sourcing, food safety, compliance.

# EXPERIENTIAL LEARNING

2/26/18	Wild herding Worldwide: From Cows, Sheep, Goats, Horses and Camels to YOU. Tasting cheese boards and dairy products worldwide.	Dairy and cheese: Milk A, Milk B, Milk C and Cheese A, Cheese B, Cheese C; identify the milk or cheese type
3/5/18	Crafting Menus for 2050. Is there a place for seaweed, artificial meats and other novel creations?	Real meat burger vs. impossible burgers, lettuce salad vs. seaweed salad, trade-offs and comparison
3/6/18	How does one write a history of quotidian life in a premodern society? This course takes history to the micro-level, with rigor. Sometimes the simplest questions (food, clothing, shelter, patterns of marriage and reproduction) can be the most challenging—and exciting—to answer.	Laboratory explores diets of the medieval twin cities of Fustat-Cairo followed. This includes a lecture by food historian Charles Perry and a banquet that uses ingredients and food preparation from the time.
3/12/18	Princeton Diets and You. Tracking what you eat for a week and why it matters.	Carrot sticks, hummus, cheese dip, pretzels with a healthful eating poll
3/26/18	Unintended and unappreciated consequences of modern food production systems. Tasting the hidden side of high volume production.	Taste among equals: Hard boiled eggs, powdered eggs, scrambled eggs
4/2/18	Trading offs people and machines in food production. Exploring the tools of farming production, then to now.	Taste among farming practices: Compare local farm carrots vs. large farm carrots; ranch dip: homemade vs. bottles
4/9/18	The Business of Big Food. How do you cope when faced with a sea of products?	Potato chips, veggie chips, apple chips

# EXPERIENTIAL LEARNING

- |         |  |  |
|---------|--|--|
| 4/16/18 | To eat it or not to eat it. Assessing why you select what you do at the moment choosing.     | Placement: Psychology of eating<br>Big bowl, peppers and carrots; medium bowl, Stacy's cinnamon sugar chips; small bowl, lays potato chips versus the opposite presentation. |
| 4/23/18 | Earth Forward Menus. Developing culturally appropriate menus from worldwide farming futures. | Chips ahoy, Bake Shop in-house gourmet chocolate chip cookies, milk  |
| 4/30/18 | Meet what you eat. Tour and tasting of hydroponic and soil grown vegetables.                 | Local lettuce, hydroponic lettuce from Aerofarms, dressing.  |

## Looking Forward

Year two promises to be an exciting year that builds upon the foundation of year one. Here are some upcoming programs and milestones.

### APRIL 5, 2018: PANEL DISCUSSIONS AT NACUFS NE/MID ATLANTIC CONFERENCE

Campus Dining joins Sea2Table in a discussion about sustainable seafood. Sustainable seafood has been a top culinary trend for the last few years. But how do you make it work on campus and take it from a trend to a purchasing standard? A brief video presentation and panel discussion will explore how universities are successfully sourcing wild, domestic, traceable, sustainable, and affordable seafood for campus dining.

Assistant Vice President Smitha Haneef discussed a vision for campus dining and the impact Universities can have on tackling global sustainability issues through education and application.

### APRIL 24, 2018: THE TIGER CHEF CHALLENGE

Student teams compete to create globally inspired entrees. The challenge encourages students to explore the multifaceted nature of food, and in doing so, nurtures a strong sense of community, offers new learning experiences, and supports the vibrant University residential experience.

### MAY 2018: AMERICAN STUDIES COLLABORATORY AND CULINARY LAB

This Spring Col(LAB)'s inaugural module—Col(LAB) 1.0 Food Matters: Risk and Privilege—will take place as a one-time two-day occasion. Future and successive events organized under the rubric of food studies will be labeled Col(LAB) 1.1, 1.2, and so on.

Today it seems everyone—literary and cultural studies, environmental studies, science, and popular culture on almost every level, from Chopped to Food, Inc.—is talking about food. Food in America generates rich and pressing conversations about culture, class, identity, industrialization, globalization, and the environment, demanding conversations that take place across the humanities and the sciences.

Featuring a partnership among the Program in American Studies, CST StudioLab, and the Princeton Food and Agricultural Initiative, Col(LAB) 1.0 investigates the tension and interdependence between risk and privilege when it comes to our foods at the multiple and intersecting levels of production, consumption, sustainability and human choice (or lack thereof). These entangled issues of health, class, culture, scientific advancement and the environment

# LOOKING FORWARD

require and give us the valuable opportunity to engage scholars and practitioners from the humanities, the social sciences, the sciences and the University.

## MAY 2018: PRESENTING AT SEEDS AND CHIPS

Smitha Haneef, assistant vice president, University Services and co-chair of the Food and Agriculture Initiative will present at Seeds and Chips in Milan, Italy. Seeking to connect people, ideas and solutions to shape a better food system, Seeds and Chips welcomes more than 15,800 visitors from around the world.

Haneef will present on the topic of food and sustainability in the global context during a session titled, “The Next Generations and the Food System.”

## JULY 2018: PRESENTATIONS AT THE NACUFS NATIONAL CONFERENCE

Following up on the regional conference, Campus Dining and Sea2Table will again hold a panel discussion that explores sustainable seafood in the context of higher education food programs.

Smitha Haneef, assistant vice president, University Services, and co-chair of the Food and Agriculture Initiative, will also present on the urgency of exploring food as a subject of critical inquiry and practical knowledge in a presentation titled, “Why Food, Why Now, Why Princeton.”

## OCTOTBER 2018: MCURC 2018

Princeton University will host the annual meeting of the Menus of Change Research Collaborative (MCURC). The MCURC is a working group of scholars and experts from invited colleges and universities interested in accelerating efforts to move American consumers—and college and university students, scholars, and staff in particular—toward healthier, more sustainable, plant-forward diets.

## Core Team

### CO-CHAIRS

#### **Smitha Haneef, Assistant Vice President, University Services, Co-Chair**

Smitha Haneef leads the largest administrative department on campus to deliver excellence in food services. Her interests are in the area of global food systems and the design of solutions specific to geography and regions. Her vision for Princeton University Campus Dining is to nourish all students to be their healthy best and educate and engage students in global food systems.

She focuses on strategic operations and initiatives for leading healthy sustainable food and beverage programs and advises campus partners. She views Campus Dining as an applied science partner to faculty who lead teaching, education and research programs with food themes across divisions.

Prior to joining Princeton, Haneef founded and led LifeWorks Restaurant Group for Aramark, a Fortune 500 professional services company and strategized workplace services for Google, Nike, Cisco Systems, Disney Studios, and JP Morgan. She serves on the board of the National Association for College and University Food Services (NACUFS).

Haneef received a bachelor's in commerce from Osmania University and a diploma in hotel management, catering technology and applied nutrition from the Institute of Hotel Management, Catering & Nutrition (IHMCT). Haneef has completed professional education programs from Harvard Business School, Harvard Law School and Harvard Graduate School of Education.

#### **Daniel Rubenstein, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology, Director, Program in Environmental Studies**

Daniel Rubenstein is a behavioral ecologist who studies how environmental variation and individual differences shape social behavior, social structure, sex roles and the dynamics of populations. He has special interests in all species of wild horses, zebras and asses, and has done field work on them throughout the world identifying rules governing decision-making, the emergence of complex behavioral patterns and how these understandings influence their management and conservation. In Kenya he also works with pastoral communities to develop and assess impacts of various grazing strategies on rangeland quality, wildlife use and livelihoods. He has also developed a scout program for gathering data on Grevy's zebras and created curricular modules for local schools to raise awareness about the plight of this endangered species. He

## CORE TEAM

engages people as 'Citizen Scientists' and has recently extended his work to measuring the effects of environmental change, including issues pertaining to the global commons and changes wrought by management and by global warming, on behavior.

Rubenstein is the Class of 1877 Professor of Zoology. He is currently Director of Princeton's Environmental Studies Program and is former Chair of Princeton University's Department of Ecology and Evolutionary Biology and Director of Princeton's Program in African Studies. He received his Bachelors degree from the University of Michigan in 1972 and his Ph.D. from Duke University in 1977 before receiving NSF-NATO and King's College Junior Research Fellowships for post-doctoral studies at Cambridge University. As the Eastman Professor, he spent a year in Oxford as a Fellow of Balliol College. He is an elected Fellow of the Animal Behavior Society as well as the American Association for the Advancement of Science, and has received Princeton University's President's Award for Distinguished Teaching. He has just completed his term as president of the Animal Behavior Society and was most recently a Visiting Research Scholar at Merton College, Oxford.

### TEAM MEMBERS

#### **David Wilcove, Professor of Ecology and Evolutionary Biology and Public Affairs and the Princeton Environmental Institute**

David S. Wilcove is professor of ecology, evolutionary biology and public affairs at Princeton University. Prior to joining Princeton's faculty, he worked for the Environmental Defense Fund, The Wilderness Society and The Nature Conservancy. He is the author of *No Way Home: The Decline of the World's Great Animal Migrations* (2007), *The Condor's Shadow: The Loss and Recovery of Wildlife in America* (1999) and numerous technical and popular articles in the fields of conservation biology, ornithology and wildlife conservation. His research focuses on the impacts of farming, logging, hunting and other human activities on biodiversity, particularly in Asia. Professor Wilcove has served on the boards of directors of the Society for Conservation Biology, Rare, American Bird Conservancy, Natural Areas Association, Galapagos Conservancy and the New Jersey Audubon Society, among other organizations.

#### **Shana Weber, Director, Office of Sustainability**

Shana S. Weber is the founding director of Princeton University's Office of Sustainability and has advanced University-wide partnerships in comprehensive sustainable implementation since

## CORE TEAM

2006. Weber actively integrates campus operational and academic systems toward high impact performance and cultivating an ethos of sustainability in service to local and global communities. Her current research activities include climate-change driven population dynamics of the American pika (*Ochotona princeps*) and collaborative applied sustainability endeavors within and across academic institutions. She is also active in leveraging the educational and cultural impact of this work through communications initiatives. Weber serves as past President and current CSO for the NJ Higher Education Partnership for Sustainability, Board member for the municipal non-profit Sustainable Princeton, executive sponsor for the NE Campus Sustainability Consortium and co-founder of the Ivy+ Sustainability Consortium—Sustainability Operations Action Research (SOAR) collaborative. Weber earned her Ph.D. in Environmental Science from the Indiana University School of Public and Environmental Affairs, Bloomington. She lives with her husband, son, honeybees, rabbits and small flock of chickens in Hopewell, NJ.

### **Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology**

Simon Levin is the James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology at Princeton University where he has been a Professor since 1992 after 27 years on the faculty of Cornell University. His research interests are in understanding how macroscopic patterns and processes are maintained at the level of ecosystems and the biosphere, and in the interface between basic and applied ecology and socioeconomic systems. His Ph.D. is in mathematics, and he has been President of the Ecological Society of America and the Society for Mathematical Biology.

Levin is a Fellow of the American Academy of Arts and Sciences and the American Association for the Advancement of Science as well as a Member of the National Academy of Sciences and the American Philosophical Society. Among other awards, he won the MacArthur, Eminent Ecologist and Distinguished Service Awards of the Ecological Society of America and the Okubo Prize of the Society for Mathematical Biology and the Japanese Society for Theoretical Biology. He has also been honored with the Heineken Prize for Environmental Sciences, the Tyler Prize for Environmental Achievement, the Margalef Prize for Ecology and the Kyoto Prize for Basic Science. Most recently, he was awarded the U.S. National Medal of Science by President Obama. Levin has mentored more than 100 graduate students and postdoctoral fellows.

## Resources

### ABOUT THE PRINCETON FOOD AND AGRICULTURE INITIATIVE

<https://fai.princeton.edu/>

Princeton Food and Agriculture Initiative Overview Video

<https://www.youtube.com/watch?v=Y-M50p9ko00&t=14s>

### ABOUT PRINCETON UNIVERSITY

<https://www.princeton.edu>

Planning for Princeton's Future

<https://www.princeton.edu/strategicplan/>

Campus Vision for the Future of Dining

<https://dining.princeton.edu/vision/>

Campus Dining Tour

<https://dining.princeton.edu/where-eat/touring-dining-options-campus>

### INITIATIVE IN ACTION

Pass the pulses, please: a case study about replacing pizza with a beans, greens and grains concept

<https://fai.princeton.edu/action>

Clear Labs CEO explores next-generation food safety testing

<https://dining.princeton.edu/news/clear-labs-ceo-explores-next-generation-food-safety-testing>

Princeton welcomes Mauritian president to explore challenges facing global food systems

<https://www.princeton.edu/news/2017/11/02/princeton-welcomes-mauritian-president-explore-challenges-facing-global-food>

# RESOURCES

Partner farmers share insights at World Food Day breakfast

<https://dining.princeton.edu/news/partner-farmers-share-insights-world-food-day-breakfast>

Princeton, Stockholm University team up to explore 'Earth in 2050' global environment

<https://www.princeton.edu/news/2017/12/07/princeton-stockholm-university-team-explore-earth-2050-global-environment>

Serving up culinary education in local schools

<https://dining.princeton.edu/news/serving-culinary-education-local-schools>

Princeton teaching kitchens warm up a brisk Wintersession

<https://dining.princeton.edu/news/princeton-teaching-kitchens-warm-brisk-wintersession>

Sharing new tastes through cultural heritage dining

<https://careers.princeton.edu/sharing-new-tastes-cultural-heritage-dining/>

Princeton Campus Dining nourishes people and planet

<https://www.youtube.com/watch?v=EHbL492UbM0>

# Pass the Pulses, Please



**“If you can get excited about good food, then you can get excited about beans, greens and grains.”**

It was in June, 2016, at a regularly scheduled Culinary Council meeting within Campus Dining, that a bold proposal was put on the table. Chefs Brad, Dan and Christeen suggested that a station featuring beans, greens and grains replace the pizza station in Butler/Wilson, a favorite among students.

Bold concepts are not unusual at Culinary Council meetings, where members typically ideate, looking to initiatives that might be introduced in upcoming semesters. But replacing pizza with beans, greens and grains? That seemed a tall order, even though it aligned with the mission and philosophy of Campus Dining, and with various Princeton initiatives in nutrition and sustainability that culminated in the Food and Agriculture Initiative.

A partnership among faculty, Campus Dining, and the Office of Sustainability, the Food and Agriculture Initiative explores global food and agriculture systems as a subject of critical inquiry and applied knowledge.

A case in point: palm oil.

The cultivation of oil palm (for palm oil) is widely recognized as one of the major drivers of deforestation in Southeast Asia and, increasingly, in the New World tropics. Millions of acres of tropical forests have been cleared and replaced with

monotypic stands of oil palm, resulting in tremendous losses of biodiversity.

Working with Campus Dining, the Food and Agriculture Initiative found an opportunity to test how easily an environmentally responsible purchaser (in this case, Princeton University) can identify the sourcing of food products containing palm oil and replace unsustainable sources with certified sources.

The Beans, Green & Grains proposal had at its heart nutrition and sustainability goals like these. But even so—eliminate the pizza station? How would that go down with students?

Some data points help to illuminate the degree of the challenge.

According to the *HuffPost* in 2017, the food ordering app GrubHub, working with Spoon University, analyzed data of users on college campuses to figure out various trends in how and what foods students order.

The analysis reveals that the foods students order most are:

1. Pizza
2. Fries
3. Wings
4. Soup
5. Salad

And let us not forget that National Pizza Pie Day is celebrated annually in the US (it was February 9 of this year).

“I was a little bit wary of it when I first heard about the Beans, Greens & Grains station,” says Alexandra Wheatley, who was an undergraduate at Princeton when the initiative launched. It took her by surprise.

“I knew there would be segments of the Princeton population that really wouldn’t want to migrate away from pizza. But at the same time, I was really excited about it.”

In April of 2017, she wrote a piece for *The Daily Princetonian* in which she opined: “Campus Dining has embraced ‘plant forward’ menus that highlight great flavors and healthy, sustainable ingredients. As part of the Culinary Institute of America and the Harvard T.H. Chan School of Public Health’s Menus of Change program, this plant forward approach is Princeton’s way of integrating optimal nutrition, environmental stewardship, and social responsibility into the meals we eat each day.”

Nearly a year later, her appreciation of the station is exclamatory.

“It’s awesome! Eating green is one of the best things you can do for yourself and the environment. If you cut out meat in your diet, it’s better for the planet than reducing

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your driving and recycling your waste.”

Alex isn't alone in her enthusiasm. Cecilia Shang, currently a senior in the Woodrow Wilson School for International Public Affairs, expresses a similar opinion.

“Beans, greens and grains is a small station in one dining hall. But it's a win-win-win narrative. The fact that it highlights plant-forward diets and is healthful places it in line with our wellbeing and that of the planet. It changes behavior and unites people. That it does all this is necessary—and amazing!”

Cecilia also notes that Beans, Greens & Grains gives students a chance to interact with the Campus Dining staff, “the people preparing my food”—a welcome aspect of the station for many.

“If you can get excited about good food,” she summarizes, “then you can get excited about beans, greens and grains.”

Students began flocking to the new station almost immediately after it launched, in numbers that surprised just about everyone associated with the initiative—not least, Chef Brad, one of its originators.

“I thought there might be a lot of push-back for the pizza. In fact, there was little. Looking back on it today, during its roughly three semesters of operation, there has been more student demand for beans greens and grains than there was for pizza when that was what the station served.”

And why not, considering what awaits the hungry diner there:

- Delicious, nutritious, seasonally oriented foods that are cooked to order
- Moroccan, Mediterranean and Latin vegetarian stocks, among others, made from scratch
- Healthful oils, primarily olive, used in cooking
- Whole wheat pasta, gluten-free or not
- Frequently changing menus featuring the freshest foods
- Abundance of earth-friendly ingredients

“We wanted to make our menus more plant-forward and Beans, Greens & Grains was our answer,” Chef Brad explains. “I eat it all the time. I'm proud of it. There's a lot of variety here. We can give you whatever you want.”

Smitha Haneef, Assistant Vice President, University Services, and Co-Chair of the Food and Agriculture Initiative, regarded the station as an experiment, one that might not work. Like Chef Brad and others, she too was surprised by its success.

“I hadn't realized the level of interest it would garner,” she admits. “After the launch, in talking to graduate students on campus, they told me how well their needs were met there. As one student explained it, ‘I know I can always go to Beans, Greens & Grains and come away with something I like.’”

The success of the station may have something to do with its avoidance of markers that could prove to be turnoffs for students.

“We steer clear of buzzwords like vegan and sustainable and plant-based,” says Smitha. “It's simply a fun experience that is also delicious and good for you.”

University Professor Elke Weber endorses this approach.

“The general strategy of not using identity-based labels, but focusing instead on the kinds of experiences that people actually enjoy, like taste, of presenting new options like quinoa in an appealing fashion, and not wagging a ‘you must’ finger at people, is ingenious.”

Beyond eating delicious foods that look as good as they taste, what else is in it for students choosing “Beans, Greens and Grains?”

Registered Dietician and Nutritionist Melissa Mirota has an answer.

“Eating at Beans, Greens & Grains makes it easy for you to achieve your daily amount of protein and fiber. You simply cannot

order something unhealthful there.”

She continues, “Students in general don't consume enough dietary fiber or micronutrients like magnesium and iron. By eating lentils, for example, you get 18 grams of protein and 16 grams of dietary fiber in every cup.”

Melissa views the station as a central part of Campus Dining's approach to wellness and nutrition. To that end, she consults regularly with Chef Brad, helping to uncover new greens and seed grains that might be brought to bear on the experience of campus dining.

Is she surprised by the popularity of the station?

“No, not really, because in my experience at Princeton, students have been asking for more healthful fare for some time now. In fact, in 2016, in a national study that included 655 Princeton students, 71% of them asked for more information about healthful eating.”

She also points to the cognitive and behavioral benefits of eating healthfully.

“It has been shown to help students with concentration and general energy levels throughout the day, and to help them avoid over-eating and sugar consumption.”

While Melissa attends to the health of the students, Sustainability Manager Sarah Bavuso keeps an eye on new ways in which Princeton can help to cultivate the health of the planet.

“Campus Dining used to be very metric driven—for example, reduce carbon emissions by x amount of tons,” she explains. “In recent years, there has been a philosophical shift toward an ethos of sustainability.”

And what does that mean?

“We're still grappling with that question,” she admits, “defining what sustainability means. Building relationships with local food providers is part of it.”

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# “pulses are able to increase biodiversity as they are able to fix their own nitrogen into the soil, which increases soil fertility.”

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According to Procurement Director Linda Recine, who with Smitha Haneef is out visiting Campus Dining’s farm partners 2-3 times a month, 64% of foods now served on campus are locally sourced. And many of those foods—legumes and pulses, for example—support biodiversity, which is viewed today as even more important to the health of the planet than growing organically.

## Legumes? Pulses? Biodiversity?

Legumes are vegetables, the most common variety being beans. Peas and lentils are also legumes. They all have high nutritional value, being rich in protein, fiber and carbohydrates.

Pulses are the edible seeds of plants in the legume family, and grow in pods. They include dry beans, dry broad beans, dry peas, chickpeas and lentils. Pulses are healthful and nutritious. Growing them promotes sustainable agriculture, as pulse crops help to decrease greenhouse gases, increase soil health, and use less water than other crops.

According to the Food and Agriculture Organization of the United Nations (FAO), “pulses are able to increase biodiversity as they are able to fix their own nitrogen into the soil, which increases soil fertility.”

The FAO defines biodiversity as “the variability among living organisms from all sources and the ecological complexes of which they are part; this includes **diversity within species, between species and of ecosystems.**”

The President of Mauritius, Ameenah Gurib-Fakim, shared her global perspective on the importance of biodiversity during her visit to campus in 2017 under the aegis of the Food and Agriculture Initiative.

“Biodiversity is the basis of life and central to human existence. Over millennia, humans have depended on plant diversity, both wild and cultivated, to meet their needs. Biodiversity is a critical resource not only to address sustainable agriculture, but also for sustaining our ecosystems.”

Sarah brings this home to Princeton.

“I think of nutrition and sustainability as the double helix that informs Princeton’s efforts—and Campus Dining’s specifically—to address global issues on the local level. The Beans, Greens & Grains initiative checks all the boxes of the helix.

“Nutritionally, plant-based diets are better for us. Sustainably, they’re better for the planet because they use fewer resources and don’t require chemical fertilizers if you’re growing things properly.”

One example of the sustainability argument for plant-based diets can be found in a study conducted by University of Minnesota Professor of Ecology G. David Tilman and graduate student Michael Clark that was published in *Nature* and cited on the United Nations University website.

The researchers found that greenhouse gas emissions per gram of protein for beef and lamb are about 250 times those of legumes, and that twenty servings of vegetables have fewer greenhouse gas emissions than one serving of beef.

The “double helix” of nutrition and sustainability vivifies the curriculum at Princeton too, as Professor Dan Rubenstein’s new course, *Agriculture, Human Diets and the Environment*, illustrates.

The course description reads, in part: *Food fuels us and connects us with nature. Yet most of us poorly understand how food is produced and how production processes*

*impact our diets, health, livelihoods and the environment. By the course’s end, students will be confident when food shopping or perusing menus that they will make sound ethical, environmental, economic, social and medical choices.*

“It’s always good when students are able to reflect on what they’re doing, and why,” Professor Rubenstein explains. “They’re much more aware today of environmental issues.”

Evidence of this can be found in the fact that the course is by application; every student had to write why they wanted to take it.

“90% of them are there because they’re committed to changing their behavior in a way that will sustain the planet,” he explains. “They want to learn more about what’s the best way to do that.

“With the Beans, Greens & Grains station, Campus Dining is contributing to that learning too, in effect saying that taking control of your eating for your health and the good of the environment is something not to be taken for granted.”

Pointing to the work of the Princeton Environmental Institute, where he is an associate, Professor Rubenstein continues, “At Princeton, we’re working together as ecologists, psychologists, economists, policy-makers, and sociologists, to look at the full gamut of human impacts on the environment.

“As scientists and engineers, we can build better mousetraps. But if no one is using those new mousetraps, they have no impact. We’ve got to figure out how to make those new tools not just accessible, but desirable to people, so they engage with them.”

Professor Rubenstein and Smitha Haneef

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worked together to create 12 culinary labs for the course that test his theoretical concepts against the experiential learning that she designs. Culinary labs are extensions of the Food and Agriculture Initiative, and are key components of the University's overall effort to live and put into practical application the ideals of research into the environment and health.

To illustrate how one of these labs work, there was a lecture about the environmental challenges facing a growing population in 2050, followed by a demo and tasting of more sustainable choices—possible staples of a future diet—e.g., crickets, seaweed vs. lettuce, beef substitutes rather than beef.

“At the university, we are about pure science, pure knowledge,” Smitha Haneef explains. “Some of our faculty suggests we generate pure knowledge such that other institutions can draw from that, and develop different applications through that knowledge.”

“With food systems, Campus Dining has taken the approach of an applied sciences partner. How might we collaborate with you to bring your students’ learning experiences to life?”

“In that sense, we are very much a laboratory.”

Professor Weber offers a similar perspective, and a wry comment on our human proclivities.

“Princeton as a laboratory is a very appropriate way to think about the institution. It is trying to put the theoretical to work in practical ways on campus. Addressing the idea of changing habits in the face of a new reality.

“Many of our decisions we don’t make consciously. We make them by force of habit. I think this is especially true with food. Many of our food choices are formed early in life. What we get fed by our parents, in school, in our friends’ homes forms those eating habits.

“So when we go to the grocery store, we

buy the foods we’re familiar with, the things we’ve eaten for the last 20 years. Which doesn’t mean that there aren’t other food items that we would enjoy, if we would experience them.

“But we’re all sticks in the mud. We don’t like change. We like to do the things we’ve always done rather than make new choices.”

Princeton in general, and Campus Dining in particular, are trying to nudge students in the direction of changed patterns of behavior that will benefit their health and ultimately impact nothing less than the fate of the planet. It’s all about making new, and more informed, choices—about what we eat, what we don’t eat, and what that means for our world and for us as a species.

As Professor Rubenstein reminds us, “Students are going to have to live on the planet in 2050 with 9 billion people. How those 9 billion people are going to sustain themselves is not obvious.”

It seems likely that an important part of the answer to that question is, beans, greens and grains.

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## Princeton, Stockholm University team up to explore ‘Earth in 2050’ global environment



Seated, from left to right: Daniel Rubenstein, Class of 1877 Professor of Zoology, Professor of Ecology and Evolutionary Biology, and Director, Program in Environmental Studies; Line Gordon, SRC Deputy Director and Deputy Science Director; Simon Levin, James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology; Smitha Haneef, Assistant Vice President, University Services; Thomas Elmqvist, Professor, SRC.

Standing, from left to right: Thayer Patterson, Research Community Coordinator, Princeton Institute for International and Regional Studies; Juan-Carlos Rocha, Researcher, SRC; Michael Celia, Theodora Shelton Pitney Professor of Environmental Studies, Professor of Civil and Environmental Engineering, and Director, Princeton Environmental Institute; Jon Norberg, Professor, SRC; Amilcare Porporato, Professor of Civil and Environmental Engineering and the Princeton Environmental Institute; Peter R. Jaffe, William L. Knapp '47 Professor of Civil Engineering, Professor of Civil and Environmental Engineering and Associate Director for Research, Andlinger Center for Energy and the Environment; Talia Young, David H. Smith Conservation Postdoctoral Fellow at Princeton; Fernando Jaramillo, Postdoctoral Researcher, SRC; Maja Schluter, Associate Professor, SRC; Wijnand Boonstra, Associate Professor, SRC; Wenying Liao, Graduate Student in Ecology and Evolutionary Biology; Luojun Yang, Graduate Student in Ecology and Evolutionary Biology; Erik Andersson, Associate Professor, SRC; and Timothy D. Searchinger, Research Scholar, Woodrow Wilson School, Science, Technology, and Environmental Policy Program.

Princeton University welcomed researchers from the Stockholm Resilience Centre (SRC) of Stockholm University from Nov.12-14 to collaborate on key areas related to the environment in the global context.

The meeting, “Earth in 2050: Boundaries, Obstacles and Opportunities,” was sponsored by the Princeton International Fund, the Princeton Environmental Institute and the Andlinger Center for Energy and the Environment.

Presentations sparked conversation about feeding the world, urban infrastructure, biodiversity and conservation biology, human behavior, and water quality. The symposium was held in the Julis Romo Rabinowitz Building and Louis A. Simpson International Building.

Professor Simon Levin, the James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology at Princeton, serves on the SRC board and led the event.

Levin emphasized the potential of the collaboration: “SRC is the leading institute in the world focused on what makes socioecological systems robust and resilient in the



Simon Levin, the James S. McDonnell Distinguished University Professor in Ecology and Evolutionary Biology at Princeton, opens the workshop, setting goals for the two-day session. Levin serves on the SRC board.  
*Photo by Sameer A. Khan/Fotobuddy*

face of a changing environment, and their expertise is complementary to Princeton's in our quest to build a sustainable future for all humanity," he said. "There was great enthusiasm on both sides, and we look forward to productive partnerships."

The University has identified environmental studies as an opportunity for academic leadership as part of its strategic planning framework. Reflecting that opportunity, a committee made up of several Princeton departments planned the workshop with the SRC to help shape new directions in environmental studies and research.



Fernando Jaramillo (left), a postdoctoral researcher from Stockholm University, and Lars Hedin, the George M. Moffett Professor of Biology and Chair of the Department of Ecology and Evolutionary at Princeton, discuss their research. Jaramillo studies freshwater availability and changes, from local to global scales. Hedin presented to the working group on sustainable use of soil and water resources.  
*Photo by Sameer A. Khan/Fotobuddy*



Princeton welcomed visitors from the Stockholm Resilience Centre of Stockholm University from Nov. 12-14 to collaborate on key issues related to the environment in a global context. A range of speakers presented at the meeting, "Earth in 2050: Boundaries, Obstacles and Opportunities." Standing at right is Smitha Haneef, assistant vice president, University Services, and co-chair of the Food and Agriculture Initiative at Princeton.  
*Photo by Sameer A. Khan/Fotobuddy*

"We believe that understanding and embracing our role in the environment is critical to our own survival," said Line Gordon, SRC deputy director and deputy science director. "We thoroughly enjoyed the level of engagements in the discussions, and it was fantastic to advance the thinking on sustainability with such a brilliant group."

At the meeting, scientists presented their expertise within the context of building a sustainable future for humanity. They also broke out into smaller working groups. By the end of the second day, a few major research themes emerged: feeding the world, urban sustainability and managing complex systems for resilience.

"I really believe that we together can have a powerful role to play in the future," Gordon said. "I look forward to engaging in the next phase, where we will operationalize some of the discussions in joint research projects on food, urban sustainability and behavioral change."

Princeton recently launched the Food and Agriculture Initiative, which is educating and engaging students on food and agriculture as a subject of critical inquiry and applied knowledge.

Smitha Haneef, assistant vice president, University Services, and co-chair of the Food and Agriculture Initiative, sees great opportunity in deepening the relationship between Princeton and the SRC. She expects that the University will be seen as a living-learning lab where Campus Dining implements actual solutions for a healthy planet.

"I am really excited to see this global platform come together as we are working with and for our scientists and students to design projects," she said. "Our goal is to generate pathways and take a solutions-based approach for a sustainable food system at a local, regional, continental and global level. Princeton's educational environment coupled with SRC's work on planetary boundaries would provide a unique way for us to take this approach."

Lars Hedin, the George M. Moffett Professor of Biology and Chair of the Department of Ecology and Evolutionary Biology, agreed. "When it comes to food, the Princeton-SRC collaboration is positioned to capture unique and world-class leadership in this area, by combining Princeton's strength in fundamental and quantitative knowledge of hydrological-biogeochemical systems with SRC's strength in human and socioecological dynamics."

**Chris Lentz**

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## Princeton welcomes Mauritian president to explore challenges facing global food systems



During a visit to Princeton on Oct. 5, President of Mauritius Ameenah Gurib-Fakim (center at back), met with nearly 40 students, faculty and staff over breakfast in the Garden Room at Prospect House to discuss agrobiodiversity. *Photo by Sameer A. Khan/Fotobuddy*

**Princeton University welcomed Ameenah Gurib-Fakim, president of Mauritius, on Oct. 5 for a day of discussion with students, faculty and staff about the state of global food systems.**

“Biodiversity is the basis of life and central to human existence,” she said during an afternoon lecture in McCosh 50. “Over millennia, humans have depended on plant diversity, both wild and cultivated, to meet their needs. Biodiversity is a critical resource not only to address sustainable agriculture, but also for sustaining our ecosystems.”

Yet today the delicate balance of food ecosystems is under threat as the human population grows to an expected 9 billion people by 2050.

“Food production will need to increase at least by 50 percent and more in the populous parts of Africa and Asia,” she said. “Today, according to the FAO [Food and Agriculture Organization], over 812 million people go to bed hungry every day. Sadly, hunger amid plenty is the tragic leitmotif of our times.”

In addition to hunger, Gurib-Fakim noted that more than 2 billion people suffer from micronutrient deficiencies, where their diets lack key vitamins and minerals necessary for growth and development and for fighting disease. Children, she said, bear a disproportionate share of the burden of malnutrition.



After giving a lecture in McCosh 50, President Gurib-Fakim takes questions about the state of food systems in Africa and the impact that individual actions can have on effecting change. Photo by Sameer A. Khan/Fotobuddy

“Increasing the sustainable use of agricultural biodiversity in production and consumption systems will be an important part of the solution to the challenge of meeting future food and nutrition security,” she said. “Conservation of biodiversity must span the entire spectrum of activities and locations, on-farm, off-farm, in seed banks, all the while drawing on the wealth of local, indigenous knowledge.”

During her visit, Gurib-Fakim also shared her message directly with President Christopher L. Eisgruber, who expressed his support for the University community to engage and explore the issues further.

She also met with students throughout the day, including juniors Jordan Salama and Dan Sullivan, who were inspired to take action. “Meeting President Gurib-Fakim, a head of state, was truly a surreal experience for Dan and me,” said Salama. “As a result, we’re excited to explore a project documenting the fight against climate change in Mauritius itself and are currently in touch with the Mauritian embassy in Washington, D.C.”

Gurib-Fakim was hosted by Campus Dining as part of the Food and Agriculture Initiative, which explores global food and agriculture systems as a subject of critical inquiry and applied knowledge.

“We have embarked on a journey to try to address one of humanity’s greatest challenges,” said Smitha Haneef, assistant vice president, University Services. “Having an opportunity to meet with President Gurib-Fakim — to gain her unique perspective as a scientist, world leader and entrepreneur — is an invaluable experience. She is an inspiration to me, my colleagues and to the youth around the world.”

Along with Haneef, faculty members Daniel Rubenstein and David Wilcove, as well as Shana Weber, director of the Office of Sustainability, comprise the core team of the Food and Agriculture Initiative. Rubenstein is the Class of 1877 Professor of Zoology and professor of ecology and evolutionary biology who also directs the Program in Environmental Studies. Wilcove is a professor of ecology and evolutionary biology and public affairs and the Princeton Environmental Institute.

**Chris Lentz**

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# Clear Labs CEO explores next-generation food safety testing

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What is really in the food that we eat? We cannot always be sure, according to Sasan Amini, CEO and co-founder of Clear Labs, Inc.

During a presentation in the Lewis Science Library earlier this month, Amini explained how next-generation sequencing can significantly improve food safety, compared to conventional technologies.

“The magnitude of this problem is pretty huge,” Amini explained. “The estimate from the UK authorities is around a \$10-15 billion impact on an annual basis on the global food industry.”

Amini was invited to Princeton as part of the University’s Food and Agriculture Initiative. The Initiative—a partnership among faculty, Campus Dining, and the Office of Sustainability—explores global food and agriculture systems as a subject of critical inquiry and applied knowledge.

Amini earned his PhD in Molecular Biology at Princeton University and his B.Sc. in Biotechnology from the University of Tehran, where he entered as a gold medalist in the International Biology Olympiad.

**Chris Lentz**



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## Partner farmers share insights at World Food Day breakfast



As part of a celebration of World Food Day, local farmers and Campus Dining staff met in Rockefeller College to discuss the state of local and domestic food systems as well as opportunities for collaboration.

“This breakfast is our way to express our gratitude to the farmers, fishermen, ranchers, and care takers of our food systems around the world,” explained Smitha Haneef, Assistant Vice President, University Services. “We are grateful to them for all they do to nourish us and our community.”

Much of the conversation focused on systemic challenges facing local producers. Increased regulations have led to cost increases that price out local farmers, especially against large-scale, mono-crop operations. A few participants mentioned the need to educate consumers about the value of locally produced items as a way to shift behavior.

Campus Dining committed to helping to close the gap between producers and consumers by sharing stories with campus members—both about the farmers and about local ingredients used throughout campus.

The breakfast was part of Princeton’s Food and Agriculture Initiative, which explores global food and agriculture systems as a subject of critical inquiry and applied knowledge.

Special thanks to the following attendees: Scott Morgan from Morganics Family Farm, Samantha Jany from Brown Dog Produce CSA, Beth Roberts from Cedar Lane Farm, Catherine Marchese from Marchese Farm, Yusha Hu from Local Bushel and Allegra Lovejoy '14 from Northeast Organic Farming Association of New Jersey (NOFA-NJ).

**Chris Lentz**



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# Saving food, one ounce at a time

**If you step into a dining hall any day on Princeton's campus, you're presented with a vast array of cuisines from around the world.**

Though portions are carefully calculated, some food goes untouched at the end of meal periods. While Campus Dining has had a composting initiative for 20 years as part of its sustainability efforts, there was a communal feeling that the food could go toward a better cause.

Smitha Haneef, assistant vice president for Campus Dining in University Services, and Sarah Bavuso, sustainability manager for Campus Dining, had been meeting with chefs on campus as well as students in Greening Dining, a student group focused on adopting more sustainable practices in the dining halls. Working together, students, chefs and administrators began an effort to distribute the excess food to families in central New Jersey.

"As part of our vision, we are committed to being in service of our campus and our community," Haneef said. "We take a one-ounce-at-a-time approach to reducing food waste. We recognized an opportunity to divert edible food away from composting and landfill, which only strengthens our program."

"You can look at communities around Princeton and see how many families there are in need of help. We really wanted to take the food that we spend so much time preparing and give it one last chance to feed another person or family," Chef Dan Maher said.

The process of getting the food to the community involved a series of steps. Aside from following a strict logging and packaging process to adhere to health codes, Bavuso faced a larger challenge.

"After many months of trying to find a charity to accept our prepared foods, we found the Food Donation Connection," Bavuso said. "They are a nonprofit that connects those with food with those in need. They took great care in matching us with an amazing harvest partner."

Bavuso and her team settled on Bentley Community Services, a nonprofit corporation whose South Brunswick, New Jersey, facility serves working middle-class families who are just making ends meet.



Campus Dining staff in the Butler-Wilson dining halls prep and serve 2,000 meals per day for hungry students.

The food donation program began last fall with Butler College and Wilson College, and it now includes the Forbes College Dining Hall. The founders of Bentley Community Services, Dorothy Stearns and Brant Holmes, are delighted to have partnered with Campus Dining.

"Princeton provides us with a wide variety of food that changes our whole distribution process," Stearns said. "An entire family can eat out of one of the bags of pasta with marinara, French toast, eggs or chicken cacciatore."

Stearns added that organizations like Bentley are equally beneficial for the broader community.

"We help divert high-quality goods from restaurants and markets in the area that would otherwise end up in compost. We practice food sustainability as well as financial sustainability," she said. Bentley not only helps feed the families it serves — the group also assists them in monitoring and managing their finances. It also requires each family to volunteer time to the organization and eventually graduate from its program.



At the end of a meal, wellness manager MartiAnn Schenck checks the temperature of the remaining food to ensure that it is still within a safe range.



Residential food service worker Leonie Laloi-Joseph ladles leftover vegetable barley soup into a bag for storage.



Laloi-Joseph removes the air from the bag and ties it so it's ready for freezing.



Chef Dan Maher places the bagged food on trays and moves it to the freezer to keep it as fresh as possible for the food harvesting program.

Greening Dining co-presidents senior Cecilia Shang and junior Shun Yamaya, along with their members, worked with Campus Dining on the food harvesting program and on efforts to make students aware of food waste, such as setting up food waste weigh-in stations at the plate return in dining halls. They sorted the waste from the bins and were able to construct multiple full plates from the amount of untouched food found in them and shared their findings on social media.

“We all live in such an abundance of excess food in the world, and it’s great to be able to divert the food we don’t finish,” Shang said. “On an individual scale, you think one little bit doesn’t make a difference, but it definitely adds up.”

“Growing up in Japan, I was taught not to leave any food on the plate,” and not just so he could have dessert, Yamaya said. “It was more so coming from a place of gratitude. Even leaving one grain of rice would be a disservice to it. It would be a disservice to my mother who made it, the farmers who produced it and whatever other forces went into making this rice.”

While Campus Dining aims to eliminate food waste through its planning and purchasing, Maher said that they inevitably have days that are less busy than expected. There is always going to be a “little bit of something that can be reused,” Maher said. “Five or six portions to a family of three is almost two meals.”

Campus Dining plans to incorporate the food harvesting program into each dining hall to give a bit of extra help to those who need it most in the surrounding community.



Food service storekeeper Odman Jean Denis prepares a week’s worth of food for Bentley’s pickup on a Tuesday morning. After removing the racks from the freezer, Jean Denis inventories and weighs each bag of frozen food. He then places the food in large red shipping containers for Bentley to take to its facility.



Bentley community volunteer Kathy Sanford stocks the food into freezers for families to choose and enjoy.



The bags of frozen food contain a variety of cuisine from Campus Dining.



Bentley co-founders Dorothy Stearns and Brant Holmes oversee a morning delivery.



Campus Dining staff arrive at Bentley for a tour of the facility.



Sarah Bavuso, sustainability manager for Campus Dining, and John Studwell, a cook in Forbes Dining Hall, look over featured entrees during a Thursday lunch period.



Senior Cecilia Shang is co-president of the student group Greening Dining.



Junior Shun Yamaya is co-president of Greening Dining.



Senior Lydia Watt, a member of a student food donation group, said that the food harvesting program, while effective in battling local economic inequality, "generates a larger consciousness of sustainability. Food waste and food overproduction, and the environmental problems associated with them, are incredibly significant to how we live our lives."

**Nick Donnoli, Office of Communications**

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## Princeton teaching kitchens warm up a brisk Wintersession



Whitman Cook Rudy Natareno-Urizar demonstrates how to prepare chicken parmesan.



Forbes Cook Abdel Moukkad works with first-year student Arjun Krishnan to prepare a vegan dish with tofu, penne and broccoli.

As the temperatures dropped outside, Princeton students and staff turned up the heat inside. And it was not just the thermostats. Across campus, Campus Dining chefs and cooks led four sessions for 100 participants on culinary approach and technique.

“Engaging our community in this way is a key part of our vision to support our students, faculty, and staff to be their healthy best,” says Smitha Haneef, assistant vice president, University Services. “Food brings everyone together and we all walk away having learned something new.”

At Whitman College, Senior Operations Manager Greg Billows, Chef de Cuisine Jared Gierisch and cooks Fredy DeLeon, Rudy Natareno-Urizar, Ervin Soto, Dennis Stewart and Alex Lopez offered three different lessons to three groups of students. One group learned how to prepare fresh Italian sausage—from the casing to the cooking. Another rolled fresh gnocchi. The third group created chicken parmesan. Students then joined staff for a family-style meal to show off their efforts.

“It was a wonderful experience for staff and students,” says Kristin Frasier, Whitman College program administrator. “We love creating an environment where learning like this can happen.”

At Forbes College, Chef de Cuisine Alex Trimble and cooks Abdel Moukkad, Sundown Lightner, John Studwell and Mike Valencia worked with three groups of students to create garlic knots, pizza, and penne with broccoli rabe. Chef Trimble ended the lesson with a demonstration on making bread pudding, including how to crack two eggs at once without leaving any shell in the creamy mixture.

Up the hill inside the Rockefeller and Mathey servery, Executive Chef Rick Piancone and Chef de Cuisine Michael Gattis shared secrets on transforming cauliflower into pizza crust and fried “cauli-rice.” Students learned the versatility of cauliflower and tried their hands at cooking the crust before sitting down to eat their delicious creations.

Students were not the only ones having fun. Inside Café Vivian, Piancone, Gattis, and Senior Operations Manager Matthew Smith led a team-building program for a dozen staff members in the Academic Manager’s Group (AMG). This was the second session between the AMG and Campus Dining. Together, the teams prepared fresh ginger ale, a kale and cabbage salad, vegetable stromboli, seared chicken with white wine and herbs, and a ricotta dessert.

“It was an amazing opportunity to work with colleagues in a different setting,” says Kathleen Applegate, department manager, Mathematics. “With limited time and a specific task, you learn to communicate and work together effectively. It was great to work with these incredibly talented chefs and get to know colleagues better. Everyone who attended thought it was an extremely worthwhile event.”

Campus Dining is part of the Teaching Kitchen Collaborative, which seeks to advance personal and public health through culinary literacy and integrative lifestyle transformation.

**Amy G. Brown**

## Serving up culinary education in local schools



Throughout the year, Princeton University chefs and staff visited local schools to share their knowledge and skills with students from pre-K to grade 5.

In December, chefs designed programs as part of the Garden State on Your Plate program. Garden State on Your Plate, run by the Princeton School Gardens Cooperative, brings fresh produce and products from local farms into schools' cafeterias, where local chefs prepare recipes for tastings for the students, parent volunteers, and school employees.

This year's session focused on carrots—prepared in a variety of ways to encourage students to try healthy wholesome food while expanding their taste buds and culinary skills.

Students in pre-K to grade 1 learned about numerous ways to cut a carrot and how different cuts affect different recipes. Older students in grades 3 to 5 also explored sustainability and food waste reduction concepts, ensuring that all parts of the carrot can be used.

Rick Piancone, Executive Chef at Rockefeller and Mathey Colleges, gave one example of how the greens of carrots—parts normally discarded—can be used to create an Italian-style pesto sauce.

Whether learning how to craft a flower-shaped carrot or how adding lime to the carrot changes the flavor profile, students were encouraged to explore food outside the cafeteria. They are also building positive food memories with healthy, wholesome ingredients, which can support a healthy relationship with food.

The program sought to educate, engage and empower students to make healthy, sustainable food choices that benefit themselves, their families, and ultimately their communities.

In March, as part of National Nutrition Month, Campus Wellness Dietitian Melissa Mirota visited the local preschool, University Now Day Nursery, with a Charlie Cart. The Charlie Cart Project seeks to integrate food and cooking with lessons in math, English language arts, science and social studies.

Mirota, along with Princeton Assistant Vice President Smitha Haneef and undergraduate students Alice Wistar and Selina Pi, led children in pre-K and kindergarten classes through a hands-on nutrition program where children made a mango and cucumber salad.



***Melissa Mirota, RDN***

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# Princeton Culinary Lab

*Food and Agriculture Initiative*



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Princeton culinary labs are designed for faculty to collaborate with Campus Dining as a principal collaborator to design experiential learning programs that complement the curriculum being offered.

Each culinary lab is co-designed by faculty and Campus Dining representatives. There are 14 culinary labs this semester—each one with a different theme and methodology. Each culinary lab complements the theoretical content that students explore as part of the curriculum.

Culinary labs are transdisciplinary in nature, and they have been designed to support and enhance the teaching and theoretical components being covered in the class. They have a direct tie in to the curriculum.

Culinary labs have been envisioned as part of the Food and Agriculture Initiative. Launched in April 2016, the Food and Agriculture Initiative (FAI) explores global food and agriculture systems as a subject of critical inquiry and applied knowledge. The initiative is co-chaired by Daniel Rubenstein, Class of 1877 Professor of Zoology and professor of ecology and evolutionary biology who also directs the Program in Environmental Studies and Smitha Haneef, assistant vice president, University Services.













Blood Orange

Oregano

Chives

Rosemary

Chives

Thyme

**FOOD & AGRICULTURE** :  
— I N I T I A T I V E — ●  
●  
●