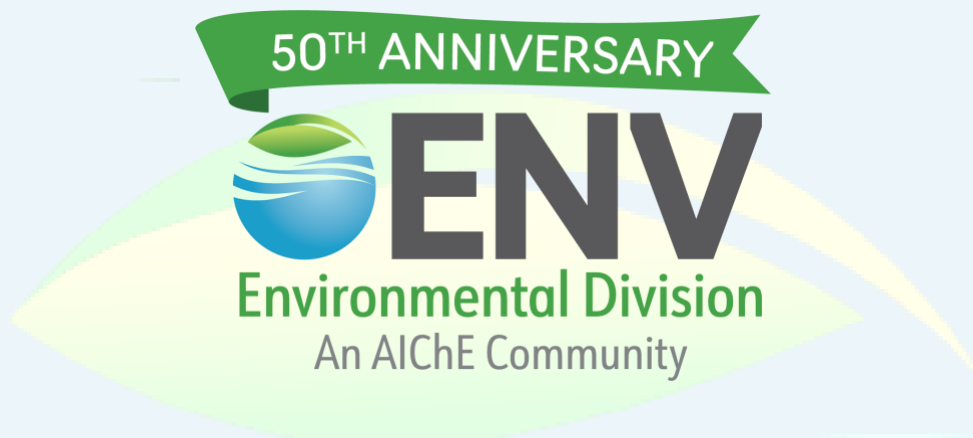


Environmental Division 50 years Anniversary Newsletter



Edited by: Debalina Sengupta, Associate Director, TEES Gas and Fuels Research Center, Food Energy Water Nexus Coordinator, Texas A&M Energy Institute, Texas A&M University, Immediate Past Chair 2020, Early Career Award 2016

Co-editor: Shweta Singh, Assistant Professor, Department of Agricultural & Biological Engineering, Purdue University

Past Chair's Message - Debalina Sengupta

As the COVID-19 pandemic has brought the world together in unprecedented ways, slowed the economy down, and helped us to realize the potential of the environment, stories from around the world on improvements in air and water quality pour in. In some ways, we have been left with a greater appreciation of the invaluable natural capital on which all human activities are based.

The Environmental Division of the American Institute of Chemical Engineers has reached a milestone this year, 50 years since its inception. The Division shares this milestone with the National Environmental Policy Act (NEPA), Earth Day, and the formation of the Environmental Protection Agency itself. The Environmental Division is commemorating the event and celebrating the contributions of Chemical Engineers towards the betterment of the world through a series of events and publications. A taskforce led by Prof. Larry Erickson is overseeing these activities.



As the Past Chair of the Environmental Division, it has been my pleasure to compile this special Edition of the Environmental Division newsletter. I solicited your inputs for sharing your views, excerpts from your past and present work, opinion, anecdotes, and any contributions which you think is worth sharing for the progress we have made towards the Environment with our Engineering expertise. I received the responses, and today, I am eager to share the information with the AIChE Community! One thing is for sure, we have better technology that can capture and provide easy access to your

valuable comments and inputs than we did 50 years ago! We have created a stream of videos to capture interviews with past Environmental Division Awardees, and also share them through our social media channels at AIChE. With the pandemic, this year has also marked the first time when AIChE very efficiently has moved to a completely virtual platform to ensure safety first while still providing exceptional content and meeting experience for all the members.

In this special edition Newsletter, there is a section on the past, present and future of the role of chemical engineers for the environment. Followed by that, I have captured the opinions of past Division Award winners, and then we have the section on the Annual Meeting program and activity highlights. We will continue to celebrate the 50 years into the next year as well, where we intend to bring high quality technical content for our members at competitive and/or free for a limited time. At a juncture in history when everybody is trying to cope with personal losses, work disruptions, or simply the crisis for the world, the AIChE Environmental Division strives to provide a positive life-long learning experience, support, and optimism towards making the world a better place to live in!

I hope you will consider joining the AIChE Environmental Division, especially if you are a student. There is no better time than now to join the team building the future for the world that we want to live in, and there is absolutely no better time than being a Chemical Engineer!

PLEASE REMEMBER TO VOTE FOR 2021 EXECUTIVE COMMITTEE

Dear Member,

As a reminder, the 2020 Environmental Division (ENV) Election will be taking place until November 30, 2020. If not done so already, you can cast your vote online by clicking [here](#).

You can review each biography by clicking on the candidate's name. Once you have made your selection(s), remember to click "Vote".

If you have any questions or concerns, please feel free to reach out to AIChE Customer Service at CustomerService@aiche.org.

Environmental Division (ENV)

<https://www.aiche.org/election/196>

50 Years of the Environmental Movement, The Past, Present and Future – Debalina Sengupta

When Rachel Carson wrote her book "Silent Spring" in 1962, she methodically used examples drawn from many real communities where the use of DDT had caused damage to wildlife, birds, bees, agricultural animals, domestic pets, and even humans. The book was important, because it took a very scientifically complicated and controversial subject, and presented it to the wider public to convey the message of chemical hazards. Carson's claim that humans were misusing powerful, persistent, chemical pesticides before knowing the full extent of their potential harm to the whole biota inspired the start of the modern environmental movement.

Ever since that time, chemical engineering has evolved as one of the most complex disciplines of engineering, where not only the products became important to bring about change in daily lives, but

also provided key solutions to the life cycle of those products. The Environmental Protection Agency was setup as a regulatory body which was responsible for regulating the chemicals that came out of any facility. End-of-pipe treatment of chemicals marked early environmental initiatives, where companies or any other public/private entity had to comply with the regulated amounts, and established treatment after the processes were completed. Over the past 50 years, we have systematically shifted from end-of-pipe treatment of chemicals because we slowly realized that process efficiency was not only related to more emissions, but also the loss of product itself. This led to the notions of pollution prevention, where the pollutant species were prevented from formation, through advances in reaction engineering (catalysis) and separation methods. When the formation of pollutants was unavoidable, they were destroyed using additional unit operations.

The release of chemical species can occur in one of the three main media, air, water and/or soil. The impact of such releases was initially unknown, and often went unmeasured. There has been advances in this direction through the study of fate and transport of materials through these multi-media systems, leading to complex models for impact assessment. By preventing the formation of certain species in the reaction/separation processes, selective elimination of pollution has been achieved. More importantly, we have access to information from the United Environmental Protection Agency on very detailed toxic and hazardous chemicals lists, water pollutants, and criteria air pollutants.

However, over the years, we have realized that there are extremely complex relationships between the chemical pollutant, and its impact on the environment and human health. When a direct relationship cannot be established, it has formed the basis of scrutiny, and extreme controversies arose from such cases. The impact of greenhouse gases, mainly carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons on the atmospheric ozone layer were found in the 1980's, with an almost immediate attempt for reduction of CFCs. The debate has continued since then on the much more abundant CO₂ and CH₄ emissions.

Carbon dioxide is still not regulated by laws in the United States. The primary reasons for this may be very well political, but there are scientific reasons as well. Carbon dioxide is the most stable oxide state, rendering it almost benign to any chemical treatment before discharge. According to the Lawrence Livermore National Laboratory data in 2019, petroleum (36.7), natural gas (32.1), coal (11.4) and nuclear (8.5) account for the maximum energy resources in the United States' consumption of 100.2 quads of energy. CO₂ is not regulated, but in the 2000's, EPA started the Greenhouse Gas Emissions inventory which showed the extent of greenhouse gas emissions from various point and non-point sources. Since then, two schools of thought have emerged. Keeping in line with the pollution prevention and the end-of-pipe treatment directions of the original pollution control strategies, one looks at carbon management within the system of fossil resource utilization, while the other examines the treatment and disposal of carbon dioxide capture, sequestration and storage (CCS) mechanisms. Entities which pay a price for the fossil resources have increased their R&D portfolio towards prevention of CO₂ and pushing for more yield, conversion, and efficiency. For processes, where the primary output of the fossil resource is the production of heat energy through combustion, the CCS has been the direction of research.

The majority of vehicle fleet in the United States is still dependent on gasoline and diesel, which are the non-point sources of CO₂ emission. Any non-point source makes it difficult to control. Hence, there are considerations of changing from decentralized non-point sources, to centralized generation of emissions through electricity, and changing the vehicle fleet to electric cars. Considerable research has gone into planning such transitions in energy generation and utilization from the US EPA, Department of Energy, and numerous researchers. While a consensus has not been reached, clearly there has been promising advances made towards conscious decisions from industries and supply chains alike.

Wind, solar, hydro, and biomass form the remaining four energy resources in the United States. The benefits from these resources have been extensively analyzed, and proven to be promising. Outside the United States, many developing nations have taken aggressive policies regarding the shift to renewable forms of energy, as the ones described above. While there are clear reasons for sustainability considerations, energy resources are still guided by the availability of resources in a country are primary rather than the secondary environmental benefits they bring. In the future, transition fossil feedstock such as natural gas is expected to fill the gap, while research continues to put alternative and renewable resources in the energy mix. Caution needs to be taken to have a holistic view towards sustainability of these processes, as often the entire life cycle inputs of material resources are not taken into consideration

The complex problems that face the world today are guided by a more global economy, where shift of environmental burdens from one country to another have been debated extensively. The free economies of first world nations have benefited from shifting production to countries with centrally controlled governance structures, and the availability of cheap labor forces, often resulting in compromised environmental quality in those areas. As environmental awareness continues to spread around the world, environmental justice concerns and dialogue has taken central stage. Most of the countries in the world view the environment as a combined social responsibility. While the EPA's strong environmental regulations have been heavily criticized for being too stringent, it has continued to be a guiding beacon for environmental protection.

The global economy also has created an unwanted consequence, which the world has to deal with. Plastics has been helpful in creating our lives better, through multiple uses. The properties of plastics have given stable, sturdy, long lasting materials that are used in almost all products around us. The end-of-life of plastics have been a concern for many years, with them ending up in landfills, but little progress has been made in the United States to divert or treat the plastics streams from the municipal solid waste as it really did not pose as an immediate human health hazard or environmental risk.

The plastics recycling industry was heavily dependent on China to accept recyclable plastic materials. The low cost of bulk and commodity plastics market had proven to be uncompetitive to have an economically sustainable model for recycling the materials. Starting from 2018, China changed their recycling policies, reducing upto 90% of the recycled imports, causing many nations including the United States to rethink and invest in dealing with plastics waste. Recent NSF and DOE initiatives have been exploring science and innovation related to the waste plastics. Much of the initiatives have also been industry led, with coalitions such as the Alliance to End Plastic Waste working on the forefront.

Plastics form a part of a bigger issue in the society, the methods to tackle waste. The latest concepts in addressing waste has been centered around the broader concept of Circular Economy. The Ellen MacArthur foundation has been working to develop and promote the idea of a circular economy. They have been working with business, academia, policymakers, and institutions to mobilize systems solutions at scale, globally.

In today's world, we realize that the environment is not an isolated problem, but a confluence of several issues, which are often interconnected and required advanced knowledge and skills to solve. The knowledge of processes, systems, and scales have been never more important to identify the truly multidisciplinary nature of the Environment. The future will be guided by more focus on the convergence of different disciplines to solve the environmental challenges in a concerted manner, taking into account the multiple and often conflicting objectives of environment with economic and social constraints. Advances in computing technology has now the promise of making this happen, and should be included in the consideration for environmental protection.

Recent Trends in Environmental Division Programming

The Environmental Division started 50 years ago with Air, Water, and Hazardous Waste problems as the pressing concerns at that time. Over these 50 years, these have remained the core issues that impact us, and fundamental science has been developed around these areas. Climate Change and Waste Plastics will likely define the environmental challenges in the future, and require the development of systems-based sustainability solutions. Recent trends in programming from the Environmental Division has seen these issues being incorporated into core programming, with sections for Climate Change, Sustainability, Process Development. Special programming around Waste Plastics and Food Energy Water Nexus has also taken the center stage with multiple papers submitted each year. We also are open to special webinars every month, and solicit topics from members.

Our interests continue to grow in all the current trends in environmental issues, while improving our knowledge of fundamentals in all these areas. Interested members are requested to send an email communication with the willingness to join these activities to the Division Leadership Team.



[List of Environmental Division Sessions at AIChE Annual Meeting 2020](#)

Join the Division:

Membership Rate: \$45

(Includes Wiley Journal Subscription to Environmental Progress and Sustainable Energy)

Special Student and Young Professional Subscription Rate available!

If you are interested in joining the Environmental Division, you can do so by calling customer service at 800-242-4363 or +1-203-702-7660.

Statements from Environmental Division Award Winners

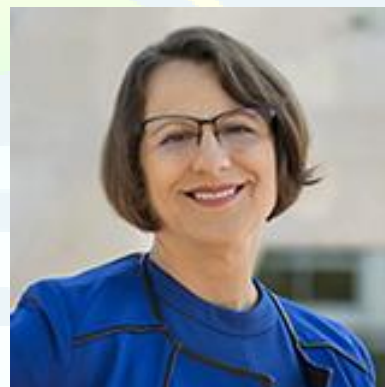
For this special edition Newsletter, we contacted past Lawrence K. Cecil Award Winners and asked them their opinions on the state of Environmental Issues in today's world. Most of the awardees responded with the common observation that we have come a long way in 50 years, but our work is not done by any means. Some of the positive impacts have been cleaner water, air and land through improved science and technological advances. Some of the negative issues still remaining to be solved are the lack of communication between scientists and public policy makers. This needs to be supported with computational systems-based analyses, sustainability perspectives, and involvement of younger generation of students and researchers early in their career as agents of meaningful and impactful change. The following section summarizes the thoughts of the awardees in their words.

"In this 50th year of the Environmental Division of AIChE, the communication of accurate and understandable science to the public and policy makers has never been more important. The existential threat of climate change to human civilization manifests itself in natural disasters of record scale. In the face of the COVID-19 pandemic, our best protection remains responsible human behavior, even as scientists have emerged more prominently as public figures. I have been fortunate to work on both the fundamental science of selective oxidation catalysts aimed at reducing CO₂



production, as well as on public engagement on energy and environmental topics. Those engagement efforts, whether on state-level planning committees, National Academies' reports, or through popular media, do not necessarily show up in the traditional metrics of academic career success. Nevertheless, I believe that is critical for chemical engineers to bring their diverse skills to help our global society address the challenges of resources, environment and, climate in feasible and equitable ways. All of us can find ways to bring our individual expertise and interests to this shared mission. We must also do so with humility. Technology alone is rarely the answer. Public engagement is a partnership, and one well worth our efforts for today and for future generations on this planet." - **Mark Barteau, Cecil Award 2018**

"I started my career in hazardous waste management, which transitioned to combustion and air pollution and quality. My work early on was some of the first experiments done on thermal desorption of contaminants from soils and then transitioned to fine particle formation, in particular soot emissions and destruction. I am currently involved in chemical looping, a carbon capture technology for combustion of solid fuels. The fundamental level of chemical engineering core capabilities, namely kinetics, adsorption/desorption, and mass transfer, has enabled better understanding and design of air pollution control systems. Chemical engineering lends itself to a systems thought process which can be utilized to solve many of the grand challenges. The role of data science in learning more is uncharted area. I started on the Environmental Division as a new faculty member. The many connections I made during those early years with fellow members served me well. In 1991, after my first daughter arrived on November 15 (yes, usually when the Annual Meeting was held), I took a break from AIChE and the Environmental Division, but now that my two daughters are older, it has been great to become re-engaged." - **Joann Lighty, Cecil Award 2017.**



"I was a young faculty member when the ED was established. I have served on the Editorial Board of Environmental Progress and EP&SE. I have served ED as secretary and later as treasurer. I have participated in many ED sessions at AIChE meetings.

In 1985, I accepted a leadership position at Kansas State University to develop a research and public service program on hazardous substance research. In 1989, Kansas State University became the lead university for the Great Plains/Rocky Mountain Hazardous Substance Research Center with funding from EPA and other sources, and I served as Center Director from 1989-2003. Our science advisory committee recommended projects related to bioremediation and phytoremediation, and the Center investigators provided leadership for the development of the field of phytoremediation. Robert Peters was a member of the science advisory committee, and we helped to bring hazardous substance research into AIChE ED programming. Using vegetation for remediation is inexpensive and the technology has been very beneficial to society. There are many sites in the world where remediation is needed, and land is becoming more valuable because of the increase in population and importance of land for food and

other purposes. From 1990 to the present, I have had 17 papers accepted for publication in Environmental Progress and EP&SE. Some of these are related to hazardous substance research; others are related to sustainability. I was one of the faculty helping to lead a Research Experiences for Undergraduates NSF project on sustainable energy for 9 years. This included preparing manuscripts for EP&SE with undergraduates to publish their summer research, and writing a book Solar Powered Infrastructure for Electric Vehicles: A Sustainable Development. In response to an invitation from the editor, I prepared the review manuscript "Reducing greenhouse gas emissions and improving air quality: Two global challenges" which was on the EP&SE top 10 list in 2017. Because of interest in this topic, the book Reducing Greenhouse Gas Emissions and Improving Air Quality: Two Interrelated Global Challenges was prepared and published. In 2020 as part of the 50 years ED initiative, I provided leadership for the paper "Nitrogen oxides and ozone in urban air: A review of 50 plus years of progress" for publication in EP&SE. There is much that remains to be accomplished to reduce carbon emissions and improve air quality. In September, 2020 I am in my 57th year of service at Kansas State University. I am teaching 3 seminar classes, Hazardous Waste Engineering Seminar, Sustainability Seminar, and Air Quality Seminar. I have emeritus status and am serving without any salary. Being active in the ED has resulted in many valuable experiences."- **Larry Erickson, Cecil Award 2006, Peter B. Lederman Service Award 2020.**

"My fondest memories of the Division go back to how I got involved. I was at a meeting in Houston, probably in 1970, and attended the ED dinner, chaired by our founder, Larry Cecil. Our style back then was to go around the room, and have each attendee identify him or herself and explain why we were there. I did but concluded by saying, "your leadership team contains too many Texans; you need to diversify". In the next year or so I became Air Section Chair and, shortly after that, Division Chair. It seems as if we get what we wish for and I remain thrilled to continue to be a member of our leadership team.



In the AIChE, I have served as Chair of the-Environmental Division, Programming Chair and Chair of the Solid Waste, Air and Legislation /Regulations Sections. I am currently Vice Chair of Air Section and Vice Chair of Programming I am Past Chair of the Government Relations Committee (now PAIC) and Environmental Subcommittee (T.J. Hamilton Government Service Award) and served two terms as Vice Chair. I am a Past Director and Past Chair/ Vice Chair of the Management Division. I was the Philadelphia National Meeting Program Chair and am a Past Member of the Executive Board of the Program Committee. I am also a Past Member of the Nominating and Ethics Committees; Past Member of Editorial Review Board of Environmental Progress and a Founding Member – CWRT. I am a Past Member of CCPS/SVA Users Group; and managed the AIChE-AWMA joint webinar program. I am an Institute Fellow – **Richard D. Siegel, Cecil Award 1985 and Environmental Division Service Awards 1988, 2013. [also interviewed for the 50th year]**



"I did my bachelor's in Chemical Engineering from Vanderbilt in 1984. After that, I worked at the EPA on their CERCLA OSC, RCRA Permits. I spent time in the industry working as Regulatory project officer commercial hazardous waste TSD – incineration. I have represented company with national trade group and worked with lawyer on policy commenting on proposed regulations – and believed it would help persuade the regulators if I had both ChemE and a law degree. Most lawyers have no technical background at all. And ChemEs that go to law school typically go into patent law. However, Environmental Law is perfect for ChemEs. Having worked on the CERCLA – BROS Superfund Site and the Vertac dioxin site in Jacksonville Arkansas – permit

equivalencies under 40 CFR 264 Subpart O, RCRA – Hazardous Waste Incinerator Permits for ENSCO, CAA – Same – US Army’s Sarin - Nerve Gas Incineration facility permits in Pine Bluff Arkansas, CWA – manufacturing plant cited for illegal discharges where geese were causing spikes in nitrogen in discharge, SDWA – Compliance defense for MCL as well as RMP. But an interesting case involved UIC Class II CO₂ tertiary oil recovery and UIC Class VI conversion, and also working on UIC Class VI permitting regulations with AIChE and UEF’s Carbon Management Technology Conference provided me with multiple experiences on the environmental protection agency in some of the early years of its inception.

In my opinion, United States has led the world on conventional pollution policy, but now we need to fill gaps. It takes too long to recognize the hazard of pollutants not yet included in the regulated list of pollutants. E.g. PFAS. Also, Plastic does not exhibit properties that arise from conventional pollutants because it is largely inert, and is hazardous precisely due to its inert nature. We need legislation, but as always, when there is a gap in regulation, legal risk still exists as long as causation can be proven. The research is developing that shows harm arising from both PFAS and also plastic, thus – to create more certainty, legislation and regulation would be helpful to avoid the chaotic results of regulation through case by case by litigation – one judicial decision at a time.

Diversity broadly provides a stronger team. As a new chemical engineer, I never met another female chemical engineer. But the value of my addition to the team was clear, and resulted in better coverage of issues and more opportunities to consider issues in another way with different approaches. In law, there were already more females and the benefits of diversity were probably already recognized.

I am a life member, Fellow and leader within AIChE. As a chemE in government or industry, I was isolated within the scope of my work duties. But through AIChE, my horizons expanded to the full scope of my interests. AIChE allowed me to consider new ideas for my current work, as well as ideas for potential future interests and employment. It also connected me in valuable ways with colleagues who remain friends today.” - **Mary Ellen Ternes, Peter B. Lederman Service Award 2020 [also interviewed for the 50th year]**

“All of my degrees are in chemical engineering but the focus of my work has always been environmental engineering. My undergraduate preparation was marked by two frustrations, a feeling that too much of chemical engineering was driven by empiricism without a solid theoretical foundation and a lack of interest in “chemical engineering in boxes”. The first frustration had more to do with my naivete and the emphasis on practical chemical engineering calculations in my early chemical engineering education. Both frustrations were overcome, however, by pursuing graduate studies which led to a better understanding of chemical engineering theory and also introduced me to the science and engineering of the natural environment. I began my career focused on long range transport of air pollutants and the fluid dynamics of the atmosphere but I quickly became attracted to contaminant behavior in soils and sediments. The latter study began surprisingly as a consulting job undertaken with a colleague Louis Thibodeaux. These efforts began a lifetime relationship with both Louis, who sadly recently passed away, and contaminated sediments. Within a few years, what was originally a relatively esoteric subject became one of great importance due to its difficulty (what do you do with 50 miles of contaminated river?) and its immense potential cost (the cost of management of many contaminated sediment sites exceed 100 million dollars). The ability to contribute to those problems led to a very rewarding career and a great deal of recognition culminating in election to the National Academy of Engineering in 2005. It is a great example of how an opportunity can lead you in completely unexpected but rewarding directions.



Throughout it all I appreciated the strong foundation in math, chemistry and physics afforded by my training in chemical engineering and the practical training and problem-solving focus that was the outcome of my early “frustrating” training in engineering empiricisms. I believe that a chemical engineer can go far with that combination of theory and practice and continue to be among the most successful of those attempting to address environmental challenges. We will always face conflict between our human desires and environmental impacts but with knowledge and experience we can continue to address and mitigate that conflict.” - **Danny Reible, Cecil Award 2001 [also interviewed for the 50th year]**

50 years Anniversary Interviews available on the AIChE Website (Click [link](#))



[Videos Interviews for 50th Year Anniversary of the Environmental Division](#)

Bhavik Bakshi, Cecil Award 2019: Dr Bakshi discusses nature of environmental problems, the concepts of shifting of environmental problems and impacts. Ecosystems and engineering are interconnected, and he emphasizes the need for techno-ecological synergies with case studies and further reading. <https://www.aiche.org/community/bio/bhavik-bakshi>

Heriberto Cabezas, Cecil Award 2013: Dr. Heriberto Cabezas discusses resilience, sustainability, application of information theory to address environmental and ecology problems. Waste Reduction Algorithm (WAR), and use of Fisher Information are discussed as contributions. The role of convergence research in environmental issues is stressed. We also discuss the role of policy, and new emerging concepts on circular economy. The roles of chemical engineers are stressed in all walks of life. We conclude with discussion on the COVID-19 pandemic, and the probability of higher frequency of such events, with the population increase around the world. <https://www.aiche.org/community/bio/heriberto-cabezas>

Urmila Diwekar, Cecil Award 2011: Dr. Urmila Diwekar was the first woman to receive the Lawrence K Cecil Environmental Division at AIChE. She discusses her journey as a process system engineering expert working in the field of sustainable chemical engineering with a focus on environmental and energy domains. The nuclear waste problem in Hanford was taken as an example to discuss combinatorial complex problem and the development of Center for Uncertain Systems: Tools for Optimization and Uncertainty (CUSTOM) to deal with multiple problems in these areas. Nuclear, fossil, renewable systems have been area of research focus for discrete, continuous and time dependent problems for decision making. In recent times, food, energy water nexus has been her focus with policy insights. Her models developed in chemical engineering have been applied to human reproductive systems modeling with clinical trials. <https://www.aiche.org/community/bio/dr-urmila-m-diwekar>

Arup Sengupta, Cecil Award 2009: Dr. Arup Sengupta discusses his passion for water treatment, using fundamentals of chemical engineering principles. Discussion focuses on trace contaminant removal, ion-exchange technology, and building sustainable societies that has touched the lives of over two million people worldwide. We conclude with a philosophical view towards understanding and focusing on fundamentals to solve future problems.

Yoram Cohen, Cecil Award 2003: Dr. Yoram Cohen discusses the role of chemical engineers in solving many types of environmental problems, the need for bringing science to the public, and how his research has evolved over the years to cover all aspects of environmental issues. Dr. Cohen brings a unique perspective regarding the role of chemical engineers to solving environmental problems given his experience as past Chair of both the AIChE Environmental Division (2002) and the Separations

Division (2008), and as co-founder of the EPA National Center for Intermedia Transport Research (NCIR), the NSF Center for Environmental Impact of Nanotechnology (CEIN), and the California Center for Environmental Risk Reduction. Dr. Cohen stresses the need to consider the integration of science, engineering, policy and the regulatory process when addressing environmental issues and solutions at both the teaching and practical levels. <https://www.aiche.org/community/bio/yoram-cohen>

Member's News/Opinion Corner

Optimized Approaches to Cleaning the Environment by Emmanuel A. Aboagye, John D. Chea, Fred Ghanem, and Swapana S. Jerpoth, Department of Chemical Engineering, Rowan University

While the 2020 lockdown had negative impacts on world economies, it demonstrated the impact of emission reduction, caused by less industrial pollution and traffic, on the environment. Many news agencies reported a 50% drop of carbon monoxide in NYC, a 40 years recovery of air quality in Los Angeles, a 25% decrease of air pollutants in China, and a 20 year low of aerosols in India. Globally, experts say we could see a 5.5 percent reduction in emissions in 2020 when compared with 2019. Our team, at the Sustainable Design and Systems Medicine Lab led by Dr. Kirti M. Yenkie at Rowan University has devoted our research to obtain the same positive impacts by applying economically feasible solutions to the discharge of pollutants. We are engaged in recycling projects such as systematic optimization of solvent recovery in chemical processes and waste circumvention of finished petroleum products during cleaning operations, remediation prediction such as modeling, and developing optimal control strategies for chromate removal using ion exchange resins, environmental impact minimization such as synthesizing wastewater treatment networks using optimization-based approach, and decreasing our reliability on fossil fuels such as enhancing the efficiency and cost structure of perovskite photovoltaics. We are also proud to see one of our team members to put this knowledge into practice through an internship at the EPA this year. With the enforcement of social distancing, our team's productivity was not affected as we rely on the vast data currently available to create predictive models using various optimization tools and software at Rowan University such as MATLAB, GAMS, ASPEN, SUPERPRO, ANSYS, COMSOL, and PYTHON. With weekly web meetings to share ideas and experiences, we are able to focus on solution-based approaches to various environmentally challenging projects leaving a healthier world to live in.



A combo picture shows the skyline of Murcia, Spain days before the national lockdown, (left), and the same site forty days into the lockdown, (right). Image via Shutterstock.

Three women become first females to graduate from UAB with engineering doctoral degrees in the same term under the supervision of Prof. Robert Peters:

The commencement ceremony at the University of Alabama at Birmingham last summer marked the first time in its history that the School of Engineering has awarded doctorates to three female Alabama residents in the same term. The women, Sandra Cutts, Jaquice Boyd and Ashlyn Manzella, are all receiving their doctoral degrees in civil engineering. Prof. Robert Peters, long standing Secretary to the Environmental Division, made history at UAB with this feat. Please see [UAB news article](#) for details. This is the first time in UAB's School of Engineering's history that three doctoral students all graduated under the same department and the same mentor.



Highlights of the Environmental Division at AIChE 2020 Virtual Meeting:

Green Collar Engineering Opportunities for Chemical Engineers (9:00 AM PST, Saturday 11/14): (Live session) Come and join an interactive discussion about the challenges, advantages, and career opportunities for chemical engineers in the environmental field.

Environmental Division Membership Meeting (11:30 AM PST, Monday 11/16): (Live session) Come and hear about recent division activities and plans for the next year.

Environmental Division Networking Event (3:00 PM PST, Tuesday 11/17): (Live session) Come and meet with other members of the Environmental Division in a more informal setting.

50th Anniversary/Environmental Division Awards and Honors (9:00 AM and 10:30 AM PST, Wednesday 11/18)

(Pre-recorded session) 9:00 AM PST: 50 Years of Environmental Regulation: Lessons Learned, Progress Made, Future Trends, interview of Mary Ellen Ternes.

(Live session) 10:30 AM PST: Presentation of Cecil Award, Early Career Award, Dr. Peter B. Lederman Service Awards, and Student Awards; Invited talks by Cecil Award and Early Career Award winners.