TAWWA awarded scholarships to the following students: Razan Bayan, Ania Cadena, Amy Cain, Cynthia Castro, Kasi Clay, Emily Epperson, Larah Gonzalez, A H M Golam Hyder, Neha Irrinki, Gracie James, Zahra Kohankar Kouchesfahani, Bianca Navarrete, Samuel Paredez, Brooke Rogers, Jolie Starling, John Antonio Teodoro and Daniela Vallejo.
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In its continued effort to support higher education, Texas Section has awarded 19 scholarships for the 2020-2021 academic year. The TAWWA Scholarship Committee selected 17 students to receive a $2,000 TAWWA scholarship.

TAWWA, in cooperation with Plummer Associates, Inc., also named Zahra Kohankar Kouchesfehani, of McKinney, as the recipient of the $3,000 Plummer Associates, Inc./TAWWA Environmental Scholarship. This scholarship is awarded to a student studying to become an engineer or scientist in the water environmental field.

Amy Cain, of San Antonio, was also named the recipient of the One AWWA Operator Scholarship. This $2,000 scholarship award can be used for certification/licensure, two-year water related associate degree, technical school program, professional training program, books and manuals and operator-related conferences. The scholarship recipient also receives a one-year AWWA Operator membership.

You can help TAWWA fund more scholarships for students next year by purchasing the TAWWA water conservation license plate or donating online at www.tawwa.org.

Samuel Paredez was awarded a scholarship from funds raised by the Water Conservation License Plate.

Thank you to our Scholarship Committee, chaired by Irazema Rojas, for their hard work in selecting the scholarship recipients: Robert Canterbury, Rio Grande

CONTINUED PAGE 13 | scholarships
Becoming Virtual Professionals

BY MELISSA BRYANT

I believe everyone is becoming a pro at hosting virtual meetings and making virtual presentations by now. I personally have sat on a few virtual trainings that focused on my voice projections, setting up my camera, optimal lighting and ensuring I was making eye contact with my camera so my audience felt I had eye contact with them. I have learned the best way to connect with others on a virtual meeting is to always leave my camera on; this helps me stay focused on the conversation and maintain that important personal connection with others that can often be lost in virtual meetings. While my trainer also had some great tips on hand movements and facial cues, I must admit, I still miss our in-person office meetings, trainings and conferences.

Speaking of conferences, we are in full speed planning mode for our 2021 Texas Water Conference. I would like to congratulate Shay Roalson and Rick Coronado who will be our co-chairs planning the conference for next year. We are planning for a virtual conference with as many hybrid opportunities as possible. Given the current circumstances we are facing, I hope to see an overwhelming number of abstracts on Diversity & Inclusion or on COVID-19 and what we can learn about systems, processes, and staying in tune with our employees. I think there are several lessons learned that we can document from the unique situations we are in.

I do want to mention that several regions are wrapping up their Regional Water Plans that will be incorporated into one Comprehensive State Water Plan by the Texas Water Development Board (TWDB). This year the regions were tasked to evaluate potential climate change impacts. It was great to see the regions looking at how we can incorporate multi-benefit type projects. This type of planning will help us move in a direction of building our communities to be more resilient. The TWDB is also moving forward with finalizing their committees for the new Regional Flood Planning Groups. There are still a few regions that need water utility and water district professional representatives, so I encourage you to check the website and make sure your region is represented.

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It's Time to Step Up and Make a Real Difference

BY MIKE HOWE
tawwa executive director

If you look to the right of this page you can tell it has been a long time since I graduated from UT Austin. (The next paragraph is what my adult children call one of my "back in the day" stories, but it is important to this article.)

When I went to UT, tuition was $50 per semester plus books. Even then, books were more than tuition. Other than a few other fees for labs or something else, that was it. Getting a degree was a real bargain. Many of you who are my peers remember what a bargain it was.

Fast forward to today and it is stunning what an undergraduate degree costs. Tuition alone can be greater than 100 times more. Now, I won’t even try to go into the reasons why, but I know the inflation rate has not grown that much since I graduated.

As you look through this issue of TEXASh2o you can read about the outstanding students who received scholarships from the Texas Section AWWA this year. But realize this scholarship is a very small portion of their total costs each semester. After reviewing more than 50 applications, this year we are awarding another seventeen $2,000 scholarships, plus a $2,000 Operator Scholarship with funds from the Texas Section. In addition, we are also awarding a $3,000 scholarship funded by our friends at Plummer Associates, Inc.

The costs of higher education are nothing less than brutal and, if that wasn’t enough, we are in the middle of the pandemic. I cannot imagine what it must be like to try to go to school in these times. But these students are doing just that, and they will persevere.

And while we are proud to have provided nearly $500,000 in scholarships over the last few years, it is just not enough. It is no wonder so many students are saddled with torturous student debt when they graduate. And, for many of them, they are paying it off for many years as they build their career and a life for themselves after school.

This debt is one of the reasons that, as graduates move into the workforce, they still struggle with what we have all considered the "American Dream." Such things as owning a home, starting a family or living on
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San Antonio Water System Minority and Woman-owned Business Enterprise Disparity Study

Small, Minority, Women and Veteran-owned Businesses Are Encouraged to Give Feedback on Barriers to Contracting with SAWS

The San Antonio Water System is conducting a disparity study to research race- and gender-based barriers to doing business with SAWS and the operations of its Small, Minority, Woman, Veteran-owned Business Enterprise program. If your firm currently works with or has tried to bid on work for SAWS as a prime contractor, subcontractor or supplier, Colette Holt & Associates would like to hear from you.

The study will examine factors necessary for entrepreneurial success, such as access to business capital, bonding, networks, suppliers, and other resources. It will also gather anecdotal evidence of any continuing effects of past or present race and sex discrimination, and the impact of the current SMWVB program. Finally, the study will review SAWS’ current program and activities and make recommendations for future initiatives and enhancements, including data collection to assist the agency in setting its goals.

CONTINUED PAGE 46 | disparity study

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Tackle Taste and Odor with Proactive Water Quality Monitoring

BY FRANCES BUERKENS, STEPHANIE A. SMITH, GREG FORD, AND HUNTER ADAMS

Originally published in Opflow Volume 46, Issue 10: https://doi.org/10.1002/opfl.1437

Water utilities face increasing frequency and duration of taste-and-odor (T&O) events and cyanotoxin issues. Expedited analysis is critical for reservoir management, requiring utilities to revamp operations and conduct in-house testing. The COVID-19 pandemic may inspire permanent changes to some operations, requiring traditionally lab-based technicians to rely more on technologies that enable them to gather and analyze data remotely. Utilities must adapt to these dynamic environmental and social conditions, leading many to explore how technology can facilitate affordable, scalable, repeatable monitoring programs.

Many biological monitoring programs still depend on the same technology that Dutch scientist Antonie van Leeuwenhoek used in 1676 to discover the first bacteria observed by humankind: the microscope. Although microscopes are a key fixture in every microbiology lab, their development has slowed because optical limits have been largely reached.

CONTINUED PAGE 27 | water quality monitoring
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Chapter; Aide Fuentes, Desert Mountain Chapter; Mica Garza, Capital Area Chapter; Jes Johnson, Capital Area Chapter; Justin Kirchdoerfer, North Central Texas Chapter; Jennifer Kldies, Coastal Bend Chapter; Jaime Kypuros, South Texas Chapter; Ann Peche, South Texas Chapter; Yongki Shim, Southeast Chapter; and Lizzie Wilson, Capital Area Chapter.

The 2020-2021 scholarship recipients are:

RAZAN BAYAN
Southern Methodist University | Human Rights, Mathematics
Razan Bayan graduated from Islamic School of Irving and is currently attending Southern Methodist University, pursuing degrees in human rights and mathematics, with minors in law and legal reasoning and Arabic. In high school, she was involved with National Honor Society and part of Muslim Youth Voices CAAM Film Club, where she wrote, directed, acted in and edited a film that premiered at CAAM Film Fest and was broadcast on PBS nationally. She has been accepted into SMU’s pre-law scholar program and would one day like to be a human rights attorney. Her AWWA family member is Mohammad Bayan, vice president at Jones | Carter.

ANIA CADENA
Texas State University | Biology
Ania Cadena graduated from Aledo High School and is currently attending Texas State University, pursuing a degree in biology. In high school, she was involved with HOSA (Help Occupations Students of America) Club and Kids Who Care, a non-profit that teaches kids and young adults leadership skills through musical theatre. She’s served on the KidPower leadership team for the past seven years, and has been board president since August 2019. Her AWWA family member is Ignacio Cadena, client service manager at Black and Veatch Corp.

CONTINUED PAGE 14 | scholarships
AMY CAIN
University of Texas at Austin | Biology
Amy Cain is currently attending the University of Texas at Austin, majoring in biology with a minor in computational biology. She hopes to take part in an undergraduate research lab and work with professors studying wastewater management with the ultimate goal of being a project manager for a wastewater and sewer firm. She’s involved with the Dell Pre-Health Scholars student organization, volunteering at clinics and creating public service projects and has interned with Maestas & Associates in San Antonio for the past four years. Cain is also the recipient of the One AWWA Operator Scholarship and a member of AWWA.

CYNTHIA CASTRO
University of Houston | Environmental Engineering
Cynthia Castro is pursuing a Ph.D. in environmental engineering at the University of Houston. She helped develop the National Water Model for the National Oceanic and Atmospheric Association, which predicts streamflow and flooding conditions for all catchments in the continental U.S. in real-time. Castro has also been training as a disaster response volunteer for water and sanitation issues and has been involved in pro-bono civil engineering design projects to improve the lives of those affected by both floodwaters and unclean drinking water. She is a student member of AWWA through the University of Houston.
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KASI CLAY  
Tarleton State University | Environmental Science  
Kasi Clay is currently working toward a master’s degree in environmental science from Tarleton State University. She is also taking additional courses in public administration. Clay serves as president of the North Texas Chapter of the American Backflow Prevention Association and is involved with TAWWA's North Central Texas Chapter, the Texas Water Utilities Association, the Dallas County Medical Reserve Corp and the Water Environmental Association of Texas. She is a member of AWWA through Austin Water, where she serves as water quality manager.

EMILY EPPERSON  
University of Notre Dame | Biology  
Emily Epperson is attending the University of Notre Dame, majoring in biology (pre-professional studies) with a minor in environmental science. She plans on pursuing a career in either medicine or environment science and wastewater management and plans to intern in both fields to determine which path best suits her skills and talents. She has volunteered more than 400 hours at the Shriner's Hospital in Galveston, the Houston Ronald McDonald House and the Friendswood Health Center. Epperson is part of Notre Dame's Glynn Honors Program and also made the Dean's List. Her AWWA family member is Trent Epperson, assistant city manager for the City of Pearland.

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LARAH GONZALEZ
University of Texas at Austin | Computer Science
Larah Gonzalez graduated from STISD World Scholars in Edinburg and is currently attending the University of Texas at Austin, pursuing a degree in computer science with a special interest in Artificial Intelligence. In high school, Gonzalez was involved with the Technology Student Association, serving as president, was her class treasurer and was involved with the National Honor Society. Her AWWA family member is Carlos Gonzalez, utility engineer for McAllen Public Utility.

A H M GOLAM HYDER
University of Texas at El Paso | Environmental Science & Engineering
A H M Golam Hyder is working toward a Ph.D. in environmental science and engineering at the University of Texas at El Paso. His career goal is to become a consultant for providing solutions to challenges of handling high salinity water with multiple ions in the water and wastewater treatment industry and work to provide technology delivery to regions having these specific needs to alleviate the challenges of finding freshwater sources. Hyder has published five research articles in peer-reviewed journals and is a student member of AWWA through the University of Texas at El Paso.

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NEHA IRRINKI
University of Texas at Austin  |  Business Administration, Marketing
Neha Irrinki is attending the University of Texas at Austin, pursuing degrees in business administration and marketing with minors in entrepreneurship and environmental science. She is involved with the Hindu Students Association and is a Resident Assistant, organizing educational and community building programs for the sustainability living and learning community residence hall. She would like to start her own non-profit organization that focuses on nontraditional recycling practices such as reusing various school supplies and clothing. Her AWWA family member is Sam Irrinki, principal at Weston Solutions.

GRACIE JAMES
Tarleton State University  |  Education
Gracie James graduated from Lake Country Christian School in Fort Worth and is currently attending Tarleton State University with plans to pursue a career in the field of education. In high school, she was involved with basketball, serving as Captain of the Girls Varsity Team, softball, track, National Honor Society, Spanish Honor Society and served as a mentor to a fourth grader. Her AWWA family member is Jeff James, principal at Kimley-Horn and Associates.

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ZAHRA KOHANKAR KOUCHESFEHANI
University of Texas at Arlington | Civil Engineering

Zahra Kohankar Kouchesfehani is attending the University of Texas at Arlington pursuing a Ph.D. in civil engineering. Her research project is focused on rehabilitation of pipelines with spray applied pipe lining methodology. Kohankar Kouchesfehani is a graduate research and teaching assistant and a student member of AWWA through the University of Texas at Arlington. She is also the recipient of the Plummer Associates, Inc./TAWWA Environmental Scholarship.

BIANCA NAVARRETE
Musicians Institute | Vocal Performance

Bianca Navarrete is studying vocal performance at the Musicians Institute in Los Angeles. She has sung the national anthem at various sporting events, conferences and galas, as well as performed at shows around Los Angeles. She's looking forward to performing her sophomore jury, where she has to select, chart and perform seven songs that fit seven different musical categories, including an arrangement or original composition. Her AWWA family member is Marcela Navarrete, vice president at El Paso Water Utilities.

SAMUEL PAREDEZ
Victoria College | Business Administration

Samuel Paredez graduated from Goliad High School and is attending Victoria College, working toward a degree in business administration with a focus on international business. In high school, he was a Platoon Sergeant for Goliad ISD Cadet Corps and also part of the varsity tennis team and Spanish club. His AWWA family member is Gary Paredez with the City of Mathis. His scholarship is awarded from Water Conservation License Plate funds.
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**BROOKE ROGERS**
Tarleton State University | Nursing
Brooke Rogers is attending Tarleton State University, working toward a nursing degree. She has been accepted into the Tarleton Nursing Program with the goal of becoming an RN. She serves on the Sodexo Food Advisory Board, is a Tarleton Transition Mentor and part of Tarleton Serves. Her AWWA family member is James Rogers, maintenance manager at Upper Trinity Regional Water District.

**JOLIE STARLING**
University of North Texas | Public Health Sciences and Epidemiology
Jolie Starling graduated from Texas A&M University with a degree in forensic and investigative science and is attending the University of North Texas Health Science Center for a master's degree in public health sciences and epidemiology. Since 2019, she has worked for the U.S. Department of Agriculture as a Biological Science Aide in their insect control and cotton disease unit. By continuing her education, she plans to contribute to global public health and safe water practices as a researcher, volunteer and scientist. Her AWWA family member is Donna Starling, water programs manager at the City of Irving Water Utilities.

**JOHN ANTONIO TEODORO**
Marymount Manhattan College | Musical Theatre
John Antonio Teodoro graduated from Park City Independent High School and is attending Marymount Manhattan College studying musical theatre. He has been involved in professional theater in the Houston area since 2017, was a chorus singer for the Houston Grand Opera and served as a research assistant for EJ Metrics. He was also a volunteer assistant counselor at Unity Theatre.
Summer Program. His ultimate goal is to write a musical about Juan Seguin, defender of The Alamo, Senator of the Republic of Texas and Mayor of San Antonio. His AWWA family member is Manuel Teodoro, professor at Texas A&M University.

DANIELA VALLEJO
Massachusetts Institute of Technology
Daniela Vallejo graduated from The Hockaday School in Dallas and is currently attending Massachusetts Institute of Technology with an interest in chemical-biological engineering. She is passionate about the role of biological engineering in global health. In high school, she was part of JETS, which designed and built a robot for the BEST competition, and was also part of varsity swimming, orchestra and cross country. Her AWWA family member is David Vallejo, senior project manager at Jacobs Engineering Group.
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Advancement potential exists, with higher magnification to better observe individual cells, but this is unlikely to change how utilities monitor raw water. Utilities can look to new technologies to bring a broad environmental picture into focus.

**Comprehensive Monitoring**
From the field to the lab, a water utility’s goal is to seek information about one variable: change. Dynamic environmental conditions require responsive tools to reveal potential problems. Cyanobacteria and algae populations can bloom within hours. Blooms that remain unchecked can attract unwanted attention, undermining confidence in public water systems. However, there is no single solution to track change. Biology is elusive, and complex problems evade simple answers. Utilities can respond in two ways: (1) increase sampling frequency and number of locations, and (2) integrate multiple tools that expand an analyst’s field of view.

It’s impossible to detect change fast enough to make effective decisions without ample data across multiple locations and time scales. If data are limited in frequency or location, accurately tracking cyanobacteria and algae populations turns into a wild goose chase. Cyanobacteria were the first group of living organisms on Earth. Outlasting dinosaurs gives credence to their evolutionary capabilities.

Cyanobacteria benefit from diurnal variations, enabling them to outcompete algae. Propelled by buoyant cells, cyanobacteria rise to the surface at night to absorb more light and sink during the day to enhance nutrient absorption. Because we can’t assume that cyanobacteria are evenly distributed across a body of water, monitoring programs must encompass a broad spatial and temporal view that accounts for changes throughout day to night, spring to summer, and pre- to post-treatment. A 1-mL sample—concentrated or not—analyzed once a week can’t provide a comprehensive view.

**New Technologies**
Increasing sampling frequency and locations is often
CONTINUED FROM PAGE 27 | water quality monitoring

difficult, as labs are frequently understaffed and overloaded. Fortunately, remarkable technological progress has taken place in recent years, making it possible to expand monitoring programs with a limited team. Three relatively new technologies—multiparameter sondes, semiautomated flow-imaging microscopes, and DNA-based assays—can be integrated from the field to the lab to form the foundation of a comprehensive screening program for cyanobacteria and address concerns about the production of T&O compounds as well as toxins.

Collecting and Understanding Data. Used in the field, multiparameter sondes, such as the EXO series from YSI Xylem (www.ysi.com), are remotely deployed, collecting data day and night. Sondes serve as “first responders,” providing early detection for blooms and bloom dynamics. By collecting statistically significant data sets, sondes establish a baseline to determine what’s normal for a particular location. Every location has a unique profile, much like a fingerprint; sondes show what that fingerprint looks like so when something changes—such as temperature, pH, dissolved oxygen (DO), chlorophyll, or phycocyanin levels—utilities can determine if that change is a precondition to a bloom.

Chlorophyll and phycocyanin monitoring provide early indication of a potential bloom, but a thorough understanding of bloom patterns is gained by adding additional parameters. Monitoring temperature reveals what temperature range supports harmful algal bloom (HAB) formation in each reservoir. Water treatment plant operators and managers should learn how temperature aligns with seasonal, spatial, and temporal bloom patterns. Reservoirs in temperate climates may host spring or fall blooms that result from different populations of algae and cyanobacteria.

DO refers to the equilibrium in which gases naturally dissolve into water. DO patterns change with HABs. During the early and peak growth phases of an HAB, DO can increase significantly in the vicinity of the bloom as a result of exceedingly high photosynthetic activity. More oxygen is generated than can be
consumed by either the cyanobacteria or other organisms, leading to supersaturation in which DO levels exceed 100 percent. As blooms fade, algae become food for bacteria and other organisms that consume oxygen, at which point DO levels can drop precipitously. The result is hypoxia.

It’s a common misperception that cyanotoxins kill fish in surface water reservoirs, but the culprit is most often hypoxia. The size of the bloom relative to the size of the water body and the proximity of a DO sensor to the bloom or oxygen-consuming bacteria affect one’s ability to observe these patterns for managing a reservoir. In addition, DO monitoring aids in understanding the efficacy of aerators used to prevent stratification.

Fluorescence-based pigment detection is another powerful tool to monitor cyanobacteria and algae populations from afar. Two individual pigments, chlorophyll and phycocyanin, warn whether the growth might be an algal bloom or a cyanoHAB. Chlorophylls a and b are found in all eukaryotic algae. Cyanobacteria contain chlorophyll a and phycocyanin. Every reservoir has a unique baseline, ideally monitored in relative fluorescence units. Deviations from that baseline can alert analysts of a bloom in its early stages. Phycocyanin levels make the distinction of a cyanoHAB possible when both pigments are monitored. When used with a logging instrument and telemetry, pigment detection can reduce trips to the field, optimizing when to collect samples or perform other analyses.

**Simplifying Identification.** Once a sonde has validated that a bloom may be forming and a trip to the field is deemed essential, the second line of defense is to identify what organisms are in the raw water and quantify how many are present. A semiautomated flow-imaging microscope, such as the Flow-Cam Cyano from Yokogawa Fluid Imaging Technologies ([www.fluidimaging.com](http://www.fluidimaging.com)), identifies and enumerates cyanobacteria and nuisance algae. Although the traditional microscope is a superior tool for species-level identification, most utilities limit identification to the genus level or functional group. The FlowCam Cyano speeds up this time-consuming process by presorting data into three functional...
groups: cyanobacteria, diatoms and other algae, and detritus and decomposing organisms. Technicians sort the remaining data by morphology through the use of image-recognition software, taking care to identify the most prolific genera and grouping the remaining low counts into more general categories. This strategy deviates from traditional approaches, but it's a simplified methodology with a turnaround time of five to 30 minutes in most samples, including sample preparation and data collection.

Species-level identification requires an investment in time and considerable taxonomic skill, preventing many utilities from taking this approach. Some utilities have developed long-term species-level data sets by partnering with expert taxonomists. These incredible resources are difficult to seamlessly merge with a flow-imaging microscope because the data acquisition and data analysis methods are different. Correlating microscope results with a flow-imaging system requires patience, but the result is a statistically significant data set with a same-day turnaround time.

This topic isn't straightforward and is sometimes considered controversial by utilities that appreciate the value of speciation. However, treatment decisions are rarely affected by determining the exact species. The move from species- to genus-level identification with a flow-imaging microscope offers speed and repeatability in a time-constrained environment.

Samples identified to species level using traditional microscopy are rarely analyzed more than once a week and often have a turnaround time of three days to three months, at which point conditions have changed and the data become useful only as a historical snapshot. Although microscopic records must be transcribed and digitized, a flow-imaging microscope automatically saves a digital image of all organisms in the sample, along with a comma-separated values report of the count, concentration, and size of the organisms. Reports are customized by the operator to highlight populations more likely to cause a problem, allowing technicians to spot organisms posing higher risk in each day's samples.

What can take hours by microscope takes minutes with a flow-imaging microscope, creating an opportunity for utilities to commit to a treatment plan within a matter of hours instead of days or weeks. The transition to decreasing turnaround time, increasing sampling frequency, and increasing sample locations provides the statistically
significant understanding utilities need to make qualified treatment decisions.

The number of cyanobacteria and algae genera can feel overwhelming in light of the discovery of new species and reclassification of known species. Fortunately, there’s a relatively short list of nuisance organisms, aptly named the Dirty Dozen. The organisms that wreak havoc are often repeat offenders, with Dolichospermum (aka Anabaena), Microcystis, and Aphanizomenon earning a place at the top of the global “most-wanted” list. Although cyanobacteria regularly make headlines, green algae, golden algae, and diatoms create T&O trouble as well. Almost any type of algae can induce a T&O event at a high enough density, so it’s critical to know if any one genus is flourishing. Upon detection, spot treatment in reservoirs can address problems as they arise. This methodology ensures that algae and cyanobacteria don’t form significant blooms, dodging a problem that’s difficult and expensive to treat.

Detection and Quantification. The traditional metric for measuring cyanobacteria concentration is a cell count. Sondes track an increase or decrease in concentration, and a flow-imaging microscope determines the cell count for each genus. A molecular-based technology, such as the CyanoDTec Total Cyanobacteria Assay from Phytoxigene (www.phytoxigene.com), measures the 16S rRNA gene common to all cyanobacteria, thereby quantitatively measuring the number of cyanobacteria present. Because of variations across genera, there’s no correlation between cell count and gene copy numbers; however, increases in either are indicative of bloom growth. Should a Microcystis bloom take place, counting cells per milliliter or running the Total Cyano Assay will indicate the concentration of the bloom, but it won’t confirm toxicity. The scientific community hasn’t yet determined what triggers a bloom to become toxic, but there are tools available to rapidly predict whether toxin production is possible.

Cyanotoxins are produced by many strains of cyanobacteria spanning multiple genera. However, because toxicity isn’t uniform among strains,
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CONTINUED FROM PAGE 31 | water quality monitoring

conventional bacteriological classification methods are unable to accurately predict toxicity. Analytical methods for detecting toxins often take days to perform and aren't predictive. Thanks to recent advances in understanding the biosynthetic pathways of toxin production, analysts can detect target genes that are critical to the production of cyanobacterial toxins in environmental samples. Many cyanobacteria can produce toxins, and many can produce more than one type of toxin. However, not all algal blooms are toxic. Because a DNA-based assay such as CyanoDTec detects and quantifies the presence of cyanobacteria and their toxin-producing genes in environmental samples, it can be used to answer two questions: When should a water body be tested for toxins, and which specific toxin should be tested? In less than three hours, laboratory technicians can know if cyanobacteria are present and which toxin poses a risk. Technicians can identify and quantify the presence of total cyanobacteria, along with four genes responsible for producing toxins: microcystin, nodularin, cylindrospermopsin, and saxitoxin. The
state of Ohio recently ran paired samples of the CyanoDTec Toxin Gene Assay and microcystin measurement by enzyme-linked immunosorbent assay and had a 100 percent correlation of gene detection, with toxin measurement below the US Environmental Protection Agency’s threshold of 1.6 µg/L.

Treatment solutions are like goalies—they’re a key team member but should be the last line of defense against 2-methylisoborneol (MIB), geosmin, and cyanotoxins. Treatments should be used strategically as a last resort; otherwise, utilities could inadvertently inflate a problem. It’s important for operators to know if they’re treating potentially toxic cyanobacteria. Identifying organisms to genus level can be critical in determining whether a human health event could be at hand, and toxin gene measurement quantifies the associated risk level. Adsorptive treatment, such as powdered activated carbon, can only do so much for a toxin event. Copper sulfate will lyse cells; if those cells contain toxins, those toxins become considerably more difficult to remove from treated water. T&O management follows a similar pattern. Lysing a small number of cells can prevent a large T&O event, and preventing further cyanobacterial growth minimizes the event’s scale. Rather than waiting for a bloom, proactive utilities can spot treatments and address a problem in its nascent stages.

If cells from a bloom lyse, MIB and geosmin can linger for days or weeks.

A Bright Future
Water utilities depend on scientists and technicians to interpret results and determine how to mitigate problems. Although technological advancements have transformed monitoring methods, these approaches fail to produce simple answers.

Despite this challenge, the future is bright. Scientists have a culture of sharing information, and talented leaders have turned a weakness into an opportunity for advancement. A follow-up article in Opflow’s November issue will feature thought leaders across the United States who have proved through critical thinking, strategic scientific analysis, and hard work that cyanobacteria and algal blooms can be managed effectively and affordably.

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their own, or eventually even getting rid of that car you had in high school that was handed down and buying something you could call your own. These dreams are real and are supposed to be the "reward" for working hard, graduating and moving on with your life.

And, except for the weight of this debt, many would be able to move faster toward their dreams and making their contribution to our water community. As they do, they become part of the economic engine that will be part of our recovering economy. However, the growing debt crisis in student loans is, in itself, potentially staggering.

OK, sorry. I didn't mean to get on my soap box nor attempt to go back in time and teach Eco 101, 102, or the first chapter of my book, "Why My Kids Still Live at Home." (They don't, by the way).

But, and as they say, here is "the Ask." We need your help and our students need your help. I don't think I have to sell you on the idea of contributing to our scholarship program. I just need to show you how easy it is to turn to your computer and just do it.

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CONTINUED FROM PAGE 4 | letter from the texas section chair

Finally, I would like to take the time to congratulate all the scholarship recipients this year. Keep up the great work in your studies and continue to focus on your end goals. I’m sure transitioning to virtual classes has been difficult for some students, but continue to be diligent in your time set aside for studying and stay ahead of your assignments. Continue to persevere through this school year!
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CONTINUED FROM PAGE 9 | disparity study

This will be the third disparity study conducted by SAWs, with the last one measuring contracting practices for Fiscal Years 2013-2015.

“The current best practice for race-conscious governmental entity contracting and purchasing programs (with either aspirational or mandatory goals) is to have utilization and availability data for minority and woman-owned businesses in the entity’s market area that is not more than five years old,” said Marisol V. Robles, SMWVB Program Manager for SAWs.

Small group business owner interviews are planned for October 2020. These focus groups will gather information to understand your experiences with SAWs’ contracting programs and practices, including perceived race- or gender-based discrimination when seeking SAWs’ contracts.

The study team will contact businesses to confirm information on specific contracts and/or to receive additional contract information that is currently not available to SAWS. CHA will also conduct interviews with business owners and stakeholders to collect information regarding discriminatory barriers and the current SAWS Small, Minority, Woman and Veteran-owned Business (SMWVB) program. An electronic survey will also be sent to interested parties to collect additional anecdotal information.

The study is anticipated to be completed Spring 2021. Your participation in these sessions is important to the disparity study. For more information about the study and opportunities to participate, please visit the study website: SAWs.disparity-study.com or email SAWS-study@mwbelaw.com.
## What’s Happening Across Texas

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACTIVITY</th>
<th>TIME</th>
<th>LOCATION</th>
<th>INFORMATION</th>
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<tbody>
<tr>
<td>NOW</td>
<td>Texas Water 2020 - Virtual</td>
<td>Online</td>
<td><a href="http://www.txwater.org">www.txwater.org</a></td>
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<td>OCT 26</td>
<td>WateReuse in Texas Virtual Conference</td>
<td>Online</td>
<td><a href="http://www.weat.org/events/wrt-2019">www.weat.org/events/wrt-2019</a></td>
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Want to share your event with the Texas water community? Contact Mike Howe, 512-238-9292, or mikehowe@tawwa.org.

Check the Section’s website, [www.tawwa.org](http://www.tawwa.org), for the latest information on Section activities.
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