

**American Institute of Chemical Engineers,  
Cleveland Section**

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**Wednesday, September 11, 2024, 2:30 PM**

**Washkewicz College of Engineering, CSU, Room 405** (Chester Avenue, Cleveland, OH 44115); reference: <https://www.youtube.com/watch?v=yFMTsb-iJa8>

AICHE Membership is Not Required to attend any meetings.

## **Quantum Computing at the Cleveland State University**

**Abstract:** The IBM Quantum System One installed at the Cleveland Clinic is the first quantum computer in the world to be uniquely dedicated to healthcare research with an aim to help Cleveland Clinic to accelerate biomedical discoveries. Using quantum mechanics, new computing machines can process information in new ways, promising early breakthroughs. Cleveland State University (CSU) is building its expertise in the exciting field of quantum computing in partnership with the Cleveland Clinic, Case Western Reserve University, and Kent State University. Together, they are developing educational and research programs to deliver innovative engineering solutions. In this talk, I will cover the basics of quantum computing and CSU's efforts in this emerging field.



**Bio:** Prof. Chansu Yu is a Professor in the Department of Electrical and Computer Engineering at Cleveland State University. He received his B.S. and M.S. degrees in Electrical Engineering from Seoul National University, South Korea, and his Ph.D. in Computer Engineering from Pennsylvania State University in 1994. Prof. Yu has over 10 years of industry experience with LG Electronics and more than 20 years in academia, primarily at CSU. He has held several leadership roles at CSU, including Chair of the EECS Department, member of the CSU 2.0 Task Force, member of the Cleveland Innovation District project, and co-director of the CSU T.E.C.H. Hub. He developed the B.S. in Data Science and the Ph.D. in Applied Data Science programs, jointly with the Cleveland Clinic at CSU. As the coordinator of the Quantum Computing program at CSU, he is responsible for developing three quantum computing courses and collaborates with CCF, Case, and Kent State on various project proposals. Dr. Yu is a member of the Regional Leadership Board of Greater Cleveland Partnership's (GCP) RITE and a mentor for Global Cleveland. He also serves as the chair of the Computer Science Endorsement Program Committee for the Ohio Department of Higher Education (ODHE). He currently holds several research grants, including three active National Science Foundation grants totaling \$4 million, with one as the principal investigator and two as co-principal investigator. His research interests include quantum computing, cybersecurity, mobile computing, and computer science education.

For those attending this event and interested, a Professional Development Hour Certificate (1 PDH) will be available to you in the following days by Joe Yurko.

**Meeting Location:** Washkewicz College of Engineering, CSU, Room # 405

Chester Avenue 2:30 – 3:30 pm: Presentation by: Dr. Yu

Cleveland, OH 44115 2:30 – 3:30 pm: Meal by: CLE AIChE

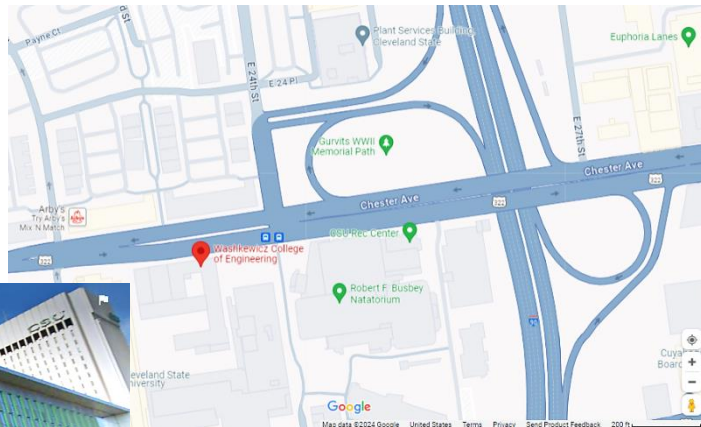
Menu:

Pizza & Soft Drinks

CLE AIChE Professional Members cost: \$10 per person

CSU AIChE Student Members cost: Free

CSU IEEE Student Members cost: Free



**RSVP Recommended by Monday 09Sep2024** with Joseph Yurko and AIChE at: [yurkojoe5@gmail.com](mailto:yurkojoe5@gmail.com)

**AIChE Annual Report from 2023:**

[https://www.aiche.org/sites/default/files/docs/pages/2023\\_aiche\\_annual\\_report\\_v07.pdf](https://www.aiche.org/sites/default/files/docs/pages/2023_aiche_annual_report_v07.pdf)

## **NE Ohio Project Team Looking for Chemical Engineering Consulting Services**

A project in NE Ohio is seeking chemist or chemical engineer to provide consulting services for a forthcoming project. The project includes designing and building a test station to calibrate flow meters and instrumentation used in an industrial process. The fluid in the process is caustic and toxic. The goal is to find a solution that is safe to use and has similar physical properties to the existing fluid. The consulting services would include evaluating the existing fluid and identifying the test fluid. Information on the existing fluid and samples of the fluid are available. The project is ready to start immediately. More detailed information will be provided to interested parties.

James G. MacMillan, PE, CEM  
Principal, Director of Engineering  
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### VOTING INSTRUCTIONS

To enable members to make informed selections for the AIChE election, the candidates for President-Elect (*below*), Secretary (*page 2*), and Director (*pages 2-4*) have provided an overview of their experience, as well as plans for future programs and direction of the Institute. These messages, listed in random order, are in the candidates' own words.

You may vote for a maximum of one (1) candidate for President-Elect, one (1) candidate for Secretary, and four (4) candidates for Director. Election results will be tallied on October 1<sup>st</sup> and announced on October 28<sup>th</sup> at AIChE's Annual Meeting in San Diego.

Members have the option of utilizing an electronic proxy instead of a paper ballot. If you would rather use an electronic proxy instead of the enclosed paper ballot, please go to the proxy web site on or after August 26<sup>th</sup>:

[AIChE.SocietyElection.com](http://AIChE.SocietyElection.com)

Your membership number will serve as your personal identification number. The same rigorous standards guarding your privacy will be applied to both paper ballots and electronic proxies.

To use the enclosed paper ballot, please follow the instructions on the right. To be valid, your ballot or electronic proxy must be received by September 30, 2024.

1. The paper election ballot for the 2025 Board of Directors is included separately. On the ballot, fill the boxes opposite the candidates of your choice. Be sure to use a pen with blue or black ink or a dark pencil. The scanner that "reads" the ballots will not pick up other ink colors.
  2. Mark boxes for the candidates you choose like this:
- Not like this:
3. Seal the marked ballot in the return envelope provided and write in your return address. Do not erase or cross out your name or membership number from the back of the envelope. If they are incorrect, please write in the correct information. This information is used for election control.
  4. Ballots must be received by September 30, 2024. Please be sure to attach the proper postage.
  5. Please do not enclose dues payments, address changes, or any other correspondence with your ballot—these items should be mailed directly to the Institute's Member Service Center (PO Box 4429, Danbury, CT 06813-4429).

### NOMINATED AS PRESIDENT-ELECT FOR 2025 (and to succeed to the presidency in 2026)

#### Anne O'Neal

Anne O'Neal is Manager of Process Safety Culture and Competency at Chevron and an AIChE Board Member and Fellow. Her 42-year career includes several other senior positions in process safety and health, environment and safety. She also founded Chevron's early technical career development program after assignments in process engineering, operations, maintenance, strategic planning, and creating Chevron's first management system approach to process safety.



She earned her BS in chemical engineering from the Univ. of California, Davis, and was a founding member of their Center for Women in Engineering and a ChE Departmental Advisory Board member.

An early participant in AIChE's Center for Chemical Process Safety (CCPS), and a CCPS Advisory Board member since 2005, she and colleagues pioneered Process Safety Faculty Workshops which have reached 500+ globally. She also co-led the 2005 API/PECA sustainability reporting guidelines development.

**Statement:** Since 1908, AIChE has provided something unique to each of us — the chance to grow as a student leader, a platform for technical advancement, a connection point for the educators of tomorrow, a home for institutional collaboration on the advancement of technology, and a cohort of talented colleagues. As President, I will strive to ensure a robust Institute serving our evolving needs as technology advances.

I remain a champion of CCPS's essential work in saving lives, protecting the environment, educating engineers, and contributing to thriving economies through the prevention of process safety incidents.

As AIChE's influence expands through CCPS, the RAPID Manufacturing Institute, the Society for Biological Engineering (SBE), and the Center for Hydrogen Safety (CHS), we must sustainably address grand challenges at scale. We serve those challenges best with the efficiency, effectiveness, and clear roles and responsibilities brought through financial health, good governance and robust policy.

I've seen first-hand the spark lit by great teaching and the vital role that ethics and risk awareness play in undergraduate engineering education. The AIChE's Foundation — through the Undergraduate Process Safety Learning Initiative — has played a critical enabling role.

While we tackle society's grand challenges, we can't ignore the barriers and headwinds society presents to encouraging and enabling engineers and scientists from all walks of life to contribute and to thrive. IDEAL is essential for our Institute in order to bring the world's best minds to solve her most challenging problems. My mother encouraged me to combine my knack for chemistry, math, and physics into ChE, an opportunity not available in her day. AIChE must play a similarly active role in transforming headwinds into tailwinds for the benefit of all.

I'm honored by this nomination and the chance to continuing to serve.

#### Gavin Towler

Gavin Towler is Honeywell's Chief Scientist for Sustainability. Before that he held several R&D roles including Chief Technology Officer of Honeywell UOP. He has worked in process design and clean fuels technologies for 32 years, has 77 patents, co-authored a textbook on process design, and is a Chartered Engineer, AIChE Fellow, and member of the National Academy of Engineering. Gavin has a BA and MEng from Cambridge and a PhD from the University of California, Berkeley, all in chemical engineering.



An AIChE member for 35 years, Gavin has been active in programming and leadership of the Computing and Systems Technology (CAST), Process Development, Fuels and Petrochemicals, and Management divisions. He also served on the Board of Directors (2008-10), Chemical Engineering Technology Operating Council (CTOC), Membership Committee, Foundation Board, CCPS Board, Industrial Advisory Board, and CEP editorial advisory board. He is a trustee of CACHE Corporation and helps teach design at the National University of Singapore.

**Statement:** When I first attended an AIChE meeting, I was amazed and inspired by all the problems chemical engineers were working on and the curiosity, passion, and engagement everyone had. I loved it so much that I've been coming back ever since.

We have always been a diverse and interdisciplinary profession, and AIChE mirrors that and gives us opportunities to come together to learn, share, and support each other, make new friends, and apply our skills to solving global challenges. If elected, I plan to continue the great work AIChE has been doing in expanding the diversity and inclusivity of the profession through programs such as the Future of STEM Scholars Initiative (FOSSI) and IDEAL, and creating more value and opportunities for members through initiatives like RAPID and the Institute for Learning and Innovation.

I came to the USA for grad school and was fortunate that I could make my career here. For decades, the U.S. economy and our world-class universities made the USA a magnet for talent. That's an advantage worth keeping, but recently the H-1B visa process has become overwhelmed by applications for IT workers, making it ever harder for overseas students to find work here after graduation. If elected as AIChE President, I want to engage with other professional societies and the National Academies to build a consensus for revising visa policies to make it easier to attract top talent to our schools and offer graduates a better chance of contributing their skills and diverse perspectives to the U.S. economy.

I would love to hear your ideas and concerns and you can contact me at



## NOMINATED AS SECRETARY FOR THREE YEARS BEGINNING IN 2025

### David J. Dixon

David J. Dixon holds the Robert L. Sandvig Professorship in the Karen M. Swindler Department of Chemical and Biological Engineering at the South Dakota School of Mines and Technology (SDSMT). He is a chemical engineer with BS/MS degrees from SDSMT and a PhD from the University of Texas at Austin. At SDSMT, he has served as: Principal Investigator for an NSF-IUCRC BioEnergy Center; department chair, starting up a chemical and biomolecular engineering PhD program; a Fulbright Scholar, developing university-level partnerships in Germany, Mongolia, and Peru; and an instructor offering the department's first stand-alone course on process safety. David received SDSMT's 2019 Presidential Outstanding Professor Award. His research has been funded by the U.S. Department of Defense, National Science Foundation, Environmental Protection Agency, Small Business Innovative Research, and industry — in diverse areas such as protective membranes, water remediation, and applied solar energy. He has industrial process engineering experience at Dow Corning. Currently, he serves as an AIChE Board Director and is an Institute Fellow. He remains active in the Student Chapters (Chair, 2006–2007), the Career and Education Operating Council (CEOC) membership committee, and on AIChE's Chem-E-Car Competition organizing committee, where he has been involved since its inception. Dixon served as an AIChE Student Chapter advisor, a Group 4 (Education) National Program Committee chair (2004–2005), and chaired CEOC in 2020.



**Statement:** Through my past experiences in academia, in industry, as well as in my leadership roles within AIChE, I've learned of the many diverse areas in which our organization is involved. As an Institute, we are well positioned to help promote and contribute to strategies that can solve many of our world's challenges. If elected, I want to help AIChE continue "Doing a World of Good," through:

- strengthening its position as a global leader of chemical engineering by supporting and helping to develop AIChE's many diverse communities;
- continuing to promote enriching opportunities for young professionals and youth from all walks of life to achieve their dreams, such as the Future of STEM Scholars Initiative, K-12 outreach, and local sections; and
- helping chemical engineers to be recognized as a community that has the expertise and knowledge to address some of the world's great challenges, such as available water, sustainability, process safety, and clean energy.

I look forward to the opportunity to serve as your Institute Secretary and ask for your support. Please feel free to contact me at david.dixon@sdsmt.edu.

### Julianne Holloway

Julianne Holloway is an associate professor of chemical engineering at Arizona State University (ASU). Prior to ASU, Julianne completed her BS and PhD in chemical engineering at Drexel University and her postdoctoral training at the University of Pennsylvania. She has been active in AIChE since 2006, including as the "Celebrating 20 Years of Women in Chemical Engineering" Symposium Chair, Materials Engineering and Science Division Director, and Biomaterials Area Chair. In 2020, she was elected to AIChE's Board of Directors. Her significant contributions to AIChE were recognized by the Herb Epstein Award for Technical Programming, AIChE's 35 Under 35 Award, and the John C. Chen Young Professional Leadership Scholarship. Julianne's research focuses on the development of biomaterials for tissue engineering applications. Her expertise in biomaterials has been recognized through numerous awards, including Associate Scientific Advisor for Science Translational Medicine, Emerging Scholar for the Journal of Biomedical Materials Research, and the MTF Biologics Junior Investigator Award.



**Statement:** My first involvement with AIChE was as an undergraduate student, where I served as the Student Chapter President. Since then, AIChE has played a critical role in my career at every stage. If elected, I will use my experiences within chemical engineering to advance AIChE's strategic plan.

- I will commit to strengthening and expanding AIChE's global reach, positioning the chemical engineering community to address and solve today's grand challenges. Towards this goal, I will work with AIChE to highlight the critical role of chemical engineers in advancing technology related to sustainability, manufacturing, and health. By augmenting our global profile, we will inspire future chemical engineers, enhance public support, and strengthen our profession.
- To address future challenges, we will need to continually adapt to meet the needs of our members and the broader society. I will seek to strengthen AIChE's role in developing new educational tools to ensure members' success and to promote lifelong learning. I will work to enhance AIChE's role as a hub to share new scientific ideas and to catalyze the development of innovative technologies, especially related to data science and artificial intelligence.
- The chemical engineering profession is stronger when we work together. I will work with AIChE to foster an inclusive community unified in "doing a world of good." Additionally, I will encourage AIChE to forge new connections, as well as strengthen existing relationships between academia, industry, and governmental agencies.

I welcome your ideas on how AIChE can shape the future of chemical engineering at julianne.holloway@asu.edu.

## NOMINATED AS DIRECTOR FOR THREE YEARS BEGINNING IN 2025

### Robert Y. Ofoli

Robert Y. Ofoli is an AIChE Fellow. He holds a PhD in chemical engineering (Carnegie Mellon University), a PhD in agricultural engineering (Michigan State University), and a BS in agricultural mechanization (University of Maine). He is an associate professor of chemical engineering, student chapter advisor, and Faculty Excellence Advocate for the College of Engineering at Michigan State University, with active research in plastics upcycling. His service to AIChE includes the Student Chapters Committee (Chair in 2006), Chem-E-Car Committee, Chem-E-Car Rules Committee, and member of the team that successfully revamped Chem-E-Car operations safety as requested by the AIChE Board. Robert served three terms on the Career and Education Operating Council (CEOC; 2017 Chair). He was also a member of the American Chemical Society (ACS) Joint Board-Council Committee on Publications, and a Treasurer of the ACS Colloid and Surface Chemistry Division, during which he became familiar with organizational tax-exempt 501(c)(3) regulations.



**Statement:** AIChE is a global organization with diverse cultures, languages, races, ethnicities, and genders. Its leadership requires a diverse set of approaches — for example, thinking "mosaic," not "melting pot;" building from the bottom up, not top down; focusing on core values (ethics, trust, transparency, professionalism); and cognizance of implicit bias.

The necessity for globally-sensitive programming is reflected in 2024 AIChE President Alan Nelson's support for several AIChE initiatives and programs: IDEAL (inclusion, diversity, equity, anti-racism, and learning); RAPID (Rapid Advancement in Process Intensification Deployment); Explorer AIChE membership for non-traditional chemical engineers; FOSSI (Future of STEM Scholars Initiative) scholarships for diversification; and the "Bee a ChemE" campaign for middle school students. Achieving these diverse goals requires dedicated efforts to broaden our global impact. When I think of the difficulty of doing this successfully, I remember Billy Jean King's assurance that "pressure is a privilege." I embrace the pressure, with the knowledge that successful solutions are not a one-person job; they require collaborating with colleagues to develop measurable metrics to assess real progress.

My goal is to use the principles of servant leadership that I depend on for complicated issues. I am committed to advancing AIChE's strategic plans by:

- enabling the success of stakeholders in chemical engineering and related professions;
- supporting IDEAL, FOSSI, and RAPID, and working to create other essential communities;
- working with Directors and Fellows to educate our national political leaders on the true value of DEI in academic institutions;
- promoting lifelong learning across the profession; and

### David Klanecky

Recognized for his impressive 30+ year career in R&D, operations, and commercial and strategic leadership roles in North America, Europe, and Asia, David Klanecky brings this experience to his role as the CEO and President of Cirba Solutions, the most comprehensive and trusted battery materials and management provider. Leading the strategic growth of Cirba Solutions, Klanecky led a capital raise, securing roughly \$300 million. Collaborating with the private and public sectors, David is focused on expanding operational and technology capabilities to support the growing needs of the circular battery supply chain.



David currently sits on the board of AIChE's Institute for Sustainability Board; the External Advisory Committee for the Advanced Energy Technologies Directorate of the Argonne National Laboratory; is a Board Director for NanoGraf; and is president-elect of NAATBatt International.

**Statement:** As a member of AIChE for more than 30 years, I currently sit on the managing board of the organization's Institute for Sustainability. It's an honor to be considered for the Institute Director role, to help further the success of critical advancements in communities through the chemical engineering profession. I want to use this platform to encourage current and future generations to play a more active role in the evolving scientific disciplines arising in the face of today's challenges.

As a society, we are undergoing a multitude of transformational changes, including electrification and the creation of sustainable supply chains. These are difficult problems to solve and cannot be accomplished in a vacuum. We need the versatile skillsets and expertise possessed by chemical engineers to be invited to the table, as they are critical collaborators and elite scientific minds that are part of providing solutions for these large societal issues.

With industries moving towards automation, we must face this challenge head-on to ensure that chemical engineers, and those entering the field, remain relevant during this transformation, and emerge at the forefront. This evolution includes enhancing academic curriculums by ensuring that students have access to real-world and hands-on experiences to promote lifelong learning, including adaptable and flexible learning styles to meet the future needs that this profession will demand.

During my 10 years spent overseas, I led organizations of differing cultural backgrounds, reinforcing the importance to me of having a diverse workforce to address the creation and strengthening of new initiatives to solve global challenges.

As Director of AIChE, I will use my leadership experience and passion to ensure



**Jerry J. Forest**

Jerry Forest brings four decades of experience to his candidacy for the AIChE Board of Directors. As Senior Director of Process Safety at Celanese, he achieved a 90% reduction in process safety events over 13 years. Currently serving as a process safety improvement consultant at Jerry Forest, LLC, and as adjunct lecturer in chemical engineering process safety at Louisiana State University (LSU), Jerry's expertise is widely recognized. He holds a BS in chemical engineering and an MBA from LSU, and a master's degree in pastoral studies from Loyola.



Jerry prioritizes data-driven strategic planning, intentional competency development, the fostering of a robust process safety culture, and driving excellence in conduct of operations exemplified by the creation of the acclaimed "Walk the Line" program. Certified as a Process Safety Professional and emeritus member of AIChE's Center for Chemical Process Safety (CCPS), and recognized as a Fellow of both CCPS and AIChE, Jerry Forest is uniquely positioned to contribute invaluable expertise to the AIChE Board.

**Statement:** Passionate about improving process safety across organizations, I am committed to reducing the severity and frequency of process safety events. My extensive engagement with CCPS, encompassing positions as a staff consultant and boot camp instructor, along with prior roles as vice chair of the CCPS planning committee, member of the technical steering committee, and active participation in 17 project committees — five of which I chaired — underscores my commitment to CCPS and AIChE.

As past chair of AIChE's Process Safety Division (PSD), I led a multi-year endeavor to survey members, creating a value proposition, bylaws update, and name change from Safety and Health Division to Process Safety Division — aligning PSD's objectives with AIChE committees and projects. This includes the first IDEAL gap assessment aligned with AIChE. My passion for process safety is evident in my projects that have had national and global impacts, such as Walk the Line, a conduct-of-operations model addressing human factor incident causes; and Process Safety in Academia, a network of university professors teaching process safety that was created to help them learn from each other.

As an AIChE Board Director, I am committed to furthering the organization's aspiration of "Doing a World of Good." My focus areas include championing initiatives through the PSD, CCPS, AIChE Academy, and the Global Congress on Process Safety to realize a "world without process safety incidents" by addressing human factor incident causes and enhancing conduct of operations. Additionally, I am dedicated to promoting lifelong professional and personal learning, particularly among student and early career chemical engineers.

**Raymond Rooks**

Raymond Rooks is a principal engineer at AVN Corporation, where he develops new chemical processes, and designs and operates process separation systems, in particular distillation systems, for a range of clients and chemistries. Before AVN, he spent 14 years at Praxair/Linde in cryogenic technology, working in process development, technology management, and competitive analysis. He also spent eight years at Union Carbide/Dow Chemical in process separations. He has given presentations and published several articles in process development and distillation. Within AIChE, he has been a member and served in the leadership of the Process Development Division for 25 years. He is also a member of the Chemical Engineering Technology Operating Council (CTOC), and last year was elected an AIChE Fellow.



**Statement:** Chemical engineering as a profession is experiencing a declining workforce as engineers retire and other professions compete for the best students. Personal interactions with students have shown that they have a strong desire to make an impact in the world and drive us to a greener and more sustainable world. Chemical engineering is a critical element in a sustainable future, but many students don't have exposure to the profession.

AIChE's greatest strength — the interactions of its members and the building of communities — is a key part of our strategic plan. These are realized in AIChE's IDEAL Path, the Process Engineering Community, technical divisions, student chapters, local sections, etc. AIChE has a unique opportunity to be more central to the needs of its members. Different communities have difficulty interacting with each other. This is particularly true among younger members. Ad hoc approaches can be valuable, but bringing members together can be the core of what we do, helping to highlight the value of AIChE.

AIChE's web platform provides a great starting point for integrating our diverse communities. By focusing on building connections, an expanded AIChE digital ecosystem will allow our diverse communities to easily connect, find resources, and for members to highlight their professional profile.

Increased interactions between communities will play an outsized role in strengthening our organization. New initiatives, such as the "Bee A ChemE" program, are an example of engaging our numerous student chapters to excite middle school students about our profession. More of this is needed, even after someone has decided to pursue chemical engineering.

My focus will be to strengthen interactions throughout the Institute as I believe it's

**Frank van Lier**

Frank van Lier was Global Senior Director of Process Technology for The Lubrizol Corporation, retiring in 2022 with 40+ years industrial experience across R&D, operations, and technology. His experience included numerous leadership roles at Lubrizol's Ohio and Texas plants and a year as the General Manager of Lubrizol's Zhuhai, China, manufacturing facility (2018). He also spent six years on the board of the Lubrizol/Indian Oil joint venture located in Mumbai, India. Frank earned a BSChE from the University of Cincinnati and an MBA from Case Western Reserve University.



An AIChE Fellow, Frank has been a member of AIChE since 1980. Most recently, he was on the inaugural governing board of AIChE's RAPID Manufacturing Institute, acting as Chair in 2022. He also chaired the Chemical Engineering Technology Operating Council (CTOC; 2015) and was a director and Chair of the Management Division. Current activities include service as a reviewer for the Virtual Technician and Operator Training Program (VTOP) being developed by AIChE's Institute for Learning and Innovations, and continued engagement with the Management Division.

**Statement:** My hopes for AIChE are to continue to build on the successes of the past. I see RAPID and the Center for Chemical Process Safety (CCPS) as key examples of successful efforts to engage chemical engineers from across industries. RAPID has created valuable industry and academia collaborations focused on more sustainable, safer, and more economical manufacture as exemplified by the successful implementation of process intensification projects at Lubrizol plants in close collaboration with the University of Pittsburgh. The next five years of RAPID are all about shifting to a more sustainable model while still delivering value to AIChE members and their organizations.

Continuing to improve and add member value through AIChE's education efforts will lead to expanded membership and increased corporate engagement if members can cost effectively learn from experts in the field.

The number of AIChE technical divisions, forums, and technology groups can make it confusing for even veteran members to navigate the massive volume of offerings. Opportunities to continuously improve targeted communications are critical to keeping members engaged and attracting new members.

The above are the areas I've supported in the past and intend to support as a director of the Institute. We need to continue to build the network of engineers and encourage/engage with the younger and more diverse cohorts to bring out the best in all as part of AIChE's mission to build an inclusive community united in "doing a world of good."

I am honored to be a nominee for the AIChE Board of Directors and ask for your support.

**Stephen P. (Steve) Beaudoin**

Stephen P. (Steve) Beaudoin is Professor in Purdue's Davidson School of Chemical Engineering. He is Founding Director of the Purdue Energetics Research Center (PERC), where he directs multiple DoD-sponsored research centers focused on explosives and propellant engineering. He is also Founding Academic Director of a novel online Master's degree program focused on defense and security that serves three U.S. Navy bases. Beaudoin was the 2021–2022 Chair of the Purdue University Senate, and has served Purdue as Interim Associate Vice Provost for Student Affairs. He has chaired multiple sessions at AIChE's regional and Annual meetings and has been a mentor at the AIChE Young Faculty Workshop. He has published more than 100 refereed articles, has made ~200 technical presentations, and has received the NSF Early Career Faculty Research Award as well as numerous teaching and mentoring awards. He earned his BS from the Massachusetts Institute of Technology (1988), his MS from the University of Texas at Austin (1990), and his PhD from North Carolina State University (1995), all in chemical engineering.



**Statement:** As a Board member, I would encourage the Institute to pursue workforce development activities that bring more engineers into our profession and help existing professionals to enhance their skills. I have substantial experience with workforce educational programs through an MS degree program that I direct and through a program I am developing at a local community college to train operators to work in chemical facilities. I would encourage the use of the AIChE Institute for Learning and Innovation (ILI) construct to review emerging industrial needs against the classical chemical engineering curriculum to find ways to address such needs without sacrificing valuable outcomes.

We learned from the COVID pandemic that educational and professional activities can be successful when executed remotely. I would encourage activity within the AIChE Academy to develop more asynchronous, remote educational content leading to short course or university credits (including certificates) in key topic areas. The certificates could be stackable to form advanced degrees, and this would provide maximum flexibility as our stakeholders pursue their lifelong learning needs. To develop more engineering talent, it is also important to create compelling educational content for junior and senior high schools. This can inspire students to prepare themselves to succeed in university chemical engineering programs — which is important in general but especially so for schools in diverse communities where there may be few existing chemical engineering role models.

If elected to the Board of Directors, I will help AIChE remain the leading international voice in the chemical and related engineering professions by promoting new partnerships and activities such as these that help us to be responsive to the needs of our stakeholders and society.



NOMINATED AS DIRECTOR FOR THREE YEARS BEGINNING IN 2025

**Luke Landherr**

Luke Landherr is a College of Engineering Distinguished Teaching Professor and Associate Chair of Undergraduate Studies in the Chemical Engineering Department at Northeastern University. He received his BS from Lafayette College and his PhD at Cornell University, before completing an NRC postdoctoral fellowship at the National Institute of Standards and Technology.



His NSF-funded research into comics and videos as visual learning tools for students has enabled him to create groundbreaking educational tools. These materials have been used at universities and high schools throughout the U.S. and internationally, including the "Wide World of Chemical Engineering" comic and the *Crash Course: Engineering* series with PBS Digital. He is a regular contributor and Publication Board member for the *Chemical Engineering Education* journal. He was named one of AIChE's 35-Under-35 in 2017 and has won AIChE and American Society for Engineering Education (ASEE) awards for his educational research and teaching, including AIChE's awards for Excellence in Engineering Education Research and for Innovation in Chemical Engineering Education.

**Statement:** I am honored to be nominated for AIChE's Board of Directors, and to have the opportunity to represent our discipline, colleagues, and students in this capacity. I have extensive leadership experience within AIChE, having served as Chair of both the Societal Impact Operating Council (SIOC) and AIChE's K-12 Committee, as well as Director for AIChE's Education Division. Through these roles, I helped found and organize the K-12 STEM Showcase at the Annual Meeting starting in 2019, and helped build AIChE's K-12 Community — now with several thousand members. I also served as Programming Co-chair for the 2021 Annual Meeting.

I strongly believe in AIChE's aspiration to provide leadership to our field and promote lifelong growth in chemical engineering. If elected, I aim to further the impact of the Institute through:

- creating and expanding programs, outreach, training, and initiatives that will increase growth in our profession and attract new generations of chemical engineers;
- promoting policies that enable innovative research and technology so that chemical engineers can continue to be leaders in medicine, sustainability, materials, and the many other fields that make up our discipline;
- improving communication and highlighting the achievements of chemical engineers both within our profession and beyond, to better engage members and support growth efforts;
- upholding the IDEAL path by helping to build an inclusive community where all members are empowered to contribute to and strengthen our profession.

I welcome your feedback and any dialogue about how I can best serve you on the AIChE Board at [L.Landherr@northeastern.edu](mailto:L.Landherr@northeastern.edu).

**Akua Asa-Awuku**

Akua Asa-Awuku is currently a professor of chemical and biomolecular engineering and the Associate Dean for Diversity, Equity and Inclusion in the A. James Clark School of Engineering and Professor at the University of Maryland, College Park. She received her BS (2003) in chemical engineering from the Massachusetts Institute of Technology, and her MS (2006) and PhD (2008) in chemical engineering from the Georgia Institute of Technology. Dr. Asa-Awuku's primary research explores and predicts the fate and transport of aerosols and droplets in the environment, and their interactions with water as they pertain to air quality, climate, and health. Her work as an engineer, teacher, and leader is deeply rooted in chemical engineering principles, and during her career she has worked with academic, industry, and community partners to address some of the most pressing environmental and atmospheric challenges of our time. She currently has more than 70 publications and is a recipient of research grants from the U.S. National Science Foundation, the Environmental Protection Agency, and the Department of Energy.



**Statement:** I am deeply honored to have the opportunity to serve, and I am enthusiastic about leveraging my leadership skills and technical expertise to make meaningful contributions to the AIChE Board of Directors. I first became a member of AIChE in graduate school, and my passion and dedication to our field of chemical engineering have only grown stronger over the years. I firmly believe that our discipline represents a distinctive intersection of science, innovation, and real-world application with the potential to address pressing global challenges through technological advancements and chemically sustainable solutions.

My prior and current experiences have shaped my perspectives and are well-aligned with the current AIChE strategic plan. I am the former President of the American Association for Aerosol Research and currently sit on external advisory boards for the National Center for Atmospheric Research, Pacific Northwest National Laboratory, and Georgia Tech. My work in climate and environmental justice research via a chemical engineering lens has helped to expand our profession's ability to address important societal issues and maintaining relevance in today's evolving world requires ongoing engagement with the public, industries, and government. Additionally, the opportunity to continually learn and adapt in our dynamic and impactful discipline fuels my enthusiasm to serve. I will strive to bring fresh, innovative perspectives, to invigorate discussion, inspire creative problem-solving, and drive strategic decision-making for the board of directors. In closing, I encourage all members to keep this dialogue going in ways to foster growth and future impact in our chemical engineering discipline.

Please feel free to email me with any further ideas or questions you may have: [asaawuku@umd.edu](mailto:asaawuku@umd.edu).

**INCUMBENTS**

**President-Elect  
(to serve as President in 2025)  
Joseph D. Smith**

Missouri University of Science and Technology  
Chief Technology Officer,  
Elevated Analytics Consulting



**Treasurer  
(Second Year of a Three-Year Term)  
Ana P. Davis**

Head of Health, Safety, and Environment  
in North America  
Syngenta



Please join me and vote for your favorite candidate for AIChE Election in 2025!  
Also, note that a local CLE AIChE member is running for office. Voting begins August 26<sup>th</sup> and ends September 30<sup>th</sup>. For reference, please go to:  
[2024 AIChE Board Election for the 2025 Board| AIChE](#)

■ AIChE<sup>®</sup> Election Ballot ■

**President-Elect** (Please vote for one)

- Anne O'Neal
- Gavin Towler

**Secretary** (Please vote for one)

- David J. Dixon
- Julianne Holloway

**Director** (Please vote for four)

- Robert Y. Ofoli
- David Klanecky
- Jerry J. Forest
- Frank van Lier
- Raymond Rooks
- Stephen P. (Steve) Beaudoin
- Luke Landherr
- Akua Asa-Awuku

To be counted valid, ballots must be received by **September 30, 2024**.

To use an electronic proxy instead of this paper ballot, please visit:

[AIChE.SocietyElection.com](https://www.aiche.org/election)

on or after August 26, 2024.

Thank you for voting.



## Article from Chemical Engineering Progress Magazine, August 2024, page 18: “The Rise of Artificial Intelligence”

By: MELANIE MESROPIAN

<https://www.aiche.org/resources/publications/cep/2024/august/rise-artificial-intelligence>

Artificial intelligence (AI) has seen a rapid expansion in its capabilities, especially in recent years. As defined by Amit Gupta in “Introduction to Deep Learning: Part 1” (*CEP*, June 2018, pp. 22–29), artificial intelligence is the “capability of a machine to imitate intelligent human behavior.” Likewise, machine learning (ML) describes a computer’s ability to learn without explicit instructions. AI has the potential to completely reshape the way we live, work, and engage with technology. We are constantly interacting with AI/ML, from voice assistants such as Siri or Alexa, to image and music curation based on our personal preferences through services such as Pinterest or Spotify. Unsurprisingly, AI and ML have found their way into many technical industries, including chemical engineering.

From problem-solving to real-time monitoring and predictive diagnostics, AI has a wide range of applications and uses in the chemical process industries (CPI). However, before rushing to employ AI wherever possible, it is crucial to fully understand the technology and its limitations in order to safely and effectively implement it. This special section discusses how the CPI is making its first forays into AI and ML. Each article covers the implications of utilizing this ever-growing technology, showcasing currently available platforms, the various pros and cons, and ways to safely implement AI into current operations through the lens of digitalization...

## Article from Chemical Engineering Progress Magazine, August 2024, page 27: “Implementing Artificial Intelligence in Process Safety Studies”

By: AMBALAVANAN BALASUBRAMANIAN, SRINIVAS GANTI, HAARISH DHARAN

<https://www.aiche.org/resources/publications/cep/2024/august/implementing-artificial-intelligence-process-safety-studies>

Artificial Intelligence (AI) has been advancing rapidly, and its capabilities can be leveraged for effective and optimal utilization of resources in the chemical process industries (CPI), especially the oil and gas industry. These industries need to conduct several process safety management (PSM) studies as part of their risk management strategy, which requires significant resources, including competent personnel, time, and money.

This article explores how different PSM studies can benefit from AI. The successful implementation of AI depends on the availability of quality labeled data and plant-specific training of the AI model. In the CPI today, most plant data is not available in a labeled format and cannot be used directly in machine learning algorithms. Therefore, after carefully reviewing the data availability and resource requirements for PSM studies, this article suggests starting with rule-based AI implementation as an initial step, followed later by the application of machine learning and deep learning concepts.

Implementing AI in PSM studies can be a game-changer, and this article discusses the necessity and limitations of such an undertaking. This article also proposes a roadmap to help the CPI integrate AI into its PSM studies with ease and efficiency.

### Process safety studies: Current capabilities

Hazard identification is an important step in risk management. Accordingly, the process industries, especially oil and gas companies, invest time, effort, and money to perform process safety studies to identify hazards, manage risk, and ensure safety and asset integrity. These studies may include:

- hazard and operability (HAZOP) studies
- layers of protection analysis (LOPA)
- failure mode and effects analysis (FMEA)
- hazard identification (HAZID) studies
- safety-critical equipment (SCE) identification
- quantitative risk assessment (QRA)
- fire and explosion risk assessment (FERA)
- fire and gas (F&G) detector mapping
- occupied building risk assessment (OBRA)
- pre-startup safety review (PSSR)....

## Article from Chemical Engineering Progress Magazine, August 2024, page 42: “Powering the Transition to Net Zero with Electric Cracking Technology”

BY: TOBIAS SINN, MARTIN HOFSTAETTER, RAINER KEMPER, GUNTHER KRACKER

<https://www.aische.org/resources/publications/cep/2024/august/powering-transition-net-zero-electric-cracking-technology>

The petrochemical industry accounts for approximately 5% of global carbon dioxide emissions (1), with steam cracking processes responsible for a significant share of this output. Steam crackers generate as much as 25% of the greenhouse gas (GHG) emissions of the European chemical industry; globally, steam crackers account for hundreds of millions of tons of GHG emissions per year (2–4). In light of this, innovative technologies must be developed and rapidly made accessible in order to achieve carbon neutrality and counteract the negative climate impact of GHG emissions.

More than 90% of today’s CO<sub>2</sub> emissions in modern steam cracking plants are owed to the high energy requirements of this process (3). The endothermic conversion that takes place in the cracking furnaces requires high temperatures — for example, the coil or reaction tube outlet has an operating temperature of roughly 850°C and a maximum tube metal temperature of up to 1,100°C. The additional energy necessary for the separation section, which separates the raw cracked gas into commercial high-value chemicals (HVCs), is also significant.

With the currently established conventional steam cracking technology, the main energy supply for the entire plant is provided by burning the plant’s methane fraction byproduct and natural gas in the cracking furnaces. In addition, the required utility steam is generated from waste heat. A substantial portion of a steam cracker plant’s Scope 1 GHG emissions are released into the atmosphere via the furnace stacks. Therefore, the electrification of cracking furnaces represents an opportune starting point for significantly reducing GHG emissions and achieving the sustainability goals set out in the 2015 Paris Climate Agreement.

The electrification of cracking furnaces differentiates itself from other steam cracker decarbonization methods mainly through its avoidance of CO<sub>2</sub> generation. Other decarbonization methods based on the elimination of the generated CO<sub>2</sub> emissions, such as fluegas CO<sub>2</sub> capture and blue hydrogen firing, all depend on CO<sub>2</sub> capture and the subsequent storage and/or utilization of the captured CO<sub>2</sub>. In contrast, electric furnaces operate without any additional expenses for CO<sub>2</sub> capture and handling. They are particularly suited for locations with high availability of renewable or low-carbon power supply and long-term low electric energy costs...



Article from Chemical Engineering Progress Magazine, July 2024, page 28:  
“Duck, Duck, Black Swan: How the Brain Can Simplify Rare, High-Impact Events”

By: WILL SHARPE

<https://www.aiche.org/resources/publications/cep/2024/july/duck-duck-black-swan-how-brain-can-simplify-rare-high-impact-events>

**The human brain tends to simplify high-consequence, low-frequency events, which can be particularly dangerous in process hazard analysis (PHA) development.**

Duck, Duck, Goose is a traditional, much-loved children’s game that plays on the balance between expectation and sudden reality. Process safety management (PSM) deals with similar themes. If you replace the goose with a swan — particularly a black swan — you can highlight the frequency of the event. Frequency is a critical topic in process safety, where we try to determine the likelihood of a particular event occurring.

The term “Black Swan Event” was first coined in financial markets with the release of Wall Street trader Nassim Nicholas Taleb’s aptly titled book, “The Black Swan: The Impact of the Highly Improbable” (1). He describes a black swan event as having three key characteristics:

- it is unpredictable
- it has a massive impact
- after the fact, an explanation makes it appear less random and more predictable than it was.

Frequency and severity are common stumbling blocks in prediction and estimation, where the human brain can take shortcuts and make errors along the way. The value of prediction and estimation cannot be ignored; however, it can be improved through psychological understanding. This section details relevant process safety and psychological science definitions.

*Process safety.* To understand the risk a process, unit, or facility presents, two key elements must be understood: the likelihood of an event (*i.e.*, frequency) and the magnitude (*i.e.*, severity) of the impact of the event. The Center for Chemical Process Safety (CCPS) Process Safety Glossary (5) defines such terms as the following:

- Risk: a measure of human injury, environmental damage, or economic loss in terms of both the incident likelihood (frequency) and the magnitude (severity) of the injury or loss
- Frequency: the number of occurrences of an event per unit time (e.g., 1 event in 1,000 years =  $1 \times 10^{-3}$  events/yr)
- Severity: the maximum credible consequences or effects, assuming no safeguards are in place.

When using risk management tools, engineers are required to estimate the severity of a consequence and the frequency of an event. This article uses process hazard analyses (PHAs) as a point of reference. A PHA is a proactive review of process equipment and supporting procedures/activities that ensures the facility design and related PSM systems are properly managing the identified hazards...

**“To Boldly Go Where Few ChemEs Have Gone Before”**

<https://www.aiche.org/resources/publications/cep/2024/august/profile-boldly-go-where-few-chemes-have-gone>

Chemical engineer. Surgeon. Astronaut. Finding success in any one of those professions is a noteworthy accomplishment. By exploring all three of these career paths, Robert L. Satcher Jr., MD, has managed an incredible achievement. In 2009, Satcher spent 11 days in space, completing an orbit around the Earth on the Space Shuttle Atlantis and serving as the crew’s medical doctor onboard the International Space Station (ISS). “Going to space was a very rewarding experience,” says Satcher.

Satcher was born in Hampton, VA, and lived there through junior high school. He and his family then moved to Denmark, SC, and his parents worked at Voorhees College (now Voorhees Univ.), a historically Black university. During high school, Satcher was interested in math, chemistry, and physics, therefore chemical engineering became an obvious choice for him when picking a college major. He was accepted into the Massachusetts Institute of Technology (MIT) for chemical engineering, in addition to receiving a scholarship from DuPont that required him to intern at several of their locations during the summer. “All of that solidified my interest in chemical engineering,” recounts Satcher.

During his undergraduate years, Satcher worked on various research projects that were more life-science oriented. “The more I did that,” he said, “the more I realized that if I wanted to study these problems, where would they be applicable?” This was when Satcher began to find an interest in medicine and improving medical care through research. Still wanting to continue his chemical engineering education, he was accepted into an MD-PhD program, a combined curriculum between MIT and Harvard Medical School.

“Chemical engineering has such a broad footprint with a heavy involvement in the life sciences,” says Satcher. “From the engineering subspecialties, chemical engineering is probably the one that produces the most doctors.” After he received both degrees, he moved to California in 1994 for his residency at the Univ. of California, San Francisco (UCSF), where he specialized in orthopedic oncology.

While Satcher was in residency at UCSF, his research was focused on the response of the musculoskeletal system to mechanical inputs. However, his principal investigator (PI) was also involved in another project at NASA’s Ames Research Center (ARC). Satcher had the opportunity to visit ARC for his research and while there, he had the opportunity to meet and talk with astronauts. “It was kind of serendipitous,” Satcher recalls. “That led to me becoming interested in applying to become an astronaut.”...





**Article from National Society of Professional Engineers, PE Magazine,  
Spring 2024, page 8:**

**“Still Wondering: Where Are the Women Engineers?”**

BY: OLI QIRKO AND JOHN McNEILL

<https://www.nspe.org/resources/pe-magazine/spring-2024/still-wondering-where-are-the-women-engineers>

If you work in an engineering field, look around and notice the people in your organization. What do you see? Do you see homogeneity or diversity? Do you see people who look like you or have similar life experiences?

If you see people who look like you and share similar experiences, you've already got a leg up on others. Working with someone you can easily identify with is a critical factor for networking, skill development, having a sense of belonging, and realizing career success. Unfortunately, in engineering, too many women employees are still "the only one" and are unlikely to see themselves reflected in the workplace.

The lack of women in engineering fields continues despite ongoing efforts to increase the number of young women entering—and thriving in—STEM education and STEM industries. It's unfortunate because engineering truly is a field where everyone can and should have a voice. At its core, engineering is very much a helping profession—people solving problems that impact others. As a woman engineer and a dean of an engineering school, respectively, we believe engineering is a field that can be very appealing to women.

To investigate retention and success in engineering fields, Worcester Polytechnic Institute recently surveyed over 2,000 alumni. Consistently, women alumni reported more positive impacts from project work than did men. In particular, they reported greater self-efficacy. And prior surveys found that women tend to be more energized by winning together against a shared opponent (such as a problem) in a project-based environment or purpose-driven organization.

Women indicated that they gained more project management, critical thinking, communication, and cross-cultural skills. In addition, women undergraduates were more likely to have chosen to enroll in an optional first-year project-based course on human-focused problems.

And why does it matter? One reason is that a STEM degree can have a significant positive impact on economic standing—not just for the student, but for their family and for economic growth directly. The increase in workforce participation boosts production and, hence, income, savings, spending, taxes, and bigger contributions at the community and national levels. More important, women and other underrepresented groups bring a diversity of thought that allows for fuller, more applicable, and more sustainable solutions to the complex issues that face communities around the world.

As universities work to attract more women into STEM by fostering more opportunities for teamwork and projects, it's up to industry—organizations and their leaders and hiring managers, and professional associations—to build the demand for women scientists and engineers.

Article from National Society of Professional Engineers, PE Magazine,  
Spring 2024, page 18:

### “The Latest Trends in Professional Liability Coverage and Claims”

<https://www.nspe.org/resources/pe-magazine/spring-2024/the-latest-trends-professional-liability-coverage-and-claims>

Each year, the National Society of Professional Engineers, the American Institute of Architects Trust, and the American Council of Engineering Companies conduct a consolidated risk management survey of professional liability insurance carriers. The participants compile information about coverage, exclusions, claim trends, the carrier’s history, and other factors. The 2023 survey and interviews revealed issues that were much more scattershot than in previous years. NSPE thanks all of the participating carriers for sharing their industry insights for the benefit of all of our members. The survey and listing of carriers can be accessed on the NSPE website.

#### What Are the Carriers Saying?

Carriers are monitoring legislation very carefully, responding by raising deductibles, presenting increases higher than inflation, and even backing out of markets that are passing hostile legislation.

Carriers are paying attention to your firm’s practices. Objectively, carriers are monitoring turnover, sudden increases in revenue, and staffing ratios (number of PEs/revenue), keeping an eye on artificial intelligence (AI) usage, and looking for new sources of data to keep closer tabs. Subjectively, carriers had three workplace observations: First, younger practitioners aren’t being mentored, both because of hybrid and telework and because of fewer staff pursuing more work, resulting in more mistakes. Second, quality control measures have been relaxed, resulting in more mistakes. And third, although carriers characterize engineering as a "team sport" and are not fans of telework, the whole remote work issue appears to have reached a steady expectation of three days a week for telework.

Carriers are also monitoring project outcomes. Their recommendation is that engineers and design firms should stay away from professional-led design-build projects. On the other hand, contractor-led design-build projects haven’t been impressively successful. A quiet consensus appeared to emerge that progressive design-build was the preferred approach to large infrastructure projects from a risk standpoint, because all the necessary parties are at the table throughout the process...





Article from National Society of Professional Engineers, PE Magazine,  
Spring 2024, page 21:

**“Engineering Ethics, How to Hold Your Leader Accountable”**

BY KYLE PAYNE, PH.D.

<https://www.nspe.org/resources/pe-magazine/spring-2024/engineering-ethics-how-hold-your-leader-accountable>

When learning about leadership, we get to know leaders of every style imaginable – ethical leaders, servant leaders, transformational leaders, and the list goes on. With so much talk about leaders, it’s easy to forget the important role that followers play, particularly when they’re asked to do something unethical. How do they influence their leader or their peers to do the right thing? A recent study of the engineering profession identified 13 behaviors that followers can use to promote engineering ethics.

In the Spring 2023 issue of *PE* magazine, I shared the results of a study involving 300 professional engineers in the On Ethics section article, "How to Avoid Doing Bad Things for Good Reasons: Lessons from a Study of Professional Engineers." I explained that, like everyone else, professional engineers "morally disengage" and make excuses for unethical behavior at work and that these excuses predict unethical behavior. Alongside efforts to reduce moral disengagement through training and coaching, I suggested that engineering firms should highlight the stories of ethical followers, or professional engineers who do the right thing despite facing pressure to do otherwise (including pressure from their leaders). In this article, I will summarize a follow-up study of professional engineers and identify 13 ethical follower behaviors that, if modeled and reinforced, can help engineering firms reduce unethical behavior.

I interviewed 25 professional engineers about their experiences navigating ethical dilemmas at work and trying to influence their leader or their peers. The study participants described pressure to provide services that were outside their area of competence. They described pressure to "take shortcuts" or "cut corners," such as substituting materials that are cheaper or can be more readily procured, or skipping important installation or testing steps. They described pressure to mislead clients, whether by making false representations or omitting important information. They also described pressure to approve or sign and seal engineering work without having had the proper control or oversight to do so...

Article from National Society of Professional Engineers, PE Magazine,  
Spring 2024, page 24:

“Mentoring, At Any Age and Stage”

BY PAULA E. MILES, P.E., PCC, AND NATALIE J. SAYER, MSMSE, PCC

<https://www.nspe.org/resources/pe-magazine/spring-2024/mentoring-any-age-and-stage>

There is a lot of buzz on LinkedIn around "mentoring," but what is it, really? For the purposes of this article, we are using the global European Mentoring and Coaching Council definition: Mentoring is a learning relationship, involving the sharing of skills, knowledge, and expertise between a mentor and mentee through developmental conversations, experience sharing, and role modeling. The relationship may cover a wide variety of contexts and is an inclusive two-way partnership for mutual learning that values differences.

The frenetic pace within businesses across all types of industries can make leaders question the value of spending time supporting or participating in mentoring programs. From the skeptics, you might hear, "Yet another meeting to attend? Forget it!" or "Schedule a standing conversation with that new employee to share what it's taken me years to learn? Let them do their own research, go to some training classes, and figure things out the way I did – trial and error!"

Independently of years of service or job level within an organization, most employees are familiar with explicit and implicit knowledge transfer. Explicit knowledge can be expressed in words, numbers, and symbols and can be stored through readily accessible means (Cambridge Dictionary). This is the type of knowledge taught in classrooms or on webinars. It can be captured on paper and through various electronic means and transferred to new learners easily. It tends to form the foundation for learning management systems and development programs within organizations of all types and sizes.

Alternatively, the Cambridge Dictionary defines tacit or implicit knowledge as knowledge that one acquires from personal experience including observation and working within specific organizations. Tacit knowledge may be expressed as intuition, habits, thinking contexts, and departmental wisdom. While most leaders understand intuitively that tacit knowledge retention and transfer is probably important, what may not be obvious is the significant imbalance between the importance of explicit and tacit knowledge to an organization's sustainability. Research suggests(link is external) that while explicit knowledge accounts for 15% of an organization's intellectual capital, the remaining 85% is tacit knowledge. How, then, does the future-focused organization capture and transfer this staggering percentage of its assets? How do generations of leaders benefit from what is arguably their most critical knowledge source? This is the business case for mentoring.



## Article from C&EN, Chemical & Engineering News, American Chemical Society Magazine, May 6, 2024, page 24:

### “Decarbonizing Concrete”

A competition in Paris shows how innovations can reduce concrete’s adverse environmental impact

by [Alex Scott](#)

<https://cen.acs.org/environment/Improving-concrete-one-worlds-worst/102/i14>

Solving the problem that is concrete—the second-most-used substance, after water, and a candidate for the most harmful to the planet—has inspired a wave of start-ups to develop less harmful alternatives. Representatives of many of these firms gathered in Paris recently to compete for €100,000 (about \$107,000) and become the cleantech start-up champion at Hello Tomorrow’s Global Summit.

The multibillion-dollar concrete industry is a particularly rich target but one that has proven slow to change. The start-up founders in Paris seemed undaunted.

“We can turn buildings into carbon sinks,” said Steff Gerhart, cofounder and chief commercial officer of ecoLocked, as she pitched her company. The firm and others gathered in Paris claim to have alternative chemistries the world’s concrete industry could adopt to fulfill its pledge to cut its annual carbon dioxide emissions of approximately 3 billion metric tons (t)—roughly 8% of total anthropogenic greenhouse gas emissions—to zero by 2050.

ecoLocked’s product is a concrete additive featuring biochar, a carbon-rich material made by heating biomass in low-oxygen conditions. ecoLocked calculates that its approach has the potential to store about 4 billion t of CO<sub>2</sub> annually in concrete and other building materials. The company opened a lab in Berlin in 2022, and in the past year released its first product, for nonstructural concrete.

Rather than trying to offset concrete’s CO<sub>2</sub> emissions, other start-ups at the Paris meeting are seeking to reduce the amount of concrete needed in a structure by enhancing its strength. Yet others want to replace cement—the adhesive component of concrete—with lower-carbon alternatives.

Portland cement makes up 12% of concrete but accounts for 85% of its carbon emissions. Traditional Portland cement is made by combining calcium carbonate with clay minerals and heating the mixture to 900 °C in a kiln to form calcium silicates known as clinker. The clinker is then ground into a powder, and calcium sulfate is added to form cement. CO<sub>2</sub> is generated in the heating step of this process and also during the chemical transformation of calcium carbonate.

In a bid to reduce the amount of concrete a given structure requires, the French start-up Blackleaf has developed a graphene material that, when added to concrete at a concentration of between 0.02% and 0.04%, increases its compressive strength by more than 10% and bending strength by more than 20%.

“This enables the use of less concrete for the same application,” said Camila Rivera Cárcamo, a business development manager at Blackleaf. While other firms have developed graphene powders for concrete, Blackleaf says it is unique in offering a water-based graphene additive, which is easier for concrete makers to mix in. “It’s a huge advantage,” Rivera Cárcamo said. The company is now doing construction-site testing on the strength of concrete made with its additive...

Article from C&EN, Chemical & Engineering News, American Chemical Society Magazine, May 6, 2024, page 29:

“The Long-Lasting Legacy of Flint’s Water Crisis”

10 years on, Flint still faces consequences from the water crisis

Awaiting justice, residents continue to grapple with serious physical and mental health issues

by [Priyanka Runwal](#)

<https://cen.acs.org/environment/water/10-years-Flint-Michigan-still-faces-consequences/102/i14>

A decade ago, one of the worst human-caused environmental disasters in recent US history unfolded in the city of Flint, Michigan. Amid financial turmoil, the city switched its source of drinking water and thereby unleashed a crisis that exposed tens of thousands of residents to lead—a potent neurotoxin—and potentially carcinogenic compounds called trihalomethanes. The switch also led to outbreaks of Legionnaires’ disease. Despite community protests and reports of skin rashes and hair loss, officials insisted that the water was safe to drink. Independent testing by scientists proved otherwise, forcing the city to eventually acknowledge the problem and act. Ten years later, Flint residents are still awaiting justice as they continue to grapple with serious health issues caused by the water crisis.

Seeing people drink from a water fountain or directly from a tap fills Jamie Davis with anxiety. “I’m like, ‘Oh my goodness.’ I want to stop them,” she says.

For Davis—like many other residents of Flint, Michigan—memories of living through one of the most egregious human-made environmental and public health disasters in recent US history haven’t faded. “I don’t think I’ll ever get to the point where I’m comfortable [using the water] without it being filtered,” she says.

About a decade ago, during a financial crisis, a state-appointed emergency manager made a cost-saving decision involving the city of Flint’s drinking-water source. Instead of continuing to purchase Lake Huron water provided by the Detroit Water and Sewerage Department, the city resorted to the Flint River. The move was estimated to save the city roughly \$5 million over 2 years until a new pipeline, under construction at the time, would make it cheaper to bring Lake Huron water to Flint.

“We should have waited till we had the good-quality water,” says Scott Dungee, Flint’s water plant supervisor. But “we were in financial distress, so everything was about money.”

Flint officials had failed to properly treat the highly corrosive river water, which [leached lead and other metals from the city’s aging lead and galvanized iron service pipes and solder joints](#). Between April 2014 and October 2015, thousands of Flint residents were exposed to dangerous lead levels that made children particularly sick. The water switch also fueled an uptick in *Legionella pneumophila*, a waterborne bacterium that caused an outbreak of Legionnaires’ disease—a potentially life-threatening form of pneumonia—that killed at least 12 residents.

When community members—largely poor and mostly Black—raised concerns about the tainted water, state officials repeatedly dismissed them and maintained that the water was safe. [In testimony delivered on Feb. 3, 2016](#), Joel Beauvais, the acting deputy assistant administrator of the US



Environmental Protection Agency's Water Office, told Congress that "what happened in Flint was avoidable and should never have happened."

Victims of the water crisis, including Davis and her sons, are still waiting to receive their shares of a \$626 million settlement—the bulk of which will be paid by the State of Michigan. Many residents are also waiting for their yards and sidewalks to be restored after crews excavated and replaced their lead and galvanized iron service lines. Meanwhile, several homeowners are still waiting to have their pipes changed. In March, a federal judge held the City of Flint in contempt for repeatedly missing deadlines to complete this work...

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# CLE AIChE: Cleveland Chapter

## Fall 2024 – Spring 2025 Program Planning

(as of Aug2024)

Month	Topic, Speaker	Location	AIChE Officer Responsible
September 7, 2024 (6 PM)	Oktoberfest Social Event	German Central Farm, Parma	Joe Yurko, \$7/guest admission + \$ food & beverage free for CSU AIChE students: <a href="https://germancentralfoundation.com/oktoberfest">https://germancentralfoundation.com/oktoberfest</a>
September 11, 2024 (Wednesday 2:30 – 3:30 PM)	Dr. Yu, CSU, IEEE Quantum Computer	CSU, Engineering CSU AIChE & IEEE Students	Joe Yurko & Dr. Gatica, Dr. Holland, Members: \$10; Students: Free CLE AIChE: Pizzas & Beverages
October 10, 2024 (Thurs. 6 PM)	M.W. Wilson Company Steam Safety Class & Tour	M.W. Wilson Company 2579 Center Road Hinckley, OH 44233	Joe Yurko, Jeff Wilson, Dinner provided by M.W. Wilson Co.? M.W. Wilson Co.: 330-225-0663 <a href="https://www.wmsilsoncoinc.com">https://www.wmsilsoncoinc.com</a>
October 2024 (6 PM) Wed. 16Oct2024 Wed. 23Oct2024 Wed. 30Oct2024	Chemical Process Safety Analysis Seminars: by Gurmukh Bhatia, CPISA	Strongsville Fire Dept. Ward 1 Community Rm 11297 Webster Road, Strongsville, OH 44136	Joe Yurko, Dinner cost is included in the seminar expense. Seminar expense: \$25 per session with a total of 3 sessions. Certificates will be awarded for each class as well as a final certificate. sfd: 440-580-3210: <a href="https://www.strongsville.org/departments/fire-emergency-services/stations-and-equipment">https://www.strongsville.org/departments/fire-emergency-services/stations-and-equipment</a>
November 13, 2024 Wednesday (4:00 – 8:00 PM)	Benjamin A. Horwitz "Portrait of a Chemical Engineer" Career Discussion with students and professionals	CSU AIChE Section Joint Meeting, Washkewicz College of Engineering?	Joe Yurko, Dr. Gatica, Dr. Holland, CLE AIChE Meals: Professional members: \$10; Students: Free CLE AIChE: Pizzas & Beverages
December 2024 (6 PM)	Nuclear Power an Introduction, Speaking: Andrew O'hrablo?	The Sanctuary, Rockside Road Independence, 44131	Joe Yurko, Dinner menu ordering for professional members; Students cost: \$5 <a href="http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999</a>
January 2025 (6 PM)			
February 2025 (6 PM)	Appalachian Regional Clean H2 Hub ARCH2 DOE Award, Andrew Thomas, JD, CSU?	The Sanctuary, Rockside Road Independence, 44131	Joe Yurko, Dinner menu ordering for professional members; Students cost: \$5 <a href="http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999</a>
March 2025 (6 PM)	Safety Engineering in Oil Refining processes; Marianne Corrao Speaking?	The Sanctuary, Rockside Road Independence, 44131	Mike Galdoczy, Dinner menu ordering for professional members; Students cost: \$5 <a href="http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999">http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999</a>
April 2025 (6 PM)	NEOSEF Awards Banquet	CCPL Branch Library?	Joe Spagnuolo, Moderator NEOSEF Students, CCPL Branch Library Dinner: Pizza, professional members: \$10; Students: Free
May 2025 (6 PM)	Tour?		

In person events -- Remote meetings if non-contact required / COMPLETED MEETING / PLANNED MEETING / PROPOSED MEETING

