

# WEFTEC® 2017 marks many milestones

**T**his year brings the 90th WEFTEC. The conference's roots stretch back to an October 1926 meeting in Chicago where 11 people adopted a constitution and bylaws, elected officers, and appointed committees. They soon issued the first edition of the *Sewage Works Journal* to 273 paid subscribers.

From then till now, a lot has happened. The WEFTEC@90 facts you'll see spread throughout this section give some highlights. In total, the Water Environment Federation (WEF; Alexandria, Va.) will offer up 90 of these facts – one each day for the 90 days leading up to WEFTEC. See the full list online at [www.weftec.org/WEFTECat90](http://www.weftec.org/WEFTECat90).

Now, 90 years later, it's fair to say the event has grown. More than 20,000 people will gather in Chicago to attend more than 100 technical sessions, explore about 300,000 ft<sup>2</sup> of exhibition space, and participate in all sorts of additional events.

During WEFTEC's long tenure, these additional events also have racked up impressive numbers. This year, several will celebrate their own noteworthy milestones.

## 5 years – LIFT

The Leaders Innovation Forum for Technology (LIFT) is celebrating 5 years of



This is just one piece of the *LIFT by the Numbers* infographic, which celebrates 5 years of the program. Download the entire infographic at [bit.ly/werf-by-the-numbers](http://bit.ly/werf-by-the-numbers).

helping to bring innovation into practice. This joint initiative between two dedicated organizations, WEF and the Water Environment & Reuse Foundation (WE&RF), has helped more than 100 companies deploy their technologies and facilitated collaboration among water resource recovery facilities.

With all those figures on-hand, the program counts off its notable accomplishments in a *LIFT by the Numbers* infographic. Achievements include

- 800 technology reviews to provide feedback and insight,
- \$5.5 million raised to fund innovation and pilots, and
- 150 utilities surveyed to better understand industry priorities and interests.

Download the full WE&RF infographic online at [bit.ly/werf-by-the-numbers](http://bit.ly/werf-by-the-numbers).

## 10 years – WEF Community Service Project

This year also marks the 10th WEF Community Service Project. Spearheaded by the WEF Students and Young Professionals Committee, the project takes place the Saturday before each WEFTEC. Over the past 10 years, projects have included building bioswales, rain gardens, and green classrooms. More than 100 students and professionals work



During its 10 years, the WEF Service Project has brought hundreds of volunteers together with more than 3000 local students to help improve the water environment in WEFTEC host cities. The piece of the Service Project infographic above tells some of the story; get all the facts by downloading the full infographic at [bit.ly/WEF-service-project](http://bit.ly/WEF-service-project).

together to construct a project that leaves a lasting mark on the water environment of WEFTEC's host community.

To celebrate the 10th Service Project planners also tallied up the numbers in an infographic to share their successes. These include

- a total of 914 volunteers,
- 10 projects in four cities, and
- 37,700 m<sup>2</sup> (406,000 ft<sup>2</sup>) of improved space.

Download the full WEF Community Service Project infographic at [bit.ly/WEF-service-project](http://bit.ly/WEF-service-project).



Chicago's Manierre Elementary School will host this year's project. The school's impermeable playground area currently suffers from poor drainage and periodic flooding. Project volunteers will build a permeable outdoor classroom area that includes



The WEF Student Design Competition celebrates its Sweet 16th at WEFTEC 2017. This year's competition also will host more teams than ever before.

a bioswale, featuring native plant species, and a gathering space for students. This will help to capture and filter stormwater runoff, alleviate flooding, and improve water quality.

This project will be integrated in design with a concurrent project being delivered by a local nonprofit, Green City Market (Chicago). The organization has plans to build urban raised gardens where students will be able to learn about agriculture concepts. Students also will learn to cook using the food grown.

### Sweet 16th – WEF Student Design Competition

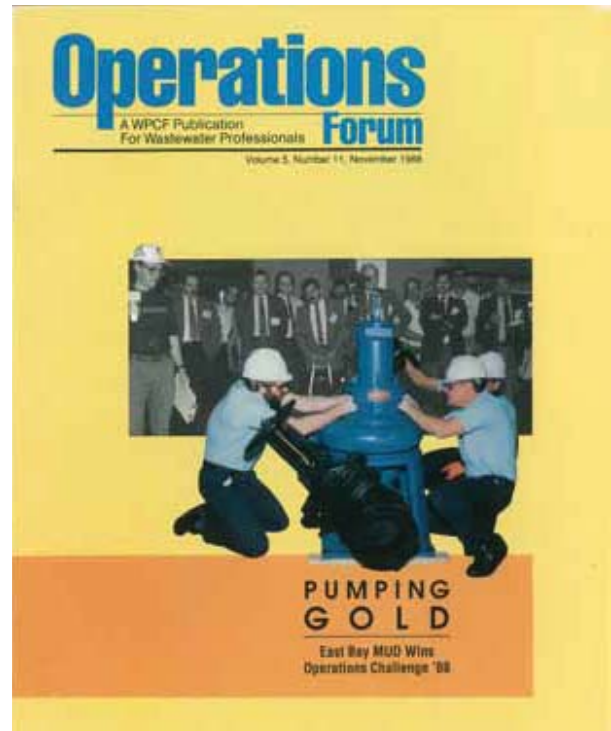
The WEF Student Design Competition celebrates its Sweet 16th at WEFTEC this year. This milestone is especially sweet for the competition because it will host the greatest number of teams in its history. This year, 17 schools from 16 different Member Associations will be represented from across the U.S. and Canada.

Joining this competition for the first time will be the University of Kansas (Lawrence, Kan.), University of Tennessee–Knoxville, Manhattan College (Bronx, N.Y.), George Mason University (Fairfax, Va.), and Florida A&M University–Florida State University (Tallahassee, Fla.). This also will be the first time that both the Kansas and Kentucky-Tennessee Water Environment Associations will send teams to WEFTEC.

The competition goes down Sunday, Oct. 1, in Rooms S105ABC at McCormick Place.

### 30 years – Operations Challenge

The 30th annual Operations Challenge is expected to draw more than 160 competitors – that's more than 40 teams of four members each. The competitors will battle through five



The first Operations Challenge debuted at WEFTEC in 1988; 2017 will mark the 30th competition. The team from the East Bay Municipal Utilities District in Oakland, Calif, took home the first honors and appeared on the cover of the November 1988 issue of Operations Forum magazine.

events – Process Control, Laboratory, Safety, Collection Systems, and Godwin Maintenance – to make their team, sponsors, supporters, employers, and Member Associations proud.

Over the years, thousands of competitors and volunteers have worked to make Operations Challenge a can't-miss event at WEFTEC. See "Operations Challenge XXX" on p. 54 to learn about its history and get a taste of what's new this year.

– Steve Spicer, WE&T

# Taking a chance on the next generation

## Opening General Session speaker discusses how to motivate and inspire youth

**H**ow can water professionals leave a legacy to help future generations in the field? This Opening General Session speaker may have the answer to that question. Fredi Lajvardi is a nationally recognized science, technology, engineering, and math (STEM) teacher who encouraged his students at Carl Hayden Community High School in Phoenix to enter a 2004 robotics competition that included teams from the Massachusetts Institute of Technology (Cambridge, Mass.) and the Virginia Polytechnic Institute and

State University (Blacksburg, Va.). Though the odds were stacked against them – the student population at the high school is mostly underprivileged and resources were limited – Lajvardi's Falcon Robotics team won best team overall that year. Future teams from the high school would place first, second, and third in successive robotics competitions.

Their win would inspire the 2015 film, "Spare Parts," starring actor and comedian George Lopez as Lajvardi. The Falcon Robotics team also was featured in the 2017 documentary, "Dream Big."

In preparation for his WEFTEC appearance, Lajvardi sat down with WE&T. He shared who inspired him to enter the STEM field; what the robotics competitions taught him about being a good mentor; and how science professionals can inspire and encourage future scientists, engineers, mathematicians, etc.

**WE&T: When you were younger, did you have a teacher or mentor that made you passionate about science and technology?**

**Lajvardi:** I was kind of self-driven toward

science and technology, but I did have a teacher that helped spur on and focus the passion I had. She was the science projects teacher, Ann Justus, in charge of getting us ready for the science fair that we competed in each year.

**WE&T: Even though the students on your award-winning Falcon Robotics team were novices, you decided to enter the Marine Advanced Technology Education competition. Had any of them competed in any science competitions prior to this? If not, why did they want to do this particular competition?**

**Lajvardi:** Two of the four students had been in several competitions through [For Inspiration and Recognition of Science and Technology (FIRST)] Robotics. They were sophomores. FIRST Robotics was a land-based robotics competition. The other two were seniors and had only been in one FIRST robotics competition prior to competing in the underwater competition. I offered them an opportunity to participate in the underwater robotics project in lieu

of their class work and they took it. We wanted to compete in something new and challenging. They all were discovering that they had a knack for robotics and wanted to



**Opening General Session speaker Fredi Lajvardi led students at a Phoenix high school to surprise everyone with their accomplishments. The students not only successfully built an aquatic robot but won in a competition against teams that included students from the Massachusetts Institute of Technology (Cambridge, Mass.).** Fredi

Lajvardi

learn more. What better way to learn than by competing in the competition?

**WE&T: How did you help instill the level of confidence in your students that they could achieve such a major feat as building an aquatic robot from scratch?**

**Lajvardi:** The students and the teachers – myself and Allan Cameron – were fairly confident that we could build some kind of underwater robot from the experience with FIRST Robotics competitions. We weren't going for the win; we were just going for the learning experience. By now we figured, we learned when we failed. We were looking to fail on a large scale so that we could learn on a large scale. We were planning on debriefing all we learned from the competition and use that info to build a robot for the following year to compete seriously.

Of course, our plan did not work out quite as we expected. We accidentally won on the first try. So, in hindsight, with the lack of pressure to win, the students were free to follow the scientific method as well

as trial and error to solve the engineering problems before them. It was this absence of the pressure to win for this particular group kids, I believe, that allowed them to be fully creative and unconventional in their approach to build a successful underwater robot.

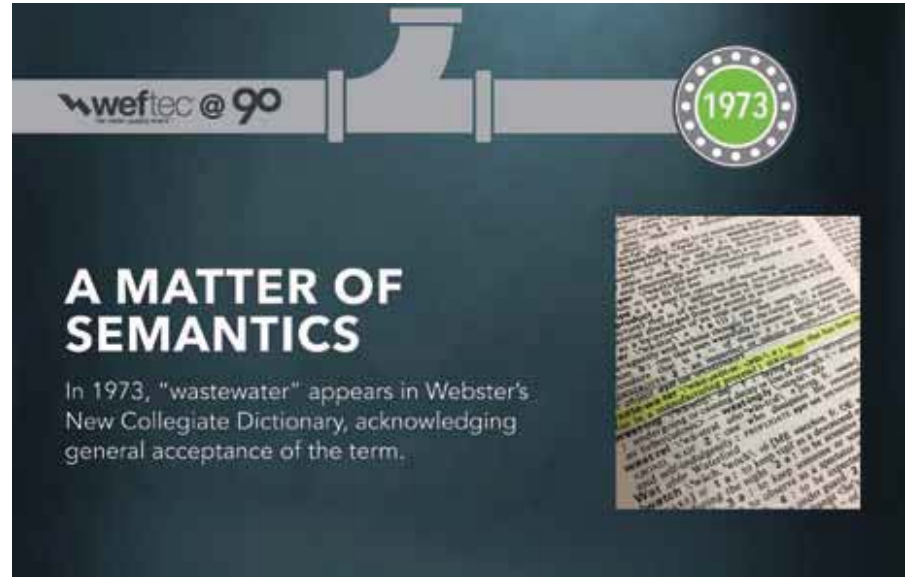
**WE&T: Are there any lessons you felt that you learned about mentorship or teaching as you helped your students prepare for the robotics competition?**

**Lajvardi:** I witnessed once again that it is hard to beat a competitive environment to get the creative juices flowing. My belief that hands-on projects are perfect for getting kids inspired and motivated so that that they can do incredible things was validated through the experience of this project. While they weren't going for the win, the competitive arena triggered a very high degree of commitment on their part. No one wants to be embarrassed when they step up to the plate, so they built a solid robot that functioned better than they imagined.

**WE&T: Did some of the Falcon Robotics team members later go on to careers in science or study science in college? Are any of them now teachers?**

**Lajvardi:** Oscar went on to become a mechanical engineer for the BNSF Railroad in Dallas-Fort Worth, following his 5 years

of military service for the U.S. Army. Cristian got a late start with college due to financial reasons, but he is now completing his engineering degree in Michigan. Lorenzo and Luis have started their own catering business specializing in authentic Mexican food. Other team members that came in the years afterward have become teachers.



**WE&T: What do you think is the biggest challenge in getting young people, especially underprivileged kids, into the STEM fields? How do we surmount these challenges as a society?**

**Lajvardi:** The biggest challenge, in my opinion, is to show students that they can have a successful place in society by focusing on STEM. They can make a difference and they can't let stereotypes dictate their future.

The way to overcome these challenges

is to show them that they matter and that they can do whatever they set their mind to. These robotics competitions allow them to see that they can compete with all levels of society and they can overcome any stereotype. Any misimpressions about their own limitations that they may harbor are dismantled through their experiences in these competitions.

**WE&T: Many Water Environment Federation members are in the science and technology fields. What advice**

**would you give to them about how to mentor the next generation?**

**Lajvardi:** Get involved with the next generation with hands-on projects and competitions. Give them the encouragement they need to follow their dreams and help them remove some of the obstacles that may get in their way. Develop real meaningful relationships so that they can see you as role models that they can aspire to be like when they grow up.

– *LaShell Stratton-Childers, WE&T*

## Expand your network at WEFTEC 2017

Know all of the many places and spaces to gather

If you ask an attendee at WEFTEC about the best experience at the conference, many will say one thing: networking.

While the hallways stretching between the exhibition and technical session rooms are prime networking real estate, WEFTEC also offers many spaces and events designed by the Water Environment Federation (WEF;

Alexandria, Va.) for you to gather, reconnect, and exchange ideas.

### Spaces to gather

**WEF Plaza.** Visit the WEF Plaza – located on the Grand Concourse connecting Exhibition Halls A and B – to access WEF's premier educational resources, publications,

services, and staff. The space, which includes the Bookstore, Honors and Awards Display, Membership Center, and Global Center, provides tables, chairs, and couches for attendees to rest and network.

**WEF Bookstore and Membership Center.** Located together in the Grand Concourse Hall B, these two main resources



provide access to a wealth of information about water sector topics and WEF itself. Browse and purchase the latest selection of books, Manuals of Practice, study guides, WEF wear, and more in the Bookstore.

Visit the Membership Center to learn more about WEF and its Member Associations. WEF members enjoy exclusive access to the Member Lounge, located inside of the Membership Center. Relax in comfortable seating, refuel yourself with light refreshments and your devices with recharging stations.

**Global Center.** This meeting area and lounge in Grand Concourse Hall A offers presentations on topics of international interest, access to language translation services, resources that match international trade delegates with exhibitors, and networking opportunities with international attendees in the lounge.

**Huddle Rooms.** Another benefit for WEF members and WEFTEC exhibitors, the Huddle Room can be reserved to hold meetings. Available by appointment, on a first-come, first-served basis – with locations in both Halls A and B – the semi-private meeting spaces are available for a maximum of 2 hours and include flat-screen monitors for presentations. Learn more

and make reservations at [www.weftec.org/mtgspacereq](http://www.weftec.org/mtgspacereq).

### Receptions to attend

**Innovation Pavilion.** Discuss cutting-edge technology and new ideas in the Innovation Pavilion. Businesses producing water technology will be exhibiting in the sixth annual pavilion, located at Booth No. 7739 in Hall B.

WEF hosts this space with its innovation partners, BlueTech Research (Cork, Ireland) and Imagine H2O (San Francisco). The pavilion's theater hosts a series of educational, interactive sessions that connect attendees with leaders in the water innovation community.

The pavilion hosts receptions on both Monday, Oct. 2, and Tuesday, Oct. 3, from 5 to 6 p.m. On Oct. 3, arrive early, from 4

to 5 p.m., to hear how brewers are making sustainable beer using reclaimed water, and stay to try some samples.

**Stormwater Pavilion.** Visit the hub for stormwater in the Stormwater Pavilion. This area, located along the 100 to 200 and 300 to 400 aisles of Hall A, features exhibitors and a theater delivering content addressing stormwater management. Topics covered include such topics as regulations and policies, flooding effects and mitigation, funding, and green infrastructure.

Registered WEFTEC attendees and exhibitors are invited to enjoy complimentary beer, wine, and soft drinks during receptions held 5 to 6 p.m. on both Monday, Oct. 2 and Tuesday, Oct. 3.

**Mix with Members.** WEF members and WEFTEC exhibitors can enjoy cocktails and conversation Sunday evening, Oct. 1, during the Mix with Members event. Open to all members who register for WEFTEC; each exhibiting company will receive an invitation for two individuals to attend the event.

**Industrial Reception.** The Industrial Reception on Monday, Oct. 2, from 5 to 6:16 p.m., connects exhibitors and water sector professionals with expertise in a range of industries such as oil and gas, as well as food and beverage. The reception costs \$25; tickets can be purchased at the Registration desk or at the reception door.

– Jennifer Fulcher, WE&T

# Operations Challenge XXX

## Honing operator skills for 30 years and counting

**A**t WEFTEC 2017, teams of skilled wastewater treatment professionals will gear up to compete in the 30th national Operations Challenge. The competition puts teams of four to the test in five events: Process Control, Laboratory, Safety, Collection Systems, and Godwin Maintenance.

The idea for the competition came from members who were inspired by the Olympic Games in the mid-1980s. After Water Environment Federation (WEF; Alexandria, Va.) Member Associations hosted their own operator-focused competitions, WEF hosted the first national competition at WEFTEC 1988.

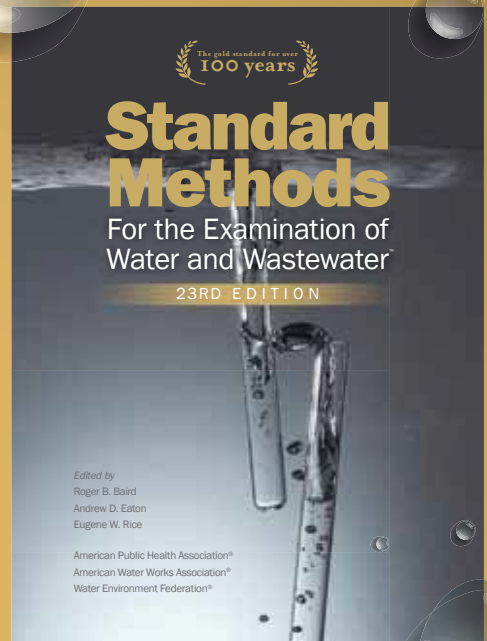
### Overcoming challenges at the first competition

Al Goodman, WEF past president, helped start Operations Challenge on a national-level. He remembers having to clarify rules on-site and handle unforeseen issues behind-the-scenes in the early years of the competition. During the 1988 team meeting, Goodman said, he had to decide “on the fly” which types of gloves were required – latex for the Laboratory event

and leather for the Maintenance event. Team members rushed out to local stores the day before the competition to purchase the



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**The Great Danes, a team from Denmark, will compete in Operations Challenge 2017. Members include Flemming B. Møller, Dia Kjellerup, Jens H. Christiansen, Frank B. Davidsen, and Nerea Uri (not pictured).**

Flemming B. Møller

required gloves.

The next year, 1989, the Collection Systems event used clay pipes. Originally, event organizers wanted competitors to replace a section of clay pipe with polyvinyl chloride (PVC) pipe, but the clay-pipe supplier for the event did not agree and threatened to pull the delivery, Goodman said. The compromise: competitors cut out a section of clay pipe and replaced it with another section of clay pipe. Because the clay was heavier and cost more to ship, organizers opted to use PVC pipe in subsequent years, he said.

Competition organizers also had to decide whether to spend more for stopwatches with a 0.01-second readout or save money on the 0.1-readout models. They chose the more detailed, more expensive watches. This choice proved advantageous while judging the Collection Systems event at WEFTEC 1989; the difference between first and second place teams was just 0.01 seconds, Goodman said.

### Recognizing operator skill

The competition's success throughout the years has relied on the many volunteers and WEF staff who host it, Goodman said. "I think [it] is one of the greatest events that WEF has ever come up with," Goodman said. "It's wonderful to see that Operations Challenge has raised the awareness of the operator's skills."

"One of the key benefits of Operations Challenge has been to provide an operator with a greater skill set at a time when we're trying to do more with less," said Bob Rutherford, facility manager at the



**Operations Challenge participants compete in the Process Control event during the Water Environment Association of Texas Operations Challenge.** Malcolm Fabiyi/Hydromantis



**Hydromantis Environmental Software Solutions Inc. (Hamilton, Ontario) designed its computer simulation program, OpTool™, to be intuitive and user friendly. Last year, the program became part of the Process Control event.** Malcolm Fabiyi/Hydromantis



**An Operations Challenge team works together to solve operations problems in the OpTool™ during the Water Environment Association of South Carolina Operations Challenge event.** Malcolm Fabiyi/Hydromantis

**weftec@90** **1981**

**BIOSOLIDS BOOST**

In January 1981, with land-applied biosolids on the rise, federal agencies issue a joint policy that outlines requirements for use.

**weftec@90** **1987**

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Teams have 15 minutes to fix operational problems posed by the simulation program during the Process Control event. Malcolm Fabiyi/Hydromantis



A team works on both the written portion and the simulator portion of the Process Control event at the New York Water Environment Association Operations Challenge competition. Malcolm Fabiyi/Hydromantis

Hampton Roads Sanitation District (Virginia Beach, Va.). Rutherford has been a WEF member since 1988 and involved with the competition since it started. Operations Challenge has given him a network of peers for advice and information that yield real-world benefits at his water resource recovery facility, he said.

### Adding digital to the mix

Operations Challenge organizers regularly change, update, and expand the five events. Last year, teams faced a new element of the Process Control event: the Hydromantis Environmental Software Solutions Inc. (Hamilton, Ontario) computer simulation program, OpTool™. In addition to the written test from past competitions, teams had to fix operational problems simulated by the program; they had 15 minutes to fix the problems to meet target effluent quality goals.

The software also has been introduced at local-level competitions. Competitors eagerly anticipate using the hands-on simulator, said Malcolm Fabiyi, president of

Hydromantis USA. “We have had almost 500 downloads of the software since the competition started, with thousands of practice hours logged by operators from the U.S., Canada, Europe, and Argentina,” he said.

The simulator features a conventional biological nutrient removal activated sludge facility programmed with 15 unique operational challenges that team members must work to fix. This year the simulator also will include an anaerobic digester and a chlorine-based disinfection system, Fabiyi said.

“We have seen scores continue to increase, reflecting the increasing level of experience with the simulator and improvements in the operational skills of operators,” Fabiyi said. A team in Ohio recently scored 925 out of a possible 1000 during a WEF Member Association competition. “That was a phenomenal achievement,” he said.

### Feeling the pressure

At WEFTEC 2017, teams also will use a new piece of equipment in the Collection

Systems event. As competitors work to repair a leaking pipe by installing a service lateral, they will use the Advanced Drainage Systems (Hilliard, Ohio) Inserta Tee compression fitting. This introduces teams to a new fitting and shows the audience a new, quick method for making a lateral connection, said Mike Keene, general manager for Advanced Drainage Systems. “Every team in the competition has been working hard all year to change the way they run this event to be as fast and as effective as they can be.”

The company has provided samples and assistance to teams to help with the transition. After seeing trial runs at local competitions, Keene helped update instructions for the event. “The reaction to the product has been outstanding,” he said. “Event times have been very fast and very competitive.”

### Evolving into an international competition

While the competition has experienced many changes in the rules, setting, and



Minimal Headloss from the Ohio Water Environment Association compete in the Safety Event at WEFTEC 2016. Pictured are Jimmy Spencer, Douglas Dietzel, Christen Wood, and Dan Valek. Kieffer Photography



At WEFTEC 2016, Elevated Ops from the Rocky Mountain Water Environment Association earned second place in the Godwin Maintenance Event. Pictured are Matt Duncan, Kelsey Gedge, and Lance Wenzholz. Kieffer Photography

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equipment since it began, welcoming international teams has been one of the most exciting. Several teams from Argentina and Germany have participated.

Every 2 years, the Interamerican Sanitary and Environmental Engineering Association (AIDIS; Buenos Aires, Argentina) hosts an Operations Challenge competition in South America. AIDIS first sent a team to compete in the U.S. to WEFTEC 2003. Since 2006, an Argentinian team has competed at WEFTEC on every even year.

DWA (Hennef, Germany), the German Association for Water, Wastewater,

and Waste, hosted its own version of Operations Challenge in 2012, 2014, and 2016. They call it the Open German Championship in Wastewater Technology.

During WEFTEC 2015, two German teams – DWA Team Düsseldorf and the DWA/IFAT All Star Team – competed in Operations Challenge. And in 2016, Team KSB–USA, an all-star team representing the U.S., competed in the German event. Team KSB–USA finished first in the Sewer Professionals division and third in the Wastewater Professionals division in Germany.

This year, a Danish team, The Great

Danes, will compete at WEFTEC. Members Dia Kjellerup, Nerea Uri, Jens H. Christiansen, Frank B. Davidsen, and coach Flemming B. Møller, come from three of Denmark's largest water resource recovery facilities. Operations Challenge provides the team members with an opportunity to come to WEFTEC and network with U.S. colleagues, Møller said. "I think this is a great way to network and to learn from other great utilities in the states; therefore, we said yes to the challenge."

– Jennifer Fulcher, WE&T

## New and notable at WEFTEC® 2017

WEFTEC® may be celebrating 90 years, but the world's largest annual gathering of water quality professionals still has new and exciting activities. Here's a sneak peek at some of what you can do to make this WEFTEC particularly noteworthy.



**EXPLORE** Chicago's McCormick Place, the largest convention center in America. WEFTEC 2017 will occupy at least 304,000 ft<sup>2</sup> of exhibition space. This secures WEFTEC 2017 a spot among the top five largest in the conference's 90-year history.



**REFLECT** on the legacy of public service you'll leave behind. The Opening General Session, on Monday, Oct. 2, will feature a keynote address from nationally acclaimed STEM (science, technology, engineering, and math) educator Fredi Lajvardi. (See a Q&A with him on p. 46.) This session also will feature a series of short, engaging "WEFTalks," new to WEFTEC 2017. These talks will offer perspectives from all segments of the water quality profession.



**SHARE** your ideas about some of the most pressing topics facing today's water sector in a new format. In these Knowledge Development Forums, topic area expert "instigators" will deliver provocative presentations on such subjects as aeration, research planning, and nutrient removal. Participants will then discuss their own experiences with these topics, fostering new ideas by sharing know-how beyond organizational lines.



**EXPERIENCE** the next generation of water sector technology during Session 321, Primary Treatment: Manufacturers' Innovative Technology Forum. Be the first to see pilot-proven innovations from some of the largest brands in water treatment before they become industry standards. Meet company representatives that can help bring the newest technologies to your organization.



**INTERACT** during technical sessions and workshops in a new way. Some WEFTEC sessions will be pilot-testing never-before-seen levels of engagement with speakers. Access compact PDF files containing presentation slides, and take notes within the software. Test your knowledge with pop quizzes and share your opinions by answering poll questions in real time.



**EXPRESS** yourself by participating in WEFTEC's new interactive art project. Pick up a card and write your answers to questions about the importance of mentorship, workforce development, and innovation. Then, professional artists will illustrate your answers on a centrally located installation in real-time. Stop by the project throughout WEFTEC to voice your experiences, get insight into your colleagues, and see the artwork develop.

– Justin Jacques, WE&T

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