

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

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Marianne C. Corrao
Co-founder/Executive VP



Monday, March 11, 2024, 6:00 PM

AICHE Membership is Not Required to attend any meetings

“Process Safety & Occupational Safety – Heinrich’s Safety Triangle”

The Sanctuary Restaurant, Independence, OH; Meeting Room

6200 Quarry Lane, Independence, OH 44131; 216-901-7852

Marianne C. Corrao, Co-Founder/Executive Vice President, Nexus Engineering Group

Email address: marianne.corrao@nexusegroup.com

Abstract: Serious process safety incidents continue to occur despite management attention and implementation of various safety programs by the process industry. The “safety pyramid” (or “safety triangle”) is often used as the basis for these programs. What is the origin of the safety triangle, what have been the results, and what changes are needed to make a meaningful shift in improvement of safety performance?

Biography: Marianne is Executive Vice President and co-founder of Nexus Engineering Group, Inc., headquartered in Cleveland, OH with offices in Toledo, OH, Chicago, IL, and Midland, MI. The company, with more than 230 professional employees, provides a full range of engineering and design services along with project and construction management expertise to the energy and process industries.

Marianne started her career in 1987 as a process engineer for The Standard Oil Company, Lima Refinery. In this role she provided technical service, conceptual engineering and design, and process safety reviews associated with capital and maintenance projects. Later, she became a commercial planner and linear program specialist focusing on crude selection, product scheduling and capital project economics and budgeting.

In 1995, Marianne joined a Cleveland based engineering firm to focus on projects from the engineering firm side of project delivery. Here she was a senior process engineer, project manager, and project director during her tenure. She had P&L responsibilities for engineering services approaching \$10 million annually at major refineries and petrochemical plants such as BP, Amoco Oil, Marathon, Valero and others.

Marianne moved to Houston, TX in 2002 to lead business development activities for Praxair, Inc. Here she developed a business strategy, technical feasibility study, risk assessment and economic evaluation for the successful design and installation of the world's first high purity hydrogen storage cavern in a salt dome geologic formation. In this role she also developed analysis tools and methods to support customer's needs to benchmark their utility balances and understand the impact of fuel and hydrogen management on their internal energy performance.

In 2005 she joined her colleague, Jeff Herzog, and formed Nexus Engineering Group. Nexus provides professional engineering and consulting services to dozens of clients including major oil companies, utilities, and chemical companies throughout the US. Nexus focuses on providing the needed technical support that underpins client's decisions on capital investments.

Marianne is a graduate of Cleveland State University with a degree in Chemical Engineering. She is blessed to be the daughter of Anthony and Joanne Corrao.

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

Meeting Location:

6200 Quarry Lane
Independence, OH 44131
216-901-7852

The Sanctuary Restaurant (see map below)

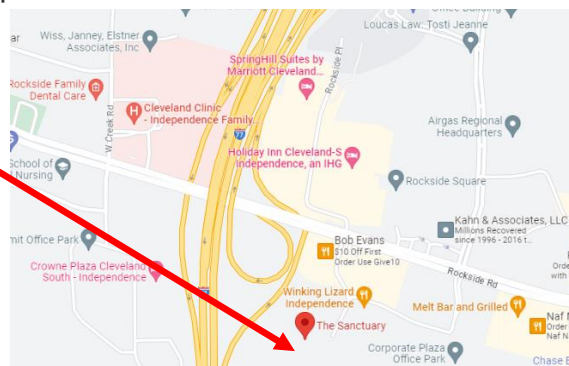
6:00 – 7:00 pm: Social Gathering
7:00 – 8:00 pm: Dinner
8:00 – 9:00 pm: Presentation with Q & A

Dinner: Non-Students: All ordering from menu
Students: \$5 each

Menu:

http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999

RSVP Required by Friday 5Mar2024 with Joseph Yurko and AIChE at: yurkoe5@gmail.com



FEBRUARY 2023 CLE AICHE MEETING: “\$1B DOE Award Update of the ARCH2 Regional Clean H2 Hub in OH”

WITH ANDREW THOMAS, JD; EXECUTIVE IN RESIDENCE, ENERGY POLICY CENTER, LEVIN COLLEGE, CLEVELAND STATE UNIVERSITY



ANDREW THOMAS, EVENING SPEAKER, WITH CLE AICHE STEERING COMMITTEE LETTER OF APPRECIATION

Discover E

<https://discovere.org/programs/engineers-week>

2024 National Engineers Week: Welcome to the Future

Founded by NSPE in 1951, Engineers Week(link is external) (February 18-24, 2024) is dedicated to ensuring a diverse and well-educated future engineering workforce. This latest Engineers Week theme — Welcome to the Future — is about celebrating today’s achievements and paving the way for a brighter and more diverse future in engineering.

With the arrival of artificial intelligence, smart cities, electronic vehicles and more, there’s no denying that the future is here. It will be up to qualified, ethical professional engineers to usher in these powerful advancements responsibly.

Engineers Week is a time for you to celebrate how engineers make a difference in our world and engage students in engineering. It’s also an opportunity to add your voice to the conversation about the need for engineers, technicians, and technologists. Consider the following activities for your Engineers Week celebrations and outreach:

- Join us on social media #Eweek2024
- Host an Engineers Week lunch or dinner
- Invite an inspiring speaker(s) for a lecture or panel
- Write a blog post or article
- Visit a classroom or afterschool program
- Invite a student(s) to shadow you at work
- Present engineering careers
- Volunteer at a science and engineering competition



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Editorial: Prioritizing a Safer Home This New Year

<https://www.aiche.org/resources/publications/cep/2024/january/editorial-prioritizing-safer-home-new-year>



By: **EMILY PETRUZZELLI**, JANUARY 2024

Happy New Year! The beginning of the year is the perfect time to prioritize your health and wellbeing. For some of us, that may mean setting fitness goals and starting an exercise routine. For others, that could mean prioritizing mental health — striking a better work-life balance or committing to a regular meditation practice. Eating more healthily and cutting out junk food is always at the top of my list of resolutions.

This year, many of my resolutions involve home renovations. To do them safely, a few projects that I want to tackle this year will likely require me to hire a professional — such as installing a generator hookup and replacing old grease-packed gas valves. Although it can seem like a chore, keeping up with home maintenance is actually one of the best things to do for your health and safety.

You may not think about it every day, but many of the appliances we use frequently in the winter — like fireplaces and woodstoves, electric space heaters, propane patio heaters, and (often lint-clogged) clothes dryers — are hazardous and should be treated with appropriate caution. The cover article this month discusses the hazards associated with another common item found in most homes — lithium-ion batteries. These batteries, omnipresent in this digital age, can present fire and explosion risks under certain conditions...

Energized community advocates will challenge industry and regulators

Communities affected by pollution will benefit from new Biden administration funding

<https://cen.acs.org/environment/pollution/Energized-community-advocates-challenge-industry-regulators/102/i2>

January 19, 2024 | A version of this story appeared in [Volume 102, Issue 2](#)

By: [Rick Mullin, special to C&EN](#)



Credit: AP Photo/Gene J. Puskar

The derailment of a Norfolk Southern train and subsequent controlled release and burn of vinyl chloride last February affected East Palestine, Ohio, a town of about 4,700 people on the Pennsylvania border.

Grassroots organizations in communities affected by industry say they are going into 2024 with an increased sense of momentum in their efforts to hold companies and government agencies accountable.

The environmental justice movement awakened in the US after the murder of George Floyd in 2020 and the powerful response by Black Lives Matter. Since then, legislation from the Joe Biden administration has trained a spotlight on communities near industrial sites. A notable example is the Justice40 Initiative, which aims to deliver 40% of the benefits of certain federal investments to communities disproportionately affected by pollution.

Recent events—including the start-up of [a major petrochemical plant in Pennsylvania](#), seismic testing for a [project to deposit carbon dioxide under a lake in Louisiana](#), and the [derailment of a train containing vinyl chloride](#) on the Ohio-Pennsylvania border—have spawned new community groups that quickly got up to speed and energized regional organizations already in place. All will be stepping up activity in 2024.

The Biden administration has continued to fund programs for communities burdened by pollution, including an initiative announced in November that will direct \$2 billion to community projects. The Environmental and Climate Justice Community Change Grants program will be funded by the administration's Inflation Reduction Act, which in 2022 earmarked \$60 billion for environmental justice programs.

This year will find community groups, regional organizations, and universities advancing programs intended to help residents challenge industry, sometimes with new personnel and resources.

The Beaver County Marcellus Awareness Community (BCMAC) launched its Eyes on Shell initiative in 2022 as [Shell prepared to begin production at its polymer plant in Beaver County, Pennsylvania](#). Then last fall, it hired an executive director and a communications director. The two positions are funded by the Breathe Collaborative, an initiative of multiple community groups in southwestern Pennsylvania...

Chemical & Engineering News (C&EN) Magazine from the American Chemical Society

Norway green-lights exploratory seabed mining

Despite environmental concerns, the country becomes the first to approve exploration for deep-sea minerals in national waters

<https://cen.acs.org/environment/water/Norway-green-lights-exploratory-seabed/102/web/2024/01>

Chemical & Engineering News; ISSN 0009-2347; Copyright © 2024 American Chemical Society

By: [Priyanka Runwal](#) January 16, 2024

Amid pushback from scientists and environmental experts, the Norwegian parliament on Jan. 9 [voted 80–20 in favor of exploratory deep-sea mining](#) in a 280,000 km² area of the Norwegian Sea. It's the first country to allow this controversial practice in waters under national jurisdiction.

The concern is that extracting these seabed minerals could damage the marine environment. But proponents argue that retrieving such underwater deposits will have less impact than mining on land and could help meet the growing demand for critical minerals needed for clean energy technologies.

"It's a great day for Norway and for energy transition," says Egil Tjøland, a petroleum geophysicist at the Norwegian University of Science and Technology and the secretary general of the Norwegian Forum for Marine Minerals.

Expeditions to the northern Norwegian Sea have found mineral reserves in the form of manganese crusts and sulfide deposits. Chemical analyses have revealed [high concentrations of copper, zinc, and cobalt and the presence of important rare earth elements](#) in these features.

For now, the government plans to open an area roughly the size of Nevada on the Norwegian continental shelf for mining companies to explore. That could include surveying the seabed for mineral deposits, conducting small-scale extractions, evaluating the deposits' mineral content and worth, and assessing the operations' environmental impact. But a parliamentary approval will be required to issue an exploratory mining license. "The authorities would like to have the last word," Tjøland says, "so it won't be a race without doing proper environmental impact studies."

Similar research conducted as part of deep-sea mining explorations in other areas of the world has documented [biodiversity loss](#) due to sediment plumes generated while retrieving the minerals. A recent study also noted [signs of acute stress in helmet jellyfish](#) that were collected from Norway's fjords and subjected to simulated mining-induced plumes in tanks. In addition to these harmful impacts on marine life, scientists are concerned about how such mining will affect carbon storage in the deep sea...

Chemical Engineering Progress (CEP) Magazine from the American Institute of Chemical Engineers (AIChE)

Spotlight on Safety: To Err is Human, To Forget is Disastrous

<https://www.aiche.org/resources/publications/cep/2024/january/spotlight-on-safety-err-human-forget-disastrous>

By: [B. KARTHIKEYAN](#), JANUARY 2024

“Almost all the major accident investigations — Texas City, Piper Alpha, the Phillips 66 explosion, Feyzin, Mexico City — show human error as the principal cause, either in design, operations, maintenance, or the management of safety” (1). It is easy to blame the human for the error, but this will not prevent the incident from reoccurring.

According to the Center for Chemical Process Safety (CCPS) Process Safety Glossary, human factors can be defined as: “A discipline concerned with designing machines, operations, and work environments so that they match human capabilities, limitations, and needs” (2). Thus, the recommendations of incident investigations should address the human factors that led to the incident. It is important to embed the lessons learned from these incidents, including the human factors associated with them, in the organization’s process safety management system. If not, humans may commit the same error again, leading to disastrous consequences.

In my early career, I had three near-death experiences while operating plants, all rooted in human error and its associated human factors...

Chemical & Engineering News (C&EN) Magazine from the American Chemical Society

Cheaper electric vehicle batteries will be here to stay

Inexpensive cathode chemistries and falling raw material prices will decrease batteries’ cost

<https://cen.acs.org/energy/energy-storage-/Cheaper-electric-vehicle-batteries-will-be-here-to-stay/102/i2#:~:text=Falling%20raw%20material%20prices%20and,just%20technology%2Denamored%20early%20adopters>

By: [Matt Blois](#), January 19, 2024 | A version of this story appeared in [Volume 102, Issue 2](#)

Falling raw material prices and a growing menu of inexpensive battery chemistries should decrease the cost of electric vehicle batteries this year, making them cheap enough for ordinary drivers rather than just technology-enamored early adopters.

After a modest increase in 2022, lithium-ion battery prices hit an all-time low in 2023, according to an [annual survey conducted by the research firm BloombergNEF](#). The company attributes the decline to weaker-than-expected demand for batteries and the falling price of lithium, a key raw material.

In addition, Max Reid, a battery industry analyst with the consulting firm Wood Mackenzie, says battery companies are switching to cathodes made with cheaper raw materials, [such as lithium iron phosphate \(LFP\)](#), which doesn’t contain expensive nickel or cobalt. LFP is becoming popular even though it stores less energy than nickel-based materials.

Battery makers are also trying to reduce the cost of high- capacity batteries by replacing nickel with manganese, Reid says. Others are hoping to cost-effectively improve LFP's performance by adding manganese. "Manganese is a really cheap material that is driving down these high-performance battery prices," he says.

Some battery makers are moving toward even-cheaper cathodes made with sodium instead of lithium. In November, the [Chinese carmaker BYD announced plans for a \\$1.4 billion sodium-ion battery factory](#). The Swedish battery firm Northvolt is also [hoping to commercialize sodium-ion batteries](#). While the raw materials for sodium-ion batteries are far cheaper than those used in their lithium counterparts, sodium-ion batteries store much less energy, Reid warns, so they have limited utility in cars. He sees more potential for stationary energy storage systems.,,

Chemical Engineering Progress (CEP) Magazine from the American Institute of Chemical Engineers (AIChE)

Managing the Hazards of Lithium-Ion Battery Systems

<https://www.aiche.org/resources/publications/cep/2024/january/managing-hazards-lithium-ion-battery-systems>

BY: MICHAEL D. SNYDER, P.E., JANUARY 2024

Lithium-ion battery technology has been instrumental to the development of energy storage systems and electric vehicles. However, associated fire and explosion risks need to be recognized and addressed in order to safely deploy this technology.

Over the past decade, the rapid development of lithium-ion battery (LIB) technology has provided many new opportunities for consumer electronics, energy storage systems (ESSs), and electric vehicle (EV) markets. However, fire and explosion risks associated with this type of high-energy battery technology have become a major safety concern.

Many advances have been made in understanding reactive chemistry and fire-safety issues related to both thermal runaway (TR) and fire hazards presented by LIBs. TR or fire can occur from battery manufacturing defects, charging system malfunctions, extreme abuse conditions that may be the result of faulty operation or traffic accidents, and end-of-life battery handling. Failure of the battery is often accompanied by the release of toxic gas, fire, jet flames, and explosion hazards, which present unique exposure concerns to workers and emergency response personnel. LIB fires often present complex emergency response challenges, requiring extensive amounts of water applied over several hours to cool batteries, extinguish the fire, and prevent reignition.

This article overviews the fundamental principles required to establish a basis of safety for proper storage, handling, and use of LIBs. Starting with an overview of the technology used in LIB systems, the article provides a review of common sources for TR and fire events and practical steps to prevent their occurrence. While regulatory coverage for LIB storage, handling, and use is still in various stages of development, a growing body of international best practices and consensus views has emerged. Finally, the article provides an overview of global best practices for emergency response activities involving LIBs to safely address TR and fire events...

Lithium-ion battery recycling goes large

As companies scramble to increase recycling capacity, they are navigating a tricky path through shifting battery chemistries and a raft of new regulations

<https://cen.acs.org/environment/recycling/Lithium-ion-battery-recycling-goes/101/i38>


November 19, 2023 | A version of this story appeared in [Volume 101, Issue 38](#)

By [Mark Peplow, special to C&EN](#)

Sales of electric vehicles are surging, and firms in Asia, Europe, and North America are building large facilities to recycle the valuable metals in those cars' lithium-ion batteries, which start to show declining performance after a decade or 2 of use. Recyclers hope that reusing the lithium, nickel, and cobalt in used batteries will reduce the environmental impact of making new batteries. Some firms also hope to recover less-valuable materials, like copper or graphite, and they're competing to show that their technologies use less energy or fewer chemical reagents than competitors do. But building a big lithium-ion battery recycling industry won't be easy. In some cases, firms need to transfer a pilot-scale process into much larger facilities. They also must deal with ever-changing battery chemistries and navigate a web of new rules regulating the industry.

The electric vehicle (EV) revolution is shifting into high gear. Automakers sold over 10 million EVs last year, more than half of them in China, and global sales should top 14 million this year, [according to the International Energy Agency \(IEA\)](#). That growth is being accompanied by a surge in lithium-ion battery manufacturing. The IEA says that in 2022, EV battery demand soared to 550 GW h, a roughly 65% rise from the previous year.

Yet after a decade or 2 of service, the performance of these batteries will decline until they can no longer provide sufficient range for their EVs. Some batteries may be repurposed for stationary energy storage, but sooner or later they will be retired for good. These end-of-life (EOL) batteries might have once been given an unceremonious burial in a landfill, but today they are far more likely to be recycled...



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Scientists probe the microscopic secrets behind fine-flavor chocolate

Scientists and farmers work to uncover the microbes and molecules behind world-class cocoa

<https://cen.acs.org/food/food-science/Scientists-probe-microscopic-secrets-behind-fine-flavor-chocolate/102/1>

January 5, 2024 | A version of this story appeared in [Volume 102, Issue 1](#)

By: [Rachel Brazil, special to C&EN](#)

Vijay Jagassar describes the cocoa produced at his Trinidad estate as “dark, woody, [with a] very strong chocolate flavor and minor floral notes.” In 2021, this intricate combination [propelled his product to the finals](#) in the Trinidad and Tobago National Cocoa Awards Competition.

Unlike bulk cocoa, which ends up blended into the bars produced by firms such as Hershey and Cadbury, Jagassar produces fine-flavor chocolate, which is sought out for its unique taste notes.

An engineer by training, Jagassar returned from Houston to his native Trinidad in 2018 and knew he wanted to take a more scientific approach to producing fine-flavor chocolate, so he contacted the Cocoa Research Centre (CRC) at the University of the West Indies. The Jagassar estate became one of the farms to participate in the CRC’s initiative to understand how cacao fermentation—a natural days-long process that converts raw cacao beans to velvety cocoa—creates the molecules behind chocolate’s flavor.

Cacao beans sold to produce fine-flavor chocolate fetch significantly higher prices: US \$5,500–\$6,800 per metric ton (t) versus \$2,500–\$3,000 for the bulk cocoa that makes up 90% of the market. Jagassar can sell [a single bar of chocolate for £13](#) (\$16.40) by using a “bean to bar” model, in which chocolate is produced using only his cocoa.

And he’s not alone. The bean-to-bar market is expected to expand by 7.8% annually over the next 5 years, according to [a report by research firm Mordor Intelligence](#).

The CRC project, which is part of a larger collaboration with the University of Nottingham and recently [retired plant geneticist David Salt](#), involves farmers as citizen scientists at eight cocoa estates across Trinidad’s six agroecological zones.

As part of the effort, [CRC researcher Naailah Ali](#) worked with the estates in 2021, observing cacao bean fermentation. The farmers monitored the temperature and pH of the mounds of cacao during the fermentation and drying process.

They also froze bean samples and sent them to the CRC lab in Trinidad. There, researchers identified which types of microbes were working their magic during fermentation and turning the initially flavorless beans into the fruity, floral, nutty, creamy, or spicy notes of fine-flavor chocolate. At the end of the project, a sensory analysis of the final cocoa liquor—the paste made from the fermented, roasted, and ground cacao beans—characterized the flavors produced...

Shape can explain how some microplastics travel so far in the environment

Many microplastics are fibers. Compared with spheres, they can spend 4 times as long in the air before settling.

<https://cen.acs.org/environment/pollution/Shape-explain-microplastics-travel-far-in-the-environment/102/web/2024/01>

By: [Carolyn Wilke](#), special to C&EN, January 22, 2024

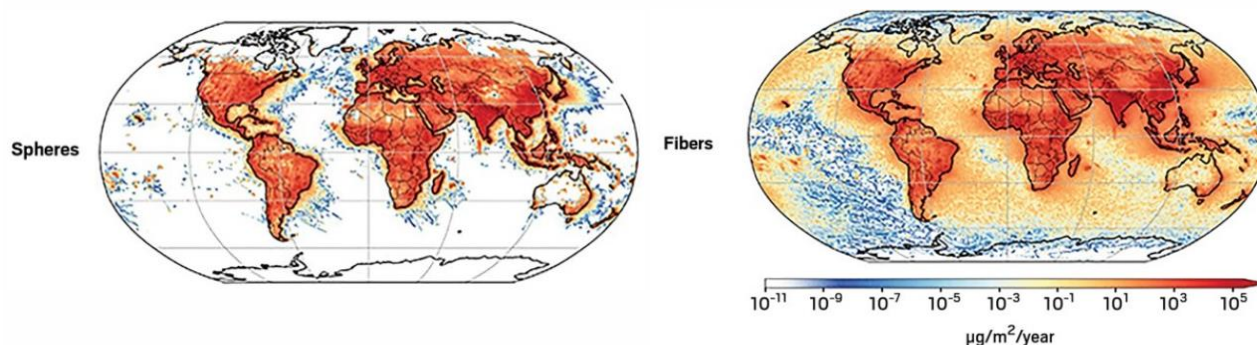
Microplastics have [turned up in some of the most remote places](#), such as the Antarctic and [the summit of Mount Fuji](#). Yet models of atmospheric transport haven't been able to fully explain how these plastic bits stray so far from the people that produced them. A new study finds that the shape of microplastics influences the distances they fly (*Environ. Sci. Technol.* 2023, DOI: [10.1021/acs.est.3c08209](https://doi.org/10.1021/acs.est.3c08209)).

"You find these microplastics worldwide, even far away from likely sources," says Andreas Stohl, a meteorologist at the University of Vienna and one of the study's authors. Most of these microplastics seem to be fibers or relatively complex shapes, he says. "But most models assume that particles are spherical."

Researchers have tools that work fairly well for predicting the transport of small particles with lengths of around 10 μm . But some microplastics can stretch up to 5 mm in one dimension. "The big knowledge gap is actually for these larger particles and especially when it comes to how they behave in the air," says Mohsen Bagheri, another of the study's authors and a physicist at the Max Planck Institute for Dynamics and Self-Organization. Many studies have investigated the motion of microplastics in liquids to work out the particles' settling velocity, or the speed at which a material falls, in air, he says. But few have actually measured that motion in air.

To arrive at more realistic estimates, Stohl, Bagheri, and their colleagues watched how particles behave in air using an instrument called a Göttingen turret, which consists of an air-filled chamber and high-speed cameras. The team filmed microplastic spheres, straight fibers, and curved fibers of various sizes as they fell through the air. For pieces of the same volume, fibers had settling velocities up to 76% lower than that of the spheres, the team reports.

When the researchers plugged their numbers into an atmospheric transport model, they found that fibers spent around 4 times as long in the air as spheres did. "It's really substantial," Stohl says. In the simulations, spheres tended to disperse regionally, while fibers dispersed more or less globally, which may explain why past models have underestimated the distances microplastics can travel...



Credit: *Environ. Sci. Technol.*

Simulations suggest that when spheres and fibers of the same volume are released from densely populated spots, spheres tend to linger nearby (top) while fibers can spread globally, reaching the oceans and polar areas (bottom).

PE Magazine (NSPE) Magazine from the National Society of Professional Engineers

Career Days Boost STEM Interest

Home » PE Magazine » Fall 2023 » Career Days Boost STEM Interest

<https://www.nspe.org/resources/pe-magazine/fall-2023/career-days-boost-stem-interest>

Fall 2023, PE Report

The University of Missouri recently published a study which shows that high school students who attend college-hosted STEM Career Days are far more likely to pursue a career in a related field.

Michael Williams, an assistant professor in the MU College of Education and Human Development, analyzed a Harvard University survey in which around 16,000 college students were asked if they had attended such a career day while in high school. He discovered that those who responded "yes" were disproportionately more inclined to have STEM-related career aspirations than those who responded "no."

Williams, who is also a faculty fellow in the MU Division of Inclusion, Diversity & Equity, is interested not only in cultivating interest in STEM career paths but also in enhancing inclusivity. "Now that we have found that this type of intervention works for turning that potential interest in STEM into career aspirations in STEM, we can work on designing these interventions in a way to be even more effective and accessible to develop a more diverse STEM workforce," he said. "If you want someone to be good at something, you want them to develop a sense of efficacy, which is about putting them in a position where they can see themselves doing it and succeeding at it, and seeing other people that look like them doing it as well."

PE Magazine (NSPE) Magazine from the National Society of Professional Engineers

2024 Engineers Week: Welcome to the Future

Home » PE Magazine » Fall 2023 » 2024 Engineers Week: Welcome to the Future

<https://www.nspe.org/resources/pe-magazine/fall-2023/2024-engineers-week-welcome-the-future>

Fall 2023, NSPE Now

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- Invite a student(s) to shadow you at work
- Present engineering careers or share Chats with Change Makers
- Volunteer at a science and engineering competition

Firms plan US solar wafer production

New technologies could help complete a US-based solar panel supply chain

<https://cen.acs.org/energy/solar-power/Firms-plan-US-solar-wafer/102/i4>

By: [Matt Blois](#), February 3, 2024 | A version of this story appeared in [Volume 102, Issue 4](#)

Nearly a decade after US production of silicon wafers for solar panels ceased, several companies have announced plans to revive wafer manufacturing in the country. Some hope new technologies will reduce the US solar industry's reliance on China.

In January, NexWafe announced it may build a 6 GW wafer plant in the US. CubicPV announced last year that it secured commitments for \$100 million to fund a 10 GW wafer facility in the US. And Qcells says it's on track to open an 8.4 GW wafer facility in Georgia by the end of 2024.

The [supply chain for silicon solar panels](#) begins by refining quartz into rods of polysilicon, a nearly pure silicon with a multicrystalline structure. The polysilicon rods are then reformed into ingots with a single crystal structure, sliced into thin wafers, and treated with chemicals to make solar cells.

Companies in the US have made polysilicon and solar panels for years, but US wafer plants closed because they couldn't compete with large-scale Chinese factories, according to a [US Department of Energy report](#).

NexWafe is hoping its new manufacturing process will be more efficient than methods used in Chinese facilities. Instead of sawing micrometer-thin slices of silicon from an ingot, NexWafe deposits chlorosilane gas onto a template. The template has a top layer of perforated silicon that allows the company to detach the newly formed wafers.

Jonathan Pickering, NexWafe's vice president of business development for North America, says producing polysilicon and ingots requires huge amounts of energy, and the sawing process wastes lots of material. He argues that skipping those steps will make NexWafe's process cheaper. "We're not going to out-scale the great work that's been done in China," Pickering says. "The way we're going to win ... is to drive a higher efficiency, higher performance, and find innovative ways to take cost out." ...

A reckoning for Japan's petrochemical industry

Mitsubishi Chemical's change of direction shows new willingness for drastic reorganization

<https://cen.acs.org/business/reckoning-Japans-petrochemical-industry/102/web/2024/01>

By: [Katsumori Matsuoka, special to C&EN](#), January 12, 2024

In Japan, there is an expression from a Chinese legend, “A tiger at the front gate, a wolf at the rear gate.” It refers to a situation in which one is caught between powerful threats and forced to make difficult choices. Japan's petrochemical industry is in such a situation, and it seems there is only one escape: massive restructuring.

In December, Mitsubishi Chemical Group, the country's largest chemical company, announced that Jean-Marc Gilson, its CEO of less than 3 years, will step down in March. Gilson, a Belgian chemical industry executive with experience at Dow Corning and Roquette, was hired [with much fanfare](#) in 2021 as Mitsubishi's first non-Japanese CEO.

His replacement will be Manabu Chikumoto, a 35-year Mitsubishi veteran who is now head of Mitsubishi's petrochemical division. Gilson's [signature plan](#) since joining Mitsubishi had been to carve out the petrochemical division as a new company. Now, that plan is on hold as the company seeks instead to reorganize the petrochemical business under Chikumoto's leadership.

At a press conference, Takayuki Hashimoto, chair of Mitsubishi's presidential nominating committee, said poor profitability in the petrochemical business is one of the key issues facing the company and that Chikumoto was chosen as someone who can reorganize the business in a “hands-on” way.

The health of the petrochemical industry across Japan has deteriorated since 2021, when Gilson announced the carve-out. Japan's ethylene-based petrochemical production centers face stiff competition from a flood of new, large-scale facilities in China. Japanese petrochemical businesses are [losing money or barely breaking even](#).

Masanori Kawakami, who was a petrochemical manager for a Japanese trading company and currently consults for several chemical-related companies, expects what he calls “unprecedented shuffling” in Japan. The prospect of regional cooperation among multiple companies—as well as more extensive and complex countrywide reorganization—is increasing, he says. But consolidating production means that several ethylene crackers are likely to close.

“My biggest mission is to participate in the reorganization of the petrochemical industry,” Chikumoto said at the press conference. “The momentum for reorganization in the industry is stronger than ever. **We cannot survive unless we undergo a major transformation.**”...

Supporting LOPA with Fault Tree Analysis

<https://www.aiche.org/resources/publications/cep/2024/february/supporting-lopfa-fault-tree-analysis>

BY: EDWARD M. MARSZAL, JOHN APPLGATE, SAFETY, FEBRUARY 2024

Risk management tools like **Layers Of Protection Analysis (LOPA)** can oversimplify risk analyses. More advanced tools such as fault tree analysis can expand these simple studies and make them more accurate.

Layers of protection analysis (LOPA) is an important tool for risk analysis, but its limitations can result in unrealistic results, especially when the result of the analysis is used to develop safety integrity levels (SIL). LOPA relies on conservative assumptions that are not always appropriate, including the independence between initiating events (IE) and protection layers. When LOPA fails to yield reasonable results, analysts can use more sophisticated techniques such as a fault tree analysis. Fault tree analysis allows for elegant handling of shared components, which can yield more accurate risk analysis and appropriate credit for dependent systems.

This article presents situations in which LOPA yields inaccurate results and demonstrates improvement using fault tree analysis. A case study of a butane sphere batch filling operation is presented in which single pieces of equipment are used for multiple purposes, including a dual-level transmitter system that is used as part of the control system, alarms, and safety instrumented system (SIS). LOPA would not allow these shared components to be credited, but fault tree analysis elegantly models their effectiveness. Following up LOPA with fault tree analysis can result in more accurate analysis and better safeguarding of equipment designs...

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Steam School is Back in Session

Process Safety Fundamentals Chemical Process Safety is widely regarded as a vital and significant part of an overall Environment, Health and Safety Management System for chemical operations. We will briefly examine some recent process safety incidents which will help us understand the history and origins of chemical process safety. We will lay the groundwork for a comprehensive process safety management system for chemical operations.

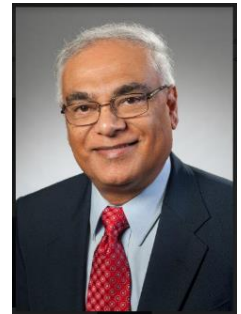
Session #1 – March 13, 2024, \$25/Person, at Cleveland Analytical, LLC; 15666 Snow Road, Brook Park, Ohio 44142
In this session we will focus on what it means to understand our chemical processes. What information is critical, and how this information is the backbone of a robust process safety management system.

Session #2 – March 20, 2024, \$25/Person, at Cleveland Analytical, LLC; 15666 Snow Road, Brook Park, Ohio 44142
This session will build on what we learned in session #1. After understanding our processes, their hazards and their safe operating limits, we will focus on learning how to consistently operate and maintain our systems following documented procedures and standards. What are the essential elements of operation and maintenance.

Session #3 – March 27, 2024, \$25/Person, at Cleveland Analytical, LLC; 15666 Snow Road, Brook Park, Ohio 44142
In this session we will use what we learned in the previous two sessions combined and, using a practical perspective, study the core element of process safety: Management of Change. Time permitting, we will work on an example of how change is managed.

Presenting:

Mr. Gurmukh Bhatia, CPSA, is President of RPSC, LLC a Risk & Process Safety Consulting services company. He retired as the Corporate Director for Process Safety and Chemical Security from The Sherwin-Williams Company, with over 45 years of work experience in the chemical industry. Mr. Bhatia is certified by the Board of Environmental, Health, and Safety (EHS) Auditor Certification (BEAC) as a Certified Process Safety Auditor (CPSA) with 15 years of auditing experience in Process Safety Management (PSM) regulated facilities. He is presently serving on the CLE AIChE Steering Committee as the Risk and Process Safety Director. Mr. Bhatia graduated from the Case Institute of Technology with a Bachelor's Degree in Chemical Engineering.



Registration:

Please register with Joseph Yurko at yurkojoe5@gmail.com by March 5, 2024 for these events. The registration fee is \$25 for each seminar session. You may take one, two, or all three sessions. The registration fee will be paid at the door the day of the event with cash or check payable to AIChE Cleveland Section #017. The fee will include dinner and a CLE AIChE Professional Development Hour certificate for completing the event. Certificates will be awarded for each event, and if all three events are taken, then a fourth certificate will be awarded.

Cleveland Analytical, LLC:

Our host is presently renovating their 2nd floor facility to install a lead analysis process to sample paint, dust, and soil samples from counties across Ohio to determine the amount of lead content. Samples with lead content above the acceptable levels will have third party companies notify residential, industry or brown field sites to undergo a site remediation process to remove the lead contamination and reduce the area lead content to acceptable levels for human and animal exposure. The central instrument to this effort that is being installed in their lab is an Inductively Coupled Plasma Optical Emission System (ICP-OES). A small test cell in this unit operates at 10,000^oK (the same temperature as the surface of the Sun) to create the plasma energy of the sample that will indicate the concentration and amount of lead in the sample. This information will determine the level of contamination and the extent of remediation required to provide a safe and healthy environment for families to live, work and play in Ohio.

CLE AIChE: Cleveland Chapter Fall 2023 – Spring 2024 Program Planning

(as of Feb2024)

| Month | Topic, Speaker | Location | AIChE Officer Responsible |
|--|---|---|---|
| September 8, 2023 (Friday 6 PM) | Oktoberfest Social Event | German Central Farm, Parma | Joe Yurko, \$7/guest admission + \$ food & beverage? https://germancentralfoundation.com/oktoberfest |
| October 11, 2023 (Wednesday 6 PM) | Brewery Tasting Tour | Market Garden Brewery, OH City | Mike Galgoczy, \$20/guest with 20 guests. Dinner: 7 PM Market Garden Brewpub & Restaurant. |
| October 30, 2023 (Wednesday 5:30PM) | ASM Joint Meeting: Heat Treater's Night H2 effect on heating metals, Justin Dzik, PE | FIVES North American Combustion, Inc., Talk & Tour | Joe Spagnuolo & Joe Yurko: \$30 Non-members, \$15 Retirees, \$5 Students. https://www.fivesgroup.com/energy-combustion |
| November 14, 2023 (Tuesday 6 PM) | History of ACS 7-National Chemical Landmarks Sites in Cleveland, Helen Mayer Speaking | The Sanctuary, Rockside Road Independence, 44131 | Joe Yurko, Dinner menu ordering for professional members, Students cost: \$5 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999 |
| December 7, 2023 (Thursday 6 PM) | Nuclear Power an Introduction, Speaking: Andrew Otrablo | The Sanctuary, Rockside Road Independence, 44131 | Joe Yurko, Dinner menu ordering for professional members, Students cost: \$5 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999 |
| January 29, 2024 (Monday 6 PM) | Chemical Process Safety Analysis, Speaking: Gurmukh Bhatia, CPSA | CCPL Independence 6361 Selig Drive Independence, 44131 | Joe Yurko, Dinner for professional member's cost: \$10, Students cost: \$5 CCPL Independence Branch: 216-447-0160, Menu: vote on recipe |
| February 15, 2024 (Thursday 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 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999 |
| March 11, 2024 Monday 6-8 pm | Safety Engineering in Oil Refining process; Speaking: Marianne Corrao, NEXUS | The Sanctuary, Rockside Road Independence, 44131 | Mike Galgoczy, Dinner menu ordering for professional members, Students cost: \$5 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999 |
| March 13, 20 & 27 Wednesday 6-8 pm | Chemical Process Safety Analysis Seminars; Speaking Gurmukh Bhatia, CPSA | Cleveland Analytical LLC 15666 Snow Road Brook Park, Ohio 44142 3 rd Floor Presentation Rm | Joe Yurko, Dinner cost is included in the seminar expense. Seminar expense: TBA at a later time. Certificates will be awarded for each class as well as a final certification. |
| April, 2024 | NEOSEF Awards Banquet | CSU Washkewicz Hall, Rm 349? | Joe Spagnuolo, Moderator NEOSEF Students, Prof. Nolan Holland, CSU ChE Lab Tours, \$15 members, Students Free |
| May | Cleveland Cliffs Steel Mill Tour, TBA | CCPL Independence 6361 Selig Drive Independence, 44131 | Bruno Mancini, Joe Yurko, Dinner for professional member's cost: \$10, Students cost: \$5 CCPL Independence Branch: 216-447-0160, Menu: vote on recipe. |

