Abdul Latif Jameel World Water and Food Security Lab

Population growth, climate change, urbanization, and development pose unprecedented challenges to the world's diverse needs for water and food. The Abdul Latif Jameel World Water and Food Security Lab (J-WAFS) is an Institute-wide effort to bring MIT's unique strengths to bear on safeguarding the world's supplies of water and food and improving accessibility and sustainability of water and food systems.

Established in 2014, J-WAFS is an interdepartmental laboratory reporting to the vice president for research and is committed to working broadly with MIT's schools and departments. In typical MIT parlance, the word "lab" refers to a vehicle for cross-Institute research activities (as opposed to a physical laboratory space). Through a variety of funding sources and mechanisms, J-WAFS supports research, student clubs, and related activities targeting diverse challenges related to the world's water and food systems. J-WAFS promotes the deployment of effective technologies, programs, and policies that will have a measurable and international impact as humankind adapts to a rapidly expanding and evolving population on a changing planet.

The annual J-WAFS Seed Grant Program has awarded grants to 35 MIT principal investigators over three annual rounds of competitive funding, with more than 100 researchers having submitted proposals. The latest round of J-WAFS seed grant proposals were reviewed this spring, and the projects awarded funding will begin September 1, 2017. Concurrently, J-WAFS is coordinating with the MIT Deshpande Center for Technological Innovation on the selection and launch of the 2017 J-WAFS Solutions grants. The J-WAFS Solutions program provides grants to MIT faculty and students to help commercialize breakthrough technologies and inventions by transforming promising ideas at MIT into innovative products and cutting-edge spinout companies.

J-WAFS is extending this base of research funding with corporate-sponsored research through the new J-WAFS Research Affiliate Program. In fall 2016, Xylem Inc., a major international water technology company, signed a three-year agreement for sponsored research and additional J-WAFS support, becoming the first member of the program.

J-WAFS also supports student engagement and campus activities around water and food. In April 2017, the lab initiated two new graduate student fellowships. The Rasikbhai L. Meswani Fellowship for Water Solutions and the J-WAFS Graduate Student Fellowship Program support outstanding MIT students who are pursuing research related to water and water supply. Three fellowships were awarded in spring for AY2018.

Through these seed grants, commercialization grants, sponsored research funding, and student fellowships, J-WAFS will have distributed more than $6 million to the MIT community through the coming fiscal year. The seed grants, comprising approximately 60% of this total, are overhead-free. The fourth cycle of seed funding and Solutions grants will be initiated during AY2018, with fall 2018 starting dates.

Highlights and Accomplishments

Supporting MIT Research

In September, J-WAFS launched eight seed research projects funded through its second call for proposals, held in FY2017. Through a competitive process initiated in AY2017, J-WAFS announced in spring the award of another $1.4 million in seed grants of up to $100,000 per year for two years, overhead-free, to seven new projects (see Seed Grants section below for details). Once these projects get under way, the J-WAFS-funded research community will include principal investigators representing 19 MIT departments, labs, and centers spanning all five Schools.

MIT Departments, Labs, and Centers (DLCs) represented in proposals submitted to J-WAFS Seeds & Solutions and in funded projects, 2015–2017

DLCs represented	SA&P[a]	Engineering[b]	SHASS[c]	Science[d]	Sloan[e]	Institute DLCs	MIT affiliate	Other	Total
In proposals submitted	4	11	5	5	1	3	1	1	**31**
In funded projects	2	8	1	4	1	2	0	1	**19**

Note: J-WAFS Solutions grantees for 2017 have not yet been announced. Table includes funded Seed grants through 2017 but only 2015 & 2016 funded Solutions projects.

[a]School of Architecture & Planning

[b]School of Engineering

[c]School of Humanities, Arts, and Social Sciences

[d]School of Science

[e]Sloan School of Management

In FY2017, J-WAFS awarded four commercialization grants and one renewal under its J-WAFS Solutions program. The lab also issued a third call for proposals; five projects were submitted for new funding alongside renewal requests. The 2017–2018 Solutions awards will be announced in August 2017.

Through June 2017, J-WAFS has attracted proposals from 107 principal investigators, funded 29 projects and 43 principal investigators, and supported 34 students, 17 post-docs, and 4 researchers through funding competitively awarded via seed grants, the J-WAFS Solutions program, and Xylem Inc. sponsorship.

Following the signing of a three-year Research Affiliate agreement with Xylem Inc., J-WAFS shepherded the selection and development of the first two (of three eventual) sponsored research projects. One project is based in the Department of Mechanical Engineering and the other is in the Laboratory for Information and Decision Systems.

Professor Jeffrey Grossman's 2015 J-WAFS Solutions project, "Fouling-Resistant Nanoporous Membranes," launched a spinout company in FY2017 called Via Separations. (See Solutions Grants section below for details.)

To promote a water and food research community on campus, J-WAFS hosted a research workshop for 2015–2016 seed grantees in September and a research speed-dating event

in December. The event, which was part of the AY2017 call for proposals, was intended to introduce researchers across departments and schools and spark research collaborations. About 20 participants gave short presentations on their research interests in water and food.

J-WAFS launched two graduate student fellowships. Each fellowship provides one semester of funding to advanced PhD students working on issues in and solutions to global water supply. A competitive call for nominations was distributed to faculty in April 2017, and attracted 15 nominations. Applicants came from eight departments in three MIT Schools. Three students were selected for fellowships, and one additional student received an honorable mention distinction.

External Engagement and Fundraising

In November 2016, Xylem Inc., a leading global water technology company with operations in more than 150 countries, became the first J-WAFS Research Affiliate. The three-year agreement includes funding for three sponsored research projects. Additional funding is directed to student support, including sponsorship of the MIT Water Club, the J-WAFS Graduate Student Fellowship Program, and other on-campus J-WAFS activities.

J-WAFS, in collaboration with the Department of Civil and Environmental Engineering, hosted the MIT Water and Food Security Student Symposium in November 2016. (See MIT Water and Food Security Symposium section below for details.)

In response to the MacArthur Foundation 100&Change call for proposals in fall 2016, J-WAFS collaborated with the Department of Biological Engineering and others to assemble a team for a project aimed at engineering cereal grains and their symbiotic microbes. If widely grown, these microbes could reduce the global need for industrially produced fertilizer. The proposal scored in the top 200 of 1,904 submissions and was formally recognized by the MacArthur Foundation with the addition of the project's executive summary in a searchable online database and on the 100&Change website.

In March 2017, MIT became an academic partner of the Stockholm-based EAT Foundation. Under the partnership, MIT vice president for research Maria T. Zuber joined the foundation's advisory board. J-WAFS is working closely with her to bring MIT's expertise and innovation in food and water to the foundation. EAT Foundation president Dr. Gunhild Stordalen visited MIT in April to launch the partnership. While here, she participated in a day-long showcase of MIT food and agriculture research and discussions with J-WAFS researchers and our leadership team. J-WAFS director John Lienhard gave an invited keynote speech at the EAT Foundation Forum in Stockholm in June 2017.

J-WAFS secured a second year of funding from Rabobank and supported the 2017 Rabobank-MIT Food and Agribusiness Innovation Prize, and mentored members of the student MIT Food and Agriculture Club who managed its production. (See Rabobank-MIT Food and Agribusiness Innovation Prize section below for details.)

J-WAFS also sponsored the third annual MIT Water Innovation Prize, organized by students in the MIT Water Club. This year's event showcased nine student teams and the selection of three winners. (See Water Innovation Prize section below for details.)

John Lienhard supported the MIT Campaign for a Better World fundraising effort with travel and presentations to key funding prospects around the globe. Professor Lienhard is the lead for the water and food theme under the "Health of the Planet" priority area of the campaign and has been involved in many other campaign-related efforts. J-WAFS is working closely with MIT Resource Development on fundraising around the water and food initiative, including the Office of Global Initiatives, the Office of Individual Giving, the Campaign Office, and the Office of Foundation Relations.

Professor Lienhard gave additional presentations at various high-profile conferences and presidential events and engaged with numerous potential corporate and philanthropic sponsors. These audiences included the MIT Water Summit; the MIT William Barton Rogers Society meeting in Washington, DC; the Agriculture, Innovation, and the Environment short course at MIT; and a number of universities, foundations, and professional conferences.

J-WAFS continued distributing a monthly email newsletter and grew its list of friends and colleagues from 700 to more than 1,000 recipients.

Research Support Grantmaking

During AY2017, J-WAFS implemented the third round of competitive grantmaking for its two current funding programs for MIT researchers.

Seed Grants

J-WAFS's third round of seed funding was announced in November 2017 through a request for proposals sent to faculty and senior and principal researchers at MIT. Following a process of peer review and panel evaluation, seven new projects were selected for funding, including environmentally sustainable fertilizer technologies, alternative food and water sources (e.g., algae and air), and improvements in desalination technologies. Each project received up to $100,000 per year, overhead-free, for two years.

The call for proposals attracted submissions from 38 principal investigators (PIs), nearly two-thirds of whom had not previously submitted proposals to J-WAFS. Funded PIs are from the departments of Biological Engineering, Chemical Engineering, Materials Science and Engineering, and Mechanical Engineering in the School of Engineering; the Department of Chemistry in the School of Science; the Department of Urban Studies and Planning in the School of Architecture and Planning; and the MIT Sloan School of Management.

The following seven newly funded projects, listed with their principal investigator(s), will begin on September 1, 2017:

- Affordable Potassium Fertilizer from K Feldspar for Africa
  PI: Antoine Allanore, assistant professor in the Department of Materials Science and Engineering
- Characterizing Extension Policy and Private Irrigation Supply Chain Linkages: Lessons from Senegal
  PIs: Stephen Graves, the Abraham J. Siegel Professor of Management Science in the Sloan School of Management; and Bishwapriya Sanyal, professor in the Department of Urban Studies and Planning

- Distributed Water Harvesting from Air in Water-Stressed and Remote Areas using Metal-Organic Frameworks
  PIs: Mircea Dinca, associate professor in the Department of Chemistry; and Evelyn Wang, the Gail E. Kendall Associate Professor in the Department of Mechanical Engineering

- Electrochemical Nitrogen Fixation for Distributed Fertilizer Production
  PI: Karthish Manthiram, the Warren K. Lewis Career Development Professor in the Department of Chemical Engineering

- Evaluation of Fully Synthetic Nitrogen Fixation Pathways, Designed for Plant Mitochondria and Plastids
  PI: Christopher Voigt, professor in the Department of Biological Engineering

- High-efficiency Chemical-Free Backwash Strategy for Reverse Osmosis Membrane Antifouling
  PIs: Xuanhe Zhao, the Noyce Career Development Professor in the Department of Mechanical Engineering; and John H. Lienhard V, the Abdul Latif Jameel Professor of Water and Food in the Department of Mechanical Engineering and J-WAFS

- Multifunctional Light-Diffusing Fibers for Simultaneous Light Management and Fluid Transport in Microalgae Bioreactors
  PI: Mathias Kolle, assistant professor in the Department of Mechanical Engineering

The following seven projects funded last year began on September 1:

- Active Materials for Heavy Metal Extraction from Water
  PI: Timothy Swager, John D. MacArthur Professor in the Department of Chemistry

- Air Pollution Impacts on Global Crop Yields
  PI: Colette Heald, associate professor in the Department of Civil and Environmental Engineering and the Department of Earth, Atmospheric, and Planetary Sciences

- Bacterial Viruses as Pathogen Control Agents in Aquaculture Systems
  PI: Martin Polz, professor in the Department of Civil and Environmental Engineering

- Estimating the Benefits to Strengthening Water Markets
  PI: Christopher Knittel, George P. Shultz Professor in the Sloan School of Management

- Gravity Fingering during Water Infiltration in Soil: Impact on the Resilience of Crops and Vegetation in Water-Stressed Ecosystems
  PI: Ruben Juanes, associate professor in the Department of Civil and Environmental Engineering

- Real-time On-site Detection of Foodborne Pathogens by Engineered Bacteriophage Integrated with Microfluidic Sample Preparation Platforms
  PIs: Jongyoon Han, professor in the Department of Electrical Engineering and Computer Science and the Department of Biological Engineering; and Timothy Lu, associate professor in the Department of Electrical Engineering and Computer Science and the Department of Biological Engineering

- Waste to Food: Yarrowia Lipolytica as Protein and Lipid Production Platform
  PI: Gregory Stephanopoulos, Willard Henry Dow Professor of Biotechnology and Chemical Engineering in the Department of Chemical Engineering

The following nine projects will conclude their two-year grant cycle on September 1, 2017:

- Advancing Water and Food Sustainability through Improved Understanding of Uncertainties in Climate Change and Climate Variability
  PIs: Susan Solomon, Lee and Geraldine Martin Professor of Environmental Studies in the Department of Earth, Atmospheric, and Planetary Sciences and the Department of Chemistry; and Kenneth Strzepek, research scientist in the MIT Joint Program on the Science and Policy of Global Change

- A Bioassay-Based Approach to Food Safety in China
  PIs: Anthony Sinskey, professor in the Department of Biology; Stacy Springs, director at the MIT Center for Biomedical Innovation; and Vishal Vaidya, associate professor at Harvard Medical School

- A Data-Driven Approach to Managing Food Security in Global Supply Chains
  PIs: Retsef Levi, professor in the MIT Sloan School of Management; Tauhid Zaman, assistant professor in the MIT Sloan School of Management; and Yanchong Karen Zheng, assistant professor in the MIT Sloan School of Management

- Electrochemically-Modulated Separation Processes for the Treatment of Contaminated Water Sources
  PI: T. Alan Hatton, professor in the Department of Chemical Engineering

- Enabling Distributed Water Quality Management by Dry Sample Preservation and Centralized Analysis
  PIs: Rohit Karnik associate professor in the Department of Mechanical Engineering; John Hart, associate professor in the Department of Mechanical Engineering; and Chintan Vaishnav, senior lecturer in the MIT Sloan School of Management

- Engineered Nitrogen Fixation: Expression in Plant Organelles
  PI: Christopher Voigt, associate professor in the Department of Biological Engineering

- Leverage Points: Opportunities for Increasing Food Production in Developing Countries
  PIs: Dennis McLaughlin, H. M. King Bhumibol Professor in the Department of Civil and Environmental Engineering; and Erica James, associate professor in the Department of Anthropology

- Quantifying Mercury Contamination of Rice and its Impact on Food Security in China
  PIs: Noelle Selin, associate professor at the Institute for Data, Systems, and Society and in the Department of Earth, Atmospheric, and Planetary Sciences; and Valerie Karplus, assistant professor in the MIT Sloan School of Management

- Strategies for Urban Stormwater Wetlands Los Angeles and Houston
  PIs: Alan Berger, professor in the Department of Urban Studies and Planning; and Heidi Nepf, professor in the Department of Civil and Environmental Engineering

Solutions Grants

The J-WAFS Solutions program's mission is to move water and food technologies from MIT labs into the commercial world, where they will improve the productivity, accessibility, and sustainability of the world's water and food systems. J-WAFS Solutions aims to help MIT faculty and students commercialize breakthrough technologies and inventions by transforming promising ideas at MIT into innovative products and cutting-edge spin-off companies.

The J-WAFS Solutions program is funded through a research partnership with Community Jameel, a social enterprise organization with ties to Abdul Latif Jameel. The program, administered in partnership with the MIT Deshpande Center for Technological Innovation, awards grants of up to $150,000 per year. Approximately 15 projects in total are expected over five years, from September 2015 to August 2020.

Two calls for proposals have been issued since 2015, resulting in six funded projects and one renewal over two years. One of these projects has since launched a spinout company. Team members on the Solutions project "Fouling-Resistant Nanopourus Membranes" have created a company called Via Separations. Led by PI Jeffrey Grossman and MIT graduate student Shreya Dave, the team created a membrane out of graphene oxide that can filter water at nanoscale levels. Via Separations is bringing this new technology to the food industry, with its first application in the dairy sector. With subsequent support from a National Science Foundation grant, the team conducted 100 customer interviews to confirm that their technology could become a viable business venture. Via Separations has since received both Massachusetts state and US federal funding and is initiating its first round of venture capital funding.

A third call for J-WAFS Solutions proposals was issued in February 2017. Five projects were proposed for new grants alongside renewal requests. Final funding decisions for 2017–2018 grants are pending.

The four 2016-funded projects are as follows:

- Floating, Heat Localizing Solar Receivers for Distributed Desalination
  PI: Gang Chen, Carl Richard Soderberg Professor of Power Engineering and department head in the Department of Mechanical Engineering
- Electrochemically-mediated Adsorptive Processes for Water-remediation
  PI: Alan Hatton, Ralph Landau Professor and director, School of Chemical Engineering Practice in the Department of Chemical Engineering
- Detection of Pathogens Using Dynamically Reconfigurable Liquid Colloid Particles
  PIs: Timothy Swager, John D. MacArthur Professor in the Department of Chemistry; and Alexander M. Klibanov, Novartis Professor, Chemistry and Bioengineering in the Department of Chemistry
- Development of Low-Cost Water Filter Using Sapwood Xylem
  PIs: Rohit Karnik, associate professor in the Department of Mechanical Engineering; and Amy Smith, senior lecturer in the Department of Mechanical Engineering and co-director, D-Lab

The two 2015-funded projects are as follows:

- A Multiplex, Nanosensor Platform for the Real Time Monitoring of Food and Water-Borne Contaminants
  PIs: Michael S. Strano, Carbon P. Dubbs Professor of Chemical Engineering; and Anthony J. Sinskey, professor of Microbiology and Health Sciences & Technology (renewed for September 2016–August 2017 funding)
- Fouling-Resistant Nanoporous Membranes
  PI: Jeffrey Grossman, professor in the Department of Materials Science and Engineering

Engagement through Conferences, Events, and Student Support

Workshop on Low-Carbon Desalination

J-WAFS, in collaboration with the Global Clean Water Desalination Alliance, hosted a two-day invitation-only expert workshop at MIT focused on low-carbon desalination on October 17–18, 2016. The event was organized at the request of the Global Clean Water Desalination Alliance, which was formed at COP21, and sponsored by J-WAFS. The workshop was chaired by J-WAFS director John Lienhard. Joining together in discussion were two dozen academic, industry, and government experts from 11 nations who discussed issues and framed a concluding report. The aim of the workshop was to map out opportunities and priorities for research, prototypes, and demonstration projects supporting low-carbon desalination. The workshop produced an extensive report and high-level executive summary of the research needed to make low-carbon desalination a reality.

In advance of the workshop, participants contributed written material on research and development needs that they regarded as critical to the reduction of the global warming potential of desalination. These contributions were discussed during the workshop and formed the basis of the concluding report. During the two days, participants engaged in a vigorous discussion about the opportunities and priorities for powering desalination systems with low-carbon energy in the context of current and emerging trends in desalination and energy production. The 125-page report summarizes the experts' assessment of available technologies and their recommendations for research, development, and demonstration of low-carbon desalination. The event included remarks by Maria Zuber, MIT's vice president for research.

Workshop findings were presented at the COP22 meetings in Marrakech, Morocco, during November 2016. The intent of this report is to serve as a guide for further research and development aimed at sustainable solutions for the world's growing water challenges. It is also available to the public on the J-WAFS website.

MIT Water Summit

The MIT Water Club is a student group and a leading network for water research and innovation at MIT. J-WAFS continues to be the primary sponsor of the Water Club. In addition to a guest lecture series, the Water Club organizes a major annual summit as well as the MIT Water Innovation Prize and Water Night, a graduate student research poster session.

This year's MIT Water Summit was held on November 17 and 18, 2016, with the theme "Water Utilities of the Future." With speakers from MIT and diverse outside companies and government, panels focused on visions for the future; the role of policy; the role of economics, utility and industry partnerships; and academia to markets. Speakers included CEOs of both small (e.g., Sourcewater) and large (e.g., Xylem Inc.) water companies, government agencies, and nonprofit organizations such as the Massachusetts Water Resources Authority, the Port Authority of New York and New Jersey, and the Water Environment and Reuse Foundation, among many others. J-WAFS was the major sponsor of the student-led event, and both John Lienhard and executive director Renee Robins were speakers. More than 200 participants attended the event, including students and faculty, business leaders, technologists, and investors.

MIT Water and Food Security Student Symposium

On November 21, 2016, J-WAFS and the Department of Civil and Environmental Engineering co-hosted the MIT Water and Food Security Student Symposium. The symposium was curated by Chandra Madramootoo, visiting professor in Civil and Environmental Engineering and J-WAFS visiting scholar. It featured presentations from seven graduate students from across various programs and departments at MIT.

The student presentations focused on how research can result in solutions to specific food and water security challenges across the globe. Presentations addressed a variety of topics, among them how data can be used to understand the effect of air quality on crop production and how solar irrigation systems support cost savings and energy independence for rural farmers in India. Audience members also learned about new technologies to improve rural farming practices in India. One such example is CoolCrop, a system of modular cold storage units that can reduce crop waste and increase profit for small-scale farmers. The event concluded with an audience discussion and closing remarks by Dennis McLaughlin, the H. M. King Bhumibol Professor of Civil and Environmental Engineering at MIT.

2017 Water Innovation Prize

On May 1, 2017, the MIT Water Club hosted the third annual MIT Water Innovation Prize, an event that is co-sponsored by J-WAFS and its research affiliate Xylem Inc., among others. The prize is a solutions-to-market competition focused on water innovation. The event included a kick-off generator dinner in the fall to support the formation of student teams. Thirty first-round proposals were submitted, and 10 final student teams competed for $30,000 in cash awards. Finalist teams worked with mentors who supported their idea development and helped them formulate a final business plan and presentation. In addition to pitches from the teams, the final event featured keynote speeches by Keri Waters, co-founder and CEO of the Santa-Cruz based venture Buoy Labs, and Mark Duey, regional director for Latin America at Water for People, an international nonprofit working on water and sanitation.

Each team prepared a business plan and five-minute pitch. Business plans and pitches were reviewed by a panel of six water innovation and entrepreneurship experts from across the region. The judges selected three winning teams; each was awarded $10,000 to help team members build their research into a business.

The 2017 prize winners were:

- change:WATER Labs, a group that is creating a revolutionary portable and evaporative toilet to expand access to safe, dignified sanitation to vulnerable families in places such as refugee camps with no power or plumbing
- Pipeguard, a team that is trying to use smart robotic solutions to accurately detect and locate leaks in water distribution systems
- Takachar, which is aiming to help rural smallholder farmers reduce their irrigation needs up to 20% by developing a carbon-negative, high-yield, moisture-retaining fertilizer

Rabobank-MIT Food and Agribusiness Innovation Prize

Sponsored by Rabobank, the Rabobank-MIT Food and Agribusiness Innovation Prize—with awards totaling $25,000—aims to be the premier food and agribusiness business plan competition for university and graduate students. The prize is distinct from other competitions because of its specific focus on food and agribusiness, and because of the access it provides to the broader business community for winning teams. J-WAFS received a second gift of nearly $50,000 from Rabobank to support the competition this year. With oversight from J-WAFS, the student MIT Food and Agriculture Club organized the contest.

Seven teams out of approximately two dozen entrants were selected by judges to compete in the final pitch event in May that was attended by a capacity crowd in the MIT Samberg Conference Center. John Lienhard gave a welcome address and Renee Robins served on the five-judge panel. Three winning teams were announced following a keynote address by Sam Schatz of the New Jersey-based vertical farming company AeroFarms.

The 2017 prize winners were as follows:

- First Prize ($12,000): Cambridge Crops, an MIT-Tufts University team developed a silk fibroin coating that, when applied to crops, leaves a film that reduces cell respiration and water evaporation and drastically slows ripening and spoilage of produce.
- Second Prize ($8,000): Spray that Stays, a team from MIT produced an innovative pesticide application that causes water droplets to adhere to leaves, thus requiring one-tenth the amount of pesticide needed for crop application. The result is reduced waste, cost, and pollution.
- Third prize ($5,000): WISRAN, a software technology that improves efficiency for large-scale farmers by producing real-time measurement and analysis of the time, cost, and effectiveness of their farming activities.

J-WAFS Graduate Student Fellowships

In spring 2017, J-WAFS announced two new graduate student fellowships and requested faculty nominations of outstanding students pursuing research related to water and

water supply. The 15 students nominated came from eight departments in three MIT schools, and reflected the breadth of student research in water and water supply being carried out on campus. The three selected students and one honorable mention recipient exemplify the creativity, excellence, and rigor for which MIT is known. Each was awarded one semester of funding. The four students receiving recognition were:

2017–2018 Rasikbhai L. Meswani Fellows for Water Solutions:

- Sarah Fletcher, PhD candidate at the Institute for Data, Systems, and Society. Sarah's research focuses on sustainable water resource system planning, with an emphasis on developing flexible water supply planning tools that can help policymakers meet societal needs for water in the face of an uncertain future.
- Omar Labban, PhD candidate in the Department of Mechanical Engineering. Omar's research addresses how and why nanofiltration can improve reverse osmosis technology for desalination.

2017–2018 J-WAFS Graduate Student Fellow:

- Tzu-Chieh Tang (Zijay), PhD candidate in the Department of Biological Engineering. Zijay is developing genetically engineered microbes that could cheaply and effectively be used as water quality sensors.

Honorable Mention:

- Mathieu Dahan, PhD candidate in the computational science and engineering program in the Department of Civil and Environmental Engineering. Mathieu's work applies game theory to urban water resource sensing, allocation, risk assessment, and monitoring in order to make it easier to control water network use and maximize emergency response strategies.

Personnel

J-WAFS had some staffing changes in FY2017 that are allowing for expanded initiatives and outreach. Current J-WAFS personnel are as follows:

Professor John Lienhard, from the Department of Mechanical Engineering, continues to serve as director of J-WAFS and as the Abdul Latif Jameel Professor of Water and Food.

Renee J. Robins '83 continues to serve as the executive director for J-WAFS.

Andi Sutton joined J-WAFS in March 2017 in the new position of communications and program manager. Previously, Andi worked within MIT for 12 years, serving as program manager for the Consortium for Graduate Studies in Gender, Culture, Women, and Sexuality (formerly the Graduate Consortium in Women's Studies) in the School of Humanities, Arts, and Social Sciences.

Kenny Luu is the financial coordinator for J-WAFS. Kenny joined J-WAFS in February after working as a financial assistant II at the MIT Energy Initiative.

Professor Chandra Madramootoo was a visiting scholar with J-WAFS for the duration of calendar year 2016 while he was on sabbatical, and since January 2017 is continuing on a part-time basis. Prior to 2016, Professor Madramootoo was dean of the School of Agricultural and Environmental Sciences at McGill University in Montreal. This year, he has offered a several non-credit seminars, advised J-WAFS seed grantees on agriculture-related questions, and received an appointment as visiting professor in the Department of Civil and Environmental Engineering.

John H. Lienhard V
Director
Director, Center for Clean Water and Clean Energy
Director, Rohsenow Kendall Heat Transfer Lab
Abdul Latif Jameel Professor of Water and Food

Renee J. Robins
Executive Director