

J-WAFS Food & Water News

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MIT News

The MIT Joint Program on the Science and Policy of Global Change Issues *Food, Water, Energy and Climate Outlook 2016*

The MIT Joint Program on the Science and Policy of Global Change released its annual update in September on the direction the planet is heading in terms of economic growth and implications for resource use and the environment. Key findings about the agriculture sector in [Food, Water, Energy and Climate Outlook 2016](#) suggest that extreme heat and drought linked to a changing climate are likely to increase the frequency of major crop failures. Their models also show increased water stress in most regions, resulting from increasing demand due to population activity, economic activity, and changes in climate, with the largest impacts predicted in developing countries and particularly in Africa. The full report is available for [download](#).

Monsanto licenses CRISPR technology to make crops more resilient

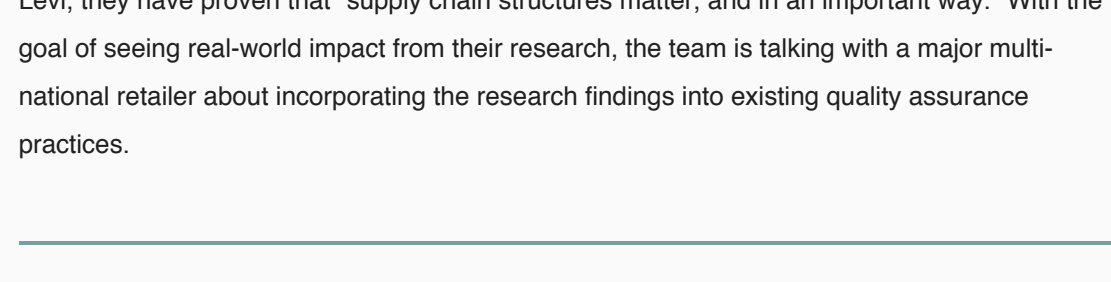
In mid-September, Monsanto announced a non-exclusive license agreement with the Broad Institute for application of its CRISPR technology to crop improvement. CRISPR is a new genome-editing tool that has much promise for improving the precision and flexibility that microbiologists have in inserting desired DNA sequences into an organism's genome. Introduced in 2013, researchers have been experimenting with its use in various food crops as a means to convey desirable traits—such as pest resistance—to plants. Monsanto's license is the first the Broad has issued to a company for use in agriculture. The Broad Institute is a close MIT partner with labs adjacent to campus.

J-WAFS Highlight

Food Safety

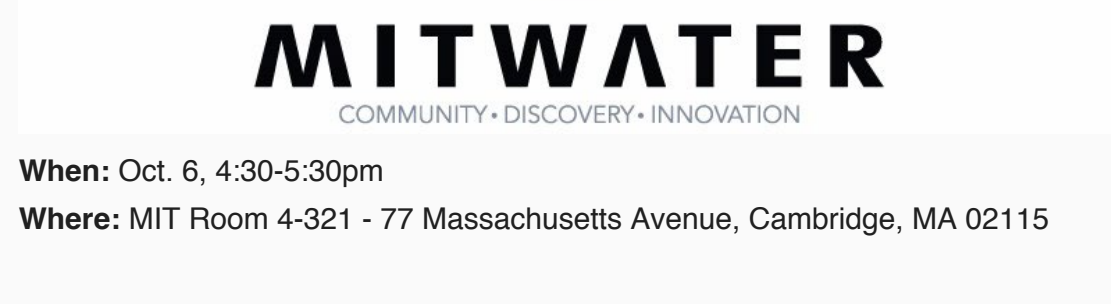
Last month's newsletter highlighted J-WAFS's efforts to improve food safety, with a focus on the Sinskey-Springs-Vaidya bioengineering project "A Bioassay-Based Approach to Food Safety in China." This month, we spotlight another J-WAFS food safety project, which takes a supply chain perspective. Led by Professors [Ritsef Levi](#), [Tahid Zaman](#), and [Yanchong \(Karen\) Zheng](#) of the Sloan School of Management, the project "A Data-Driven Approach to Managing Food Security in Global Supply Chains" received a two-year J-WAFS seed grant in 2015. The team has just completed its first year of research.

Food supply chains are increasingly becoming global in scope. An estimated 15 percent of all food products in the US are imported, while for some product categories, such as seafood, imports are estimated to be as high as 80 percent or more. Due to the internationalization of our food supply, the supply chains that bring food to the world's populations are now more vulnerable to environmental, socioeconomic, and political constraints or disruptions. One particular area of concern is the potential impact should food supply chains become a terrorist target.



As a result of this increased safety risk, President Obama signed into law in 2011 the Food Safety Modernization Act, which gave the federal Food and Drug Administration new authorities to regulate the growing, harvesting, and processing of foods, re-orienting the agency from its historical role of responding to contamination to a new focus on preventing contamination. In line with this shift, the act notably made food companies responsible for verifying that their foreign suppliers have instituted appropriate food safety measures.

It is in this newfound need for the evaluation and mitigation of risk in supply chains that MIT operations management professors Levi, Zaman, and Zheng enter the story. The trio's research project "A Data-Driven Approach to Managing Food Security in Global Supply Chains" seeks to aid regulators and companies in protecting the food system by developing quantitative and qualitative measures that identify the structural features of food supply chains that correlate with increased levels of disruption and safety risks, as well as predictive models that dynamically assess risks as they evolve. "We're trying to understand which fundamental conditions make food adulteration more prevalent," says Professor Levi. By providing a systematic way of identifying vulnerable points in a supply chain and estimating when there might be increased risk of adulteration, the research aims to enable regulators to better allocate scarce inspection resources by more effectively identifying problematic shipments.



This efficient allocation of inspection resources is important because the increase of imported foods has outpaced inspection capabilities. The global scaling of supply chains has meant that supply chains have become longer while the number of international shipments has also grown. In 1991, there were six million shipments of food imports to the US; by 2011, that number had grown to 24 million. Meanwhile, physical inspection of those imports has diminished as volume has increased. Current inspection rates are approximately two percent.

The research team addresses the complexity and magnitude of global supply chains by focusing on two major parts of the global food supply chain: 1) the links that connect farmers with food manufacturers, and 2) the shipping links that connect food manufacturers with consumer markets. Overall, the team is investigating how the diversification of the supply chain influences risk.

Take milk production in China for example. Under the Chinese "dragon head" industry structure, food manufacturers provide independent farmers with cattle and pay them based on the amount of milk they generate from the cows. The farmers are, therefore, economically motivated to produce as much milk as they can. And, in fact, there have been many instances of Chinese dairy farmers diluting their milk and adulterating it with inexpensive, protein-rich substances—such as melamine, a toxic compound—in order to pass protein-based quality tests. Under the Levi-Zaman-Zheng-designed approach, a drop in the cost of melamine would indicate an increased risk that milk from China could be contaminated with melamine. In other words, dynamic, real-time risk valuations could be assigned to different product categories and/or shipping routes, allowing more targeted and appropriate safety precautions and interventions.

One year into their research, the group has empirically validated its hypothesis. According to Levi, they have proven that "supply chain structures matter, and in an important way." With the goal of seeing real-world impact from their research, the team is talking with a major multinational retailer about incorporating the research findings into existing quality assurance practices.

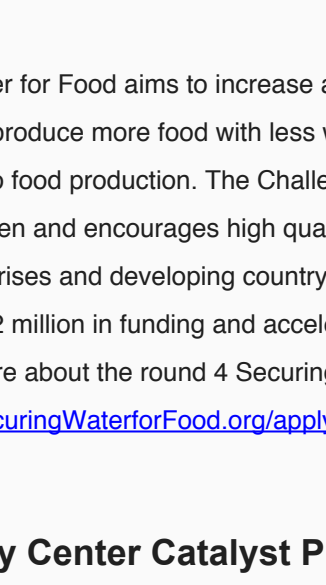
Upcoming MIT Events

J-WAFS/CEE Water and Food Security Seminar Series

Presented by Chandra A. Madramootoo (visiting professor, Department of Civil and Environmental Engineering (CEE), and visiting scholar, J-WAFS), the purpose of this seminar series is to provide senior undergraduate and graduate students in CEE, as well as other MIT graduate students, with a background on some of the challenges of global food security, particularly in relation to issues around water management engineering and agro-ecologic challenges. More information can be found [here](#).

- **Wednesday, Oct. 12:** Strengthening Value Chains in Irrigated Agriculture
 - Topics to be covered include: inclusive market-oriented development, cold chains, digital agriculture, seed technology, financial inclusiveness. This seminar will take place at noon-1:00 pm in room 1-131.
- **Monday, Nov. 21:** CEE/J-WAFS Water and Food Security Student Research Symposium
 - Graduate students from various programs at MIT will present their research in water and food security, and the audience will have an opportunity to ask questions and provide inputs to enhancing the water and food security research agenda at MIT. A reception will follow. The symposium will take place at 3:00-4:30 pm in room 2-139

MIT Water Club Lecture Series



MITWATER
COMMUNITY · DISCOVERY · INNOVATION

When: Oct. 6, 4:30-5:30pm
Where: MIT Room 4-321 - 77 Massachusetts Avenue, Cambridge, MA 02115

Throughout the year, the MIT Water Club will be hosting knowledgeable professionals from the water space for engaging talks. On October 6, Chandra Madramootoo, a professor in the Department of Bioresource Engineering at McGill University, visiting professor in the MIT Department of Civil and Environmental Engineering, and visiting scholar at J-WAFS, will present. Professor Madramootoo's areas of expertise include water management, irrigation, drainage, and international agriculture development. For more information about the event, click [here](#). Light refreshments will be served. This MIT Water Club event is sponsored by J-WAFS.

MIT Global IDEAS Challenge Generator Dinner

When: Oct. 6, 6:45-9:00pm
Where: Morss Hall, Walker Memorial - 142 Memorial Drive, Cambridge, MA 02142

Each fall, the Generator Dinner is a space for students who are interested in innovation, social entrepreneurship, international development, and local public service to come together to brainstorm projects, network, and recruit team members. The first 45 minutes of the dinner will consist of an information fair about additional relevant resources across campus that might support students' projects. Networking tables will be available for various thematic areas, including agriculture & food, energy & environment, entrepreneurship & finance, water & sanitation, and emergency/disaster relief. [RSVP and event details are available on Eventbrite](#).

MIT Water Innovation Prize: Kick-off Dinner

When: Oct. 12, 6:30-8:00pm
Where: MIT Media Labs, Silverman Skyline Room - 75 Amherst Street, 6th Floor, Cambridge, MA 02139

The annual [MIT Water Innovation Prize](#) will begin with a kick-off dinner where students will pitch their start-up ideas and form teams. Student teams will be mentored by industry veterans to develop a technology-to-market road map. The teams will pitch their business plan and compete for the grand prize in April. This MIT Water Club event is sponsored by J-WAFS.

MIT Water Summit - Early bird tickets now available

When: Nov. 17-18
Where: Tang Center (E51), Wong Auditorium - 70 Memorial Drive, Cambridge, MA 02142

Early bird ticket sales for the fifth annual MIT Water Summit have begun. This year's Summit will delve into the "Future of Water Utilities" and reflect on how the economic, policy and technology infrastructure needs to evolve to respond to our water challenges. In addition to panel discussions featuring leaders from industry, academia, and federal agencies, the Summit will also include a poster presentation session, working group discussions, and technology showcase. Ticket prices include breakfast, lunch, and snacks over both days. For information and registration, click [here](#).

Boston-area Water and Food Events

New England Water Innovation Network (NEWIN) Water Pitch Night

When: Oct. 12, 5:30-7:30pm
Where: Massachusetts Clean Energy Center - 63 Franklin St., 3rd Floor, Boston, MA 02110

Within its regional Water Innovation Ecosystem, NEWIN coordinates a number of activities to support its members with networking, knowledge sharing, and commercial success. NEWIN Water Pitch Night is one of its local events that highlights innovators and connects them with key players in the value chain. NEWIN Water Pitch Night on October 12 will focus on water IT, data analytics, sensors, and opportunities within the "industrial internet of things" (IIOT). Tickets are available [here](#).

Lecture on 'Flint Water Crisis: Keeping the Citizens of Flint Safe'

When: Oct. 20, 5:30-6:30pm
Where: Northeastern University, Snell Library - 360 Huntington Ave, Boston, MA 02136

Emily Garner will speak on how the Flint Water Study team at Virginia Tech uncovered the water quality issues in Flint, Michigan. Emily Garner is currently a PhD student at Virginia Tech studying environmental and water resources engineering. She is a member of the team led by Dr. Marc Edwards that worked with citizens of Flint to identify the unsafe levels of lead in their drinking water and advocate for a resolution. She will present about her team's journey to provide the citizens of Flint with scientific evidence to support their claims that their drinking water was unsafe for consumption. Appetizers and beverages will be provided prior to and after the presentation. Register [here](#) by October 14 to attend this lecture.

Worcester Polytechnic Institute (WPI) Water Workshop Night

When: Oct. 24, 8:30am-5:00pm
Where: Worcester Polytechnic Institute, Rubin Campus Center - 100 Institute Road, Worcester, MA 01609

This one-day workshop, sponsored by the National Science Foundation, will bring together 150 individuals from academia, industry, and the government to identify, address, and share solutions to improve water supply abundance, access, and safety. The workshop will be conducted in partnership with the New England Water Innovation Network (NEWIN), SENCER (Science Education for New Civic Engagements and Responsibilities), and the Campus Compact organizations from the New England states. Click [here](#) to register for the event.

Funding and Other Opportunities

Call for Nominations: Grand Challenges and Opportunities in Environmental Engineering and Science for the 21st Century

The National Academies of Sciences, Engineering, and Medicine invites you to nominate experts to serve on a new study to identify high priority challenges for the broad field of environmental engineering and science. The complexity and scale of environmental challenges is growing as the global population expands toward 10 billion people by 2050 and as demands for clean water, food, and energy rise—all in the context of a rapidly changing climate. This study will identify the significant societal challenges that will require the expertise of environmental engineering and science to resolve or manage. It will also identify how the field—and also how colleges and universities—might evolve to better address these needs. In addition to experts in environmental engineering and science, individuals who have broad experience in government, environmental management, and solving complex environmental challenges are also needed. For more information on the study, visit the study webpage. Nominations to the committee must be made by October 10. Click [here](#) for more information and to nominate a committee member.

The Securing Water for Food: A Grand Challenge for Development

Launched in 2013, Securing Water for Food aims to increase access to innovations that help farmers enhance water storage, produce more food with less water, and better manage salinity in the soil and a major threat to food production. The Challenge also seeks innovations that lift the engagement of women and encourages high quality applications, especially from women-owned/women-led enterprises and developing country entrepreneurs. Awardees will receive between \$100,000 and \$2 million in funding and acceleration support to bring their innovations to scale. To learn more about the round 4 Securing Water for Food call for innovations and to apply, visit [SecuringWaterforFood.org/apply](#). The application deadline is October 10.

The Mass Clean Energy Center Catalyst Program Awards

The program's primary intent is to stimulate the commercialization of clean energy and water technologies developed in the Commonwealth. Awarded funds are used to demonstrate the feasibility of technologies in specific industry applications in order to obtain increased industry and investor interest. Up to five awards (\$65K each) will be granted. Additionally, under the Catalyst Award Challenge, MassCEC will provide funding and technical support for projects that deploy water innovation technologies or innovative combinations of existing technologies. Up to two additional awards in the amount of \$65,000 each will be given for promising clean water projects. Applicants must be either a principal investigator at a Massachusetts-based nonprofit research institution, or a Massachusetts-based early stage clean energy or water tech company with no more than \$1,000,000 in combined financing, grant funding, and revenues and have less than five full-time equivalent employees. Students/growers are welcome to apply with some restrictions. For application guidelines and the proposal template, see [mitc.org/grants](#). Applications are due by October 24.

The Food+City Challenge Prize

The 2017 Food+City Challenge Prize is currently in the submission phase. An international cohort of startup finalists is chosen annually and partnered with mentors for a four-month journey to prepare for the Food+City Challenge Prize competition. You can learn more about their ideas and success stories at [FoodandCity.org](#). As the organizers prepare for their Third Annual Food+City Challenge Prize (which will be held February 3-4 in Austin, Texas), they are looking for food systems entrepreneurs and potential partners or sponsors. Academics and students, community leaders, venture capitalists, entrepreneurs and supply chain professionals are among those who may be interested in learning more about the Food+City Challenge Prize. Food+City is a catalyst for supply chain innovation to improve how we feed cities. They would welcome your expertise in expanding this conversation into new regions, markets, and communities. The deadline to submit is October 15.

Imagine H2O: 2017 Water Data Challenge

Imagine H2O provides water entrepreneurs with the resources, insight and visibility to launch and scale successful businesses. Their virtual program offers unparalleled access to customers and investors in the water industry. IH2O does not take equity in participating startups nor does it require participants to relocate. Imagine H2O's 8th annual accelerator is open for data-driven water startups. Apply by November 7. Click [here](#) for more information.

The Advanced Environmental Solutions Prize

The Eni Award Scientific Secretariat announces the Advanced Environmental Solutions Prize. The purpose of the Advanced Environmental Solutions Prize is to promote technological innovation for pollution prevention and action against air, water and land pollution, as well as for rehabilitation and reuse of industrial sites. The Prize—a specially struck gold medal of the Italian State Mint in the indivisible sum of €200,000—is awarded to the researcher or group of scientists that achieves internationally significant research and development results in the field of environmental protection and recovery. (There are also prizes in a few energy categories.) The awards are due on November 25, with the last day to register for an account with the Scientific Secretariat on November 11. For more information, click [here](#).

The Water Award for Young Investigators

MDPI, the Multidisciplinary Digital Publishing Institute, has announced the initiation of the annual Water Award for Young Investigators. This prize is given to a young investigator in recognition of her/his excellence in the research field of water science, technology, management, and governance. The prize consists of 2,000 CHF (Swiss francs), an engraved plaque, and an offer to publish a paper free of charge and without a fixed deadline in *Water*. To be eligible, candidates must:

- 1) Be under 40 years old or no more than 10 years after receiving their PhD by December 31, 2016
- 2) Have contributed significantly to the advancement of a water resources-related field through ground-breaking research
- 3) Submit a Curriculum Vitae including an updated publication list
- 4) Submit a nomination letter from an established senior scientist

To apply, email your application to [water@mdpi.com](#) by November 30. Awards will be granted by the end of January 2017. For more information about the prize and how to apply, click [here](#).

BARD Funding Opportunities

The US-Israel Binational Agricultural Research and Development (BARD) Fund is offering a few agriculture-related funding opportunities. The individual opportunities are detailed below. More information and the application guidelines can be found at [Bard-isus.com](#).

- **Postdoctoral Fellowship Program Award** *Duration: 1-2 years. Submission date: Jan. 16, 2017*
 - Funds postdoctoral fellowships for US citizens to perform agricultural research with established Israeli scientists. Recipients travel to Israel to carry out their research.
- **Senior Research Fellowship Program Award** *Duration: 2-12 months. Submission date: Jan. 16, 2017*
 - The program promotes joint agricultural research between established scientists from the US and their Israeli hosts.
- **Graduate Fellowship Student Program Award** *Duration: 3-6 months. Submission date: Jan. 16, 2017*
 - The program enables PhD students in one country (US or Israel) to travel to the other country to acquire new skills and techniques in their field of study.
- **Workshop Award** *Submission date: Jan 16, 2017*
 - Funds workshops whose purpose is to identify research needs and to promote increased contact between scientists throughout the world in areas related to the binational and agricultural interests of the US and Israel.

Food Tank - Research Director position

[Food Tank](#) is a 501(c)(3) nonprofit focused on building a global community for safe, healthy, nourished eaters. It spotlights environmentally, socially, and economically sustainable ways of alleviating hunger, obesity, and poverty, and create networks of people, organizations, and content to push for food system change. Food Tank is looking for a dynamic research director to help manage content for a global network of readers to catapult this growth. For a job description, see [FoodTank.com/jobs](#). To apply, email a résumé, cover letter, and portfolio or writing samples to [Vanesa.Botero-Lowery](#).

