

# OhioENGINEER

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2022

## Ohio engineering schools offer students real-world experiences



**University of Dayton  
student engineers  
adapt toys for kids  
with disabilities**

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**LEADERSHIP VIEWS**

*by Aurea Rivera, PE, PMP, PMI-ACP, President,  
Engineers Foundation of Ohio*



**EFO works to expand opportunities for women in engineering**

Engineering has been historically dominated by men. In fact, the National Science Board's 2019 study, *STEM Labor Force of Today: Scientists, Engineering, and Skilled Technical Workers*, found that among the major occupational categories in science and engineering, the representation of women is the lowest in engineering at 16 percent.

Women – and especially women of color – are under-represented in engineering, starting with obtaining engineering education. According to the National Center for Science and Engineering Statistics, which is a principal statistical agency within NSF, 111,402 U.S. citizens/permanent residents were awarded bachelor's degrees in engineering in 2018. Of that figure, 86,340 were male and 25,062 were female. Among the females, 3,182 were "Hispanic or Latino," 90 were "American Indian or Alaska Native," 3,791 were "Asian or Pacific Islander," 1,268 were "Black or African American," 14,921 were "White," and 1,810 were "other race or unknown."

However, in recent years, there has been a push to be more inclusive of women in engineering and other STEM fields. In this column, I will explore how the Engineers Foundation of Ohio (EFO) supports and seeks to expand opportunities for women in engineering.

**Why bother?**

Supporting women in engineering is essential for two important reasons. First, it is simply the right thing to do. Everyone should have the opportunity to pursue a career in engineering if they are interested and qualified. Second, including women in engineering can lead to better solutions and better designs. Research has shown that teams with diverse perspectives are more innovative and make better deci-

sions. In engineering, this can mean finding more effective and efficient solutions to problems and creating products and technologies that are more inclusive and accessible to a broader range of people.

**Barriers to entry for girls and women in engineering**

Several barriers can prevent women and girls from entering engineering fields, including:

1. **Lack of role models:** Many females may not have access to role models or mentors in engineering, making it more difficult to envision themselves pursuing careers in these fields.
2. **Stereotypes and biases:** Women in engineering may face stereotypes and biases that can make it harder for them to succeed in these fields. For example, they may be seen as less competent than their male counterparts or discouraged from pursuing particular studies or research areas. The Google Manifesto (2017) is an example of how these biases can and do derail women's careers in the computer science field.
3. **Lack of support:** Women in engineering may lack the support and resources they need to succeed, such as access to education, networking opportunities, or funding.
4. **Work-life balance:** Engineering can be a demanding field that requires long hours and a high level of dedication. These professional expectations can make it difficult for women to balance their work and personal lives, particularly if they also have caregiving responsibilities.

See "EFO & Women Engineers," page 3

**On the cover:**

University of Dayton mechanical engineering students Jordan Wilson (left) and Bridget Gerber (right) work with Kim Bigelow (center), director of the Engineering Wellness through Biomechanics Lab, to adapt toys for children with disabilities in the School of Engineering's new \$1 million EMPOWER Lab. Toys are donated to children in need via the United Rehabilitation Services of Greater Dayton.

See feature article, "Ohio engineering schools," page 6.



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Overall, these barriers can make it more difficult for women to enter and succeed in engineering, and it is crucial that society and EFO address these barriers.

### **EFO's vision and mission**

EFO is a non-profit organization that supports the engineering profession in Ohio through various educational programs and initiatives. According to our mission, "EFO is dedicated to advancing engineering education in Ohio," and EFO's vision is to strive to be "the premier educational organization for Ohio's engineers from elementary school through retirement."

One of the critical areas of focus during my tenure as EFO president is expanding opportunities for women in engineering. Expanding opportunities for women within the engineering profession is essential for the success and advancement of the field, and EFO is working to support and promote this in several ways.

### **EFO's initiatives**

EFO supports women in engineering through its various outreach and education initiatives.

According to the American Association of University Women (AAUW), "Girls and women are systematically tracked away from science and math throughout their education, limiting their access, preparation and opportunities to go into these fields as adults."

AAUW also says, "The gender gaps are particularly high in some of the fastest-grow-

ing and highest-paid jobs of the future, like computer science and engineering."

EFO has three terrific youth programs: Imagine Engineering, Ohio MATHCOUNTS, and scholarships. These EFO programs can benefit all young students and possibly put them on paths towards engineering careers. They may also encourage young females to seek out further STEM-based education at critical junctures when they otherwise may be discouraged from such pursuits.

Imagine Engineering introduces second graders to the vast and exciting world of engineering. EFO identified this age as critical to developing proper attitudes toward math and science so all children can realize their potential for engineering should they one day choose it for their careers.

We are proud that EFO recently developed a new learning tool that expands Imagine Engineering beyond the traditional classroom to reach even more students. With the release of our download-on-demand educational video in 2021, in-class and at-home learners alike now have access to EFO's program, which is praised by second grade educators! Presently, we are preparing to translate EFO's video to Spanish to expand our reach even further!

EFO is also working to get out the word about Ohio MATHCOUNTS, our flagship program, and college scholarships. Ohio MATHCOUNTS has grown to include nearly 1300 middle school children statewide in local chapter math compe-

titions. Meanwhile, EFO has more than \$33,000 in scholarships available this year.

With more exposure, we hope to increase our participation in Ohio MATHCOUNTS and the number of scholarship applications we receive. To expand our reach, EFO is working to promote these programs with Ohio schools, home school associations, Ohio Council of Teachers of Mathematics (OCTM) and other community organizations.

EFO also provides practicing engineers with tools and experiences that are conducive to developing a more diverse work environment. EFO has recently offered PEs these continuing education programs: "The Intersection of Ethics & Diversity, and Inclusion in Engineering," highlighting the University of Toledo's College of Engineering's inclusion program, "Diversity Leads to Better Engineering," featuring Zweig Group's ElevateHER program, "Valuing Professional Licensing in the U.S.," providing data showing that professional licensing of highly skilled workers appears to substantially support women's and minorities' move toward wage parity. In addition, the Engineers Leadership Institute, EFO's unparalleled management training program, and our various leadership and networking opportunities provide tremendous resources and support.

### **Conclusion**

Supporting women in engineering is not only the right thing to do but it can also lead to better outcomes and a more innovative and thriving field.

EFO is helping to create the building blocks for a better engineering profession. Through our various programs and initiatives, EFO is working to support women and better equip them so they can drive innovation and progress through their engineering careers.

Ultimately, these initiatives will require the efforts of all of us. We can make a difference! We can create more opportunities for women in a STEM workforce by working together and taking action.

Please support EFO on this journey. Write me at [efo@ohioengineer.com](mailto:efo@ohioengineer.com) with your ideas to support women in engineering!

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The graphic features a green checkmark on a computer keyboard, with a pencil pointing to it. The background is dark with blue and green highlights.

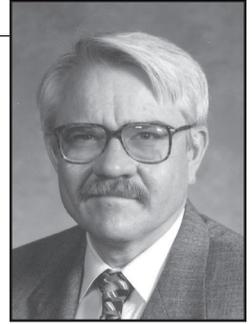
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# My adventures in installing & using solar panels at home

It seems that everywhere you turn in the suburbs these days, you can see at least one house with a rack mounting holding several solar panels on the roof. Not as obtrusive as transmission-line towers or large wind-turbine generators, these solar panels are a visually benign source of power generation.

A solar panel installation can have any one of a wide range of ratings. A single panel for residential use is often rated at 250 watts, and the nominal rating of a typical installation is 250 watts times the number of solar panels.

I was curious about this technology. When I added a new wing to my house, I decided to put a solar panel installation on the new roof – before the siding was installed to make running the wiring as inexpensive as possible. (See the photograph of my home below.)

I also wanted to track the output of the home solar electric system converter to get a feel for daily generation patterns. The system I purchased has a feature that transmits relevant data to a digital device.

There are a number of ways to plan a residential solar panel installation, and they fall into three general categories:

- An **off-grid solar electric system** supplies all of the electricity for the residence. This is the most sophisticated system, and it requires some form of energy-storage apparatus, such as batteries.
- Using a **solar electric system that is paralleled with the electric utility system**, a major part of the electrical load is supplied by the solar panels while peak power needs are supplied by the utility. Batteries are also often supplied with this option.
- There are no moving parts in a **low-maintenance installation**, which means that the solar panels and converter will typically last longer than they do with the off-grid system or the utility-paralleled system. There are no batteries that require replacement after three to five (or maybe even ten) years.

I chose the low-maintenance installation. Since I was doing this for the first time, I decided to contact the electric utility to find out which solar equipment companies have supplied an acceptable system in the area.

Important considerations included the size of my new roof, which limits the number of solar panels that can be installed, the electric utility's preference to limit the system's nominal rating to the minimum demand for a residential installation, and a few utility restrictions:

- If there is a utility system outage, the solar installation (let's call it co-generation or "cogen") has to disconnect itself so that utility lineman can work safely to restore the distribution network. Most cogen controllers can be set up to auto-synchronize when there is a return of voltage to the network.
- During peak power cogen output, it is likely that if the residence demand is very low compared with the usual minimum demand, power will be returned to the utility. To facilitate this, a bi-directional meter needs to be installed. Also, the electric utility does not want a big infusion of power into its distribution network as there could be loadability issues on the distribution lines and inverse current versus time relaying could be adversely affected.
- If metered power is detected by returned to the utility, the utility will pay for the generation but, the payment will be at a lower rate than the cost of power to the customer. This is because the electric utility has the sunk costs of the transmission system and distribution system that do not apply at the cogen interconnection. By the way, if the user wants the cogen facility to be cost competitive with other sources of energy, the user should check what renewable energy credits are available. The author's installation will not quite break even in cost.

Figure 1 shows a typical daily generation profile. Note that where there are



See "Solar panel installation," page 5

spikes, clouds are blocking the sun's emission of photons. Also, note that the "9.54 kWh" label in Figure 1 is the total energy generated for the 24 hour period shown.

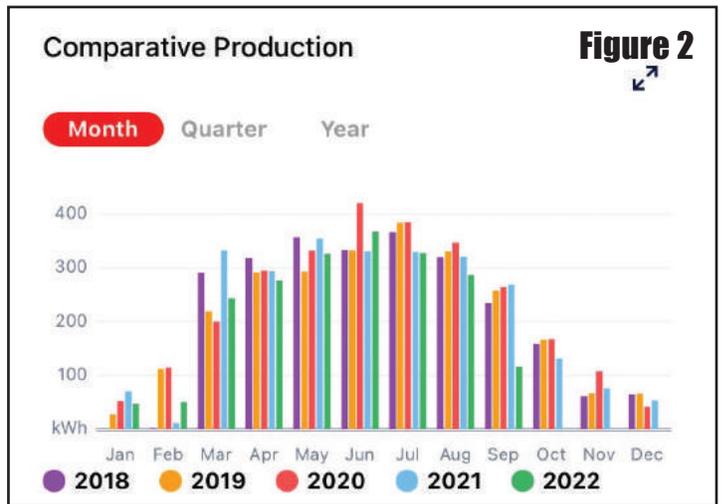
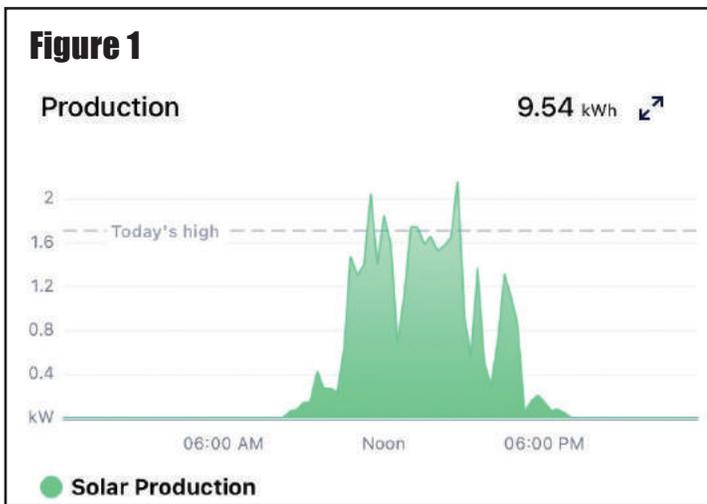
Figure 2 shows the monthly generation record. As expected, generation is higher in the summer and much lower in the winter. Snow and ice will block the sun's rays too.

One interesting event recorded on the monthly record occurred in February of 2021. A thick ice sheet covered the panels for the entire month so there was virtually no generation.

Hopefully there will not be a repeat of the Laurentide Ice Sheet that covered northern Ohio! I feel relatively safe as this phenomenon happened during the Pleistocene Epoch, which ended about 20,000 years ago.

To compare solar cogen utilization factors with utility base-load generation, I calculated cogen output for a typical year. Next, I divide this number by the cogen nominal rating times the number of hours in a year. The cogen system I describe here had a utilization factor of about 14 percent. By comparison, the utilization factor of typical base-load units is 98 percent. In any event, I have had a lot of fun playing with the cogen data!

**Nils Nilsson, PE, FNSPE**, is a past president (1993) of the Ohio Society of Professional Engineers and a member of the Mahoning Valley Chapter. He has been active with NSPE's Professional Engineers in Industry interest group, and he became an NSPE Fellow in 2005. He received a BSEE from the University of Cincinnati and an MSEE from the University of Akron. He worked 33 years as an engineer for FirstEnergy (originally Ohio Edison) and has worked as an engineer for City Machine Technologies in Youngstown, Ohio. He began consulting for Lanier Consulting in 2003 and currently does engineering consulting for Jemkel Diagnostic, Inc.



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# Ohio engineering schools offer students real-world experiences

## **Kent State University's aerospace engineering program earns highly respected ABET accreditation**

With the international surge in commercial and cargo air transportation, the evolution of the advanced air mobility industry, and the emerging commercial space industry, there is an increased demand for aerospace engineers.

In time to meet this call, the aerospace engineering program at Kent State University's College of Aeronautics and Engineering (CAE) has earned ABET accreditation. While the aeronautical systems engineering technology program earned ABET accreditation in 2013, the aerospace engineering program is the first engineering degree at Kent State University to earn this highly respected, and industry recognized, accreditation.

Kent State says its CAE students have an advantage when entering the workforce thanks to their mentors and internships as well as the University's investments in state-of-the-art capabilities – an airport, aircraft simulators, wind tunnel, air traffic control simulation, space systems, human factors, unmanned aircraft systems and additive manufacturing.

## **University of Toledo mechanical engineering students custom build two light-weight walkers for child**

Bethany Rasmusson, a six-year-old girl from Pemberville, Ohio, has Wolf-Hirschhorn syndrome, a rare genetic condition which requires her to use a walker. But most walkers are too cumbersome.

"It's been difficult to find a walker that gives her freedom. Her small size makes the equipment too heavy for her to maneuver," explains Bethany's mom, Kelly.

Mechanical engineering students from The University of Toledo College of Engineering used their senior design project to help, custom-building one indoor and one outdoor walker for Bethany.

"It's just been such a huge blessing," said Kelly. "This will open up so much freedom for Bethany."

## **University of Akron engineering achieves great things in 2022**

The University of Akron ground-breaking polymer science and plastic engineering program was named the top university program in the world in 2022 according to EduRank, a global ranking site. The ranking methodology included

research performance, non-academic prominence, including backlinks to a university from other sites, and an alumni score. UA continued to lead in the area of polymers with the announcement that the University was adding a BS degree in polymer science and polymer engineering. UA is the first public university in Ohio to offer this program.

In other news at the University of Akron in 2022, the Akronaunts rocket club became the first collegiate rocket team in Ohio to design, build and fire a liquid engine, and the team's Emergence 3 rocket was launched to 38,000 feet, eclipsing the previous team record of about 22,000 feet.

## **AFIT offers new graduate certificate in hypersonic flight**

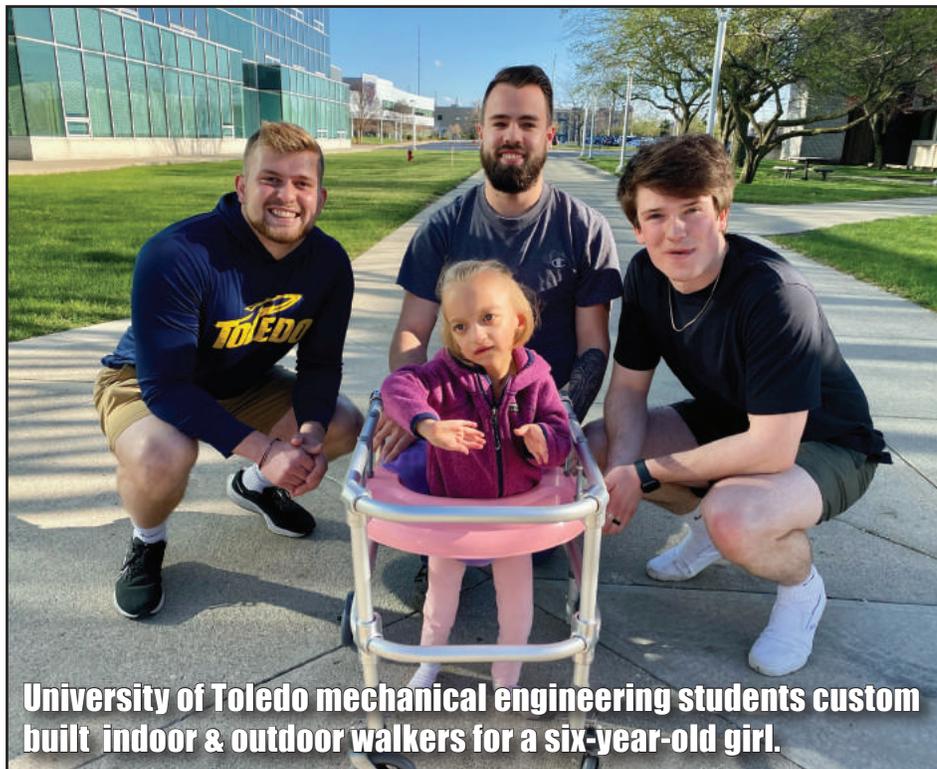
The field of hypersonics has emerged as a technical discipline that is critical to ensure the U.S. will be able to fight and win future conflicts. Registration is now open for Air Force Institute of Technology's new graduate certificate program in hypersonic flight. This program is designed to produce technical professionals who can understand, evaluate, and communicate the unique complexities of the hypersonic flight environment. Core courses cover the areas of inviscid hypersonic flows, high temperature gas dynamics, and hypersonic propulsion. An elective course will further the student's understanding in computational fluid dynamics, nonequilibrium phenomena, reentry dynamics, or chemical propulsion. Prospective students need an ABET-accredited degree in aeronautical, aerospace, astronautical, or mechanical engineering with a cumulative 3.0 GPA.

## **Case alumnus & two students launch startup aimed at cleaner water**

A Case Western Reserve University alumnus and two students are co-founders of CLEANR, a business with cutting-edge, patent-pending technology that could transform the way the world uses water.

"We have a product at the top end of the market in removing microplastic from washing machine waste water," Case alumnus Max Pennington said.

In starting their business, CLEANR founders used Sears think[box] – a 50,000-square-foot innovation center and makerspace at Case – for prototyping and their business headquarters. They also



**University of Toledo mechanical engineering students custom built indoor & outdoor walkers for a six-year-old girl.**

See "Schools," page 7



**Engineering students from Cedarville University claimed second place in two categories at NASA's Student Launch Competition in 2022.**

took a new course in entrepreneurship. Leaning on Case resources and connections, CLEANR expanded its team and began talking to investors.

Today, CLEANR has a deal with Case to equip a percentage of campus washing machines with filters, and the company is looking to expand their product worldwide. The timing is perfect since France recently passed legislation requiring filters on all washing machines by 2025, and there is similar pending legislation in several other countries.

### **Cedarville University engineering students place at NASA's Student Launch Competition**

Seven mechanical and computer engineering students from Cedarville University claimed second place in two categories at NASA's Student Launch Competition in 2022. Cedarville earned the second-place rookie team award and the second-place reusable launch vehicle award. This competition provides students with real-world experience and a context to apply the skills learned in classes. And, the success the Cedarville team enjoyed could lead to further NASA's discoveries on Mars.

This year, Cedarville plans to return to NASA's 2023 competition, bringing 10 new mechanical, computer, and electrical engineering students. The team aims high to launch their rocket 6,000 feet in the air.

For more information about Cedarville University, visit [cedarville.edu](http://cedarville.edu).

### **20th Annual Research Symposium honors Central State University CESTA student achievements**

Three environmental engineering students and one chemistry student from Central State University's College of Engineering, Science, Technology and Agriculture (CESTA) took top awards at the Research Symposium hosted by the Association of 1890 Research Directors in April.

Each year, the Research Symposium highlights the outstanding work of researchers and students at HBCU (Historically Black Colleges and Universities) Land-Grant Institutions. The 20th Annual

Research Symposium, held in Atlanta, was attended by 1,100 undergraduate and graduate researchers and scientists from around the U.S.

CESTA's winning students received honors for their presentations on various topics, including plant health and production and plant products; renewable energy natural resources, environment and climate change; and fine resolution image classification of LiDAR and aerial photos for Wayne National Forest in Ohio.

### **University of Cincinnati engineering students co-op with companies such as Tesla, Apple, Microsoft and NASA**

The University of Cincinnati is ranked among the top 100 most innovative schools according to Reuters.

The UC College of Engineering and Applied Science offers dozens of majors and certificate programs, and students have access to world-renowned faculty, forward-looking classes, and state-of-the-art labs. UC engineering students also have tremendous opportunities to participate in cutting-edge research.

U.S. News & World Report ranked UC as number one among public universities for co-ops. With seven Fortune 500 companies in Cincinnati's backyard and one of the most vibrant startup ecosystems in the nation, UC's co-op program helps develop real-world engineers and build students' resumes while funding their degrees. UC students have five different co-op positions to help them learn their engineering interests. UC students work for companies such as Tesla, Apple, Microsoft, and NASA. Seventy-five percent of UC students receive a job offer from their co-op placement company.

### **Cleveland State engineering helps business owner get back on the trails with adaptive bike project**

Following a spinal cord injury, Cleveland business owner Ray Petro needed help to get back on the bike trails. So, three entities – Cleveland State University's Spinal Cord Injury Volunteer Corps (SCIVC), the University's Center for

Human-Machine Systems lab and Ohio's Manufacturing Advocacy and Growth Network facility – teamed up to add a power-steering unit onto Petro's four-wheel adaptive bike. Now it's easier for him to steer and maneuver.

Petro opened Ray's Indoor Mountain Bike Park, the world's first indoor bike park, in Cleveland in 2004. When Petro sustained his injury in a serious mountain biking accident in 2017, he needed some help to get back to his favorite hobby. SCIVC, an outgrowth of the Washkewicz College of Engineering at Cleveland State, and the community stepped forward.

To learn more about the College, visit [engineering.csuohio.edu](http://engineering.csuohio.edu).

### **New EMPOWER Lab gives University of Dayton students access to experiential learning & research**

With nearly \$2.5 million in funding, four faculty in the University of Dayton (UD) mechanical engineering department specializing in biomechanics are providing students at every level opportunities for experiential learning and research in posture, balance, neuro-muscular control, computational modeling and rehabilitation.

The School of Engineering's new \$1 million EMPOWER Lab is a shared teaching and research facility for students and faculty to access world-class equipment, including 3D motion cameras, wearable motion measurement sensors, a force-measuring treadmill, virtual reality systems, and a Caplex System, which provides a central platform to emulate wearable devices such as exoskeletons and prosthetics.

### **Marietta petroleum engineering grads have a competitive advantage**

Marietta's Petroleum Engineering BS degree is one of the top of its kind in the country, producing some of the most sought-after graduates in the nation. According to Payscale.com, Marietta College's Petroleum Engineering graduates earn on average \$100,800 in the early part of their careers (first among all engineering schools).

Marietta's program prepares students to thrive in careers in upstream oil and gas operations, specializing in reservoir engineering, drilling engineering, production engineering, completions engineering, and upper-level management.

With industry-experienced professors, state-of-the-art facilities, leadership-focused courses, and abundant study abroad opportunities, students gain insight into every aspect of the oil and gas industry from experts in the field and conduct



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groundbreaking research with leading faculty. Beginning freshman year, students have the chance to gain hands-on experience in exciting internships from the Ohio Valley to California – and sometimes even abroad. Seniors will complete a rigorous team project in an industry-style setting, designed to simulate the realities of a career in petroleum engineering.

### Miami University offers combined bachelor's/master's program

Miami University's combined bachelor's/master's degree program gave engineering student Allie Filiatraut a jump-start on her career and connections that landed her a full-time job offer.

Filatraut began her new position in August with Georgia-Pacific, working with its Dixie Products Group to design future retail products. As an undergraduate student at Miami, she studied mechanical engineering with a minor in paper science and engineering. She also ran for the Miami track and field team.

The combined bachelor's/master's degree gives students the flexibility to work toward both degrees in just five years. For Filiatraut, it provided her with a solid foundation for the future.

### Mount Union engineering programs produce well-rounded graduates

The Department of Engineering at the University of Mount Union offers bachelor of science degrees in mechanical, civil, electrical, computer and biomedical engineering majors. The mechanical and civil engineering programs are ABET accredited, while the remaining programs will undergo accreditation after graduating their first classes.

Engineering students benefit from small class sizes, new state-of-the-art engineering labs, and personal attention from the engineering faculty who are experts in their various fields. In addition, plans are underway to expand facilities and labs by thousands of square feet.

Through extensive hands-on learning, international experience, and innovative research opportunities, students will develop critical thinking skills to solve complex problems.

A Mount Union engineering education also leverages the liberal arts to graduate highly-skilled engineering leaders and entrepreneurs.

About 90 percent of engineering students have at least one paid internship before graduating, and job placement for graduates exceeds 95 percent. Alumni work in industry (e.g., Westinghouse, Goodyear, and Michael Baker), government, and graduate school.

### Mount Vernon Nazarene partnerships will prepare students for semi-conductor manufacturing work

Mount Vernon Nazarene University has announced two partnerships that will prepare faculty to teach new skills and expose students to real-life experiences in semiconductor and semiconductor-related manufacturing.

Intel established and funded an education and research program to promote real-world experience and innovation in semiconductor manufacturing. As part of that, MVNU students will partner with Kent State University to receive hands-on technical training in semiconductor technology and cleanroom protocols. These learning opportunities will be accomplished through intensive summer institutes, hybrid immersive experiences, and virtual reality simulations. In addition, MVNU engineering students will receive extensive hands-on training in semiconductor manufacturing-related technology and coursework through the Ohio-southwest Alliance on Semiconductors and Integrated Scalable-Manufacturing (OASIS).

### Muskingum engineering student studies transient heat conduction in a heat fin

Muskingum College student Chloe Joseph, a Muskie Research Fellow, completed an in-depth research project this past summer.

Joseph, class of 2023, is majoring in general engineering with minors in mathematics and physics. She is working with Associate Professor of Physics Richard Taylor on a computational study of transient heat conduction in a heat fin. The project is based on an American Journal of Physics article that used a mathematical model to describe heat conduction in a heat fin – a surface used to advance heat transfer processes and prevent overheating in many mechanical engineering applications.

"The mathematical model yielded some unexpected results," Joseph said, "which may have been due to embedded simplifications and assumptions. The goal of our project is to solve that mystery by developing a computational model that can produce more refined predications."

### Ohio Northern offers undergraduates KEEN & research experiences

Ohio Northern University's engineering program gives undergraduates an opportunity to cultivate an entrepreneurial mindset, apply for a research position at a large institution or government lab, and engage in meaningful community service.

The Kern Entrepreneurial Engineering Network (KEEN) was established at Ohio

See "Schools," page 9

Northern to help undergraduate engineering students cultivate entrepreneurial mindsets so they can create personal, societal and economic value through a lifetime of meaningful work. Ohio Northern is among 50 elite schools invited to join KEEN, and it is one of the few institutions to be with the network since its inception in 2005.

Ohio Northern engineering students may apply for highly competitive research experiences for undergraduates, called REUs. These usually take place at large research institutions or government labs, and ONU students have an excellent placement rate. ONU engineering and computer science students have participated in REUs working in nano-technology, wind turbines, biomedical, automotive and more.

### **Investments enhance a strong engineering program at Ohio State**

In U.S. News & World Report's 2023 Best Colleges issue, Ohio State's undergraduate engineering program again ranks first in Ohio and has risen to 15th among public universities nationwide. Among both public and private institutions, Ohio State Engineering ranks 27th overall, tied with Harvard University and University of Minnesota.

Assets enhancing Ohio State's engineering program include recent

investments. A \$15 million gift from the Austin E. Knowlton Foundation will finalize the design and construction of the Biomedical and Materials Engineering Complex. The first phase of the Complex – funded by generous donors and state investment – was the completely renovated 124,000-square-foot Mars G. Fontana Laboratories, home to the Departments of Materials Science and Engineering as well as Biomedical Engineering.

In addition, Ohio State is leading the Hybrid Autonomous Manufacturing, Moving from Evolution to Revolution (HAMMER) Engineering Research Center – a new \$26.5 million NSF engineering research center to create intelligent autonomous manufacturing systems and educate a future manufacturing workforce.

### **Ohio University leads ASCENT workforce development & training program for Ohio's emerging semiconductor industry**

Ohio University (OU), a Carnegie R1 research institution, makes significant contributions to the state through research and innovation while preparing students to be the leaders of tomorrow through experiential learning.

With 10 regional sites, including several in Appalachia, OU serves communities by fueling economies, creating partnerships and working toward meeting the local workforce needs by expanding academic offerings and access to education.

Appropriately, Intel has awarded OU a \$3 million grant to lead the Appalachian Semiconductor Education and Technical (ASCENT) Ecosystem program that will create an inclusive workforce development and training program to cultivate the next generation of skilled technical professionals for Ohio's emerging semiconductor industry. The funding is part of an education and research program grant that supports Intel's future semiconductor manufacturing in New Albany, Ohio.

Over three years, ASCENT will develop and deliver new

educational options, including standalone and stackable certificates, associate degrees, bachelor's degrees and graduate degrees that prepare students for career opportunities created by Intel's arrival to Ohio.

### **Wright State prepares its students for Intel's arrival**

When Intel announced a \$20 billion investment to build two advanced semiconductor factories in New Albany, Ohio, and a related investment in higher education, Wright State University understood the assignment.

Wright State took stock of its assets, which include strong programs in engineering, computer science, chemistry and physics, invaluable partnerships with business and other colleges, and a state-of-the-art cleanroom facility to train students to work in microfabrication facilities.

A key participant in two Intel grants that support curriculum development and workforce training, Wright State is also among a group of leading research institutions from Ohio, Indiana, and Michigan that recently launched the Midwest Regional Network to Address National Needs in Semiconductor and Microelectronics.

The Network's objectives are to support Intel and associated industries, expand opportunities for students, and address research and workforce needs.

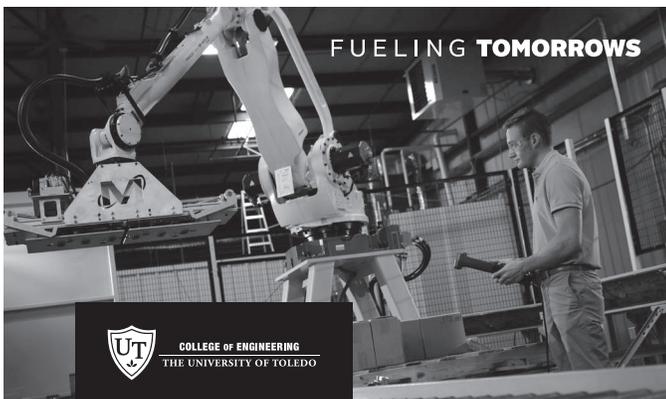
### **Youngstown State University opens Watson Team Center on campus**

Youngstown State University has opened the Frank and Norma Watson Team Center, a new facility designed to better prepare YSU engineering teams for regional, national and international competitions.

The center will house YSU's nine student-led teams, including the Baja Car, Steel Bridge and Concrete Canoe competition squads, all of which have consistently placed high in contests held across the country. The Bridge team has finished first in four of the last five regional contests, while the Concrete Canoe team has won three of the last four. In 2021, the Canoe team placed second in the national competition.

"This new Center will allow all of our student teams to share common resources efficiently and effectively, especially with the YSU Excellence Training Center right down the street," said Wim Steelant, dean of the College of Science, Technology, Engineering and Mathematics.

"The Center's location between our business and engineering buildings on campus also allows for business students and engineering students to collaborate," he continued.



**Advancing Possibilities.** UToledo's College of Engineering partners with corporations in our community and worldwide who provide you with a variety of co-op opportunities and career guidance. By the time you graduate, you'll have completed a year's worth of paid industry experience.

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# Lunchtime Legislative Briefing

20 MINUTES

Top policy news  
impacting Ohio PEs

SCHEDULE

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Friday, June 30

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# Engineers praise Fall CPD Conference for featuring excellent technical, managerial & ethical education

The 17th annual Fall CPD Conference was held virtually in November and – like EFO's previous education programs – it earned excellent reviews from PEs with many reporting that they rely every year on EFO for their continuing professional development (CPD) hours.

Since 2006, EFO has provided quality and affordable CPD through its annual conference, an award-winning program designed by PEs for PEs.

The 2022 program included timely technical, managerial and ethical training – in total 15 CPD hours – or half of the hours that Ohio PEs need for their biennial license renewals.

In technical and managerial sessions, PEs learned about the Glass City Riverwalk revitalization, following Ohio EPA regulations, technology for drilled shafts in bedrock, cyber security challenges, cortical bone mechanics technology, new sustainable uses of carbon-based materials in buildings and infrastructure, the return of manufactur-

ing to America, patents and intellectual property, AI and machine learning, effectively working with a project manager, NASA's research on aircraft icing, and Ohio's plans for improving its defense and aerospace sectors by 2030.

In Ohio-mandated ethics training seminars, participants were given a refresher on PE registration requirements and responsibilities, and they learned about what went wrong when a pedestrian bridge failed at Florida International University.

"These virtual conferences are getting better and better," said one repeat customer. "The emceeing was excellent, the content was well relevant and organized, and the production was impeccable."

Other participants also offered stellar reviews, including: "Another great year," "Nicely done," "Excellent agenda," "Great conference, great topics, great job," "Very informative," "This format works well," "Worthwhile," "Excellent series," "All very well presented and the topics great," and "Fantastic program."



The two-day Fall CPD Conference was hosted by EFO President Aurea Rivera, PE, PMP, PMI-ACP. As the camera rolls, Rivera, pictured in front of "the green screen," thanks the Conference sponsors for their generosity.

## PEs learn about cortical bone mechanics technology

Left to right are Brian Clark, PhD, executive director of the Ohio Musculoskeletal & Neurological Institute, and Andrew Dick, MS, director of engineering at OsteoDx Inc. At the Fall CPD Conference Clark and Dick provided an overview of developments in the assessment of cortical bone fragility in vivo and the development of Cortical Bone Mechanics Technology™ (CBMT) as a scientific instrument and as a medical device. With Dick providing the mechanical engineering perspective, the duo discussed the unmet medical need for osteoporosis diagnosis and limitations of mechanical response tissue analysis (MRTA), how OsteoDx has improved upon MRTA and led to CBMT, and how biological/physiological materials are modeled in comparison to standard engineering materials.



Retired LTC Curt Vincent, BSEE, MS Telecommunications, of Cyber Assurance Associates, taught PEs that people are the biggest cyber risk to any organization. As a consultant, Vincent helps organizations minimize risk and thwart would-be

attackers. Previously, at Morgan Stanley he built and led the 400-person Cyber Security Division.



State Board of Registration Executive Director John Greenhalge, MBA, provided PEs with a refresher on everything they should know to be registered in Ohio, including the practice act, license renewals, continuing education

requirements and audits, use of seals, certificates of authorization, disciplinary actions and the Code of Ethics.



Retired Colonel Joseph Zeis, Jr., Esq. – Governor Dewine's aerospace and defense advisor – started the Conference describing Ohio's strategy for growth in aviation, aerospace and defense.



Sebastian Lobo-Guerrero, PhD, PE, DGE, of AGES Inc., taught PEs about state-of-the-art technology pertaining to the design, construction and inspection of drilled shafts.

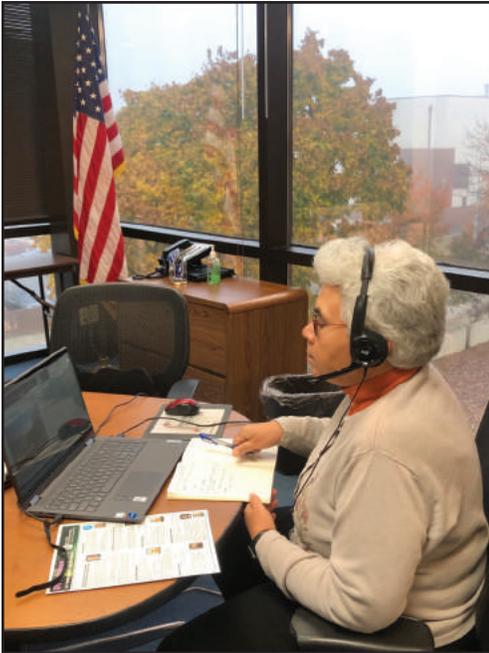


Mike Gramza, PE, of Bergmann provided a seminar on the re-imagined downtown Toledo Riverwalk, a fast-tracked project funded by a \$23.7 million BUILD grant.

Thomas Cikotte, an Ohio EPA environmental specialist in the Office of Compliance Assistance and Pollution Prevention, provided a regulatory overview of air, water and hazardous waste regulations. >>>



# PROGRAMS



From EFO's office in Columbus, President Aurea Rivera, PE, PMP, PMI-ACP, asks the audience's questions of speakers at the 2022 Fall CPD Conference. It takes a lot of coordination to emcee a virtual conference and President Rivera did a great job!

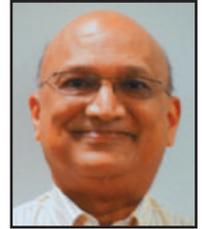


Jason Trembly, PhD, director of the Institute for Sustainable Energy & the Environment at Ohio University, provided a lecture on new sustainable uses of carbon-based materials in buildings and infrastructure. Trembly explained that legacy mining wastes can be converted into advanced-carbon materials.

Rebecca Bowman, Esq., PE, DFE, NSPE senior director of ethics and professional practice, presented "A Study in Ethics: Florida International University Pedestrian Bridge Failure." She highlighted the missed opportunities to identify and correct design flaws as well as apparent ethics issues that arose during the design and building of the bridge.



Thank you to American Electric Power & American Electric Power Foundation for supporting OSPE & EFO programs!



Shreeder Adibhatla, PhD, PE, a consultant at Rockdale Systems, LLC, provided an engineering perspective on artificial intelligence and machine learning, including applications in automotive aerospace, medical, and law enforcement.

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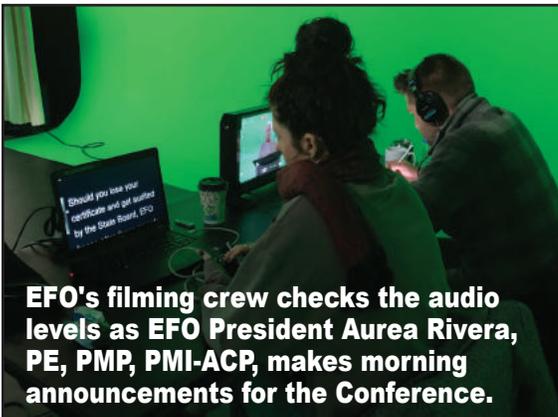
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Thomas Irwin, BSEE, JD, attorney at law with Calfee, Halter & Griswold, LLP, provided a seminar on how to identify and protect inventions. He covered the requirements of patentability of inventions, and how to identify patentable inventions.



Neil Littell, PhD, PMP, CSMS, director of project management programs at Ohio University, made a presentation focusing on the perspective of a typical project manager. He included tips for team members so they can work more effectively with project managers.



EFO's filming crew checks the audio levels as EFO President Aurea Rivera, PE, PMP, PMI-ACP, makes morning announcements for the Conference.

Gregory Kozera, PE, director of marketing for Shale Crescent USA, made a presentation explaining what the major manufacturing costs are today and why the United States and Ohio have the advantage over China and the world. Kozera highlighted the opportunities that are available for Ohio engineers.



Tadas Bartkus, PhD, chief of engineering and senior researcher for the Ohio Aerospace Institute, presented "Introduction to Aircraft Icing & NASA's Approach to Understanding It." He talked about NASA's research to mitigate the hazards of aircraft icing and the future of aviation. As a NASA contractor, Bartkus is a member of the NASA Glenn Research Center icing branch. He has studied jet engine icing since 2014.



## PROGRAMS

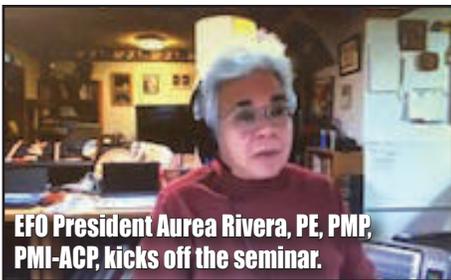
### Engineers learn to communicate & lead in 'the new abnormal' at EFO's December Seminar

Engineers at the 2022 December Seminar learned how to survive the new topsy-turvy business world that includes labor shortages, a supply-chain crisis and staggering inflation.

Co-presenters Ray Waite, Jr., MS, PMP®, founder of Lighthouse Force, and Ted Janusz, MBA, CSP, CVP, founder of Janus Presentations, LLC, led the discussion showing Ohio PEs that a new style of engineering leader is needed to navigate these turbulent times.

"Teams need leaders who inspire, motivate and excite them," Waite said.

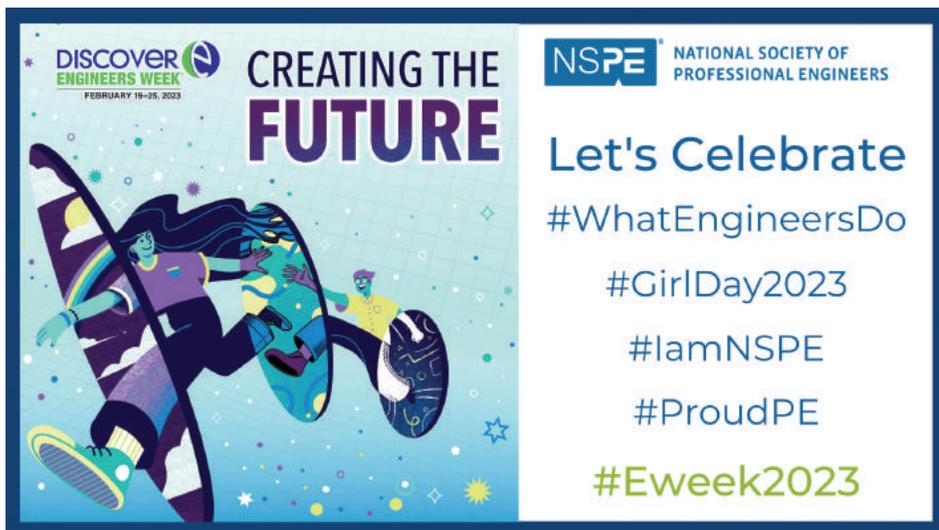
In EFO's interactive workshop, engineers learned stronger communication skills; how to motivate top performing teams; how to make teams agile; and important human resources considerations. One hour of state-mandated ethics training focused on ethical leadership. This six-hour CPD training was also worth credit for Project Management Professional certification through PMI.



### Download your 2023 E-Week social media toolkit

In preparation for Engineers Week, February 19-25, 2023, the National Society of Professional Engineers has created a social media toolkit available for download. It includes sample posts, graphics, Zoom backgrounds, and more.

There is also information about Girl Day, the Future City competition, and World Engineering Day. To promote and celebrate Engineers Week, download the file: <https://www.ohioengineer.com/eweek23tools.docx>



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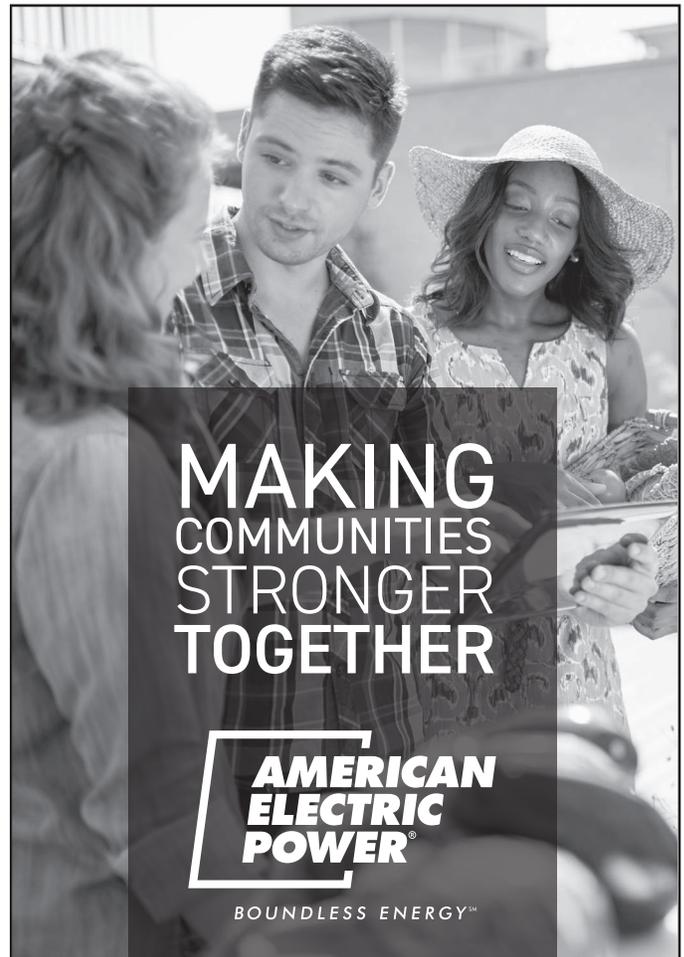


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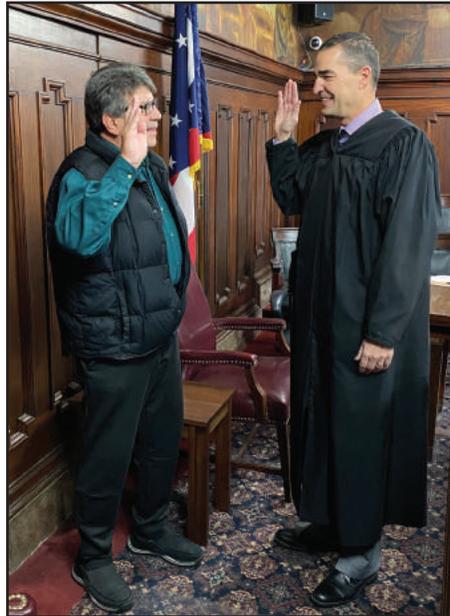
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## OSPE Vice President Joe Warino, PE, PS, FNSPE, is re-appointed to county & state sewage treatment advisory groups

OSPE Vice President of Legislative & Government Affairs Joseph V. Warino, PE, PS, FNSPE, was reappointed to the Mahoning County Sewage Treatment Appeals Board. Picture: In October, Warino was sworn in by the Honorable Robert N. Rusu, Jr., a judge for the Probate Division of the Mahoning County Court of Common Pleas in Ohio. >>>

In other news, at the state level, Warino was also re-appointed to the Household Sewage Treatment System Technical Advisory Committee by outgoing Speaker of the Ohio House of Representatives Robert R. Cupp. Warino's appointment to this state-level position is pursuant to Ohio Revised Code section 3718.03(A)(3) and is effective as of December 31, 2022.



OHIO SOCIETY  
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## WELCOME, NEW MEMBERS

Welcome to these new NSPE-Ohio members from December 14, 2022, through January 2, 2023:

### Mahoning Valley Chapter

Richard A. Deschenes, Jr., PE

### Toledo Chapter

Mohammadjavad Abdollahzadeh  
Duncan Alexander McEwen, PE

### Tuscarawas Valley Chapter

Samuel Raber

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## LEGISLATIVE & GOVERNMENT AFFAIRS

by Joseph V. Warino, PE, PS, FNSPE, Vice President,  
Legislative & Government Affairs, Ohio Society of Professional Engineers



# Be a '5G' PE

## Grow, Generate, Guide, Give & Government!

When thinking about what message I wanted to get across to the membership, as well as all of the professional engineers throughout the state, and while doing my research on the internet I came upon a particular thought.

Now bear with me for a moment here to allow me to layout the framework...

In the current "high tech" world of internet accessibility and cell phone communications, everyone strives for the best, most recent, most reliable and the fastest service available. As of this writing, the best, most reliable, fastest speed for the transfer of information is called "5G."

Whether we know exactly what it is or not, *we must have it!*

I am fascinated by the "hype" that the media creates around new products, including the new "5G" network.

Frankly, I would like to see that same enthusiasm generated and applied toward advocating for the engineering profession.

With the number of legislative challenges and issues facing professional engineers, I can't help but wonder just what a "5G professional engineer" might look like? How could we market "5G PEs" so that all professional engineers would strive to be recognized by that title?

Here is my attempt to describe just what a "5G Professional Engineer" might look like, and explain exactly what the "5G" might mean when applied to the engineering profession.

**The First G: Grow within our profession by getting involved in your professional engineers society, the Ohio Society of Professional Engineers.** Attend chapter meetings and continuing education programs. Volunteer to sit on a committee that interests you. OSPE has dozens of opportunities and I'm certain one committee or another, or one volunteer opportunity or another, will meet your personal interests. And membership in OSPE is the best way to accomplish the next four G's.

**The Second G: Generate interest in the tenets of our pledge as professional engineers.** When issued your Professional Engineer's certificate you were likely

asked to recite our oath or pledge, **The Engineers' Creed:**

*As a Professional Engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare.*

*I pledge:*

- *To give the utmost of performance;*
- *To participate in none but honest enterprise;*
- *To live and work according to the laws of man and the highest standards of professional conduct;*
- *To place service before profit, the honor and standing of the profession before personal advantage, and the public welfare above all other considerations.*

*In humanity and with need for Divine Guidance, I make this pledge.*

Live the Creed, breathe it and share it with the people you meet. Tell children, tell the public, tell politicians who we are as professionals. For all intents and purposes, the Engineers' Creed is the hallmark of our profession and our promise to the world.

*Grow within our profession,  
Generate interest in our Creed,  
Guide the next generation,  
Give back to your community,  
and be a Government advisor!*

**The Third G: Guide the next generation.** Volunteer for an Engineers Foundation of Ohio youth education program – Imagine Engineering, Ohio MATHCOUNTS or scholarships. Mentor a young engineer or engineering student. Speak about engineering at a local high school career day.

**The Fourth G: Give back to your community by sharing your expertise as a PE.** Volunteer to serve on a local

community or state board or committee. Engineers are desperately needed in the current political climate. After all, engineers are scientists, problem solvers.

### **The Fifth G: Government advisor!**

Serve as an advocate for professional engineers by contacting your state legislators (in person or by phone, mail or email) to get to know them. As you develop your relationship, let them know that Ohio PEs work every day to protect the public health, safety and welfare, and that they are highly qualified to do so. Offer these Ohio policymakers your assistance on understanding important engineering and technical issues.

I am pleased by the amount of support we have received from our OSPE members in addressing the several House and Senate bills that have called for changes to Ohio's licensure laws. To the many members who "stepped up to the plate" to assist in this effort, I offer my heartfelt thanks on behalf of OSPE.

By being a "5G engineer," you would not only be helping OSPE to advocate for our profession, you would also be exemplifying stellar professional engineering behavior.

There continues to be a major push for the relaxation of licensure laws, not only in Ohio but throughout the country. I implore each and every one of you to do your best to advocate for the engineering profession.

Help OSPE by doing your best to educate your legislators of the importance of professional engineering input and involvement in their daily lives, and the lives of their constituents. OSPE and the members of its Legislative and Government Affairs Committee would be only too happy to prepare talking points for your use.

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# OSPE celebrates its legislative victories & prepares for new challenges in 2023



The close of the 134th Ohio General Assembly in December 2022 included two legislative victories for the Ohio Society of Professional Engineers, and the Society is gearing up for new challenges in the 135th in the new year.

### **Indemnity provisions legislation is law**

Ohio Governor Mike DeWine signed into Ohio law Senate Bill 56, which regulates the use of indemnity provisions in professional design contracts related to public improvements. This legislation, sponsored by Ohio Senator Louis W. Blessing III, PE, was supported by OSPE.

Before Senate Bill 56 it has not been unusual for contracts to require the design professional to indemnify (i.e., compensate for harm or loss) and defend a public agency against third-party claims, regardless of the design professional's liability in a lawsuit.

Previously, OSPE provided testimony in support of this legislation. Our Past President Devon Seal, PE, MBA, stated our position: "Senate Bill 56 requires fair, proportionate, liability for design professionals. This will reduce risk for design professionals bidding on public improvement projects, leveling the playing field for small businesses, increasing competition, and lowering costs."

At least eleven other states, including Indiana and Michigan, have enacted statutes that are similar to Senate Bill 56.

### **OSPE-supported Senate Bill 131 gets the governor's signature**

In other news, the Ohio Senate has concurred with House amendments to Senate Bill 131 – legislation that OSPE worked on over two general assemblies. The bill, which OSPE supports, was delivered to Governor DeWine on December 22, 2022, and he signed it on Monday, January 2, 2023.

Senate Bill 131 requires the Ohio State Board of Registration for Professional Engineers and Surveyors to issue a license to an applicant who holds a license, government certification, or private certification or has satisfactory work experience in another state under certain circumstances. (The bill is actually much larger in scope;

it impacts most Ohio occupational licensing authorities.)

Over the 133rd and 134th Ohio General Assemblies, OSPE worked on massaging language in the Senate legislation and in the companion House legislation (House Bill 203) that would permit out-of-state licensees to obtain Ohio PE licenses. Specifically, in both chambers' bills, OSPE was instrumental to adding language that requires a minimum education requirement for out-of-state candidates seeking Ohio PE licensure. The original bills in the Ohio House and the Ohio Senate would have confined the requirements to experience and an examination.

OSPE's intervention underlined the critical need for a proper engineering education. Our members know that experience and exam are undeniably important, but they are not a substitute for the foundational knowledge provided by an ABET-accredited engineering education or its equivalent.

OSPE Vice President of Legislative & Government Affairs Joe Warino, PE, PS, FNSPE, provided the Society's proponent testimony in December 2022: "OSPE is fully supportive of Senate Bill 131, as passed by the Senate. We thank the sponsors, Senators Kristina Roegner and Rob McColley, for introducing Senate Bill 131 as this occupational license 'reciprocity' bill appeared in its last form in the 133rd Ohio General Assembly – complete with the trio of fundamental requirements for engineering licenses, including the 'minimum education requirement,' 'satisfactory work experience,' and passing 'an examination.'"

"This 'three-legged stool' of education, experience and examination is recognized nationwide under model law prescribed by the National Council of Examiners for Engineering and Surveying," Warino continued.

### **Thank you Senator Blessing!**

OSPE extends its gratitude to Senator Louis W. Blessing, III, PE, who carried Senate Bill 56, the indemnity provisions bill, in the 134th Ohio General Assembly and who was invaluable in helping OSPE on the "reciprocity" legislation in the 133rd Ohio General Assembly. His efforts are helping the public and engineers alike.

### **We are expecting a State Board review & we're watching for occupational licensing bills in 2023**

OSPE is prepared for the 135th Ohio General Assembly, which began in January 2023 with both chambers swearing in their members. We remain vigilant as we watch for new occupational licensure bills, and we know we can expect the Ohio General Assembly to review the State Board of Registration for Professional Engineers and Surveyors, and possibly suggest changes for the Ohio Board.

The State Board of Registration's review is called for by Ohio Senate Bill 255 (enacted in April 2019), which requires standing committees of the General Assembly to periodically review occupational licensing boards regarding their operation.

In response to the 2021-2022 review of other Ohio occupational licensing boards (primarily health-related boards), both chambers in the 134th Ohio General Assembly passed House Bill 509. This legislation included a volume of recommendations for these boards, including some stringent changes reducing the required continuing education hours, reducing their license registration fees and, in some specific fields, removing the license requirement altogether.

OSPE's members know that the unlicensed practice of engineering would be devastating to Ohioans. Furthermore, Ohio engineers and surveyors enjoy among the lowest and most cost-effective license fees in the United States, and the engineering and surveying associations together find Ohio's continuing education requirement beneficial, and not burdensome, to Ohio PE and PS licensees.

OSPE will reconvene and lead the engineering and surveying associations' coalition in the new year. We have worked together successfully in the past, and in January we will discuss tactics for supporting the continuance and effectiveness of the State Board of Registration. We anticipate collaborating on a public relations effort with the 135th Ohio General Assembly and staying ahead of their process.

Watch for developments in our electronic newsletter, *Legislative Update*, and *OhioENGINEER* magazine.

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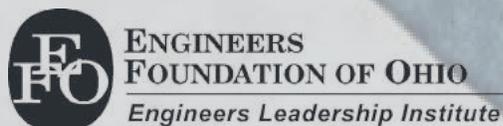
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