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A Commitment to Excellence

As noted in my last President's Page, since its founding in 1955, the American Academy of Environmental Engineers and Scientists has striven to provide structure and international leadership in the evolving field of environmental understanding, remediation, and protection. Indeed, the Vision Statement of the Academy is "Leadership and excellence in Environmental Engineering and Science," and a primary Academy Objective is... "To document and recognize excellence in environmental engineering and science practice." I raise this point as we look toward the AAEEES Excellence in Environmental Engineering and Science Awards Ceremony, to be held at the National Press Club in Washington, DC. The Awards Ceremony was originally scheduled for April 23, 2020 but, due to the COVID-19 pandemic, is being rescheduled for October.

The Academy's Excellence in Environmental Engineering and Science Awards recognizes outstanding achievement in the practices of environmental investigation, understanding, and protection. The Awards are prestigious, and the award categories include:

Design	Planning
Environmental Communications	Research
Environmental Sustainability	Small Firms
Industrial Waste Practice	Small Projects
Operations/Management	University Research

The Grand Prize winner in Industrial Waste Practice also receives the W. Wesley Eckenfelder Industrial Waste Management Medal. The above awards are typically based upon the achievements of integrated teams of environmental engineers and scientists, and further information is available on the

Academy website (<https://www.aaees.org/e3scompetition/>). In addition to these awards, the Academy sponsors several Excellence Awards presented to individuals. These include for 2020, the following:

- Gordon Maskew Fair Award – honoring one of the academic pioneers of environmental engineering and science; the 2020 Awardee is Danny D. Reible, Ph.D., BCEE, Donovan Maddox Distinguished Engineering Chair, Texas Tech University
- Edward J. Cleary Award – recognizing outstanding performance in the management of environmental protection enterprises; the 2020 Awardee is Prakasam Tata, Ph.D., BCES, Executive Director, Center for the Transformation of Waste Technology
- Stanley E. Kappe Award – in recognition of extraordinary and outstanding contributions to public awareness of the betterment of the environment; the 2020 Award-

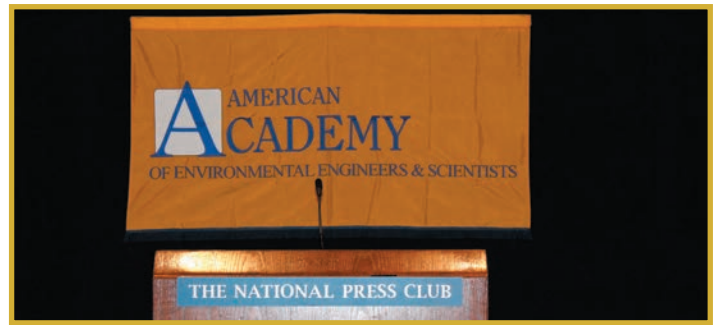


"The Academy's Excellence in Environmental Engineering and Science Awards recognize outstanding achievement in the practices of environmental investigation, understanding, and protection.

ee is Wendy A. Wert, BCEE, Environmental Engineer, Sanitation Districts of Los Angeles County, California

- AAEES Science Award – honoring an individual who is an outstanding achiever in the implementation and management of environmental science programs; the 2020 Awardee is Nancy G. Love, Ph.D., BCEE, Professor of Environmental Engineering, University of Michigan

In addition, Ann Massey will be presented the Academy Honorary Member Award, and Jimmy C. M. Kao, Ph.D., BCEE will be presented the International Honorary Member Award. Ms. Massey has over 30 year of experience in project, program and operations management, and currently serves as President of Corporate Development for Wood PLC. Dr. Kao (Board-Certified in 1998) is Chair Professor, and Director of the Institute of Environmental Engineering at National Sun Yat-Sen University in Taiwan.



Our Academy Excellence Awards to individuals, and teams of Environmental Engineers and Scientists offer each of us a challenge, and motivation, to strive for excellence!

In closing, I offer my congratulations to Academy President-Elect Dr. Lilia Abron, BCEE, for her recent election to the National Academy of Engineering. I also want to express my deepest appreciation and gratitude to each of our Board-Certified Members who serve on Academy Boards, Committees and Working Groups, and especially to the Chairs of those Boards, Committees and Working Groups, for their service to and support of the Academy and its commitment to excellence.

Jim

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Doubling Down

Have you ever thought of the Academy as a curator of knowledge? When you stop and take a moment to reflect, the concept and discussion of human knowledge is one that has been with us for quite a while. Not so much been with us as a side effect, but instead been with us as a tangible contributor to the activities that enable progress through the dissemination of knowledge. Perhaps the most important characteristic of progress is that we have learned how to combine knowledge and progress in ways that transform the world. We have learned how to capture knowledge, and in so doing, have laid the groundwork for our ability to access and exploit the knowledge-creation that is transforming the world.

However, the question remains: how do we make that translation from data to knowledge to wisdom that we've all heard about? As more people contribute their ideas and innovations to the bubbling cauldron that is our economy, it becomes apparent that a small contribution by a large group of people can be more powerful for the growth of knowledge than having one super genius whose insight was able to shake the knowledge edifice to its foundation.

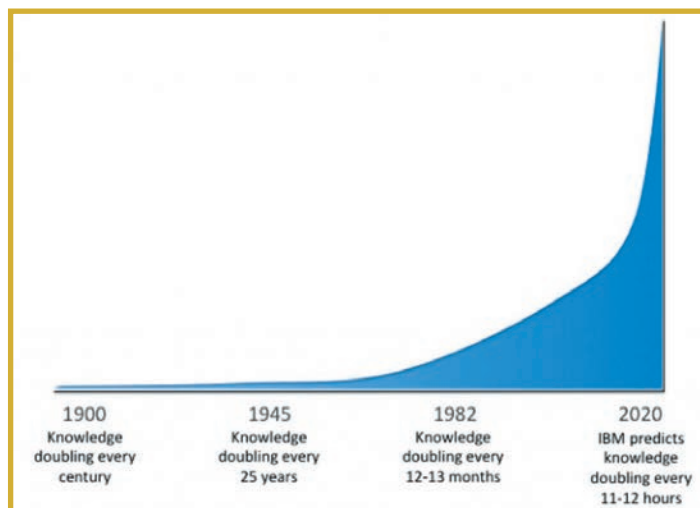
Which takes us back a few years to 1982 when Buckminster Fuller wrote a book entitled *Critical Path* that attempted to capture quantitative information on the knowledge building process. In his analysis, Professor Fuller decided, probably relatively arbitrarily, to start with the year one. From there, he had to determine what the chunks of the timeline look like for enough years to pass to have generated a doubling of human knowledge. The interesting part was that not only did human knowledge double over time, but the speed of the transformation from one era of doubling to another was accelerating. Fuller's evaluation and analysis went as follows: doubling number 1 took place over a span of roughly 1500 years. The next doubling occurred after another 250 years passed, concluding at about 1750.

This is where the knowledge party really took off. By 1900, the next doubling was accomplished; followed by another doubling by 1945. This inexorable march toward enhanced knowledge reached yet another milestone by 1982 when it was estimated that knowledge was now doubling every 12 to 13 months. The last data point in the series comes from a forecast developed by a team from IBM that was in charge of developing this construct. Their most recent analysis and benchmarking of the growth of knowledge led them to develop a forecast that projected a doubling of knowledge occurring on a 12-hour cycle by 2020.

Initially, it's a little hard to think about something that large moving that rapidly, but it doesn't sound all that far-fetched you stop and think about it. Much of it is technology driven which makes it easier to understand this aspect of knowledge

growth than pure academic research. A simple example is the growth of cell phone use in sub-Saharan Africa. In this area, there are more people who own cell phones than have electric lights in their homes. The reason is simple. The phones are being used as banks and repositories of financial knowledge rather than just data and talk generating devices. Cell phones have enabled the growth of an entire chain of commerce that is based on the knowledge captured by those simple cell phones. It is easy to see how the doubling of knowledge applies here when you go from one person with a cell phone to a village with 20 or 30 cell phones to an entire region with thousands of cell phones. Every new cell phone added to the system becomes a new repository of knowledge that enables the use of the existing network to conceive of and grow the next generation of cell phone-based commerce and industry.

So things look pretty rosy for the people who are working to take advantage of this rapid development and deployment of ideas and things that are designed and destined to make their lives easier and more prosperous. But there is an underlying challenge to the ability to continue to grow knowledge so rapidly. That is what is known as the half-life phenomenon. Put simply, the half-life of anything is described as the



amount of time it takes for a specific bit of knowledge to lose half of its value.

That bit of knowledge could be intellectual property or could be a physical item. A simple example might demonstrate how this principle works. The question is: what is the half-life of the system that Uber uses to match its vehicles and drivers to the locations where customers are waiting to take their prepaid ride? A simple point of reference for valuation is to take a look at the market capitalization of Uber - which was around \$50 billion in early March 2020. The interesting thing about Uber is that its systems are constantly being updated to enable it to capture the learnings that are available from its customers, and from its drivers as they go about their commercial missions. The half-life of the Uber system probably closely approximates that 12 hour increment that was forecast for the value of knowledge in 2020 by the IBM research team.

What we now have is a two-part system that creates knowledge, and in so doing, simultaneously destroys the value of knowledge going forward. What's interesting here is that these two countervailing forces aren't really positioned as such. Individuals working on the knowledge creation side are incentivized by the ability to capture and deploy new knowledge to address a specific market opportunity. They don't concern themselves with the fact that their work and knowledge development destroys existing markets. They are too busy building the next generation to concern themselves with the shrinking half life of yesterday's critical systems.

Okay, so we have all this tech talk kind of theoretical discourse that I'm not sure connects in any way to what the Academy does for its members. Or does it? Is it possible that the Academy and its members have an opportunity to promote the creation of knowledge-building activities across the environmental sector? Is it perhaps equally likely that the Academy and its members can also work to identify and define the half-life of existing systems?

One of the foremost challenges in dealing with this kind of a worldview is that there is no one individual or group of individuals that can hope to construct and make available to the environmental community a – for want of a better term – catalog that tracks the development of knowledge building organizations and activities.

There is probably a very good reason for that. Part of it may be that it's a fool's errand to which there is no palpable conclusion. Part of it may be that the task is so large and daunting that no one can realistically expect to gather and disperse the resources required to accept this challenge. There are a host of reasons why something like this may never get off the ground, but there are incentives out there for people willing to give it a shot. That is because the ability to identify and properly structure an understanding of the next generation of technology and systems for an entire community could find themselves with a golden goose.



"Is it possible that the Academy and its members have an opportunity to promote the creation of knowledge-building activities across the environmental sector?"

On the half-life side of the argument, there is a need to understand the forces that are driving the erosion of the value of current systems. Perhaps most valuable is the ability to put generational change onto a timeline. Mapping and establishing a timing for expected changes will be a key driver of opportunity and the ability to get a foot in the door to be part of the process of transforming existing systems.

So it should come as no surprise that humanity's ability to create and accommodate knowledge building is the reason we sometimes find ourselves on a treadmill where someone keeps cranking up the pace every 10 minutes or so. The key to long-run success is obvious, adapt to and incorporate the new; understand and divest of the old. And, oh yeah, don't forget that this is a knowledge-based contest.

So let's see if we can bring this full circle on behalf of the Academy and its members. If we pull in the knowledge-creation transfer component, where we have accepted the construct of knowledge doubling at some definable constantly changing rate, what does that tell us about the career path of environmental engineers and scientists?

Well, it is quite clearly throwing down the gauntlet for what engineers and scientists need to be able to evaluate and incorporate into their working lives. Even if we don't accept the extreme rate of change arguments, if we assume that knowledge in the environmental engineering and science areas disseminate more slowly, even if the rate of change is discovered to yield a doubling every five years, that is a lot of knowledge being dumped into the lap of a practicing engineer or scientist with minimal guidance on how to adapt and adopt this new-to-the-world knowledge.

So we know that the deluge of new information that has been building is going to inundate us on an ongoing basis.

Executive Director's Page, continued on page 12

Officer Nominees for 2021

The Academy's 2019 Nominating Committee has recommended the following slate of candidates for the 2020 ballot.

PRESIDENT-ELECT

Daniel B. Oerther, Ph.D., P.E., BCEE, BCES

VICE PRESIDENT CANDIDATES

R. Benson Pair, Jr., P.E., BCEE

David A. Vaccari, Ph.D., P.E., BCEE

TRUSTEE-AT-LARGE CANDIDATES

Leslie Lopkee Chau, BCES

David M. Gaddis, P.E., BCEE

James D. Fitzgerald, P.E., BCEE, C.E.M.

Mark Rood, Ph.D., BCEEM

CANDIDATE FOR PRESIDENT-ELECT



Professor Daniel B. Oerther, PhD, PE, BCEE, BCES is renowned for interprofessional education and community based participatory research improving access to clean water and nutritious food worldwide. He previously served as Treasurer and currently serves as Vice President of the Academy.

Dan was the first member both to be Board Certified as an Engineer (BCEE) and as a Scientist (BCES). He founded and funded the Academy's Student Team Award, and his own work was recognized by the Academy with the: 2009 Excellence in Environmental Engineering and Science (E3S) University Research Honor Award for, "Improved Water in Northwest Tanzania"; 2014 Excellence in Engineering and Science Education Award; 2016 E3S Superior Achievement Award for, "Improved Water Quality in Ixcán, Guatemala"; 2017 Pohland Medal for sustained and outstanding efforts to bridge environmental engineering research, education, and practice; 2018 Kappe Award for extraordinary and outstanding service advancing the Academy; and 2020 E3S Environmental Sustainability Honor Award for, "COAST: Caribbean Ocean and Aquaculture Sustainability

faciliTy". In 2020-2021, Dan is serving as the Kappe Distinguished Lecturer.

In addition to his leadership within the Academy, Professor Oerther is a Trustee of the Chartered Institute of Environmental Health in the United Kingdom and a Trustee and the Treasurer of the Sigma Theta Tau Building Corporation on behalf of the International Honor Society of Nursing.

Dan's accomplishments in interprofessional education include the: 2004 AEESP Award for Outstanding Contribution to Environmental Engineering and Science Education; 2019 ASEE Robert G. Quinn Award for outstanding contributions in providing and promoting excellence in experimentation and laboratory instruction; and 2019 NSPE Engineering Education Excellence Award for linking engineering education with professional practice.

Dan's accomplishments in community-based participatory research improving access to clean water and nutritious food worldwide include the: 2015 Steven K. Dentel AEESP Award for Global Outreach; 2018 AWWA Dr. John L. Leal Award for sound medical/public health expertise and courageous leadership advancing public health; and 2019 Lillian Wald Humanitarian Award from the National League for Nursing.

Voting will be conducted electronically.

Notices will be emailed to all eligible BCEEs, BCEEMs, BCESs, and AAEEs Members in May.

CANDIDATES FOR VICE PRESIDENT



R. Benson Pair, Jr., P.E., BCEE is the Chief Technology Engineer (CTE) - Environmental at KBR, Inc., an international engineering, procurement and construction company. KBR serves the hydrocarbon industry, including LNG, refining, petrochemicals and polymers, ethylene, and

fertilizer. KBR offers a number of proprietary technologies, including ammonia, ethylene and fluid cat cracking (FCC). Mr. Pair is located in the corporate headquarters in Houston, Texas. Mr. Pair has more than 46 years of industry experience, the last 30 of which is with KBR. As the Environmental CTE, Mr. Pair manages the Environmental Engineering group, supporting KBR projects around the world. The group primarily addresses air pollution control, wastewater treatment and solid waste management, from permitting and environmental approvals, through Front End Engineering and Design (FEED), to detailed design, construction, start up and commissioning. Prior to joining KBR, Mr. Pair worked for Engineering Science, Inc. in its Houston, Texas office for 16 Years. Joining Engineering Science upon graduating from Rice University, he worked his way up from his entry level engineering position to become Manager of the Houston Office.

Mr. Pair is a registered Professional Engineer in Texas, receiving his P.E. in 1980, and a Board Certified Environmental Engineer (BCEE). Mr. Pair obtained his BCEE certification in 1984 while working for Engineering-Science. Mr. Pair has focused his career on the industrial sector, being introduced to industrial wastewater treatment running bench scale and pilot scale simulation studies. He has designed grass roots treatment plants, expanded existing facilities, and assisted in trouble-shooting operating facilities. In his career, Mr. Pair has completed projects in a dozen countries. Mr. Pair has considerable experience in permitting and regulatory approval, at the local, state and Federal levels. He has worked on projects funded through international lending institutions such as Ex-Im Bank and World Bank. Mr. Pair has over 15 years of experience working on domestic LNG projects and the Federal Energy Regulatory Commission (FERC) approval process.

Mr. Pair currently serves the Academy as the AIChE representative on the Board of Trustees. He is the Board liaison to the Sustainability Committee. He is also a member of the Major Partners Committee and the American Academy of Environmental Scientists Certification Board (AAESCB). Mr. Pair



David A. Vaccari, Ph.D., P.E., BCEE is a professor of environmental engineering at Stevens Institute of Technology in Hoboken, NJ. He has a masters and PhD in environmental science and a masters in chemical

engineering, all from Rutgers University. Originally focused on wastewater treatment and water pollution, he now specializes in modeling nonlinear statistical modeling in general and modeling of global phosphorus resource flows in particular. The work in phosphorus drew from experience with NASA in the development of bioregenerative life support systems for long-term space missions, and from the development of a textbook published by Wiley, Inc., *Environmental Biology for Scientists and Engineers*. The phosphorus work also led to publishing an article on phosphorus resources in Scientific American Magazine.

He was a member of the Board of Directors of ABET, Inc., and is currently a Commissioner for the Engineering Accreditation Commission of ABET. He is currently on the Board of Trustees of AAEES and is a member and former chair of the AAEES Education Committee.


Dr. Vaccari is a licensed professional engineer, a Board-Certified Environmental Engineer, and is listed in the *Who's Who in Environmental Engineering and Science*.

has a long history of serving professional societies. He is currently a member of the Academy, AIChE, and the Water Environment Federation (WEF). Over the course of his career, Mr. Pair has served in every office of the Southeast Section of the Water Environment Association of Texas, as well as every office in the AIChE Environmental Division. He has also served on the editorial board of the AIChE publication *Environmental Progress*. He has served multiple terms as the AIChE representative on the Academy Board for a total of 12 years.

Mr. Pair received his B.A. in Chemical Engineering and his M.Ch.E. from Rice University in 1972.



Leslie Lopkee Chau, BCES is a Principal Scientist in hydrogeology at Wood Environment & Infrastructure Solutions, Inc., part of a global engineering firm headquartered in Aberdeen, Scotland. Les received a bachelor's degree in geophysics from the University of California, Berkeley and a master's degree in geology from the University of California, Riverside.



Les is currently the Principal Investigator in assessing the impacts of climate changes on the sustainable management of water resources in severely over-exploited groundwater basins in California. He is working with the U.S. Geological Society and reservoir engineers to model the reoperation of the reservoirs in managing flood control, downstream water supply, and the adaptive mitigation of the impacts of climate changes – the “new normal” of droughts and severe storm events.

Les has 23 years of experience managing large-scale groundwater resource projects with special expertise in groundwater quality assessments and regulatory compliance. Les' current regulatory work is on California Title 27 prescriptive monitoring protocols, Non-15 discharge compliance, and water quality assessments for sites with cleanup requirements.

Les is active at the local and state levels on the compliance with the 2014 California Sustainable Groundwater Management Act legislation (SGMA). He is involved with the City and County of San Francisco and County of Monterey in public education of sustainable water project planning, resiliency planning, and adaptive management of various aspects of climate change impacts. Les Chau is passionate about addressing California's water issues through public education and advancement in water technology.



James D. Fitzgerald, P.E., LSP, BCEE is a member of the Academy's Hazardous Waste Management and Site Remediation (HWMSR) Committee and is current the Committee's Chair. Much of his professional career has been as an environmental consultant focused on municipal water and wastewater consulting (with Hazen and Sawyer) and private multi-national client consulting (with ERM, Environ and Antea Group) addressing air, wastewater, hazardous waste management, and legacy site investigation and remediation needs as well as due diligence, compliance assurance and management system development assignments. He is currently developing several projects where dairy waste is converted into renewable natural gas (RNG).

If re-elected Trustee, he will continue to focus on enhancing the community's (educators, practitioners, consulting firms, and clients) awareness of the Academy's certification value proposition. Increasing Academy "brand" awareness will entice practitioners to seek certification (demonstrating their technical expertise) while also providing clients with assurance they are working with "certified" practice leaders. The Academy's future success (including financial stability) depends on the Academy being recognized as the "premiere" technical certification for environmental scientists and engineers. In addition, the Academy must be a leader in adapting to address to current and future practice needs as well as the needs of younger professionals.

Mr. Fitzgerald has a BE in Chemical Engineering and a ME in Environmental Engineering from Manhattan College. He is a licensed professional engineer in several states and a Licensed Site Professional (LSP) in Massachusetts. He is a member of several National Council of Examiners for Engineering and Surveying (NCEES) examination committees.



David M. Gaddis, P.E., PMP, BCEE, CQA is a Corporate Quality Manager at CDM Smith Inc., an employee-owned full-service engineering and construction firm founded in 1947. The Firm's focus is on providing solutions in the water, environment, transportation, energy and facilities fields. Mr. Gaddis has spent his entire 39-year career with CDM Smith.

David works with a core team to monitor the implementation and function of the Firm's ISO 9001:2015-compliant Quality Management System (QMS) and spearheads firm-wide quality initiatives. David ensures QMS process execution and client requirement awareness throughout the organization. This is accomplished through a multi-faceted auditing program, training programs and education on root cause analysis. David has also driven the development of database applications that are used to monitor metrics and a firmwide user application that consolidated all project delivery requirements.

Prior to his present engagement with corporate quality, for three decades he executed projects including study, design, construction coordination, resident engineering and start-up of facilities across the spectrum of CDM Smith's practice. He is licensed to practice engineering in 4 states and is also certified as a project management professional. Among his accomplishments, Mr. Gaddis was a member of the firm's project management training committee.

Mr. Gaddis received his BCEE certification in 2001 and became an active member of the AAEEES Excellence in Environmental Engineering Committee in 2009. He accepted the Chair in 2012. He has been the New Jersey State Representative for AAEEES since 2009.

Under his direction, several projects have received peer recognition, including The Somerset Hills Interceptor Rehabilitation, Somerset, NJ (CEC of New Jersey Grand Award 1999); Franklin Township Sewerage Authority Sewer Map Automation Project (CEC Honor Award 1999); Montclair Radium Contamination Cleanup, Montclair, New Jersey (CEC of New Jersey Excellence Award 1992); NJDEP, Camden Metropolitan Area Water Supply Feasibility Study, New Jersey (National ACEC Honor Award).

Mr. Gaddis is an FAA-licensed airplane pilot, holds a commercial deep-sea commercial diver certificate and serves his community as a trustee of the 1,000-member homeowner association where he lives. He has a daughter, Sarah, who is a young HR career professional.



Mark Rood, Ph.D., BCEEM, FAEESP, FAWMA is Ivan Racheff Emeritus Professor of Environmental Engineering and Science Program (EES) in the Department of Civil and Environmental Engineering (CEE) at UIUC. Mark is a fellow of the Air and Waste Management Association (AWMA) and Association of Environmental Engineering Science Professors (AEESP). Mark was the 2018 AAEEES Kappe Lecturer while providing 17 lectures in North America and a member of AAEEES's awards committee. He was the Chief Editor of ASCE's *Journal of Environmental Engineering* transforming the journal's submission/review of manuscripts from hardcopy to paperless. Mark was a member of AEESP's Executive Committee as treasurer while improving AEESP's membership directory. Mark was vice-president

of AWMA, chairperson of higher education committee, recipient of Lyman A. Ripperton Environmental Educator Award, Frank A. Chambers Excellence in Air Pollution Control Award, and Exceptional Education Contributor Award.

He presided the College of Engineering's Executive Committee and its Promotion and Tenure Committee. Mark was the chairperson of CEE's Promotion, Tenure Committee and Advisory Committee. He also coordinated EES. He manages a UIUC grant related to a patent as a co-inventor. Mark specializes in air quality pertaining to separation of vapors/gases from gas streams. Mark contributed to the characterization of atmospheric particulate material related to climate change and visibility. He has 196 publications with h-Index of 44.

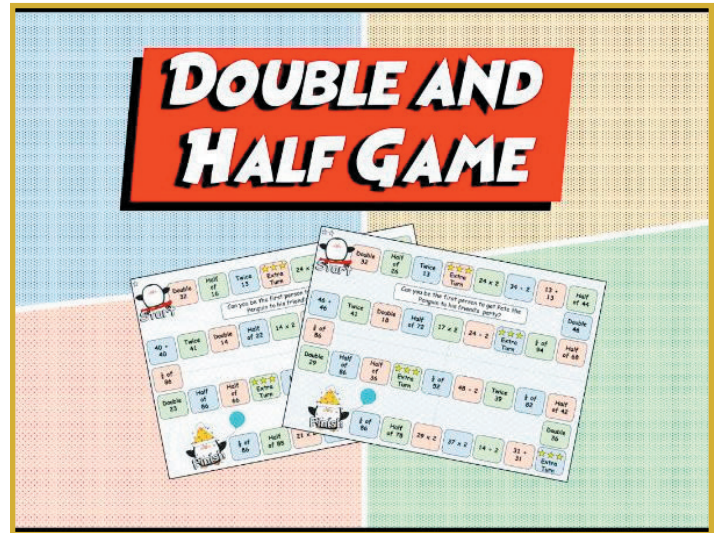
As a trustee of AAEEES, Mark will encourage more academicians to become active members of AAEEES and will actively support the management, communications and promotion of AAEEES as he did with AWMA and AEESP.

And we are going to be in charge of determining how to put that knowledge to good use in order to keep project management and customers happy. But to complete our theoretical framework, we have to introduce the notion of technological half-life. Current estimates for a technological half-life in the engineering professions run from between 2.5 to 5 years. It is noteworthy that even the experts can't seem to agree on what the magic number might be though they do know that the phenomenon is real.

What we need to concern ourselves with as Academy people is what are the impacts of the doubling/half-life on a person's professional career path? Let's look at an early career environmental professional, one who has just gotten out of college. During the time that he was learning how to become an engineer, the world has shifted. We can posit an increase in the volume of knowledge available that could be at least double the total in existence when he was first entering school. If the rate of doubling is more aggressive, let's say a doubling every year, the volume of knowledge he is responsible for mastering has grown by a factor of 16.

On the flipside of this question is the discussion about the half-life of technology and what the rate of destruction of value is over time. Here again, the actual calculations for the expected impact are a function of the assumptions we make. If we assume that the half-life is not overly aggressive, we can look at an example in which the half-life is five years. That means that the day that our budding young engineer graduates half of the trove of knowledge that he worked so earnestly to build will be irrelevant and/or obsolete. If there is a quicker half-life being used, let's say around two years, that implies that our

" Are the forces that are creating the environmental future through the doubling phenomenon effectively cleansing the system of those elements that are no longer actively able to retain value?



graduating engineer has already gone through one complete cycle of obsolescence.

Getting the Academy back into the picture, we need to take a look at what it means for an individual to be board-certified. This discussion indicates that any applicants will have gone through massive changes of knowledge-building while simultaneously going through the existing database to jettison those elements that are at the tip of the destruction of value in their technological half-life.

The dynamic is undeniable. The question that has to be investigated is whether or not the Academy's examination and eminence certification qualification activities are keeping up. Are the forces that are creating the environmental future through the doubling phenomenon effectively cleansing the system of those elements that are no longer actively able to retain value? This is a daunting task, but one that may well yield some revolutionary perspectives for the Academy and its members.

Burk



The 2020 AAEEES *Honorees*

The AAEEES Awards were established to honor and recognize distinguished environmental engineers, environmental scientists, educators, students, and professionals. Below is the criteria for each award. Profiles of this year's honorees are presented on the following pages.

GORDON MASKEW FAIR AWARD

The Gordon Maskew Fair Award honors one of the pioneers of environmental engineering. Dean Fair, in addition to his own exemplary career, spawned a living legacy during his lifetime - those that he taught are now teaching us.

Through the Fair Award, the Academy seeks to identify Board Certified Environmental Engineers, Board Certified Environmental Engineering Members, and Board Certified Environmental Scientists who have contributed to the status of the environmental engineering or science professions by exemplary professional conduct; recognized achievements in the practice of environmental engineering and science; and significant contributions to the control of the quality of the world's environment.

The Gordon Maskew Fair Award was established in 1971.

STANLEY E. KAPPE AWARD

The Stanley E. Kappe Award honors the man whose dedicated leadership, strong devotion, and tireless efforts contributed so much to the growth and advancement of AAEEES during the period he served as its Executive Director, 1971 to 1981.

This award is presented to the Board Certified Environmental Engineer or Board Certification Environmental Scientist who has performed extraordinary and outstanding service contributory to significant advancement of public awareness to the betterment of the total environment and other objectives to the Academy.

The Stanley E. Kappe Award was established in 1983.

THE AAEEES SCIENCE AWARD

The AAEEES Science Award is given to an individual who is an outstanding performer in the management and implementation of environmental science programs and projects conducted under either public or private auspices and has demonstrated exemplary professional conduct, has distinguished qualities of personal leadership, originality in

devising new management techniques for dealing with environmental issues, and sensitivity and responsiveness to the impact of social and political influences on the conduct of environmental programs.

The Science Award was established in 2018.

HONORARY MEMBER

One or more Honorary Member may be selected each year by the Academy's Board of Trustees by affirmative vote of at least two-thirds of its members. The individual so honored possesses one or more of the following characteristics has attained a position of eminence in the environmental engineering profession; has made a singular noteworthy contribution, or a sustained contribution, to the advancement of environmental engineering; or has performed outstanding service over a relatively long period of time in the advancement of the affairs of the Academy.

Honorary Members were established in 1982.

INTERNATIONAL HONORARY MEMBER

One International Honorary Member may be selected each year by the Academy's Board of Trustees by affirmative vote of at least two-thirds of its members. The individual so honored possesses one or more of the following characteristics has attained a position of eminence in the field of environmental and/or human health protection internationally or in his or her country; has made a single noteworthy contribution or sustained contribution to the advancement of environmental and/or human health protection in a specific area internationally or in his or her country; or has rendered outstanding service over a long period of time resulting in the advancement of environmental and/or human health protection internationally or in his or her country.

International Honorary Members were established in 2014.

EXCELLENCE IN ENVIRONMENTAL ENGINEERING AND SCIENCE EDUCATION

The E4S Award is granted to an educator who has made a significant contribution to the profession in the area of educating practitioners.

The Excellence in Environmental Engineering and Science Education Award was established in 2012 and is jointly administered by AAEES and AEESP.

W. WESLEY ECKENFELDER GRADUATE RESEARCH AWARD

This award is given annually to recognize an environmental engineering or environmental science graduate student whose research contributes to the knowledge pool of wastewater management. The award selection will be based on original, innovative research of publishable quality and other factors.

The W. Wesley Eckenfelder Graduate Research Award was established in 2012 and is jointly administered by AAEES and AEESP.

THE W. BREWSTER SNOW AWARD

This award is given annually to recognize an environmental engineering graduate student who has made significant accomplishments in an employment or academic engineering project.

The W. Brewster Snow Award was established in 2011 and is jointly administered by AAEES and AEESP.

PAUL F. BOULOS EXCELLENCE IN COMPUTATIONAL HYDRAULICS/HYDROLOGY AWARD

This award is given annually to recognize a student whose research contributes to the knowledge pool in the area of Computational Hydraulics & Hydrology. The award selection is based on original, innovative research of publishable quality. Both Master's and Ph.D. students are eligible.

The Paul F. Boulous Excellence in Computational Hydraulics/Hydrology Award was established in 2015 in association with AEESP and is sponsored by Dr. Paul F. Boulous, BCEEM.

EDWARD J. CLEARY AWARD

The Cleary Award is given to an individual who is an outstanding performer in the management of environmental protection enterprises conducted under either public or private auspices who have demonstrated exemplary professional conduct, personal leadership, originality in devising new environmental protection techniques and sensitivity and responsiveness to social, economic, and political factors in environmental protection.

The Edward J. Cleary Award was established in 1973.

Gordon Maskew Fair Award

Danny D. Reible, Ph.D., P.E., BCEE



Danny Reible is the Donovan Maddox Distinguished Engineering Chair and Paul Whitfield Horn Professor at Texas Tech University where he guides the development of the Maddox Environmental Engineering Research Center. Previously, he was the Bettie Margaret Smith Chair of Environmental Health Engineering and the Director of the Center for Research in Water Resources at the University of Texas in Austin. He also served as Director of the Hazardous Substance Research Center/South and Southwest, a consortium of Rice, Ga Tech, Texas A&M, University of Texas and LSU from 1995-2007, and is a Professor and Director Emeritus from LSU.

He holds a PhD in Chemical Engineering from Caltech, is a Professional Engineer (LA), a Board Certified Environmental Engineer and, in 2005, was elected to the National Academy of Engineering for "the development of widely used means of managing contaminated sediments". He was the 2017 Kappe Lecturer of the American Academy of Environmental Engineers and Scientists.

Danny has served on 8 National Academy of Science Committees leading to reports on contemporary environmental challenges and served on the Academy's Board of Environmental Studies and Toxicology. His current research is focused on sustainable management of water resources, technologies and practices for the use and reuse of brackish and produced waters, and the assessment and remediation of contaminated soils and sediments. He has authored or edited six books and more than 200 journal articles and book chapters. Research support as a principal investigator has totaled more than \$35 million.

Stanley E. Kappe Award

Wendy A. Wert, P.E., BCEE



Wendy is a Board Certified Environmental Engineer with the Sanitation Districts. For the past 20 years, she has been working on programs that rely on public participation to integrate water supply, water reuse wastewater facilities planning. She received a B.S. in environmental engineering and an M.S. in water resources engineering from the University of Central Florida (UCF). Her studies gave her opportunities to collaborate with others. It was during this time that Wendy developed an interest in effectively communicating math and science to diverse groups. Today, she uses her position as an engineer to support outreach and education programs that explain how the work of the Sanitation Districts identifies community needs then applies engineering and scientific principles to meet them.

Wendy's journey started on a farm in Pennsylvania. Her father is a Navy veteran and Her mother a retired school teacher. Wendy's mentor Debra Reinhart, Ph.D., P.E., BCEE encouraged her to join the Academy. Wendy joined in 1997 and discovered a network of peers to help meet the challenges of our field. Family and mentors continue to inspire her career.

Science Award

Nancy G. Love, Ph.D., P.E., BCEE



Dr. Nancy G. Love is the Borchardt and Glysson Collegiate Professor of Civil and Environmental Engineering at the University Michigan, and an adjunct Professor at the Institute of Biotechnology at Addis Ababa University. She has advised over 70 graduate students and post-doctoral research associates.

In collaboration with her students, Dr. Love works at the interface of water, infrastructure and public health in both domestic and global settings. The group advances public and environmental health using chemical, biological and analytical approaches applied to water systems, and co-design methods in partnership with communities. Specific projects include: evaluating the fate of chemicals, pathogens and contaminants of emerging concern in water with relevance to public health and the environment; using technologies to sense and remove these constituents; advancing technologies that recover useful resources from water, and developing approaches that enable local decision-making around water quality and resource efficiency. Their work is centered on identifying and translating fundamental understanding into practical solutions for water utilities and communities.

She has co-authored: over 100 peer-reviewed papers, chapters and reports; over 250 conference presentations; and a textbook on biological wastewater treatment. Dr. Love has held leadership positions in multiple organizations, including with the Water Environment Federation (WEF), the International Water Association (IWA), and the Association of Environmental Engineering and Science Professors (AEESP). She is a Fellow of all three organizations. Dr. Love is a licensed professional engineer (P.E.) in the state of Michigan and a Board Certified Environmental Engineer (BCEE).

Honorary Member Award

Ann Massey



Ann Massey, President of Corporate Development for Wood plc and the former CEO of Environment and Infrastructure Solutions for Wood plc, says her insatiable curiosity led her to study geology; but it was dogged determination that kept her working in that field. As interested as she was in the subject, she says she was ill prepared for the environment she encountered when she graduated and went to work in the oil field in the early 1980's. "It was the first time I realized there was definitely prejudice toward women in the oil field and in business in general. I wanted to help change that not only for myself, but others."

With that dogged determination, Ann has over 30 years of experience in project, program and operations management and business development. She has spent the last 10 years leading a Top 10 global environmental business as the former CEO of MACTEC, President of AmecFW E&I, and most recently CEO of Wood E&I. She believes her success is a result of creating high-performing teams that deliver profitable engineering, consulting and project management services to customers across the globe. Ann maintains a visible active role with several key customers, drives a customer focused culture, and mentors others, especially women in the business.

She is a leader that inspires people by example, and she is unabashed about her enthusiasm for the industry.

Ann has an BS in Geology and an MBA from Tennessee Technological University.

International Honorary Award

Jimmy C.M. Kao, Ph.D., P.E., BCEE



Prof. Jimmy (C.M.) Kao is a chair professor at National Sun Yat-Sen University, Kaohsiung, Taiwan. He is also the director of the Institute of Environmental Engineering, National Sun Yat-Sen University. Prof. Kao is the former Coordinator of Environmental Engineering Program at Ministry of Science and Technology, former President of The Chinese Institute of Environmental Engineering, and former President of The Taiwan Association of Soil and Groundwater Environmental Protection.

He received his Ph.D. degree in Civil and Environmental Engineering from North Carolina State University. Prof. Kao has more than 28 years of experiences as a researcher and environmental engineer in water treatment and reuse, water quality modeling, watershed management, soil and groundwater remediation, contaminated site characterization, wastewater treatment, natural disaster investigation, and risk assessment.

He is active in many professional organizations and he is a fellow member of International Water Association (IWA), Water Environment Federation (WEF), American Society of Civil Engineers (ASCE), an Academician of European Academy of Sciences and Arts (EASA), a fellow member of American Association for the Advancement of Science (AAAS), a fellow member of Environment and Water Resource Institute (EWRI), and a Registered Professional Engineer in the branch of Civil Engineering.

Prof. Kao received the following awards from ASCE: Rudolph Hering Medal in 2017, J. James R. Croes Medal in 2017, State of the Art of Civil Engineering Award in 2013, and Samuel Arnold Greely Award in 2012. He also received the Robert G. Wetzel Award from American Institute of Hydrology in 2016.

Excellence in Environmental Engineering and Science Education Award

Susan J. Masten, Ph.D.



Susan Masten is Professor of Civil and Environmental Engineering as well as Associate Chair of Undergraduate Studies at Michigan State University.

Dr. Masten is an award-winning faculty member who has been part of the College of Engineering for more than 30 years. She has taught both civil and environmental engineering courses at both introductory and advanced levels. She is the associate chair for CEE undergraduate studies.

Her research involves the use of chemical oxidants for the remediation of soils, water, and leachates contaminated with hazardous organic chemicals.

She served on Michigan's PFAS Scientific Advisory Committee, a science review panel that studied possible regulatory measures for per- and polyfluoroalkyl substances called PFAS or PFCs. She also has done extensive research on water quality in the City of Flint.

Dr. Masten has been the faculty advisor for the MSU chapter of Engineers Without Borders USA since the chapter's founding in 2004.

She is a past recipient of the Air and Waste Management Association Lyman A. Ripperton Environmental Educator Award.

Dr. Masten earned a B.S. in Biochemistry from Fairleigh Dickinson University; her M.S.E. in Environmental Engineering at West Virginia University; and her Ph.D. in Environmental Engineering from Harvard University.

W. Wesley Eckenfelder Graduate Research Award

Joseph E. Weaver



Joseph Weaver worked as a software engineer for nine years before attending graduate school to study environmental engineering with Drs. Francis de los Reyes III and Joel J. Ducoste. He is particularly interested in solving environmental problems through beneficial microbial behavior, and his work combines his former career as a programmer and his current training in microbial ecology.

Within the wet lab, Joe operated long-term environmental bioreactors treating wastewater and analyzed both the physical and microbial structures of their bacterial communities. In the dry lab, Joe developed and integrated software ranging across image analysis, bioinformatics, and computational fluid dynamics/biokinetics to both analyze and simulate those same communities.

Throughout his work, Joe formally mentored numerous undergraduate assistants, many of whom are now beginning their own graduate careers. As a former Boy Scout, Joe has also enjoyed assisting during annual Boy and Girl Scouts of America engineering events. He plans to continue in academia and establish a research program inspired by the material cycles of nature which closes the waste loop using biological waste treatment.

Co-Advisors:

Dr. Francis L. de los Reyes, III and
Dr. Joel J. Ducoste, BCEEM

W. Brewster Snow Award

Ashley Osler



Ashley Osler is enrolled in the M.S. Civil Engineering Program at the University of South Florida. There, she is also completing a concentration in Engineering for International Development that includes service as a water/sanitation engineer with the U.S. Peace Corps to gain technical experience and context to development work.

She holds a B.S. Civil Engineering degree from Gonzaga University. At Gonzaga, she was able to explore the intersection of social justice with engineering, and got her first exposure to international living during her time studying abroad in Florence, Italy.

At the University of South Florida, she was able to take classes in water/sanitation/hygiene (WASH) engineering, water resources, public health, and anthropology. This well-rounded curriculum allowed her to obtain research experience in the area of rainwater harvesting, modeling of nutrient flows in and out of Florida's largest lake - Lake Okeechobee, and looking into perceptions associated with the worsening Florida Red Tide blooms.

She is currently serving with the Peace Corps in Panama as a Water, Sanitation, and Hygiene volunteer within the indigenous region of the Comarca Ngäbe-Buglé. She lives in a small community of about 200 indigenous Ngäbe people and is improving both her Spanish and indigenous language skills. While there for two years, she works with local community to support construction and operation of gravity-fed water supply systems and will also complete research for her Master's thesis. She is interested in researching acceptability and taste thresholds of water from chlorinated gravity-fed aqueducts in rural Panamanian communities.

W. Brewster Snow Award

Megan E. Patterson



Megan E. Patterson will earn her Master's degree in Civil Engineering with a specialization in Environmental Engineering and Water Resources from The Ohio State University in May of 2020. Previously, she received a Bachelor's degree in Environmental Engineering from The Ohio State University.

Megan's Master's project created supplemental design criteria to the drinking water Ten State Standards for low-pressure membrane filtration, eliminating the demonstration study requirement for plan approval. This helps bridge the gap between engineering innovation and approval of technologies for drinking water treatment plants. She also established a framework to create design criteria for other emerging water treatment technologies which can make better technologies more cost effective and accessible for small and medium public water systems. Megan interacted with many stakeholders to develop these design criteria. She is chair of the committee established to provide updates to the design criteria, ensuring it does not become outdated as low-pressure membrane filtration evolves.

Megan is currently an Environmental Engineering Intern (EI) with Stantec Consulting Services. She is an active member of the American Water Works Association (AWWA), serving on the Ohio Section's Young Professional and Membership Committees and contributing on national AWWA membrane committees. She plans to continue working in water and wastewater treatment while pursuing PE licensure.

Paul F. Boulos Excellence in Computational Hydraulics/Hydrology Award

Jonathan L. Bradshaw, Ph.D.



Jon's professional goal is to improve environmental management decisions. Toward that goal, he develops and applies computational tools to inform decisions about water and energy systems.

Currently, Jon is a Senior Strategic Analyst at Pacific Gas & Electric (PG&E) in San Francisco, California. In that role, he develops and applies models to forecast the adoption of emerging energy technologies, namely rooftop solar, battery storage, and electric vehicles. His team works with groups across PG&E and the California Energy Commission to plan the state's transition toward a carbon-free energy future.

Prior to joining PG&E in October 2019, Jon had been conducting research at Stanford University since 2013. As part of the ReNUWIt NSF Engineering Research Center at Stanford, Jon collaborated with several water utilities to build and apply new modeling tools that improve water reuse infrastructure planning. From 2010-2013, he worked in environmental consulting in the Washington, DC, area. Jon has published several articles on water and energy system modeling in peer-reviewed journals and industry publications.

Jon works to advance diversity and inclusion, particularly within technical fields, through leading and joining various initiatives at Stanford and PG&E.

Jon has earned BS, MS, and PhD degrees in Civil & Environmental Engineering from Princeton University and Stanford University. He also holds an MS in Management Science & Engineering from Stanford.

Advisors:

Dr. Richard Godfrey Luthy, P.E., BCEE

Edward J. Cleary Award

Prakasam Tata, Ph.D., BCES



Professor Emeritus Prakasam Tata, Ph.D., has dedicated more than 65 years to water conservation and water management.

Born in Andhra Pradesh, India, Dr. Tata received his BS in Chemistry at Andhra University in Vizianagaram, India and his MS in Biochemistry from Nagpur University in India. He began his Ph.D. at Nagpur University at the age of 19, but temporarily halted his studies after receiving an invitation to apply for a research assistant position at the All India Institute of Hygiene & Public Health in 1951.

At that time, he was advised to gain expertise in water and waste management. He was further encouraged on his new path by his mentor at Nagpur, Professor M.C. Nath, who pointed out to him how people were dying from diseases as a result of water pollution.

Prakasam Tata reached the United States in 1962 and earned his Ph.D. in Environmental Sciences from Rutgers University. After teaching at Cornell University, he received an invitation from the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). He retired as the Head of the R&D Division and Assistant Director of the R&D Department at MWRDGC in 2002. Every year since his retirement, Dr. Tata visits India in a volunteer capacity as an expert on water and waste management.

He has co-authored four books and published more than 150 reports and papers related to Environmental Engineering and Science.

Dr. Tata currently serves as the Executive Director of Center for Transformation of Waste Technology, which is a not-for-profit organization in the State of Illinois.

In 2019, he was presented with the Ellis Island Medal of Honor. This distinguished award honors the contributions and good works of immigrants.



AWARDS AND RECOGNITION

National Academy of Engineering

Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to “engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature” and to “the pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education.” Election of new NAE members is the culmination of a yearlong process. The ballot is set in December and the final vote for membership occurs during January.

Individuals in the newly-elected class will be formally inducted during a ceremony at the NAE’s annual meeting in Washington, D.C., on October 4. Several AAEES Board Certified Environmental Engineers are among the new class.



Dr. Lilia A. Abron, P.E., BCEE, was selected for her leadership in providing technology-driven sustainable housing and environmental engineering solutions in the United States and South Africa. Dr. Abron is Chief Executive Officer, President, and Founder of PEER Consultants, P.C.

She is the 2020 AAEES President-Elect and has been a Board Certified Environmental Engineer in General Environmental Engineering since 2004.



Eleanor Allen, P.E., BCEE, was selected for her leadership and advocacy in making clean water and sanitation systems accessible to people around the world. Ms. Allen is Chief Executive Officer of Water for the People and has been a Board Certified Environmental Engineer in Water Supply and Wastewater Engineering since 2014.



Paul L. Freedman, P.E., BCEE, was selected for his development and application of science-based computer models for watershed assessment, remediation, and management. Mr. Freedman is co-founder and Chief Executive Officer of Limno-Tech and has been a Board Certified Environmental Engineer in Water Supply and Wastewater Engineering since 1989.

NACCHO Climate Change Workgroup

Charles R. Stack, MPH, BCES, serves as a Subject Matter Expert volunteer to the National Association of County and City Health Officials (NACCHO) and recently had a meeting of the NACCHO Global Climate Change Workgroup to develop policy initiatives



Rep. Bill Foster (D-IL) and Charles Stack, MPH, BCES, Member of NACCHO Climate Change Workgroup

addressing the public health impacts of climate change.


As part of NACCHO, Mr. Stack met with the Illinois delegation including Rep. Bill Foster (D, 14th District), Senator Richard Durbin and Senator Tammy Duckworth, and their staff, to educate lawmakers on the public health effects of climate change in the communities they serve and to advocate for climate change programs at the CDC. NACCHO members described to lawmakers the health impacts of the climate crisis affecting their communities, including wildfires in California, massive flooding in the mid-west, and extreme heat events that cause poor air quality, injury, and death.

NACCHO supports increased funding for the CDC Climate and Health program and the passage of the Climate Change Health Protection and Promotion Act (H.R. 1243/S.523) to provide federal leadership to address the public health effects of climate change.

Mr. Stack is Vice-President, CTO at NeoChloris, Inc. He has been a Board Certified Environmental Scientist in Sustainability Science since 2017.

Jennifer Osgood Named IUVA President-Elect

Jennifer Osgood, P.E., PMP, BCEE, has been named President-Elect of the International Ultraviolet Association (IUVA). She was elected by the IUVA Board of Directors and served as secretary for the past two years. She will officially take office as President in 2021.

Ms. Osgood, Associate at CDM Smith, has been a Board Certified Environmental Engineer in Water Supply and Wastewater Engineering since 2006. 

2020 *Excellence* in Environmental Engineering & Science™

The Excellence in Environmental Engineering and Science® competition exists to identify and reward the best of today's environmental engineering and science projects. Its criteria define what it takes to be the best in environmental engineering and science practice: a holistic environmental perspective, innovation, proven performance and customer satisfaction, and contribution to an improved quality of life and economic efficiency.

The 2020 entrants to the competition provide a clear indication of the trajectory of modern environmental practice. On the one hand, engineers and scientists continue to advance the exploitation of computers to enable more realistic modeling of naturally-occurring phenomena, more accurate and more timely mapping and monitoring, and more precise control of processes thereby providing increased effectiveness and efficiency. At the same time, there is also greater beneficial use of natural ecosystems, sometimes improving upon existing conditions and sometimes creating conditions that replicate nature. Increasingly, engineers and scientists are part of a team with total project responsibility from concept and design through construction and ultimately operations and management of these innovative environmental projects.

Those chosen for prizes in 2020 by an independent panel of distinguished experts, addressed the broad range of modern challenges inherent in providing life-nurturing services for humans and protection of the environment. They are but a small percentage of the many

projects involving environmental engineers and scientists around the world. Nevertheless, their innovations and performance illustrate the essential role of environmental engineers and scientists in providing a healthy planet. These award winners testify to the genius of humankind and best exemplify the Excellence in Environmental Engineering and Science criteria.

One Grand Prize is awarded in each category. Honor Awards are presented to other deserving entries, as determined by competition rules, in each category. The Superior Achievement for Excellence in Environmental Engineering and Science is awarded to the overall best entry in each year's competition.

In commemoration of the 50th Anniversary of the 1970 Clean Air Act, the E3S competition encouraged the submission of Clean Air process (and its variants) projects in all of the categories. These projects were judged within their submitted category and also in a new one-time only category "50th Anniversary of the 1970 Clean Air Act". The winning project in this category would also earn a Grand Prize

The Grand Prize winner for the Clean Air Act was also the Superior Achievement Award winner: Sanitation Districts of Los Angeles County for their project, Tulare Lake Compost.

Full profiles of this year's winning projects can be located online at <https://www.aees.org/e3scompetition/>.

Thank you to our 2020 E3S Panel of Judges

- | | |
|--|------------------------------------|
| ➤ Jack Bryck, P.E., M APSC., BCEE | ➤ James Law, P.E., BCEE |
| ➤ Majid A. Chaudhry, Ph.D., P.E., BCEE, F.ASCE | ➤ Lin Liang, P.E., BCEE |
| ➤ Rui DeCarvalho, P.Eng., BCEE | ➤ Jose A. Marti, P.E., DEE |
| ➤ Vinio Floris, P.E., BCEE | ➤ Colin McKenna, P.E., BCEE |
| ➤ Jerome B. Gilbert, P.E., NAE, BCEE | ➤ Clark McWilliams, P.E. |
| ➤ Georgine Grissop, P.E., BCEE | ➤ Kevin Morris, P.E., BCEE |
| ➤ David S. Harrison, P.E., BCEE | ➤ Jerry K. Snyder, P.E., DEE, DWRE |
| ➤ David Jenkins, P.E., BCEE | ➤ Thomas G. Sprehe, P.E., BCEE |
| ➤ Wendell Chris King, Ph.D., P.E., BCEE | ➤ Wendy A. Wert, P.E., BCEE |
| ➤ Raghunatha Komaragiri, P.E., BCEE | |



2020 Excellence in Environmental Engineering & Science™

Superior Achievement Award

Tulare Lake Compost: Attaining Sustainability in a Nonattainment Area

KINGS COUNTY, CALIFORNIA

ENTRANT: Sanitation Districts of Los Angeles County
ENGINEER IN CHARGE: Robert C. Ferrante, P.E., BCEE

The Sanitation Districts of Los Angeles County (Sanitation Districts) have developed the Tulare Lake Compost (TLC) facility in Kings County, California. TLC combines agricultural and green waste from the Central Valley with biosolids from Los Angeles County to produce compost, which is applied to farmland adjacent to the composting facility or delivered to local farmers to improve crop yields and soil quality. The facility does all this while minimizing air quality impacts in an area that is not meeting air quality goals. The facility integrates wastewater and biosolids management with soil rehabilitation, agricultural operations, and air quality improvements.

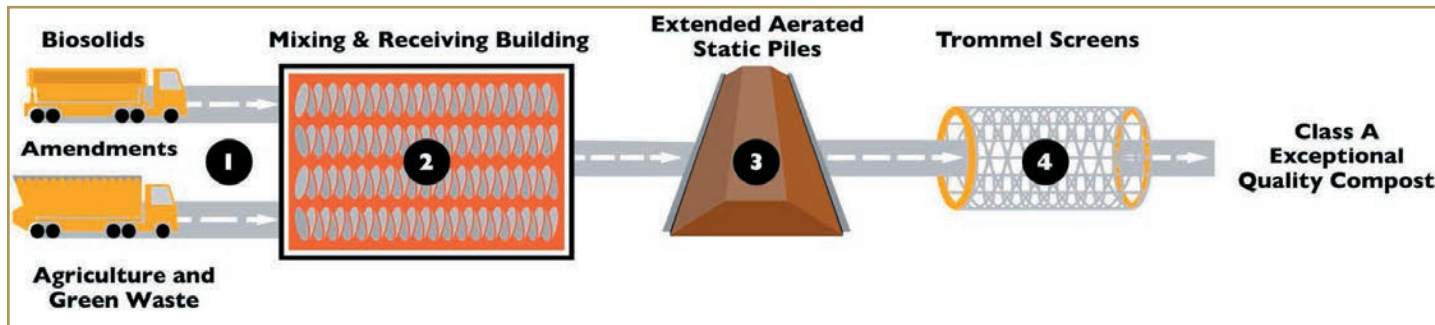
This project uses an innovative composting method to convert up to 500,000 wet tons per year of biosolids and up to 300,000 tons per year of agricultural wood waste into a nutrient-rich soil amendment. Agricultural wood waste is diverted from open burning and converted into valuable compost through sustainable operations that protect regional air, soil and water resources.

Diverting agricultural wood cuttings away from open burning helps the region achieve air quality goals by providing a sustainable alternative use. The innovative process used at the TLC produces compost that meets the EPA's Class A Exceptional Quality requirements and has no agricultural use restrictions.

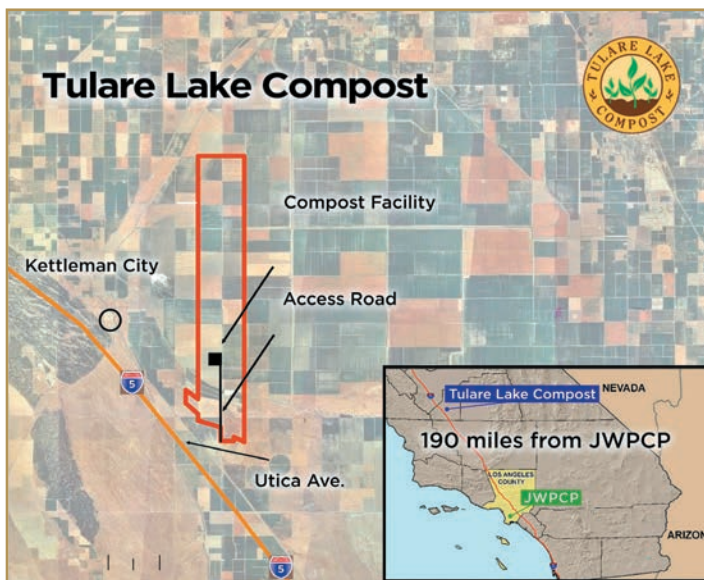


Tulare Lake Compost began operation in 2016.

"This project demonstrates the feasibility of using a modified composting process to convert biosolids, agricultural waste and green waste materials into valuable compost," said Robert C. Ferrante, Chief Engineer and General Manager for the Sanitation Districts. "TLC demonstrates how solid waste, wastewater and agricultural management can work together to address issues of major concern as California and the nation seek to improve air quality, while simultaneously beneficially reusing organic materials from the wastewater treatment process and agricultural green waste from nearby farms," he added.



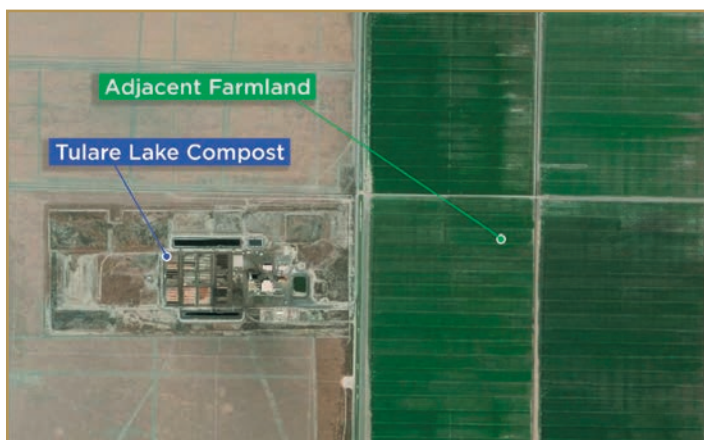
The Tulare Lake Composting process protects the environment



Tulare Lake Compost, located in California's Central Valley, serves a key role in the Sanitation Districts comprehensive biosolids management program. TLC supports nutrient recovery from the Sanitation Districts largest Resource Recovery Facility, the Joint Water Pollution Control Plant (JWPCP).



The process logic controller (PLC) also controlled a zoned irrigation system to control cap temperatures which insures low emissions. Irrigation was upgraded to cloud-based server controlled by mobile phone to facilitate remote and after hours control of the irrigation system.



The Sanitation Districts have purchased approximately 14,500 acres of the agricultural land shown here in this slide. The proposed compost facility will encompass 175 acres of land.



TLC's Administrative Office Building is LEED (Leadership in Energy and Environmental Design) Certified.



Productive Tulare Lake Compost neighboring farmland receives nutrient rich compost, which enhances water and soil conservation and improves crop yields.



Finished nutrient rich compost ready for land application on Tulare Lake Compost neighboring farms to improve soil retention, water retention, and crop yields. Compost diverts regional agricultural wood cuttings (citrus and nuts) from open field burning helping the region achieve air quality goals.

2020 Excellence in Environmental Engineering & Science™

Design Grand Prize

Stormwater and Deicing Capacity Projects

INDIANAPOLIS, INDIANA

Entrant: Wessler Engineering
Engineer in Charge: William J. Leber, P.E.

In January 2018, FedEx announced a seven-year, \$1.5 billion hub expansion at their Indianapolis facility. In anticipation of this announcement, the Indianapolis Airport Authority (IAA) selected Wessler Engineering (in partnership with 18 subconsultants) to design and construct the Stormwater and De-icing Capacity project.

Improvements included more than 100 million gallons of lined storage in earthen basins, a 10-million-gallon underground storage tank, three tunnels under Interstate 70, more than 50 million gallons per day (MGD) pumping capacity and more than two miles of piping.

Time-tested technologies applied in creative scenarios accomplished the main project objectives of transport, storage and management of stormwater and de-icing runoff from both existing and planned development areas while ensuring all discharged stormwater met the Airport's National Pollutant Discharge Elimination System (NPDES) permit requirements.

When temperatures drop below freezing, airport personnel use aircraft de-icing fluid (ADF) to remove and/or prevent ice from forming on planes. The primary component in ADF is propylene glycol, a non-toxic organic compound that exerts a significant oxygen demand as it degrades. Nearby streams and groundwater needed to be protected from ADF-laden runoff.



108" Tunnel under I-80

The Wessler Engineering team implemented “tried and true” technologies from water and wastewater projects, but redesigned them to meet the IAA project's needs, including mixing technology. This project used large-bubble compressed air mixing to provide complete mixing of the runoff in each basin while creating a waterfowl deterrent, marking the first time this particular air-mix system was used for that purpose.

Sustainable design features of the project included providing recycling opportunities, pump minimization and energy efficiency. Runoff rates to the Seerley Tank can exceed 65 MGD. Pumping that amount of stormwater runoff under Interstate 70 from the Seerley Tank to the Hanna basins would require a significant amount of energy. But with the innovative design implemented, a 78-inch pipe from Hanna fills the first 15 feet of the 30-foot deep basins by gravity with pumps filling the remaining 15 feet.

For many rainfall events, no pumping will be required aside from discharge to the Indianapolis Sanitary Sewer System. IAA personnel can override the system and manually manage the runoff streams based on the weather, basin levels, flow rates and total organic carbon (TOC) readings provided by online analyzers.



Ariel view of Hanna basins

2020 Excellence in Environmental Engineering & Science™

Design Honor Award

Middlefield-Ellis-Whisman Superfund Study Area

MOUNTAIN VIEW, CALIFORNIA

Entrant: Geosyntec Consultants, Inc.
Engineer in Charge: Eric Suchomel, Ph.D., P.E.

Cleanup of legacy environmental contamination at the Middlefield-Ellis-Whisman Superfund Study Area (Study Area) in Mountain View, California has been ongoing since the 1980s under the oversight of the United States Environmental Protection Agency (USEPA). For the past decade, Geosyntec has worked closely with the USEPA and multiple stakeholders to meet remedial requirements of the Study Area and facilitate land use improvements at the site.

The footprint of the Study Area is approximately one square mile, including former semiconductor manufacturing facilities and the former Naval Air Station Moffett Field. Of primary concern are impacts to groundwater and the potential for impacts to indoor air from various chlorinated volatile organic compounds. To address the impacted environmental media at this highly complex site, Geosyntec has worked to update and optimize the groundwater monitoring and treatment program, develop a proactive approach to assess and address the potential for vapor intrusion into existing or planned residential and commercial buildings, and modified existing treatment system components to facilitate development.

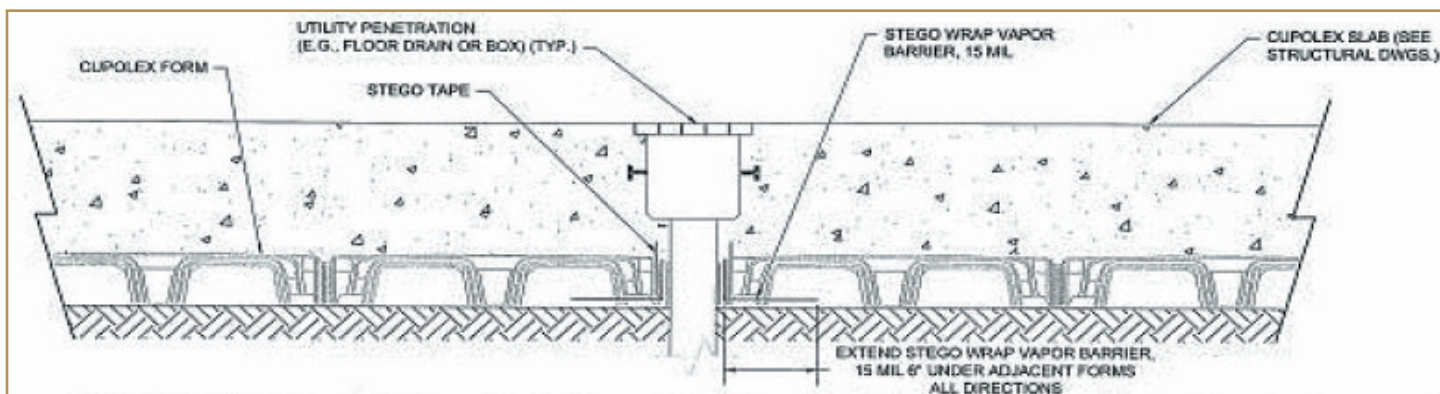
This work has included outreach to project stakeholders, including the regulatory community, to discuss the technical challenges at the Study Area. These efforts have increased trust between the responding parties and key stakeholders and led



Geosyntec implemented an *in situ* chemical oxidation (ISCO) pilot study current with property redevelopment. A novel oxidant formulation was mixed onsite and injected via a manifold into multiple wells. Construction of an aboveground parking structure is ongoing in the immediate vicinity of the injections.

to community support and acceptance of the current remedial approaches and continued redevelopment of the area.

As a result of Geosyntec's efforts since 2008, the area has continued to grow and develop into a mixed-use area supporting single family homes, multi-family residential units, commercial, industrial, and educational facilities. USEPA considers this Study Area a model of beneficial reuse of Superfund Sites; the Study Area was a case study on encouraging private investment to support redevelopment in the recent report from the 2017 Task Force commissioned to provide recommendations for expediting Superfund cleanups.



Geosyntec designed and oversaw construction of passive sub-slab venting systems using aerated floors with wind turbines, an innovative, green and sustainable technology, in new residential structures. This design detail shows the forms that comprise the aerated floor while acting as molds for the overlying concrete.

2020 Excellence in Environmental Engineering & Science™

Environmental Sustainability Grand Prize

Success of an Integrated Approach for Groundwater Clean-up Beneath an Urban University Campus

CAMBRIDGE, MASSACHUSETTS

Entrant: Geosyntec Consultants, Inc.
Engineer in Charge: Carl Elder, Ph.D., P.E.

In 2008 while preparing to construct a new building, Harvard University discovered cleaning fluids from a nearby dry cleaner below their campus, including over the footprint of the new building. Harvard University needed to resolve this situation quickly, so they assembled a premier team of engineers and consultants - including Geosyntec Consultants and Haley and Aldrich - to develop an innovative and aggressive approach to remove this contaminant from the subsurface.

Geosyntec's unconventional approach included designing and implementing distinct and complementary remedies for the various complex urban regions of the site, which included parts of the campus, city street and adjacent properties. The remedies included a mixture of targeted soil excavation, protection against vapors, targeted groundwater extraction, enhanced attenuation, and *in situ* enhanced bioremediation. *In situ* enhanced bioremediation is a passive, destructive, and low-energy technology that uses bacteria to convert the dry cleaning fluids into benign components (i.e., carbon and chloride) – this ap-

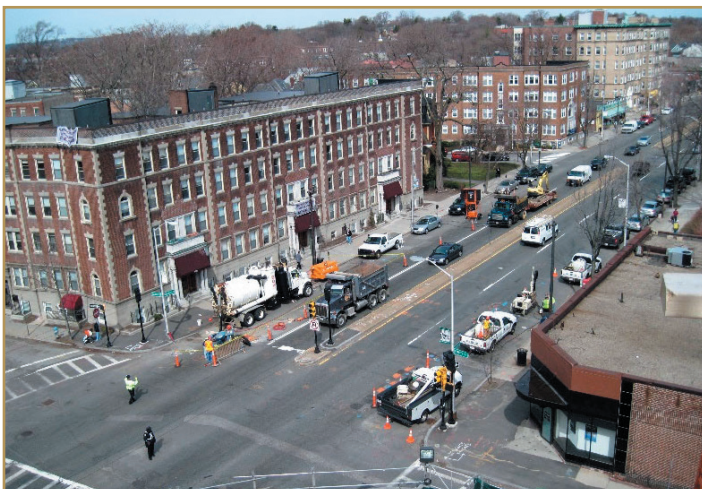


7 Years Later. The groundwater treatment system operated continuously for the above 7 years. Modifications were made over the years as adjustments to treatment were needed.

proach was selected as the main, long-term technology used to destroy contaminant mass.

Geosyntec's multifaceted remedy and innovative techniques impacts in groundwater by more than 99.9% and below Massachusetts cleanup levels.

Project accomplishments in terms of sustainability are impressive. The bioremediation remedy that was used destroyed the vast majority of PCE mass using biological (zero energy) methods. The remedy was also water neutral in that all groundwater pumped from the site to control hydraulics was re-injected, so the project had no off-site discharges. Electrical demand from the project was minimal, consisting of several small fans for vapor intrusion mitigation and three small (<1 HP) groundwater pumps. The project also had zero health and safety incidents during its 10-years. Perhaps most impressive is the public/social benefits gained from this project - this decade-long project caused no disruptions to Harvard capital improvements, operations or student life, and was virtually invisible to the thousands of students, staff, faculty and the community members who work and live in this area.



Overview of Bioremediation. Aerial view of one work area from the top of the new building. Former dry cleaner is shown on the lower right. Bioremediation amendment delivery can be seen on eastbound and westbound lanes of Massachusetts Avenue.

2020 *Excellence* in Environmental Engineering & Science™

Environmental Sustainability Honor Award

City of Virginia Beach Stormwater Management and Flood Mitigation Planning Project

VIRGINIA BEACH, VIRGINIA

Entrant: CDM Smith

Engineer in Charge: Gary St. John, P.E., BCEE

The City of Virginia Beach partnered with engineering firm CDM Smith, Inc., to evaluate the City's existing stormwater management system (SMS) and develop comprehensive flood mitigation plans. Several of the City's neighborhoods have experienced detrimental effects from heavy rain events combined with sea level rise. With limited SMS capacity and downstream tidal conditions in low-lying and coastal areas, the City developed a multi-year program of projects to comprehensively address flooding and strengthen its resiliency for the future.

The complex and longstanding issues required an integrated approach from the engineering team. Weaknesses of the SMS included aging drainage infrastructure from the 1950s and 1960s, inadequate stormwater pipe capacity and lack of stormwater storage. In order to devise a plan to mitigate flooding, CDM Smith and the City collected data and researched the historic rain events and problem areas. Neighborhoods in focus were The Lakes, Princess Anne Plaza and Windsor Woods. The data was comprised of input from residents in the City's storm complaints database, photographs of flooding during actual rain events and estimated peak flooding depths based on the photographs.

Sufficient data allowed precise calibration of hydrologic and hydraulic (H&H) models created for each neighborhood. These models predicted where flooding problems will persist and arise with simulated 5-, 10-, 25-, 50- and 100-year design storms in various sea level rise and downstream tidal boundary conditions.



The Windsor Woods stormwater pump station located on Thalia Creek will lower upstream water levels prior to storm events and provide up to 750 cubic feet per second (cfs) of capacity to maintain water levels to meet the established level of service.

With this information, the City was able to confidently invest in infrastructure improvement projects. CDM Smith's neighborhood-specific mitigation plans are available on the City's website and outline several alternative actions to reduce flooding. Evaluations of each alternative considered cost and their ability to meet the following goals: limit peak stages to three inches of water or less above the road crown for the 10-year design storm, and prevent flooding of structures for the 100-year design storm.

This project was a key component of the City's overall plan to strengthen its resiliency to protect the environment, improve quality of life and overall safety in the area, and limit economic impacts. As proved by Hurricane Matthew in October 2016, which damaged roughly 2,000 structures to the tune of about \$30 million, one intense storm can be devastating. These studies and designs equipped Virginia Beach with targeted and informed action plans to better prepare for the future climate.



CDM Smith reviewed photos documenting the event and estimated peak flood depths at multiple locations. For calibration, model results were compared with estimated flood depths derived from photos of observed water levels. To achieve calibration, model parameters were adjusted to achieve a strong match between observed flood depths and model simulated flood depths.

2020 Excellence in Environmental Engineering & Science™

Environmental Sustainability Honor Award

COAST: Caribbean Ocean and Aquaculture Sustainability facility

CARIBBEAN SEA

Entrant & Engineer in Charge: Daniel B. Oerther, Ph.D., P.E., BCEE, BCES

COAST, the **C**aribbean **O**cean and **A**quaculture **S**ustainability facility, was designed by Professor Daniel B. Oerther with funding from the United States Department of State and in consultation with the World Bank.

COAST is the first-ever parametric insurance policy designed to simultaneously protect food and nutrition security while promoting sustainable development of marine capture fisheries throughout the Caribbean. Governments purchase COAST from CCRIF SPC (Caribbean Catastrophe Risk Insurance Facility). After a severe weather event and a pay out from CCRIF SPC, governments distribute cash benefits directly to individual fishers who have registered with their governments ahead of the annual hurricane season. COAST promotes sustainable development by formalizing the fisheries sector.

Three pillars – fishing, farming, and tourism – support the economies of the 31 countries and dependent territories of the Caribbean Sea. Culturally, artisanal marine capture fishing is

arguably the single most distinctive trait, which binds together the shared identity of small island states (i.e., Dominica) and the coastal Caribbean nations of Central America (i.e., Belize) and South America (i.e., Guyana and Suriname).

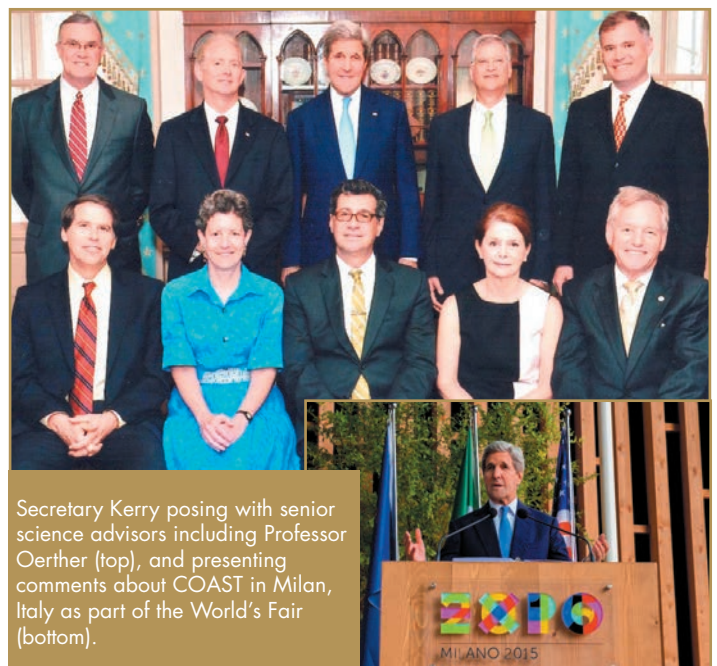
Currently, there is no other facility anywhere else in the world that provides the benefits of COAST.

In his remarks at the October 2015 World's Fair in Milan, Italy, United States Secretary of State, the Honorable John F. Kerry remarked that: *"It's[COAST] the first initiative that actually gives an incentive to governments to adopt climate-smart practices for the fisheries sectors while also protecting fishers against weather and climate-related risk."*

In the summer of 2019, the countries of Grenada and Saint Lucia were the first to purchase a COAST policy from CCRIF SPC. Professor Oerther plans to expand COAST to provide insurance coverage to nearly 300,000 artisanal fishers throughout the 31 nations and overseas territories of the Caribbean Sea.



During the design of COAST, Professor Oerther travelled extensively throughout the nations of the Caribbean Sea to meet with fishers (top) and vendors (bottom) as part of the stakeholder engagement.



Secretary Kerry posing with senior science advisors including Professor Oerther (top), and presenting comments about COAST in Milan, Italy as part of the World's Fair (bottom).

2020 Excellence in Environmental Engineering & Science™

Planning Grand Prize

Climate Resiliency and Adaptation Plan

FOUNTAIN VALLEY, CALIFORNIA

Entrant: Orange County Sanitation District
Person in Charge: Nasrin Nasrollahi

While wastewater facilities have been designed for static design conditions in the past, climate change has ushered in a new paradigm of facility design and emergency preparedness. The Orange County Sanitation District (OCSD) Climate Resiliency and Adaptation Plan is one of the first projects in California and Orange County specifically to integrate the implications of climate change into improved design standards, emergency preparedness, and facility operations for the future.

The main obstacle involved with developing a Climate Resiliency and Adaptation Plan is that climate resiliency is a relatively new field, with few examples available for how to integrate the findings of climate scientists into wastewater facility design, operations, and emergency preparedness. This obstacle was overcome by working with a multidisciplinary team to develop innovative solutions while referencing the latest developments in climate science and emergency preparedness.

To minimize the risks posed by climate change, OCSD conducted a study that involved assessing the risks posed by climate change and developing adaptations to mitigate those risks. OCSD evaluated natural hazards that are exacerbated by climate change such as flood risk.



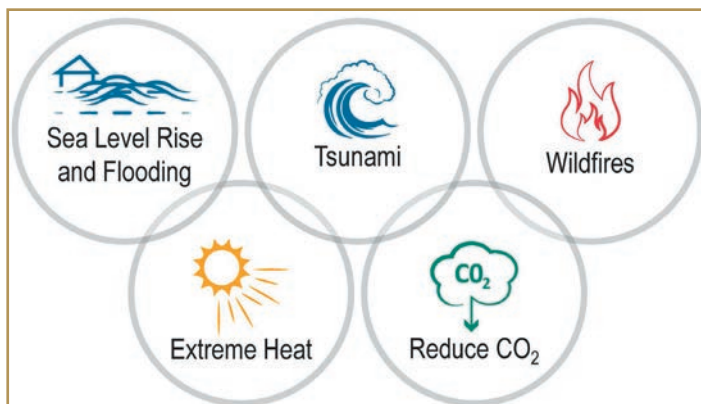
OCSD reviewed several key climate data and projections from international to regional level and used the latest published California's 4th Climate Change Assessment as the basis of future projections.

Through multi-criteria analysis, the adaptations that protect the highest value of assets while providing a high level of reliability, minimal deployment requirements, and few impacts on operability were identified.

While some regional water quality control boards are beginning to require climate resiliency plans for the National Pollutant Discharge Elimination System (NPDES) permit renewal, OCSD took the initiative to develop a climate resiliency and adaptation plan far in advance of the NPDES permit renewal in order to integrate climate resilience into the ongoing capital improvement plan to maximize public, staff, and environmental health and safety. As a result, climate resilience can be achieved while maintaining OCSD's progress on the entire collection system and reclamation facilities.



Current 100-year FEMA flood map around OCSD Treatment Plant No. 2 in Huntington Beach.



Several climate forces that impact OCSD's service area were considered in this study including sea level rise, tsunamis, wildfires, extreme heat, and reducing greenhouse gas emissions.

2020 Excellence in Environmental Engineering & Science™

University Research Grand Prize

Hybrid Adsorption Biological Treatment System (HABiTS) for Nitrogen Removal in Onsite Wastewater Treatment

TAMPA, FLORIDA

Entrant: University of South Florida

Engineer in Charge: Sarina J. Ergas, Ph.D., P.E., BCEE

Foreground Justine Marshall (MS). Left to right: Dr. Sarina Ergas (PI), Michelle Henderson (MS), Zachary Carroll (BS), Amulya Miriyala (MS), Karl Payne (PhD), Laura Rodriguez-Gonzalez (PhD).



Engineering students led by USF professors, Sarina Ergas, Kebeab Ghebremichael and James Mihelcic, Hillsborough County Water Resources Department and Hazen & Sawyer Engineering teamed together for their project, Hybrid Adsorption Biological Treatment System (HABiTS) for Nitrogen Removal in Onsite Wastewater Treatment.

About one third of the wastewater in Florida is treated in septic systems, which contribute to harmful algal blooms, loss of sea grass, fish kills, nitrate contamination of well water, and other problems affecting Florida's health, environment and economy. It is not always practical to centralize septic systems because of the high cost of building sewer systems in suburban and rural areas. Advanced onsite wastewater treatment systems have been developed, but these systems are expensive and often fail because they are difficult for homeowners to operate and maintain.

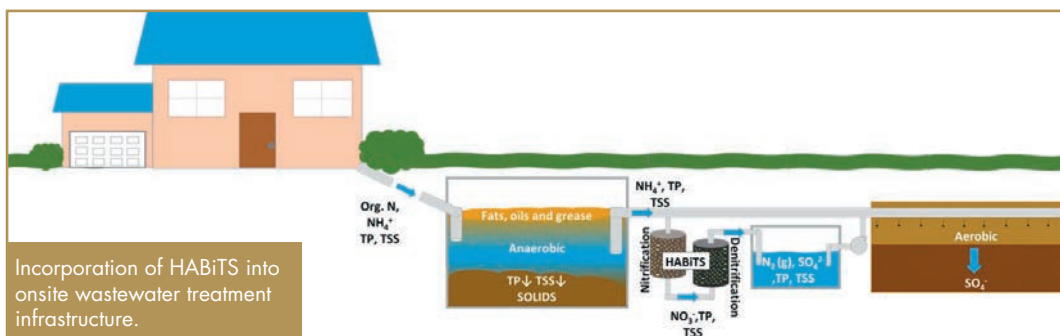
With funding from a USEPA Nutrient Research Center grant, the USF team developed "passive" biofilters that are easy to operate and maintain and can be retrofit into existing septic system infrastructure. The key to the success of the USF HABiTS process is the use low cost materials, such as clinoptilolite (which is used in cat litter to adsorb ammonia), elemental sulfur pellets (a by-product of petroleum refining) and waste tire scrap and crushed oyster shells. These materials support the growth of microbes that convert ammonia in sewage to harmless nitrogen gas. The reason these materials work better than conventional

biofilter materials is that they adsorb nutrients

when water use in the home is high, such as when everyone wakes up and goes to the bathroom, and desorb nutrients when water use is low, such as at night when everyone is sleeping. This allows the microbes in the biofilters have a steady food supply rather than being overloaded in the morning or starving at night.

The team tested their concept in the USF Environmental Engineering laboratories by comparing the novel materials with gravel in small-scale biofilters. In cooperation with Hillsborough County Water Resources Department, the team built a pilot plant (about 10% of the size needed for a 3 bedroom home) and operated it at the Northwest Regional Water Reclamation Facility in Citrus Park. The team showed that HABiTS could consistently achieve advanced secondary wastewater standards with low energy and maintenance costs and without requiring any chemical additions. By adding a simple table chlorine feeder, the treated wastewater was clean enough to be reused for onsite irrigation. This has the potential to reduce the impacts of septic systems on the environment while reducing utility bills for homeowners.

HABiTS biofilters can also be used in developing countries that lack sanitation facilities. The project trained undergraduates and graduate engineering students to develop sustainable solutions to important, social, environmental and economic problems.



2020 Excellence in Environmental Engineering & Science™

University Research Honor Award

REMChlor-MD Groundwater Contaminant Transport and Remediation


CLEMSON, SOUTH CAROLINA

Entrant & Person in Charge: Ronald W. Falta, Ph.D.

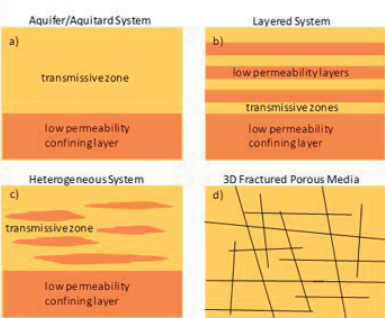
In the 274 years since founding father Ben Franklin wrote that for Poor Richard's Almanac, the inability to access clean water has come to have more to do with contaminants than a dry well.

According to the Groundwater Foundation, there are thought to be over 20,000 known abandoned and uncontrolled hazardous waste sites in the U.S., and the numbers grow every year. These sites can lead to groundwater contamination if there are barrels or other containers laying around that are full of hazardous materials. It is estimated that more than 10 million storage barrels containing different substances are stored underground in the United States. Over time, storage containers can erode, resulting in contaminants moving through the soil and reaching the groundwater, making it unfit for human use.

Ronald W. Falta, Jr. professor of hydrogeology in Clemson University's environmental engineering and Earth sciences department, has dedicated his life and career to studying contaminant transport and remediation. His research has largely focused on environmental remediation of hazardous waste sites and mathematical modeling of contaminant transport and remediation. In fact, Falta is internationally recognized for his research on modeling of contaminant fate and transport. He created the widely used software Remediation Evaluation Model for Chlorinated Solvents, which is known as REMChlor. This program has been used extensively all over the world. More recently he has enhanced the software with an important update. Falta has developed a new mathematical method to




Technology Description

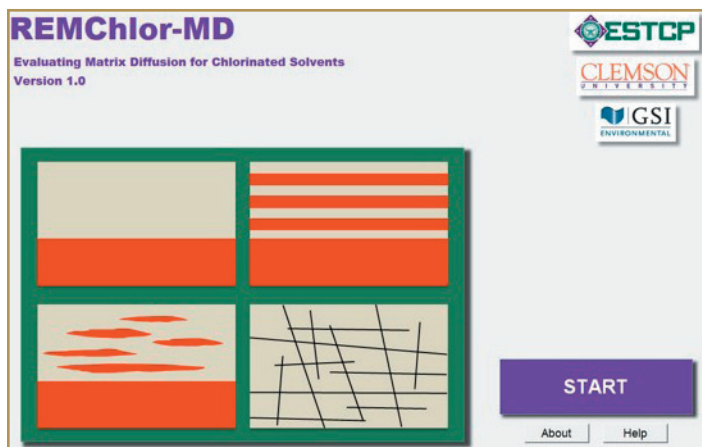


- Matrix diffusion occurs in many types of heterogeneous settings at different scales
- The traditional dual-porosity approach used in numerical models is not accurate or reliable under many conditions
- The new semi-analytical method developed for **REMChlor-MD** is accurate and efficient, and the parameters have a physical meaning

Dr. Falta presented an overview of REMChlor-MD to ESTCP, which funded the research. This slide describes the motivation for developing the new modeling tool.

incorporate the effects of matrix diffusion on predicting the behavior of groundwater contaminant plumes.

As a plume of groundwater pollution moves through zones of higher permeability, a diffusion gradient is established that drives the pollutant into adjacent zones of lower permeability. Over time these lower permeability zones can store significant amounts of dissolved pollutants. As remediation removes contaminant concentrations from more permeable zones, a reversal of the diffusion gradient results in "back diffusion" in which dissolved contaminants move back into the areas of higher permeability. This phenomenon results in persistent levels of contaminants that can impact groundwater wells long after attempts at aquifer remediation have been completed. Falta's updated model allows for consideration of the back diffusion tendency. The new software is called REMChlor-MD, and it is available free of charge from the Department of Defense Environmental Security Technology Certification Program. 



With funding from ESTCP, Dr. Falta partnered with GSI Environmental to develop the newly released software REMChlor-MD. REMChlor-MD, developed for the Department of Defense ESTCP program, is an easy-to-use, free software tool that can assist site personnel better understand matrix diffusion and help site stakeholders determine if matrix diffusion processes are significant enough to cause "rebounding" of downgradient plume concentrations above remediation goals after plume remediation or isolation is complete.



Philip Charles Singer, Ph.D., P.E., BCEE September 6, 1942 - February 17, 2020

Preeminent engineer and renowned water expert, Dr. Philip Charles Singer, P.E., BCEE, passed away on February 17, 2020.

Phil Singer was born in Brooklyn, NY, on September 6, 1942. An avid baseball fan, he grew up living only three blocks away from Ebbets Field - home to his favorite team then known as the Brooklyn Dodgers.

By the age of 17, Phil knew that he would be an engineer. His strong talents in chemistry and biology became evident during his years at Brooklyn's Midwood High School.

In 1959, Phil began his undergraduate civil engineering studies at the prestigious Cooper Union in Manhattan. His first exposure to sanitary engineering consisted of one unit covered during his freshman civil engineering survey class. This was an exciting field for him because it incorporated the chemistry and biology that he loved. But he had to wait until his senior year before taking a full sanitary engineering course. It was then that he decided that he would be a sanitary engineer.

Dr. Singer entered the graduate engineering program at Northwestern University near Chicago in 1963. It was there that he got his first in-depth exposure to sanitary engineering. He received his M.S. from Northwestern in 1964.

In 1969, he received his Ph.D. from Harvard and landed his first academic teaching position at University of Notre Dame. He spent four and a half years as the resident applied aquatic chemist in Notre Dame's Department of Civil Engineering.


In the fall of 1973, he was recruited by Dr. Charles O'Melia, P.E., BCEE, to join the University of North Carolina, Chap-

el Hill. Fellow Cooper Union alum, Dr. Daniel Okun, P.E., BCEE, then chairman of UNC's Department of Environmental Sciences, hired Dr. Singer. Dr. Singer remained UNC until his retirement in 2011. He was Professor Emeritus of Environmental Sciences and Engineering at UNC's Gills School of Global Health where he held the Dan Okun Distinguished Professorship in Environmental Engineering. After retirement, he was honored with his own endowed professorship, recognizing his extraordinary career in research, teaching, and service.

Over the course of his career, Dr. Singer received numerous honors and accolades. Among them are: AAES Gordon Maskew Fair Award; election into the National Academy of Engineering; Athalie Richardson Irvine Clarke Prize from the National Water Research Institute (NWRI); AEESP Distinguished Lecturer; AWWA Fuller Award; 2007 AEESP President; AAES Life Member; and was a current member of the AAES Board of Trustees, representing AWWA.

He edited two books; authored more than 240 scientific articles; served as investigator for over 70 grants funded by the Environmental Protection Agency and Centers for Disease Control and Prevention; and was asked to advise on the water supply crisis in Flint, Michigan.

Phil valued teaching and serving as a mentor and role model to hundreds of students during his 42-year career.

He will be remembered as a legend in the field of environmental engineering, as well a pillar of his community, for his kindness, his philanthropy, his love of athletics, and complete devotion to his family. 

20 Environmental 20 Communications Awards

Success in communicating complex and challenging issues to the public and its stakeholders is a daunting task. Communication and marketing plans must be designed to address the objectives and strategies of the campaign to reach a target audience. Through tremendous efforts, citizens, environmental conservation groups, town councils, industries, and other stakeholders have come to realize the value, benefits, and the process of projects, aimed at benefiting the public health.

In recognition of this, AAEES presents the annual Environmental Communications Awards.

This award is designed to recognize outstanding environmental communication efforts by industry; municipal, state and federal governments; and consulting firms to convey their important environmental messages to the public and other stakeholders.

Thank you to our 2020 EComm Panel of Judges

- Kenneth S. Johnson, P.E., BCEE
- James J. Newton, P.E., BCEE, ENV SP
- Momcilo Savovic, P.E., DEE

The criteria for judging the Environmental Communications Awards:

- Innovative approach to messaging or branding
- Future value to the water engineering and science profession
- Creativity and clarity in portraying and communicating the messages
- Effectiveness in delivery and achieving desired outcomes
- Integrated Design Approach - Narrative and visual elements work together to achieve the communication objectives.

The Grand Prize for 2020 went to The Metropolitan Water District of Southern California for their project, Gaining Community Support for a Regional Recycled Water Program. The Honor Award went to U.S. Army Engineering and Support Center, Huntsville, for their project, Phase II Recognize, Retreat, Report (3Rs) Explosives Safety Education Program.

Profiles of the winning projects are on the following pages. Full profiles can be viewed online at [https://www.aaees.org/ecompetition/](https://www.aaees.org/ecomcompetition/).

*Grand Prize***Gaining Community Support for a Regional Recycled Water Program****Entrant: The Metropolitan Water District of Southern California**

Person in Charge: Susan Sims, Group Manager, External Affairs | Co-Authors: Carolyn Schaffer and Rupam Soni

INTRODUCTION

To ensure a reliable water supply for the future, The Metropolitan Water District of Southern California is investing in a Regional Recycled Water Program that will purify wastewater to produce high quality water that can be reused throughout the region. It could eventually become one of the largest advanced water treatment plants in the world and provide Southern California with a local, drought-proof water source.

The program has three significant outreach challenges:

1. a large diverse region with some areas having little experience with recycled water;
2. use of a new treatment train incorporating membrane bioreactors; and
3. potential direct potable reuse. Metropolitan has an extensive outreach program to gain public support.

At the center of the outreach effort is the Regional Recycled Water Advanced Purification Center, a demonstration facility which features educational exhibits, an interactive learning center, and a robust tour program that provides visitors of all ages with an opportunity to learn about the facility and the importance of a recycled water supply. In addition, a dynamic website, extensive social media effort, presentations, special events, and press coverage have garnered strong engagement reaching over 400,000 people during 2019.

TARGET AUDIENCES

Metropolitan has a diverse service area covering 5,200 square miles and 19 million people in Southern California. Target audiences for outreach include:

- Residents and Business

- Labor, Civic, and Environmental Groups
- Industry Experts
- Elected/Appointed Officials and Staff
- Schools and Universities
- Wholesale and retail water agencies

GOALS

The goals of this outreach effort are:

- Create awareness and inform target audiences of the program and the importance of recycled water;
- Engage and educate audiences by providing clear and concise information that is relevant, informative and interesting; and
- Gain support for the Regional Recycled Water Program from key stakeholders and the public.

OBJECTIVES AND STRATEGIES

Metropolitan's approach is to engage as many people as possible to create awareness and support of the program.

Demonstration Facility Tour, Learning Center and Exhibits

Vital to the outreach effort is the Regional Recycled Water Advanced Purification Center, a 0.5-mgd demonstration facility. The Center began operating in fall 2019 and provides tours to gain public understanding and support of the project. It includes a learning center to welcome engage guests with educational exhibits. Visitors receive an introductory presentation followed by a walking tour of the Center. They learn more about the purification process through an interactive learning experience that includes displays, handouts, water samples, and photo opportunities.

Schools are an important target audience. Students from elementary schools to colleges visit the facility to learn about their water supply, recycled water, and water quality. For many, this is their first introduction to water issues, and many become interested in pursuing water careers.

Grand Opening Event

In October 2019, Metropolitan hosted a grand opening event which attracted 300 participants including elected of-



ficials, community leaders, technical experts, and program partners. Several distinguished guests such as Congresswoman Grace Napolitano, California State Water Resources Control Board Chair Joaquin Esquivel, and Los Angeles Regional Water Quality Control Board Chair Irma Muñoz attended and spoke of the importance of this program for the region. The event received strong press coverage and was promoted the program to Southern Californians.

Website

The Program's easy-to-navigate website serves as a hub for information with a wealth of resources from educational videos to technical reports.

Social Media and E-newsletter

To promote online engagement, updates are posted once or twice per week on Metropolitan's Twitter, Facebook, and Instagram accounts using #recycledwater. Updates are also included in Metropolitan's monthly e-newsletter, *Water Tomorrow*.

Presentations

Metropolitan staff presents to business organizations, environmental groups, community meetings, at conferences and other venues to provide information to target audiences.

Informational Materials

A program brochure, facility brochure, explainer video and other materials were created to provide additional information about the program.

Press and Media Coverage

Metropolitan is a highly respected voice for the media on water issues, ensuring they have complete information about the program and its importance to Southern California's water



Schools and students are a target audience for the program's outreach effort. A fifth grade class visits the Regional Recycled Water Advanced Purification Center.

future. Press releases are distributed as needed. A variety of media outlets have covered this program, informing and influencing their audiences and local citizens.

RESULTS

In 2019, Metropolitan had 4,500 in-person engagements and 400,000 online engagements by using the tools listed above. Highlights for 2019 are presented below:

- Fifty-five tours were provided and 1,500 visitors toured the demonstration facility. Survey results showed 100% of participants were satisfied or very satisfied with their tour experience and would recommend the tour to others. Furthermore, 99% were supportive of using recycled water as a new drinking water source.
- Social media posts on the Program are well-received; they are shared and on average have double the amount of views as other Metropolitan posts. They received approximately 400,000 impressions.
- The website attracted 5,300 users.
- A total of 45 presentations were given to 3,000 people.
- Thousands of printed materials were distributed and videos had hundreds of views on Metropolitan's website and social media platforms.
- News coverage of the program was featured in regional newspapers including the Daily Breeze, Orange County Register and other Southern California News Group publications; Vietnamese television station Nguoi Viet; ACWA's California H2O Series' Urban Innovation video; and the Persons of Infrastructure blog. Articles were also included in the Water Desalination Report, a sustainable living insert that was included in major newspapers, and other publications.



Congresswoman Grace Napolitano speaks to attendees at the grand opening event.

Honor Award

Phase II Recognize, Retreat, Report (3Rs) Explosives Safety Education Program

Entrant: U.S. Army and Support Center, Huntsville

Persons in Charge: Brian Jordan, Chief, Environmental and Munitions Center of Expertise and
Betina Johnson, Chief, Ordnance and Explosives Design Center Division
Co-Authors: Jodie Johnson and Kim Clower, HydroGeoLogic, Inc.

INTRODUCTION

The U.S. Army established the Recognize, Retreat, and Report (3Rs) Explosives Safety Education Program (Program) in 2000 after a fatality involving teenagers at Camp Shelby, Mississippi. In support of the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health, the U.S. Army Engineering and Support Center, Huntsville, with support from contractor HydroGeoLogic, Inc. (3Rs Team), is implementing the 3Rs Program at Army installations nationwide to address explosives safety.

Objectives of the 3Rs Program:

- Expand explosives safety education/awareness at Army installations
- Reach audiences including children, teens, adults, workers, community members, and soldiers living on or near installations
- Help installations achieve self-sufficiency in maintaining their 3Rs Program

CHALLENGES

The Army must use test and training ranges to maintain readiness while protecting human health and the environment. The 3Rs Program is aimed at protecting anyone who might encounter unexploded munitions at or near Army installations. However, implementing the Program broadly and consistently nationwide has been challenging. Installations have competing priorities and finite means to address them. The Army headquarters-level initiative is de-

signed to facilitate the 3Rs Program implementation at Army installations.

TARGET AUDIENCES

The 3Rs Program targets a wide range of audiences, including groups that comprise multiple ages, backgrounds, languages and various associations with the installation.

Marketing and Communications Goals

The 3Rs Program is an important safety marketing campaign for the Army whose message effectively saves lives. Its goal is to provide an Innovative approach to delivering a clear and consistent message across installations and to help installations become self-sufficient in maintaining their 3Rs Program.

Strategies for Achieving Project Goals

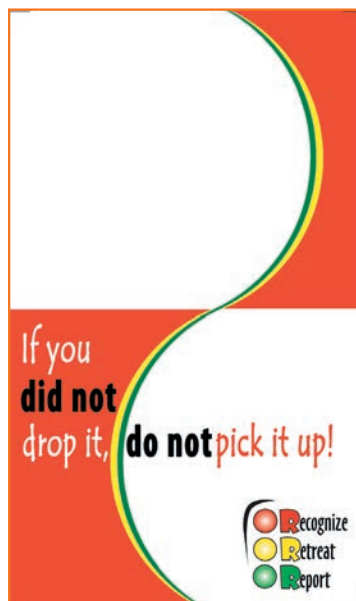
The 3Rs Team has developed and employed a five-phased approach for meeting project goals.

1. On-Post Focus Groups

The 3Rs Team designated leads to partner with installations and evaluate the current state of their 3Rs Program through focus group interviews. In response to focus group input, the team developed 3Rs materials including vinyl decals for amnesty boxes, magnets for vehicles, and pocket cards for use at worker tailgate safety meetings. The team works with installation environmental departments to further incorporate input and to increase 3Rs Program messaging to audiences who could come into contact with munitions, including environmental contractor and public works staff conducting munitions response, groundwater monitoring, and remediation projects. Site engineers, hydrogeologists, and range managers can use the 3Rs Program to communicate human health and exposure information regarding hazardous munitions constituents to protect troops and the public (Future Value).

2. Educational Resources

Clear and consistent messaging repeated across educational resources and activities is key to 3Rs awareness and learning,



particularly for children. The 3Rs Team standardizes language, color schemes, logos, and materials to ensure consistent messaging. Additionally, it tailors educational resources to provide installation-specific information such as the Fort Irwin military families guide and Fort Polk hunters guide and signage. The team works with installations to identify and translate into a variety of languages those educational resources that can then be ordered using a newly designed form to address their cultural-specific needs (Creativity and Clarity, Effectiveness).

The 3Rs Team developed a media kit to help installations spread the 3Rs safety message using print, radio, television, and online media (Innovative). Additionally, the team developed a 3Rs training course that will be available through the <https://3Rs.mil> website. This course will allow users to complete required 3Rs safety training. The 3Rs Team's integrated course design includes narrated presentation slides, real examples of munitions incidents, videos, and an interactive quiz (Integrated Design Approach).

3. Train-the-Trainer Workshops

The 3Rs Team developed adult, teen, and child slideshows and instructor guides to present 3Rs information in an age appropriate manner. The team is conducting interactive train-the-trainer workshops to demonstrate successful presentation and training techniques for installation trainers. Pre- and post-training surveys allow the team to obtain and incorporate feedback into future workshops (Effectiveness).

4. Outreach Event Support

The 3Rs Team uses creativity to engage families and child audiences. The Team designed a tent to incorporate the 3Rs branding and redesigned Sergeant Woof's mascot costume to better attract audiences at outreach events consistent with 3Rs messaging. Event attendees are further engaged with games and Program-branded giveaway. For classrooms, the team developed a short skit that involves Sergeant Woof demonstrating how he follows the 3Rs. The creativity in this skit keeps children engaged and clearly communicates the importance of following the 3Rs of explosives safety: Recognize, Retreat, Report (Creativity, Integrated Design Approach).

5. Follow-Up Assistance

The 3Rs Team is developing installation-specific communication plans that identify short- and long-term communication goals and needs, target audiences, communication platforms, lessons learned, and outreach activities. The plan serves as a guide for installations to continue public outreach and communication efforts (Clarity, Effectiveness).

The 3Rs Team's environmental communications strategy incorporates innovation, creativity, clarity, effectiveness, and integrated design providing future value and benefits to the Army and the public's health and safety.

DOCUMENTED RESULTS

Results from first 2 years of current 5-year project:

- Conducted focus groups with 102 individuals from 14 directorates at 12 installations.
- Delivered 3Rs message by
 - Providing over 73,000 copies of educational materials to 11 installations
 - Distributing 3,220 branded reusable bags across 10 installations
 - Distributing 3,400 educational resources and giveaways at an outreach event with 13,000 people in attendance
 - Distributing 15,000 educational resources and giveaways at 7 outreach events with attendance ranging from 500 to 20,000 people
- Executed a train-the-trainer workshop at Fort Irwin with 16 trainees representing 13 directorates receiving 80% "Excellent" and 20% "Very Good" ratings from participant evaluations.
- Conducted 12 website usability assessments identifying ways to improve the <https://3Rs.mil> website.
- Built an educational resource library of 196 resources that will be available on the <https://3Rs.mil> website.
- Supported seven installations in developing 3Rs Program self-sufficiency. Fort Riley is an outstanding example and since 2018, it distributed educational resources to over 200 on-post families, conducted a child and youth services event, and published an article in the First Infantry Division Post. A

Explosives Safety Awareness

**Following the 3Rs (Recognize, Retreat, Report)
of Explosives Safety Will Save Your Life.**



Find out how to protect yourself, your family,
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Recognize Retreat Report  <https://3Rs.mil>

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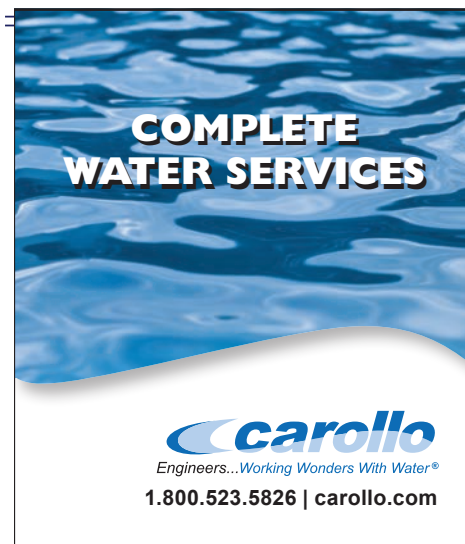
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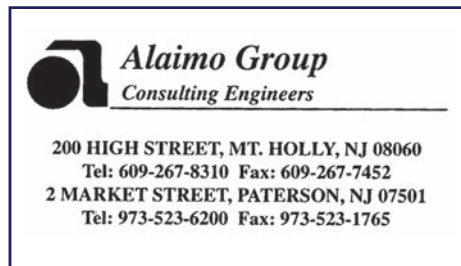


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AAEES Patrons Program

The American Academy of Environmental Engineers and Scientists has been in existence for 60 years, credentialing professionals in environmental engineering and science, educating the public about the value of environmental systems, working with ABET (the Accreditation Board for Engineering and Technology) as the Lead Society in the accreditation of over 60 college and university Environmental Engineering programs, and providing recognition for noteworthy projects and programs in the annual Excellence in Environmental Engineering and Science competition.

The Academy has greatly benefited from the collaborative spirit and active participation of its sponsoring societies. However, from the standpoint of economic support, the Academy's endeavors have focused on individual membership and the actions of these individuals in implementing its goals. To sustain the Academy's programs and enhance their effectiveness, the Academy is implementing a Patrons Program that is being offered in three categories:

- Corporate/Consulting firms, and
- Public Agency/Government organizations.

It is the Academy's firm belief that the synergistic impact of individual membership activities, coupled to support by the organizations in which they work, will create a powerful success model that will enable the Academy to better implement its organizational goals and mission.

The Patrons Program umbrella is expansive. Its intent is to have our patrons effectively co-brand with the Academy for everything that it does in outreach to either members or the general public.

The list below is a summary of the Patrons Program elements that participants receive.

- Featured recognition of Patrons on the AAEES website with a direct link to the Patron's website. We will establish a rotating schedule of all Patrons' content that features a noteworthy event or project undertaken within their overall portfolio. AAEES staff will work with Patrons' staff to structure their content and format. This aspect of the program benefits both the Patron and the Academy in publicizing the profession, its relevance, and its accomplishments.
- Oral and visual recognition (signage/logo) for Patrons at all AAEES events.
- Prominent recognition/logo display in *Who's Who in Environmental Engineering and Science*.
- Prominent recognition/logo display in the Environmental Engineering and Science Resource Guidebook.
- A listing in the *Environmental Engineering and Science Resource Guidebook*, featuring the Patron organization's Board Certified staff and its overall capabilities, at no-charge.
- Two complimentary tickets to the annual AAEES Awards Luncheon and Conference in Washington, DC.
- Two complimentary entries for the E3S competition.
- Waiver of certification application and examination fees for a Patron's employees.
- Prominent publication space/logo recognition in the *Environmental Engineer and Scientist* quarterly magazine.

The Patrons Program is much more effective in providing consistent recognition for our Patrons. Wherever the Academy goes and wherever Academy materials appear, those of its Patrons also appear.

In establishing the Patrons Program the Academy acknowledges and appreciates the past economic support of corporate, agency, and academic entities. Their support for individual events and programs has been beneficial to the Academy. We believe that the Patrons Program outlined here will be more effective in achieving the goals of the Academy in developing its programs, and more effective in providing the recognition that our Patrons seek for their sponsorship of the Academy.

Administratively, the Patrons Program enables Patrons to support the full slate of Academy activities through one annual contribution. We are setting annual Patron contribution commitments of \$8,000 for Corporate/Consulting category and \$6,000 for Public Agency/Government category.

We invite you to consider having your organization become an Academy Patron. Your decision to participate will trigger our sending you a simple 'Patrons Program Participation Agreement' that lists the program features and benefits. This will be followed by contact from the Academy staff to determine your preferred invoicing and form of payment information. We will also need to have Patrons' staff contact information to ensure that we have requisite materials -- accurate logos, entity identification, website links, and other items -- to enable us to create the content we will use to maximize your exposure and recognition as an Academy Patron.

Should you have questions please contact: Burk Kalweit, AAEES Executive Director (BKalweit@aaees.org).

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