Yale ENGINEERING

Chemical and Environmental Engineering

2025 Langer Symposium

Friday, December 12, 2025

CEE

2025 Langer Symposium

Agenda

8:45 - 9:00	Welcome and Breakfast
9:00 - 9:10	Opening Remarks by Dept. Chair John Fortner
9:10 - 10:05	Student Presentations: Lucien Dieter, Kimia Sinaeian, Mitchell Rogers
10:05 - 10:15	Break
10:15 - 11:05	Keynote Speaker: Dr. Katherine Ayers, Nel Hydrogen
11:05 - 11:20	Break
11:20 - 12:30	Student Presentations: Kelby Anderson, Conrad Kocoj, Lauren Mazurowski, Zhongren Jiao
12:30 - 1:30	Luncheon
1:30 - 2:00	Poster Session
2:00 - 2:15	Photo Outside Sterling Memorial Library
2:15 - 3:00	Keynote Speaker: Professor Daniel Esty, Yale School of the Environment and Yale Law School
3:00 - 3:10	Break
3:10 - 3:40	IICEE Pitches
3:40 - 4:00	Awards and Closing Remarks

Student Speakers

Aerosol-based Exposure to Hospital Sink Drain Opportunistic Pathogens

Lucien Dieter

Lucien Dieter is a 4th year PhD candidate in Environmental Engineering. He earned undergraduate and master's degrees in Environmental Resource Management Engineering from Arizona State University, where he investigated biofilm monitoring in redox environments. As a student researcher with The Biodesign Institute's Center for Environmental Health Engineering, Lucien also explored the biological impacts of pharmaceutical compounds and the emergence of antibiotic resistance in the built environment. Before his PhD, he served as a physical scientist with the U.S. Environmental Protection Agency. His research applies molecular biotechnology to assess and improve risks to human health in the built environment.

Reaction Coordinates for Heterogeneous Ice Nucleation: Refinement Strategies & Interfacial Pre-ordering

Kimia Sinaeian

Kimia is a Ph.D. candidate in the Chemical Engineering track of Yale's CEE Department. Her research focuses on the molecular mechanisms of ice nucleation and growth in atmospheric and biological environments, with a particular emphasis on designing and characterizing antifreeze proteins and peptide mimics. Outside the lab, Kimia enjoys learning new languages, gardening, cooking, and playing board games with friends and family.

Observational Constraints Uncover the Pervasive Contributions of Biomass Burning to Organic Particulate Matter

Mitchell Rogers

Mitchell Rogers is a 4th year PhD candidate in Professor Drew Gentner's group who studies the impacts of evolving emissions, climate, and atmospheric chemistry on air quality. He grew up in Irvine, CA and received his B.S. in Chemical Engineering at the University of California, Los Angeles before attending Yale. Outside of the lab, Mitchell enjoys playing percussion, time outdoors, board games, and attempting to cook new things.

The Science of Manufacturing PEM Electrolyzers at Scale

Katherine Ayers, Ph.D.
SVP of Research and Development at Nel Hydrogen

Dr. Kathy Ayers is Senior Vice President of R&D for Nel Hydrogen US, with responsibility for developing and executing Nel's technology strategy in proton exchange membrane electrolysis. She received her Ph.D. in Chemistry at Caltech, and spent several years in the battery industry before joining Nel in 2007. Dr. Ayers manages a broad portfolio of internally and externally funded research projects, across a range of collaborators in academia, industry, and National Labs and is the principal investigator for low temperature water splitting on the US Department of Energy benchmarking program. She has served on multiple scientific advisory boards for Energy Frontier Research Centers and similar consortia, as well as two Federal level advisory committees for DOE: HTAC (Hydrogen and Fuel Cells Technical Advisory Committee) and BESAC (Basic Energy Sciences Advisory Committee). She received R&D Awards at the 2012 and 2021 DOE Merit Reviews from the HFTO Production Team and an American Chemical Society Rising Stars Award in 2014 from the Women Chemists Committee. She became a Fellow of the Electrochemical Society in 2020 and received the inaugural Walter van Schalkwijk award in 2022. She also received a special recognition award from the Connecticut Technology Council at the 20th annual CT Women of Innovation awards event in 2025.

Student Speakers

Plasma-Coupled Electrocatalytic Ammonia Synthesis using Nitrogen and Water

Kelby Anderson

Kelby Anderson graduated from Lehigh University with a B.S. in chemical engineering in 2022 and with a M.Eng. in environmental engineering in 2023. She is now a PhD candidate in Lea Winter's lab, studying nitrogen reduction to ammonia. In her free time, she likes to run, go to crossfit classes, and spend time with friends.

Ultrafast Plasmon Dynamics of Low-loss Sodium Metasurfaces

Conrad Kocoj

Conrad Kocoj is a fifth-year PhD student in Chemical & Environmental Engineering whose research centers on dynamic light–matter interactions in materials for energy conversion and optoelectronics. He uses ultrafast spectroscopy to probe nonequilibrium carrier and lattice dynamics, aiming to uncover mechanisms that can guide the design of next-generation energy materials. Conrad is a recipient of the NSF Graduate Research Fellowship and recently published his work in ACS Nano. He is passionate about leveraging fundamental photophysical insights to advance sustainable technologies and address global energy challenges.

Engineering a Cobalt-Selective Membrane via Bulky Ligand Coordination

Lauren Mazurowski

Lauren is a 5th-year PhD Candidate and NSF Graduate Research Fellow in the Elimelech laboratory. Her research spans from the fundamental scale, developing highly ion-selective membranes for transition metal recovery, to the macro-scale, where she explores the large-scale feasibility and technical challenges of cobalt recovery from industrial and natural waters. During her PhD, Lauren also completed an internship at Apple, focusing on applying green chemistry principles for sustainable product design, and was awarded a Fulbright Scholarship. Prior to joining Yale, she earned a B.S. in Environmental Engineering and an M.S. in Civil and Environmental Engineering from the University of Nevada, Reno, while gaining industry experience in water rights, environmental consulting, and municipal design. As a passionate science communicator, Lauren placed 1st nationally at the NSF Engineering Research Center Perfect Pitch Competition. She enjoys sharing this enthusiasm with students, serving as a mentor for the STARS program at Yale, a K-12 educator at the Yale Peabody Museum, and a judge for the Connecticut State Science Fair. Outside the lab, you can often find Lauren walking her sweet dog, Lady, in East Rock Park, her favorite place in New Haven.

Rigid Microporous Polymer Nanofilms for Precise Hydrocarbon Separation

Zhongren Jiao

Zhongren Jiao is a fourth-year PhD candidate in the Department of Chemical and Environmental Engineering at Yale University, co-advised by Prof. Mingjiang Zhong and Prof. Menachem Elimelech. His research focuses on the synthesis of polymeric membranes for advanced separation applications. Zhongren has developed a series of microporous polymer nanofilms that enable precise crude oil separation, providing an energy-efficient membrane-based alternative to conventional thermal distillation. His work advances the discovery of novel membrane materials for petroleum refining and contributes broadly to both polymer science and chemical engineering. Outside the lab, Zhongren enjoys cooking and playing badminton.

Poster Session

Environmental Impact Analysis of At-Field Fertilizer Synthesis
Claire Butler - Ph.D. Candidate, Winter Lab

Using Electric Fields Caused by Lewis Acid Binding to Tune Electrocatalytic Carbon Dioxide Reduction
Yinan Chen - Ph.D. Candidate, Zhong Lab

Mechanistic Insights into Buffer and pH Effects in Heterogeneous Fenton-like Catalysis for Wastewater Treatment
Claire Chouinard - Ph.D. Candidate, Kim Lab

Peeling Back the Onion: Gas-Phase Organic Compound Emissions from Cooking-Related Sources
Drew Gentner - Associate Professor

Mechanistic Investigation of Lewis-Acid-Assisted Tacticity Control in Radical Polymerization of Vinyl Monomers
Jiawei He - Ph.D. Candidate, Zhong Lab

Treating PFAS via Simple and Green Esterification-Driven Removal
Susanna Maisto - Ph.D. Candidate, Fortner Lab

Understanding the Ion-Exchange of Sodium Super Ion Conductors for Aqueous Redox Flow Batteries
Andy Ogrinc - Postdoctoral Associate, Kwabi Lab

Temperature Responsive Nanocomposites for Low-Energy Water Desalination
Buğra Şahin - Ph.D. Candidate, Fortner Lab

Gas-Phase Organic Compound Emissions Associated with Suboptimal Distributed Natural Gas Combustion in New York City
Adam Thomas - Postdoctoral Associate, Gentner Lab

Unpacking Crystal Nucleation: Classical Nucleation Theory on Non-Uniform Surfaces and the Role of Interatomic Potentials
Fernanda Vargas - Ph.D. Candidate, Haji-Akbari Lab

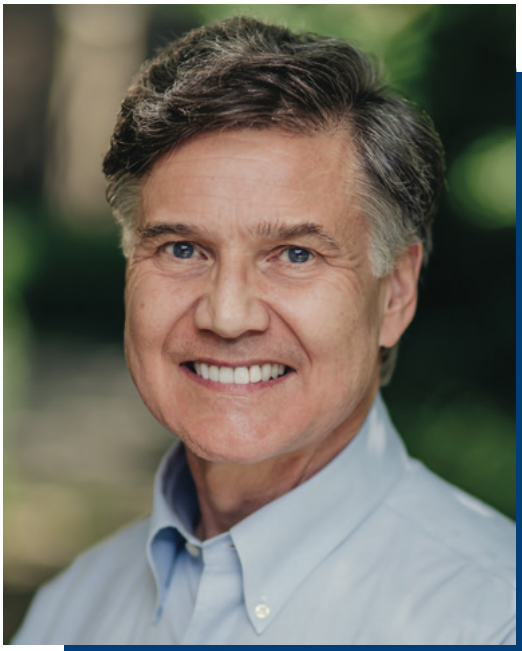
Elucidating Photothermal Reaction Mechanisms with Hybrid Ag/Au-(α-Fe2O3) Plasmonic Catalysts
Aislinn Whalen - Ph.D. Candidate, Pfefferle Lab

Clarifying the Influence that Inter-Absorber Photon Recycling and Interfacial Charge Trapping can have on Ensemble Photosynthetic Activity
Wentao Zhang - Ph.D. Candidate, Hu Lab

The 21st Century Sustainability Imperative

Daniel Esty
Hillhouse Professor of Environmental Law and Policy
Yale School of the Environment and Yale Law School

Dan Esty has primary appointments in Yale's Law and Environment Schools and secondary appointments in the Management and Global Affairs Schools. He has written or edited fourteen books (including the prizewinning volumes *Green to Gold* and *A Better Planet*) and dozens of articles on climate change and sustainability – and their connections to corporate strategy, innovation, competitiveness, metrics, and trade. He held several leadership roles at the U.S. Environmental Protection Agency from 1989-93 including service on the U.S. delegation that negotiated the 1992 Framework Convention on Climate Change. From 2011-14, Professor Esty served as Commissioner (head) of Connecticut's Department of Energy and Environmental Protection. He recently concluded two years of public service leave from Yale – during which time he worked at the World Trade Organization in Geneva helping WTO Director General Ngozi Okonjo-Iweala develop a sustainability agenda for the global trading system. He advises companies, governments, foundations, and non-governmental organizations across the world.



2025 Langer Symposium Committee

Jiawei He

Jiawei is a 4th year Ph.D. candidate in Professor Mingjiang Zhong's lab. His research centers on mechanistic investigations of tacticity formation in radical polymerization and the development of functional polymer materials with tunable tacticity.

Makenna Parkinson

Makenna is a 3rd year Ph.D. candidate co-advised by Professors John Fortner and Menachem Elimelech. Her research involves designing covalent organic framework membranes for applications at the water-energy nexus.

Poly Popova

Poly is a 2nd year Ph.D. student co-advised by Professors Jaehong Kim and Liangbing Hu. Her current research focuses on the development of novel catalytic materials through temperature shock synthesis to advance oxidation-based technologies for water treatment.

Xiang Shi

Xiang is a 2nd year Ph.D. student in Professor Shu Hu's group. His current research involves non-equilibrium catalysis and multiphysics modeling.

Rilyn Todd

Rilyn is a 2nd year Ph.D. student in Professor Jaehong Kim's lab. Her research explores materials and devices enabling electrochemical sensing in water quality monitoring applications.

History of the Langer Symposium

The concept of the student-organized research symposium was initially inspired by Dr. Robert V. Langer and former Chair of the CEE department, John Walz, with the first symposium taking place in 2003. The primary objective of this annual event is to provide graduate students in the department with a professional forum to present their research to fellow students, faculty, and distinguished guests. The symposium also offers a valuable opportunity for both new and established students to showcase new research findings, refine their presentation skills, and inspire others within the department. Dr. Langer passed away at the age of 90 on September 4th, 2015. The 13th annual Langer Symposium was held in his memory, honoring his achievements and generous contribution to the department. His thoughtful donation to Yale established the Robert M. Langer Fund for CEE, which supports various programs in the CEE department and provides funds for graduate fellowship assistance, faculty research, and visiting professors and lecturers.

Dr. Robert V. Langer (B.S. '45, Ph.D. '52) was the Vice President and Treasurer of The Badger Company, Inc., a leading global engineering firm that was eventually acquired by Raytheon. He was also a proud veteran of the U.S. Navy.