



2022 Frances S. Sterrett Environmental Chemistry Symposium

November 19, 2022

The Frances S. Sterrett Environmental Chemistry Symposium is dedicated to presenting the public with up-to-date, factual scientific information on environmental topics. The symposium is organized by members of the Long Island Subsection of the American Chemical Society (LIACS) and cosponsored by the New York Section of the American Chemical Society (NYACS).

For more information regarding the Environmental Symposium, LIACS, and NYACS, please visit the following sites:

Frances S. Sterrett Environmental Symposium – <http://newyorkacs.online/sterrett/>

Long Island Subsection – <http://newyorkacs.online/long-island-subsection/>

New York Section – <http://newyorkacs.online/>

This year, a total of five speakers have been selected to discuss a plethora of topics including wastewater resource recovery, water purification, decarbonization, and the state of environmental science education at the undergraduate level from local colleges and universities.

The organizing committee would like to thank Dr. Brian Gibney, the NYACS webmaster, for his technical assistance in promoting and streaming the event.

To all the attendees, we hope you enjoy the seminars and join us again at future symposia!

Frances S. Sterrett Environmental Chemistry Symposium Committee:

Paris Svoronos (Committee Chairperson)

Ping Furlan, United States Merchant Marine Academy

Marlon Moreno, CUNY Queensborough Community College

Paul Sideris, CUNY Queensborough Community College

Qi Wang, Nassau Community College



2022 Frances S. Sterrett Environmental Chemistry Symposium
November 19, 2022

Agenda

10:00 a.m.	Welcoming Remarks Dr. Paris Svoronos, Symposium Chairperson Dr. Kathleen Kristian, 2022 ACS New York Section Chairperson Dr. Qi Wang, 2022 ACS Long Island Subsection Chairperson
10:05 a.m.	Wastewater Resource Recovery in the Circular Economy Dr. Dimitrios Katehis, Executive Director of Operations, Bureau of Wastewater Treatment, NYC Department of Environmental Protection
10:30 a.m.	Magnetically Recoverable and Reusable Nanocomposites for Water Treatments Dr. Ping Y. Furlan, Professor, United States Merchant Marine Academy
10:55 a.m.	Chemistry of Decarbonizing Combustion and Propulsion Systems Dr. Charles E. Taylor, Retired, National Energy Technology Laboratory
11:20 a.m.	Moving an Introductory Environmental Chemistry Course Online Using the American Chemical Society's "Chemistry in Context" Dr. Kevin Kolack, Lecturer, CUNY Queensborough Community College
11:35 a.m.	Current Trends in Environmental Chemistry Education at an Urban Comprehensive Private University Dr. Laura Schramm, Director of Environmental Studies, St. John's University
11:50 a.m.	Closing Remarks Dr. Mary Virginia Orna, 2023 ACS New York Section Chair-Elect Dr. Terrence Black, 2023 ACS Long Island Subsection Chair-Elect

2022 Frances S. Sterrett Environmental Chemistry Symposium November 19, 2022



Dr. Dimitrios Katehis

Wastewater Resource Recovery in the Circular Economy

Abstract

Transitioning to a circular economy is recognized as a critical element of sustainable urban growth. New York City's wastewater resource recovery (WRR) infrastructure provides the opportunity to convert what was once considered an agglomeration of pollutants into a series of renewable resources. The City's WRR network is being retooled to provide renewable natural gas to bridge the transition to electrification and retain energy intensive industry in the City, produce high value agricultural fertilizers and soil conditioners, and serve as renewable energy platforms by harnessing the sunlight and the heating and cooling capacity of the 1.2 billion gallons of water that is processed at them. Deployment of the enabling technologies that are facilitating this transition requires a workforce with augmented technical abilities that can support these new systems, while continuing to maintain the core biorefining operations necessary to produce high quality treated water that has resulted in the best New York Harbor water quality in more than a century.

Dr. Katehis serves as the Executive Director for Operations at the NYC Department of Environmental Protection, responsible for the City's 14 Wastewater Resource Recovery Facilities, 100 pump stations and fleet of slurry tanker ships. Overseeing a staff of approximately 1600, he is charged with re-tooling the facilities and the people that support them to maximize the value that the City's wastewater infrastructure can bring to NYC residents. He is a Civil Engineering graduate of the City College of New York, where he also obtained his Masters. He earned his PhD from the CUNY Graduate Center under the mentorship of Dr. John Fillos.

2022 Frances S. Sterrett Environmental Chemistry Symposium November 19, 2022



Dr. Ping Y. Furlan

Magnetically Recoverable and Reusable Nanocomposites for Water Treatments

Abstract

The removal of contaminants such as oil and/or invasive microbes from water discharge is a concern for all vessels, which are responsible for >90% of the global trades. Current technologies possess limitations such as inadequate contaminant removal, toxic chemical production, secondary pollutant generation, and/or slow and costly processes. In this presentation, we demonstrate that magnetic nanocomposites are promising for addressing issues relating to water treatments due to their unique properties, potential effectiveness, easy synthesis, and magnetic recyclability. In particular, we describe the synthesis/fabrication of high-performance and reusable magnetic a) polydimethylsiloxane (PDMS) nanocomposite sponges for oil-water separation, and b) antimicrobial nanocomposites based on controlled release of silver, and/or photocatalytic properties of semiconducting nanocrystals for water disinfection. We present our designs and strategies for reducing cost, conserving materials, and restricting leaching of nanomaterials into aqueous environments, tackling the major challenges the nanomaterial-based water treatment methods currently face.

Dr. Ping Furlan is a full professor in Chemistry at United States Merchant Marine Academy. She received a B.S. in Applied Chemistry from University of Science and Technology of China, a M.S. and a Ph.D. in Chemistry from University of Connecticut, and had 2-year postdoctoral experiences at Bell Communications Research. She is an active member of American Chemical Society (ACS) and leader of its major science outreach programs and regional meetings. Her current research with numerous publications, grants and invited presentations has focused in the areas of developing nanomaterials for marine pollution prevention; nanoscience and technology curriculum materials; and chemistry in maritime industry curriculum materials. She has organized international conferences on nanomaterials, served as an editor and reviewer for highly reputed science, materials, and education journals. Her recent recognitions included 2020 New York ACS Outstanding

Service Award, 2019 ACS Fellow, 2019 & 2018 ACS Salute to Excellence Awards, 2016 DOT's Woman in Transportation Award, and 2015 E. Ann Nalley Middle Atlantic Regional Award.



2022 Frances S. Sterrett Environmental Chemistry Symposium November 19, 2022



Dr. Charles E. Taylor

Chemistry of Decarbonizing Combustion and Propulsion Systems

Abstract

Recent climate changes are causing countries to look for methods of reducing anthropogenic (man-made) carbon dioxide emissions. 87% of all human-produced carbon dioxide emissions come from the burning of fossil fuels. The transportation sector accounts for approximately 30% of the fossil-fuel emissions in the U.S. Numerous options exist today to reduce the emissions of carbon dioxide from the transportation sector. This presentation will look at the pros and cons of the most market-ready technologies, and the chemistry behind them as they apply to the maritime industry.

Dr. Taylor retired from the U.S. Department of Energy's National Energy Technology Laboratory (NETL) after 36 years and 10 months in December 2021. During his last year at NETL he was the Supervisory Research Physical Scientist for the Functional Materials Team and the Acting Team Supervisor, Computational Materials Engineering Team. Prior to supervising the Functional Materials and Computational Materials Teams, he worked in the Science & Technology Strategic Plans & Programs Center in the Office of Director at the National Energy Technology Laboratory. Dr. Taylor served as the Global Partnerships Manager for NETL. He was the lead within NETL for all international activities including the management and oversight of all international agreements and interactions with foreign governments and international industrial, non-governmental, and academic entities. Prior to managing the International Program at NETL, Dr. Taylor performed research for 20 years, served as Director of the Chemistry and Surface Science Division at NETL for 7 years and as Associate Deputy Director for Research and Development at NETL for 18 months. While at NETL, Dr. Taylor's investigated the conversion of methane to gasoline-range hydrocarbons, photocatalytic conversion of methane and water to methanol and hydrogen, photocatalytic conversion of CO₂ and water to methanol, photocatalytic conversion of methane contained within methane hydrates, the kinetics of the formation and dissociation of methane hydrates, the separation of hydrogen by dense-metal membranes, and the

rapid formation of methane hydrates from methane and water. Dr. Taylor has 6 U.S. Patents and numerous publications.



2022 Frances S. Sterrett Environmental Chemistry Symposium November 19, 2022



Dr. Kevin Kolack

Moving an Introductory Environmental Chemistry Course Online Using the American Chemical Society's "Chemistry in Context"

Abstract

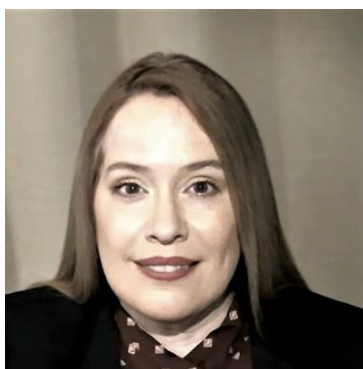
Due to low enrollment, QCC's introductory, non-majors Chemistry and the Environment course was marked for cancellation until 3 days before classes began in Spring 2021, when a registration surge occurred and it was assigned to Dr. Kolack. The lecture and laboratory components of the course, which Dr. Kolack taught previously at Indiana University in the late 1990s using an earlier edition of the same text, had not been offered online at QCC in the past. McGraw-Hill now publishes the American Chemical Society's "Chemistry in Context," offering a wealth of electronic resources to students. With chapters covering climate change, ozone depletion, acid rain, etc., non-major students in the writing-intensive course are introduced to a broad range of general chemistry concepts, in the context of the environment in which we live. Following the initial offering, Dr. Kolack rewrote the out-of-print lab manual, and the course was refined and offered again in Spring 2022. An overview of the course is presented, along with successes and challenges in offering it online.

Dr. Kolack is a tenured Lecturer at Queensborough Community College – CUNY. He earned a B.S. in chemistry at The University of Virginia guided by the legendary Frank Carey, and a Ph.D. at Indiana University in the research group of Distinguished Professor George Christou. Professor Kolack joined the full-time faculty at QCC after 13 years as an adjunct professor at The Cooper Union as well as time at St. Joseph's College, Yeshiva University, and Hunter College. The 2021 American Chemical Society New York Section Outstanding 2-year College Chemistry Teaching Award Winner and the English-language editor of more than 400 peer-reviewed publications, Professor K has more than 30 years of college teaching experience and a highly eclectic background. Dr. Kolack is the lead author of the 3rd-5th editions of "Introductory General Chemistry

Experiments" and also wrote and starred in "The Professor K Show," a topical, environmental educational TV program. Dr. Kolack was the 2015-2019 Chair of the QCC Committee on e-Learning, and was the only person in the QCC chemistry department to teach online prior to March 2020. During the transition to online learning, he posted pre-recorded lecture videos and other materials for his colleagues' use in two-thirds of the chemistry courses offered by QCC.



2022 Frances S. Sterrett Environmental Chemistry Symposium November 19, 2022



Dr. Laura Schramm

Current Trends in Environmental Chemistry Education at an Urban Comprehensive Private University

Abstract

Environmental Chemistry is an interdisciplinary branch of science often overlooked by STEM majors at the undergraduate and graduate levels. In 2015, St. John's began offering an undergraduate Environmental Chemistry course with low enrollment, populated primarily by biology majors who used the course to complete a chemistry minor. However, course assessment, independent of university teaching evaluations, provided valuable feedback. Providing students with an asynchronous online version of our undergraduate Environmental Chemistry course with recorded lectures, group projects, presentations, and exams increased enrollment in our undergraduate Environmental Chemistry course. Across the undergraduate STEM disciplines, our undergraduates now recognize the connection between environmental chemistry and environmental toxicology and health. Our Environmental Chemistry course is now a major and minor elective in the undergraduate Chemistry program and the Environmental Studies programs. An unexpected positive outcome was the need to develop a graduate Environmental Chemistry course for our master's in Environmental Sustainability and Decision-Making and Chemistry programs. Soliciting feedback from stakeholders increased student engagement in Environmental Chemistry at our university.

Dr. Schramm holds a master's in Toxicology and a doctorate in Molecular and Cellular Pharmacology, and her research has been by the NIH. Her research focuses on transcriptional regulation in cancer by pharmaceuticals and natural products. She is a full professor in the Department of Biological Sciences and has been the instructor of record for St. John's University's Environmental Chemistry course since 2015.