CLE AIChE young PROFESSIONALS

American Institute of Chemical Engineers, Cleveland Section NEWSLETTER

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https://www.aiche.org/community/sites/local-sections/cleveland/newsletters

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AIChE Cleveland Section and let colleagues know it is available

Tuesday, April 29, 2025, 5:00 PM

AIChE Membership is Not Required to attend any meetings

Meet the STEM-Focused Family Behind 35+ Award-Winning Science Fair Projects

The Snow Road Branch of the CCPL, Snow Road, Parma; Meeting Room

2121 Snow Road, Parma, OH 44134;

Mr. Vijay Anand and Ms. Ammu Anand, Parental Home School Educators

Abstract:

Mr. Vijay Anand is the VP of AI at MRI Software, with degrees in Electrical Engineering (NIT, India) and Biomedical Engineering (CASE). He also serves as Squadron Commander and Aerospace/STEM Officer in the Civil Air Patrol, mentoring youth in science, cyber, and engineering.

Ms. Ammu Anand has homeschooled their **seven children** for nearly 30 years. With a background in Zoology and Journalism, she has guided her children through **18 years of science fairs**, resulting in **over 35 unique projects**, including **ISEF finalists and Broadcom MASTERS honorees**.

Their approach is simple:

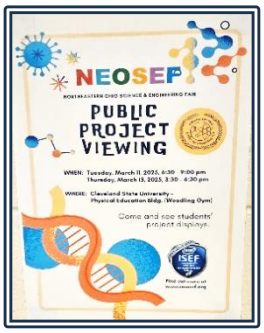
"See a need, meet a need."

From AI-powered e-noses to environmental monitoring systems, their projects reflect a love for science, problem-solving, and the Maker movement—supported by collaboration with local universities and institutions.

Join them as they share:

- Why science fairs matter for America's future
- How to find resources and mentors
- How to foster independent student innovation
- The parent's role—from the sidelines

Inspire the next generation of thinkers, builders, and changemakers!



Biographies:

Mr. Vijay Anand is the VP of AI for MRI, a real estate software company. He holds an Electrical engineering undergraduate degree from NIT, India, and a Masters degree in Biomedical Engineering from CASE. He volunteers as the Squadron Commander and Aerospace and STEM/Cyber Officer at the local Civil Air Patrol squadron and guides the family on science fair projects and extra-curricular activities.

Ms. Ammu Anand has a Zoology degree from India and was working on her Masters degree in Journalism, at which point they decided to homeschool, and has been teaching ever since. They have 7 children and have homeschooled all of them through high school. It will be 30 years of teaching for her, this year. Their

family has been involved with Science fairs and NEOSEF for the last 18 years and often with multiple projects each year. 3 of their kids went on to ISEF, and 1 was selected as the top 30 for Broadcom MASTERS and others have won multiple awards and internship opportunities from the fairs. Their projects have ranged from Creating an AI powered electronic nose to automated water monitoring of Yellow creek river, no two projects being alike, of the 35+ projects.

Science and Engineering has been their family passion, with curiosity about the world around us, the challenges we face as we live in it. “See a need, meet a need” has been the theme of most of their projects, leveraging the Maker movements, building things at home and seeking help from local universities and institutions in our wonderful North East Ohio.

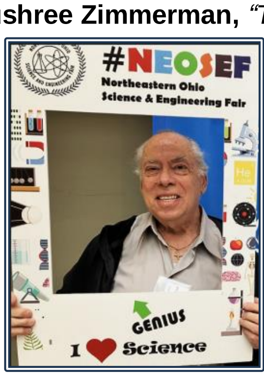
Carrying on the vision of Ben Franklin, Edison and Carver to modern day pioneers in computing and Genetic engineering and AI, they have taught their children to embrace technology, experiment and collaborate, and then to teach and freely share ideas and mentor the next generation.

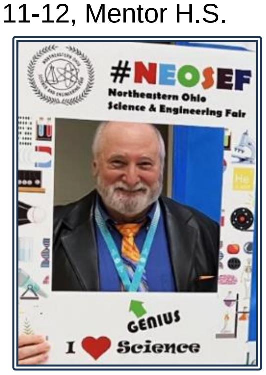
They will be sharing about why participation in science fairs is important for the U.S. and how to leverage help from various sources for a successful project and how to encourage your student to work on an idea independently and how parents can help their student from the sidelines.

NEOSEF 2025 Awards from CLE AIChE:

The Northeastern Ohio Science
NEOSEF
and Engineering Fair

1 **Matthew Graham,** *“The Energy of Light”,* ENG 7-8, St. Mary of the Falls Elementary
2 **Ethan Huck,** *“Solar Powered Plane”***,** ENG 7-8, Lake Ridge Academy
3 **Mannat Thumati,** *“Rational Design and Testing of Independent Home Turbine”,* ENG 9-10, Solon H.S.
4 **John Anand**, “Cross Cultural Gaze Patterns and Recognition Accuracy: Reducing Bias in AI Facial Recognition Systems through Visual Cue Analysis” ENG 11-12, Home School
5 **Loraine Nouafo,** *“Non-CO2 Dependent Isolation of Chondracytes for a Closed Loop Bioreactor”,* ENG 11-12, Solon H.S.
6 **Madelyn Boehnlein,** *“Hydrogel effects on Water Conservation”,* ENV 7-8, St. Mary of the Falls Elementary
7 **Ayat Jaffar,** *“Optimizing Transparent Luminescent Solar Concentrators with Nanostructured Coatings and Smart Photonic Materials: A Comparative Study with Conventional Solar Panels”,* ENV 9-10, Hawken Upper
8 **Anushree Zimmerman,** *“The effect of Microplastic on Brine Shrimp Feeding Behavior”,* ENV 11-12, Mentor H.S.



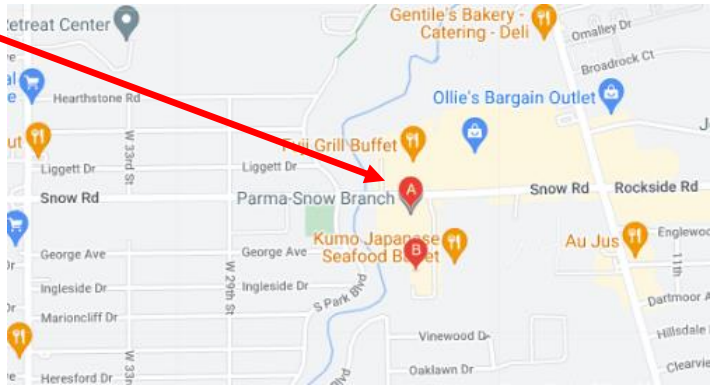


For those attending this event, a Professional Development Hour Certificate (1 PDH) will be sent to you in the following days by Joe Yurko.

Meeting Location:
2121 Snow Road
Parma, OH 44134
216-661-4240

The Parma Snow Road CCPL *(see map below)*
5:00 – 6:30 pm: Social Gathering & NASA Talk
6:30 – 7:30 pm: Dinner
7:30 – 8:30 pm: Presentations with Q & A

Dinner: : Professionals: $10 each
NEOSEF Students & Family are free
CASH, Check, or Credit Card. Thank you!



Dinner Menu:

1 Pizza and Salad
2 Soft drinks and water
3 Dessert Walnut Patika

RSVP Required by Monday 21Apr2024 with Joseph Yurko and AIChE at: yurkojoe5@gmail.com

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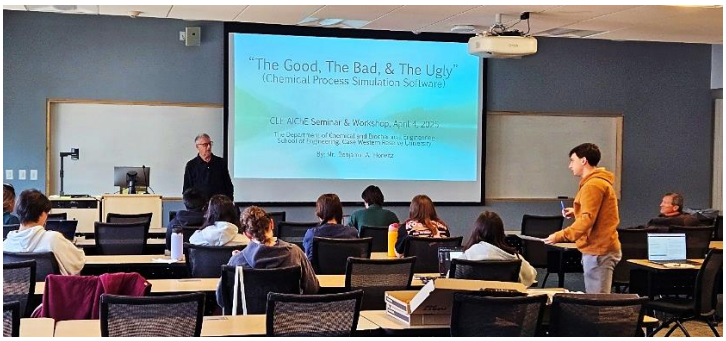
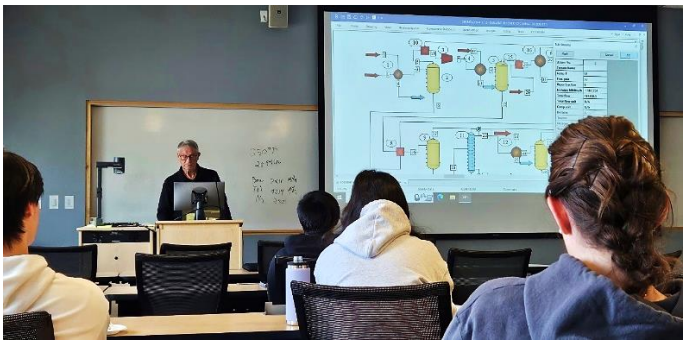
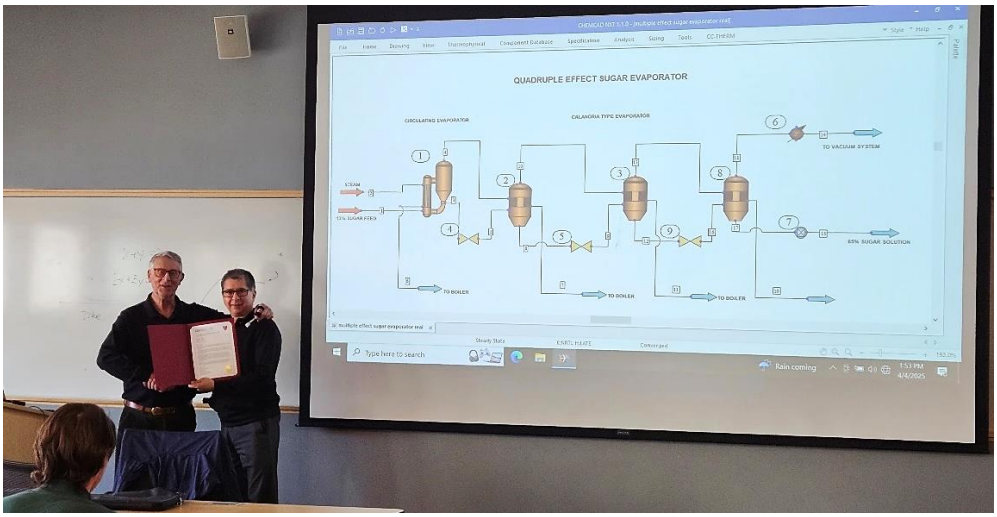
APRIL 4, 2024 CLE AICHE SEMINAR ON CASE STUDIES APPLYING PROCESS SIMULATION SOFTWARE WITH CHEMCAD AT CWRU

WITH MR. BENJAMIN HORWITZ; CHEMCAD CONSULTANT AND CLE AICHE PROCESS SIMULATIONS







(L-R) Mr. Ben Horwitz (CLE AIChE Process Simulation Chair) receiving the CLE AIChE Steering Committee appreciation letter from Mr. Mike Galgoczy (CLE AIChE Chair)

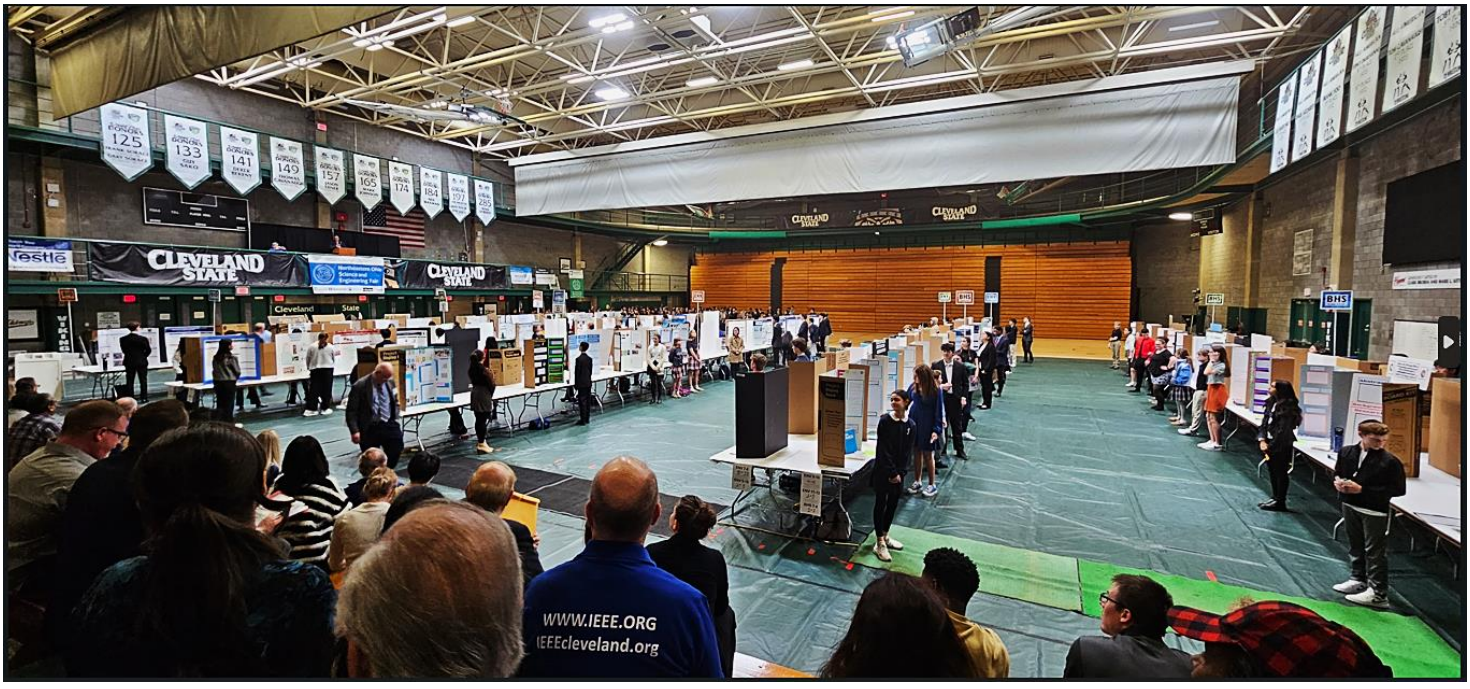
MARCH 12, 2024: CLE AICHE JUDGING NEOSEF PROJECTS AT CSU

NORTHEAST OHIO SCIENCE AND ENGINEERING FAIR **(NEOSEF)**

Student Environmental and Engineering Projects grades 7 to 12

CLE AICHE JUDGES: JOSEPH SPAGNUOLO, BRUNO MANCINI, MICHAEL GALGOCZY, AND JOSEPH YURKO

The CLE AIChE three of four Judges: (L-R) Mike Galgoczy (AIChE Chair), Joe Spagnuolo (Vice Chair), and Brian Bellomo (Vice Young Professional Chair)



Greetings and Welcome of Student Scientists (~300) by Judges (~300) in the Physical Education Building Gym on the main floor

The Judging Begins with the Student Scientists in the Physical Education Building Gym Basement

Greeting and Welcome to Judges by NEOSEF Chair followed by the Rules and Recommendations

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); April 2025

Fuel Switching Is Key to the Energy Transition, But Not Without Challenges

https://www.aiche.org/resources/publications/cep/2025/april/fuel-switching-key-energy-transition-not-without-challenges

This special section explores fuel switching — *i.e.,* the process of replacing coal, oil, natural gas, and other fossil fuels with lower-carbon alternatives such as electricity, hydrogen, and biofuels in industrial applications.

Much of the developing world is embracing the energy transition as the effects of decades of unchecked greenhouse gas emissions become increasingly evident. Rising global temperatures are beginning to manifest in more numerous wildfires, stronger hurricanes, and sea level rise. As recognition of climate change grows, so too does the need to reduce carbon emissions.

Switching from fossil fuels to cleaner alternatives will not only reduce carbon dioxide emissions, but it may also support renewable energy integration, improve local air quality, and enhance energy efficiency as older legacy technologies are replaced with innovative new ones. Diversifying energy sources can reduce the U.S.'s dependence on imported fossil fuels and increase resilience to price fluctuations — an advantage that may become more important as the U.S. implements tariffs affecting petroleum imports…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); April 2025

Key Drivers in the Energy Transition: Electrification and Other Clean Energy Solutions

By: Christopher Ng, P.E, David De Carvalho, Kenton Eriksen

https://www.aiche.org/resources/publications/cep/2025/april/key-drivers-energy-transition-electrification-and-other-clean-energy-solutions

The energy transition presents complex challenges that demand a comprehensive approach to develop and implement sustainable, reliable, and affordable solutions to reduce carbon emissions.

Understanding the latest technologies, regulatory framework, and an evolving investment landscape is crucial for driving the energy transition. To illustrate the scale of investment required, annual global investment in the energy transition reached $2.1 trillion in 2024 *(1)*. This significant investment highlights the massive scale, challenges, and opportunities that the energy transition presents for companies across the energy production and process industries.

Companies will need to navigate this transition systematically while considering company objectives and project-specific factors such as geography, existing processes, and facility lifecycles. Implementing decarbonization solutions using the approaches listed in Figure 1 may require significant investment, time, and effort to retrofit existing equipment or plants, construct new facilities, ensure compliance with grid requirements, train personnel, and adhere to local regulations *(2)*. Managing these complexities requires adopting a phased approach, which is widely used in executing engineering design projects…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); April 2025

A Hydrogen Burner Commercialization Journey

By: David B. Spicer, William A. Aslaner, Dominic J. Agentis

https://www.aiche.org/resources/publications/cep/2025/april/hydrogen-burner-commercialization-journey

Ethylene and propylene are petrochemicals commercially produced in large quantities. They are used in the production of a variety of chemical products, including polyethylene and polypropylene. These polymers are used in numerous applications considered essential to modern standards of living, such as lightweight automotive components, food packaging films, and medical protective equipment.

The production of ethylene and propylene is energy-intensive, with steam cracking being the primary method for producing most of the world's ethylene. This process involves free radical reactions that occur at very high temperatures. Steam cracking furnaces generate the required high temperatures via the combustion of fuel gas.

The fuel gas used is typically a methane/hydrogen mixture, with the combustion of the methane component generating CO_2 emissions. To mitigate associated greenhouse gas (GHG) emissions, the ethylene industry is exploring commercially viable methods, including switching to higher hydrogen content fuels. However, using very high hydrogen content fuel gas for steam cracking furnaces brings technical challenges, such as:

- generation of hydrogen with minimal GHG emissions and acceptable energy consumption
- design of the cracking furnace to be fueled by the very high hydrogen content fuel gas
- design of the burners to combust the very high hydrogen content fuel gas while providing acceptable heat distribution within the furnace and acceptable combustion emissions — with NOx of particular interest.

While other industrial companies are addressing the first two challenges, this article details ExxonMobil's journey from developing a proof-of-concept hydrogen burner to demonstrating hydrogen firing in a commercial-scale steam cracking furnace…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); April 2025

Prioritizing Safety Culture for Ammonia as a Fuel

By: Murtaza I. Gandhi, P.E., Dorothy M. Shaffer, Daniel J. Benac, P.E.

https://www.aiche.org/resources/publications/cep/2025/april/prioritizing-safety-culture-ammonia-fuel

The energy transition is occurring at a rapid rate, with hydrogen emerging as the cleanest carbon-free fuel source. Anhydrous ammonia is in high demand, offering a low-carbon, high-hydrogen-density energy source with potential applications across various industries, including shipping, thermal energy storage, power generation, and more. This shift has resulted in many legacy companies expanding from traditional ammonia manufacturing for fertilizers and chemicals to energy-related uses.

Business growth opportunities are attracting many new companies to this industry. However, many of those newer entrants lack experience in ammonia process safety, and even some of the established companies struggle to find sufficient resources. These issues are exacerbated by the lack of ammonia-specific standards and lesser-known or unpublished safety practices.

Recognition of ammonia as an energy source. Over the past five years, companies and governments have increasingly recognized ammonia's potential to serve as an energy source. For example, Japan and Singapore are establishing a green shipping corridor under a mutual agreement between the two countries. Mazda has included ammonia in its future energy roadmap, while Mitsubishi Heavy Industries successfully combustion-tested ammonia single-fuel burners. In other ammonia news, 8 Rivers plans to develop an 880,000 m.t./yr ammonia production facility in Port Arthur, TX, and Neom's 2.2-GW green hydrogen and ammonia complex is on track to meet the European Union's (EU's) "high bar" definition of renewable fuel. In another partnership, Yara and ACME signed a binding agreement to supply green ammonia…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); April 2025

Transportation Safety Risks in Emerging Energy and Chemical Markets

By: Stephen Calabrese

https://www.aiche.org/resources/publications/cep/2025/april/transportation-safety-risks-emerging-energy-and-chemical-markets

The global energy and chemical sectors are undergoing rapid transformations fueled by technological innovations, regulatory shifts, and an increased demand for sustainable products and practices for the future. As emerging markets expand their footprints, the transportation of hazardous materials — from traditional fuels to new energy carriers like liquefied natural gas (LNG), hydrogen, and anhydrous ammonia — has become a focal point of safety and risk management efforts. The complexities of global supply chains, coupled with the need to navigate a diverse and often challenging regulatory landscape, make transportation safety a critical area of concern for industry stakeholders and regulators alike.

For example, the rise of LNG export projects in previously untapped regions has introduced new transportation corridors, each with unique risks and vulnerabilities. Similarly, the push toward decarbonization drives interest in renewable energy carriers, which necessitate safety considerations during storage, handling, and transit. These dynamics demand a proactive and comprehensive approach to risk analysis and mitigation planning to ensure the safe movement of materials without compromising public health or the environment.

The following sections explore the role of risk assessment, advanced modeling, mitigation planning including emergency preparedness, cross-functional collaboration, and stakeholder engagement in creating resilient safety and response systems…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); April 2025

What is the Future of Liquid Hydrocarbon Fuels and Feedstocks?

By: Charles W. Forsberg, Dr. Bruce Dale

https://www.aiche.org/resources/publications/cep/2025/april/what-future-liquid-hydrocarbon-fuels-and-feedstocks

Given concerns about increasing carbon dioxide (CO_2) levels in the atmosphere, it is critically important to know whether all crude oil can be replaced with liquid hydrocarbons made from non-fossil feedstocks at competitive prices.

We describe herein the potential of replacing all crude oil products, such as gasoline, diesel, jet fuel, and chemical feedstocks, with hydrocarbons made from cellulosic biomass. Cellulosic biomass — *e.g.,* corn stover, trees, kelp, and other renewable organic materials — is the most abundant form of biomass on earth. If liquid hydrocarbon fuels are made from plant biomass that removes CO_2 from the atmosphere or CO_2 that comes from the atmosphere, then the process becomes net zero, and concerns about increasing CO_2 levels are eliminated. Burning these fuels emits the same amount of CO_2 that was taken up by the plants during their growth cycle.

We acknowledge the interest in other potential low-carbon fuels, such as ammonia and hydrogen. These may fill some niche markets. However, the existing fuel storage, distribution, and use systems are designed for liquid and gaseous hydrocarbon fuels. Assuming it can even be done at the required scale, replacing these systems to accommodate ammonia, hydrogen, or electricity will take decades, cost trillions of dollars, and emit large amounts of CO_2 during the replacement process.

If we wish to move quickly to a lower-carbon future, it seems much more feasible to replace petroleum liquid hydrocarbon fuels with the same fuels derived from plant biomass. Thus, we believe that the viability of replacing liquid hydrocarbons depends on finding alternatives for all three functions provided by these petroleum hydrocarbon fuels, namely: a source of energy, ease of storage, and ease of transport…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); June 2024

Drilling, Fracturing, and Characterizing Enhanced Geothermal Systems

By: John Mclennan, Joseph N. Moore, Kevin England

https://www.aiche.org/resources/publications/cep/2024/june/drilling-fracturing-and-characterizing-enhanced-geothermal-systems

The first field experiments to recover heat from hot, conduction-dominated rocks were carried out by the Los Alamos National Laboratory in the 1970s at Fenton Hill, NM. Although the experiments demonstrated that fractures could be produced and extended, the project failed to develop a viable reservoir. This project was followed by numerous failed attempts around the world. Although none produced commercial quantities of electricity (>5 MWe), they confirmed the challenges of creating reservoirs in low-permeability rocks.

In recent years, several different approaches have been proposed to extract heat for energy production using EGSs. In its simplest form, an EGS consists of interconnected injection and production wells. Cold fluid is injected into one well and acquires heat as it passes through the hot rocks before it returns to the surface through the production well. If temperatures are high enough (>200°C), a portion of the hot water can be flashed to steam to generate electricity using a steam turbine. At temperatures between 150°C and 200°C, the steam fraction will be relatively low, and ORC binary power plants can be used to generate electricity. Water returned at temperatures less than 150°C is best used for heating and cooling due to efficiency impediments for power generation at lower temperatures…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); June 2024

Advanced Manufacturing Progress: RAPID's Decarbonization Roadmap

By: Julia Faeth, Lucy Alexander

https://www.aiche.org/resources/publications/cep/2024/june/advanced-manufacturing-progress-rapids-decarbonization-roadmap

AIChE RAPID (AIChE's Rapid Deployment) is a Manufacturing USA Institute focused on advancing process intensification and modular chemical processing for the process industries where we have the Rapid Advancement in Process Intensification Deployment (RAPID).

Six focus areas were as the topics for the original RAPID road mapping efforts: chemicals and commodity processes, natural gas upgrading, renewable bioproducts, intensified process fundamentals, modeling and simulation, and module manufacturing. Several gaps were identified across these focus areas, including the need for non-thermal driving forces, selective conversion technologies, separation technologies with reduced energy requirements, predictive modeling capabilities, availability of databases for modeling, and standardization of modular process components.

Based on this information, RAPID opened a request for proposals (RFP) for projects to address these identified gaps. RAPID members responded to this RFP and projects were selected for funding based on their potential for significant technological advancement. The performance period of this initial cooperative agreement concluded in 2023. The technical research portfolio consisted of 38 projects, 82% of which achieved more than 20% improvements in energy efficiency while addressing the gaps identified during the roadmapping process.

For the next five-year period, RAPID will focus on process technologies to advance decarbonization and U.S. manufacturing competitiveness in the following industrial applications: commodity chemicals, specialty chemicals, low-carbon fuels, and carbon circularity and renewable feedstocks. Some of the potential tools for addressing these topics include process technologies (*e.g.,* microchannel reactors, novel energetics, enhanced fluidics), technology valuation (*e.g.,* technoeconomic analysis, lifecycle analysis, tech-to-market), and enterprise considerations (*e.g.,* modular approaches, supply chain issues, optimization, modeling). RAPID and AIChE will refine and lead the next roadmapping process to identify gaps across these industrial applications and approaches to decarbonizing the process industries…

Chemical Engineering Progress, CEP Magazine,
The American Institute of Chemical Engineers (AIChE); June 2024

Career Connection: Decoding STEM: Challenges and Trends in Today's Workforce

By: Kate Williamson

https://www.aiche.org/resources/publications/cep/2024/june/career-connection-decoding-stem-challenges-and-trends-todays-workforce

Science, technology, engineering, and mathematics (STEM) careers offer unique challenges and opportunities at the forefront of innovation, from driving advancements in healthcare and technology to addressing global concerns like climate change. I have witnessed many STEM job seekers whose roles have changed across sectors. Notably, certain aspects of healthcare and finance, not traditionally considered STEM fields, have grown more reliant on professionals with science, math, engineering, and computational backgrounds.

This article examines the evolving STEM landscape, discussing its broader definitions and distinctions from various interpretations. In addition, it highlights the challenges confronting STEM employers.

The STEM workforce: Definition, size, and growth. Recent breakthroughs in science and technology (*e.g.,* quantum technology, machine learning, and medicine) are reshaping the workforce and upending the conventional STEM framework. Innovations like automation and artificial intelligence (AI) propel this shift and blur the lines between traditional science and engineering disciplines.

According to the National Science Board's 2022 report, the traditional definition of the STEM workforce, encompassing those with a bachelor's degree or higher in science and engineering occupations, comprises about 6.6–7.5 million workers. A broader interpretation, including science and engineering-related degrees or jobs, yields an estimated 29 million workers. This wider definition encompasses workers whose jobs require technical knowledge and skills regardless of occupation or degree type. Some groups have considered expanding the definition to include middle-skill occupations, such as aircraft mechanics and construction supervisors, who must have specific STEM knowledge and skills…

Chemical & Engineering News, C&EN Magazine,
The American Chemical Society (ACS); March 17, 2025; Page 23

Trillions of tons of hydrogen may be waiting under our feet

A new energy industry is emerging around hydrogen made by rocks instead of renewables

By: ***Craig Bettenhausen***

https://cen.acs.org/energy/hydrogen-power/Trillions-tons-hydrogen-waiting-under/103/i7

Geological resources may be able to provide billions—or even trillions—of metric tons of clean hydrogen, according to estimates from US government researchers. By tapping into existing hydrogen accumulations and stimulating underground rocks to make more of the electron-rich gas, a new crop of energy entrepreneurs think they can put low-carbon hydrogen on the market for as little as $1 per kilogram. The concept is proven at just one site today. But if it works as well as its advocates and investors say, it could be a major win in the fight against climate change.

Hydrogen is a popular molecule right now. Billions of dollars are flowing from investors and governments into projects to make more hydrogen and use it to decarbonize both industry and transportation. But what's often lost in the discussion is that hydrogen is really an energy transfer medium, not an energy source.

The hydrogen available today is made in processes that are powered by renewable energy or, more often, fossil fuels. Molecular hydrogen as it is used and traded now is no more or less sustainable than the energy used to create it.

Except, that is, in Bourakebougou, a small town in southwestern Mali. There, almost 40 years ago, engineers drilling for water tapped instead into a natural underground reservoir of hydrogen gas. What they saw—a dry well emitting wind instead of water—was at first a disappointment…

Chemical & Engineering News, C&EN Magazine,
The American Chemical Society (ACS); March 31, 2025; Page 7

Shell to pull back from chemicals

‘We do not believe we are the natural owners of this chemical portfolio,’ CEO says

By: ***Alex Scott***

https://cen.acs.org/business/petrochemicals/Shell-pull-back-chemicals/103/web/2025/03

The energy and petrochemical giant Shell plans to pull back from the chemical industry and instead focus on its liquified natural gas business. Speaking at the firm’s capital markets day meeting on March 25, Shell CEO Wael Sawan said that the chemical business is “not delivering adequate returns” and that “we do not believe we are the natural owners of this chemicals portfolio.”

Shell sold almost 12 million metric tons of chemicals in 2024 but posted a net loss of about $102 million for the year. Sawan flagged a number of issues relating to Shell’s chemical portfolio, including a lack of scale in some areas and competition for capital within the wider company.

The company will take a regional approach to its chemical activities. In the US, where in 2022 Shell opened a $14 billion ethylene and polyethylene plant in Monaca, Pennsylvania, “we will be pursuing strategic and partnership opportunities,” Sawan said. In Europe, the firm “will pursue closures where necessary.”

Any closures in Europe would be part of a growing trend. Several companies have closed plants in Europe or say they are on the verge of doing so due to weak demand and persistently high energy and gas prices.

During the meeting, Palissy Advisors stock analyst Anish Kapadia asked whether Shell would be looking to spin off chemical assets. “We will look at any opportunities to extract value . . . and we don’t rule out any option,” replied Shell’s chief financial officer, Sinead Gorman…

Chemical & Engineering News, C&EN Magazine,
The American Chemical Society (ACS); March 31, 2025; Page 11

Dow, X-energy move on nuclear plans

By: Craig Bettenhausen

Dow Chemical, in partnership with X-energy, is moving forward with plans to power its Seadrift, Texas, plant with small modular nuclear reactors (SMRs), targeting a start date in the early 2030s. This move aims to decarbonize Dow's Seadrift facility by replacing natural gas-fired boilers with X-energy's Xe-100 reactors. The project involves a joint application to the Nuclear Regulatory Commission for a construction permit, marking a significant step towards commercializing advanced reactor technology.

Key Aspects of the Dow and X-energy Project:

- **Collaboration:**

Dow, one of the largest chemical and plastics producers, is collaborating with X-energy, a company developing advanced SMRs.

- **Seadrift Facility:**

Dow plans to replace the existing natural gas-fired boilers at its Seadrift, Texas, plant with four X-energy reactors.

- **X-energy's Xe-100:**

The project utilizes X-energy's Xe-100 reactor, a high-temperature gas-cooled reactor designed to provide both electricity and thermal energy.

- **Construction Permit Application:**

Dow and X-energy recently submitted a construction permit application to the NRC for the Seadrift project.

- **Decarbonization Goal:**

This project is part of Dow's broader strategy to reduce carbon emissions and transition its operations to cleaner energy sources.

- **Potential Benefits:**

SMRs offer a potential solution for decarbonizing energy-intensive industries like chemicals, providing both electricity and process heat.

- **DOE Support:**

The project has received support from the U.S. Department of Energy (DOE) through grants and other initiatives.

- **Fuel Production:**

X-energy is also working on developing a facility to produce the TRISO-X fuel needed for its reactors.

Chemical & Engineering News, C&EN Magazine,
The American Chemical Society (ACS); March 31, 2025; Page 22

Petrochemical makers fret over their future

At Houston conference, executives discussed challenges to competitiveness and sustainability

By: ***Alexander Tullo***

https://cen.acs.org/business/petrochemicals/Petrochemical-makers-fret-over-future/103/web/2025/04

The world's petrochemical industry is in a perilous state.

It is facing its worst business downturn in a generation because producers overbuilt capacity just as the global economy stalled during the COVID-19 pandemic. The problem is particularly bad in Europe, where nearly every major petrochemical producer is reviewing assets for closure.

At the same time, the industry is navigating the energy transition away from fossil fuels, carefully deciding which low-carbon projects to take on, which to shelve, and which raw materials to bet on for the future. Complicating the process is a new US administration that is creating volatility over trade and decarbonization policy.

These were themes at the 40th World Petrochemical Conference, hosted by S&P Global and held in Houston March 17–21. The event drew nearly 1,500 attendees from the petrochemical industry and from adjacent sectors such as plastic products, trading, energy, and finance.

A dramatic moment came early in the conference. "Is green hydrogen dead?" Mark Eramo, copresident of S&P Global Commodity Insights, asked Bob Patel, a former CEO of LyondellBasell Industries and W. R. Grace. Patel is a current director of Air Products & Chemicals, which recently pulled out a pair of projects to make green hydrogen via water electrolysis powered by alternative energy.

"It's difficult to see a business model today without subsidies," Patel said. For all sustainability projects, he said, factors like technology, subsidies, and regulations create uncertainties, and investments should be able to stand up to them. "If you can't see a path to a clear, self-sustaining economic model over—let's say over 5–10 years, maybe not 0–5—then likely it is not something you should be doing..."

Chemical & Engineering News, C&EN Magazine,
The American Chemical Society (ACS); March 31, 2025; Page 25

Chemistry majors, set to graduate in May, stress over their futures

Federal funding cuts to universities are another hurdle in a challenging career course for young people

By: *Laurel Oldach*, *Krystal Vasquez*, *Rowan Walrath*

https://cen.acs.org/careers/employment/Chemistry-majors-stress-over-futures/103/i9

Getting into graduate school in chemistry was already competitive and stressful for applicants, be they in the US or abroad. This year, in light of uncertainty about federal funding, US universities are shrinking incoming classes, rescinding admissions to PhD programs and canceling summer research opportunities. The changes have led to an uneasy and often heartbreaking admission season for students who hoped to pursue chemistry research. And some international applicants to US graduate schools are now considering programs in other countries.

She was excited when the acceptance letter came in January, from a research university in a major East Coast city. “In my brain, I was like, ‘Yeah, this is it,’ ” the student tells C&EN.

But in February, when she put together all the offers she had, she began to feel nervous. The offer letter from the research university that was her first choice had promised a contract to follow, but it hadn’t yet arrived. Meanwhile, rejections from some other universities mentioned uncertainty about federal funding—a topic that had also been making headlines in both science-focused and mainstream news outlets. The student, who spoke on condition of anonymity because she’s concerned about jeopardizing her admission, wrote to the admissions office at her first-choice school to ask for an update.

In an email in mid-February, an admissions officer said they were “uncertain whether the recommendation from the chemistry department for your admission to the PhD program will result in an offer from the Graduate School.” Despite having initially received an offer, the student was subsequently put on the waitlist. But, the admissions officer wrote, she was still welcome to attend a visitation weekend for admitted students…

TENS OF THOUSANDS OF YOUNG CHEMISTS

According to the US National Center for Education Statistics, in the academic year 2021–22 (the most recent year for which data are available), US academic institutions granted almost 40,000 bachelor's and master's degrees in chemistry and related fields.

Field of study	Bachelor's degrees	Master's degrees
Chemistry	13,629	2,310
Biochemistry	11,953	915
Chemical engineering	9,278	1,553
Total	**34,860**	**4,778**

Source: Integrated Postsecondary Education Data System.

Chemical & Engineering News, C&EN Magazine,
The American Chemical Society (ACS); March 31, 2025; Page 25

Disheartened by funding cuts, international students look beyond the US

Chemistry students are exploring programs in Canada, China, and Europe

By: ***Aayushi Pratap***

https://cen.acs.org/policy/research-funding/Disheartened-funding-cuts-international-students/103/i9

For chemistry students across the globe, coming to the US to pursue graduate education is often the dream. Ample funding, access to cutting-edge research facilities, and the ease of transitioning into industry from academia have attracted international talent to the US for decades.

But for many, that dream has suddenly been upended. Research funding cuts by the second Donald J. Trump administration, fluctuating international relations, and rescinded offer letters from US universities are discouraging some prospective students from applying to graduate programs in the US. Instead, these students are looking for opportunities in places like Canada, China, and Europe.

Abhijit Majumdar, a professor in the chemical engineering department at the Indian Institute of Technology Bombay, India's premier research university, says that for years he has watched "brain drain" from India.

But following reductions in US federal research grants and the cancellation of previously awarded grants, Majumdar says, everything seems to be in flux. He is unsure how to advise students who are planning to apply to graduate programs in the US. "People in all stages of their research careers are anxious and watching closely. It is indeed a turbulent time," he says.

Aditi Vichare, a 23-year-old researcher in Majumdar's laboratory, says she was keen on applying to PhD programs in the US until a few months ago. Given its proximity to Boston's biotech hub, Vichare was enthusiastically exploring programs at the city's University of Massachusetts campus. But news of the funding cuts has deterred her from applying to US universities this year. "I find the entire situation unstable," she says.

Vichare says that even when international students like herself are accepted by US programs, they have nagging worries about losing funding midway. "It is hard to commit to, say, 5 years of graduate school when you are unsure that you will be able to complete it," she says. "What if there are more budget cuts announced in the future?..."

CLE AIChE: Cleveland Chapter

Fall 2024 – Spring 2025 Program Planning

(as of Apr2025)

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. https://germancentralfoundation.com/oktoberfest
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 https://www.wmsilsoncoinc.com .
October 2024 (6 PM) Wed. 16Oct2024 Wed. 30Oct2024 Wed. 06Nov2024	Chemical Process Safety Analysis Seminars: by Gurmukh Bhatia, CPSA	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:
November 13, 2024 Wednesday (4:00 – 6:00 PM)	Benjamin A. Horwitz "Portrait of a Chemical Engineer" Career Discussion with students and professionals	CSU AIChE Section Joint Meeting, Washkewicz College of Engineering AIChE Chap	Joe Yurko, Dr. Gatica, Dr. Holland, CLE AIChE Meals: Professional members: $10; Students: Free CLE AIChE: Pizzas & Beverages
December 17, 2024 (6 PM)	Nuclear Power Accident Analysis, Speaking: Andrew Ohrablo, Vistra Life Cycle Manag. Fleet Engineer	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 28, 2025 (6 PM)	SARTA Hydrogen Fuel Cell Bus Fleet Expansion Funding from DOE ARCH2 Award, Kirt Conrad CEO	Burntwood Tavern Fairlawn, Akron Rt.18 and I-77	Joe Yurko, Dinner menu $26 ordering for professional members; Students cost: $5 Lobster Bisque Soup or House Salad Salmon Salad, or Angus Burger, or Fish & Chips
February 27, 2025 (6 PM): Cancelled March 13, 2025 (6 PM): Rescheduled March 26, 2025 at CSU (5:30-8 PM)	1976 Diamond Shamrock plant Fortran Simulation Startup Presentation Speakers: Dr. Fowler, Dr. Harvey Benjamin A. Horwitz, **Seminar** "The Good, The Bad, & The Ugly" Chemical Process Simulation, YPs	The Sanctuary, Rockside Road Independence, 44131 **CSU Student AIChE**, Seminar WH-405, Washkewicz Hall March 26, 2025; 5:30-8 PM	Joe Yurko, Dinner menu ordering for professional members; Students cost: $5 http://places.singleplatform.com/shulas-steak-house-8/menu#menu_5599999 Mike Galgoczy & Joe Yurko: Dinner: Pizza, professional members: $10; Students: Free. AIChE Students to bring their PCs for workshop with simulation case studies
April 4, 2025 at CWRU (12 noon – 2 PM) April 9, 2025 at CSU (2:30 – 3:30 PM)	Benjamin A. Horwitz, **Seminar** "The Good, The Bad, & The Ugly" Chemical Process Simulation, YPs Dr. Andrew Zak, YP Speaker: Academic Career Path with ChE PhD (CSU Alumni)	**CWRU Student AIChE**, Seminar AWS-349, AW Smith Building April 4, 2025, 12 noon-2 PM **CSU Student AIChE, Presentation** WH-405, Washkewicz Hall April 9, 2025; 2:30 – 3:30 PM	Mike Galgoczy & Joe Yurko: Dinner: Pizza, professional members: $10; Students: Free. AIChE Students to bring their PCs for workshop with simulation case studies **Beverages:** Free to all
April 29, 2025 (5 PM, Tuesday)	NEOSEF Awards Banquet	CCPL Branch Library Parma, Snow Road	Joe Spagnuolo, Moderator NEOSEF Students, CCPL Branch Library Dinner: Pizza, professional members: $10; Students/Families: Free
May 20, 2025 Tuesday (3 PM)	Tour of Perry Nuclear Power Reactor Simulator and Plant	Perry Nuclear Power Plant & Simulator Tour 18 visitors	Ray Zucker, Joe Yurko and Mandy Nagle (Vistra, Communications) Simulator Tour; Nathaniel Kehn and Jacob Mikulcic; Perry Nuclear Plant Peripheral Systems Tours.

Cleveland Section 017 of THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS Steering Committee 2024 - 2025

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