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 BIOLOGY. DIRECTOR, PROGRAM IN ENVIRONMENTAL STUDIES

SMITHA HANEEF
ASSISTANT VICE PRESIDENT, UNIVERSITY SERVICES

CO-CHAIR, FOOD AND AGRICULTURE INITIATIVE

CO-CHAIR, FOOD AND AGRICULTURE INITIATIVE

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 CO2 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.
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.
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

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 Eyste begin research into palm oil with support from Campus Dining.
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.
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.

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**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.

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 herdsmen 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 caretakers 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).
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
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.

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.


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.”
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.


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.
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.


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.
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topic</th>
<th>Culinary Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/5/18</td>
<td>Tastes of Hunter-gatherer, Agricultural and Industrial Civilizations. Inspecting and tasting preserved meats and plants from early domesticated species.</td>
<td>Food Systems Relationship map Smoke: meat; Salt crusted fish; Pickled vegetables</td>
</tr>
<tr>
<td>2/12/18</td>
<td>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.</td>
<td>Ancient grains, cooked cereal, spooned bread, three sisters salad, popular brand cereal</td>
</tr>
<tr>
<td>2/19/18</td>
<td>Food Forensics: From ingredients to DNA. Determining what makes up the foods we are eating and how do they taste.</td>
<td>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.</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
<td>Details</td>
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<tr>
<td>2/26/18</td>
<td>Wild herding Worldwide: From Cows, Sheep, Goats, Horses and Camels to YOU. Tasting cheese boards and dairy products worldwide.</td>
<td>Dairy and cheese: Milk A, Milk B, Milk C and Cheese A, Cheese B, Cheese C; identify the milk or cheese type</td>
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<tr>
<td>3/5/18</td>
<td>Crafting Menus for 2050. Is there a place for seaweed, artificial meats and other novel creations?</td>
<td>Real meat burger vs. impossible burgers, lettuce salad vs. seaweed salad, trade-offs and comparison</td>
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<td>3/6/18</td>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>3/12/18</td>
<td>Princeton Diets and You. Tracking what you eat for a week and why it matters.</td>
<td>Carrot sticks, hummus, cheese dip, pretzels with a healthful eating poll</td>
</tr>
<tr>
<td>3/26/18</td>
<td>Unintended and unappreciated consequences of modern food production systems. Tasting the hidden side of high volume production.</td>
<td>Taste among equals: Hard boiled eggs, powdered eggs, scrambled eggs</td>
</tr>
<tr>
<td>4/2/18</td>
<td>Trading offs people and machines in food production. Exploring the tools of farming production, then to now.</td>
<td>Taste among farming practices: Compare local farm carrots vs. large farm carrots; ranch dip: homemade vs. bottles</td>
</tr>
<tr>
<td>4/9/18</td>
<td>The Business of Big Food. How do you cope when faced with a sea of products?</td>
<td>Potato chips, veggie chips, apple chips</td>
</tr>
</tbody>
</table>
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
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
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.”

**OCTOBER 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
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


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
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
Princeton welcomes Mauritian president to explore challenges facing global food systems
Partner farmers share insights at World Food Day breakfast

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

Serving up culinary education in local schools

Princeton teaching kitchens warm up a brisk Wintersession

Sharing new tastes through cultural heritage dining

Princeton Campus Dining nourishes people and planet
https://www.youtube.com/watch?v=EHbL492UbM0