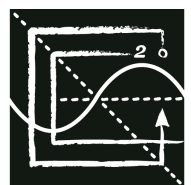


# MINUTES OF THE PARTICIPATING ORGANIZATIONS LIAISON COUNCIL

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March 2020



**NCEES**



**Participating Organizations Liaison Council**  
*Dean Ringle, P.E., P.S., Chair*

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The annual meeting of the Participating Organizations Liaison Council (POLC) was held Friday, March 13, 2020, at the Kimpton Overland Hotel in Atlanta, Georgia. Dean Ringle, P.E., P.S., president of the National Council of Examiners for Engineering and Surveying (NCEES), presided.

#### **NCEES Representatives**

- Dean Ringle, P.E., P.S., NCEES president
- Christopher Knotts, P.E., NCEES president-elect
- David Cox, NCEES chief executive officer
- Davy McDowell, P.E., NCEES chief operations officer

#### **Society Representatives**

- Joseph Cramer, Ph.D., P.E.—American Institute of Chemical Engineers (AIChE)
- Joshua Vajda, P.E.—American Nuclear Society (ANS)
- Frank Taylor, CP, PPS—American Society for Photogrammetry and Remote Sensing (ASPRS)
- Dana Porter, Ph.D., P.E.—American Society of Agricultural and Biological Engineers (ASABE)
- Curtis Weller, Ph.D., P.E.—ASABE
- William Henry, P.E.—American Society of Civil Engineers (ASCE)
- Dennis Wessel, P.E.—American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
- David Soukup, P.E.—American Society of Mechanical Engineers (ASME)
- Bland O'Connor, CPA, CAE—Council of Engineering and Scientific Specialty Boards (CESB)
- Joseph Michels, Ph.D., P.E.—Institute of Industrial and Systems Engineers (IISE)
- Gerald Wilbanks, P.E.—International Society of Automation (ISA)
- Arthur Schwartz, J.D., CAE—National Academy of Forensic Engineers (NAFE)
- James Petersen, P.E.—NAFE
- Alan Kirkpatrick, P.E.—National Council of Structural Engineering Associations (NCSEA)
- Mark Golden—National Society of Professional Engineers (NSPE)
- David Martini, P.E.—NSPE
- Mark Sargent, L.L.S.—National Society of Professional Surveyors (NSPS)
- Douglas Fisher, P.E.—Society of Fire Protection Engineers (SFPE)
- David Bourell, Ph.D., P.E.—The Minerals, Metals and Materials Society (TMS)

The following societies could not attend, many due to COVID-19 concerns:

- American Academy of Environmental Engineers and Scientists (AAEES)
- American Council of Engineering Companies (ACEC)
- Architectural Engineering Institute of ASCE (AEI)
- American Society for Engineering Education (ASEE)
- California Land Surveyors Association (CLSA)
- Institute of Electrical and Electronics Engineers—USA (IEEE—USA)
- Michigan Society of Professional Surveyors (MSPS)
- Structural Engineering Institute of ASCE (SEI)
- Society for Mining, Metallurgy, and Exploration (SME)
- Society of Naval Architects and Marine Engineers (SNAME)

President Ringle called the meeting to order and welcomed all attendees. He introduced Texas Board Executive Director Lance Kinney, Ph.D., P.E., and Nevada Board Executive Director and NCEES Past President Patty Mamola, P.E., who then gave a presentation on licensing emerging disciplines. A summary of the presentation is included in the appendix of these minutes.

POLC member organizations submitted the following reports:

#### **American Academy of Environmental Engineers and Scientists**

AAEES is pleased to engage with NCEES through participation in POLC and appreciates the opportunity to interact with NCEES and other engineering societies with a stake in engineering licensure.

AAEES has provided post-licensure certification for environmental engineers for more than 50 years, certifying duly qualified engineers through the current title of Board-Certified Environmental Engineer, or BCEE. The qualifications required for post-licensure board certification and the application process are rigorous, requiring documentation of education, experience, licensure, continuing professional development, absence of licensing board discipline, and successful completion of an advanced certification examination.

#### **Post-Licensure Board Certification of Engineers—Comparison to the Medical Profession**

The BCEE certification of environmental engineers provides a longstanding example of a licensure/post-licensure specialty certification system that is similar to the medical profession, in which licensure of all medical doctors is required. All who practice medicine are licensed as M.D.s, subject to rigorous scrutiny of qualifications at that level, and are held by licensure boards to appropriate standards of practice, ethics, and continuing professional development. In medicine, most M.D.s are also certified in advanced specialties requiring demonstration of the appropriate education, training, and experience for that specialty. This is a system that has worked for many decades to protect public health, safety, and welfare as the complexity of the practice of medicine has evolved and accelerated.

The practice of engineering is no different. Licensure as a professional engineer is a rigorous first step, requiring successful completion of an academically challenging baccalaureate program, successful completion of the Fundamentals of Engineering (FE) and Principles and Practice of Engineering (PE) examinations, and applicable and progressive engineering experience. Roughly two-thirds of applicants who are graduates of U.S. engineering programs are successful in that process. With this rigorous process, the public is assured of a basic level of competence of licensed professional engineers, a level often termed “minimal competence.” In engineering, there will always be a requirement on the part of the public for professional engineers practicing at a basic level.

In medicine, the competent and ethical practice of primary care physicians is of the utmost importance in protecting and enhancing public health and safety. Primary care physicians require a different skillset in order to practice than, for example, neurosurgeons. It is beyond the scope of state regulations and medical boards in individual jurisdictions to provide oversight of the technical qualifications in a proliferating number of complex advanced specialty practice areas.

The rate of change in the complexity of engineering practice has increased for decades, resulting in required qualifications in many engineering practice areas that are deeper, broader, and more interdisciplinary. That rate of change is not expected to slow but rather is expected to keep increasing. Like the medical profession, this will require in time appropriate recognition in engineering of advanced qualifications and skillsets beyond the basic level of licensure. The AAEES recognition of Board-Certified Environmental Engineers provides an example and framework of how this might be accomplished in other practice areas within the engineering profession.

#### **Environmental Engineering Technology Programs**

In the past year, the licensure of engineering technologists has been a significant topic of deliberation for NCEES. There are few ABET-accredited environmental engineering technology programs at the associate’s or bachelor’s levels in the United States, and AAEES has no position on the licensure of technologists as professional engineers across engineering disciplines.

We understand that in some other engineering disciplines, there is a longstanding history of engineering technology programs that educate and train engineering technologists in design disciplines, with varying differences between engineering technology and engineering curricula. Engineering technologists with design skills clearly related to the practice of engineering are licensed in a majority of licensure jurisdictions in the United States. Environmental engineering has no such longstanding history.

A trend may evolve in environmental engineering technology to establish ABET-accredited programs, likely distinctly in the public interest, to educate engineering technologists at the bachelor's level in academic programs well-suited for careers in facility management and operations superintendence of, for instance, water, wastewater, or solid waste facilities. Such programs currently entail, and will likely continue to entail, a wider divergence in curricula in comparison to engineering curricula, and, by their nature, have less emphasis on design skills than is the case with other engineering disciplines. Such programs can and likely should be accredited by the Engineering Technology Accreditation Commission (ETAC) of ABET but may have less of a clear connection to the licensed practice of engineering than is the case in other engineering disciplines. The point presented herein is that licensing boards might be wise to consider that there is a range of engineering technology programs, some of which may be more related to the licensed practice of engineering than others. This range may change over time as engineering technology programs evolve with different program objectives.

### **Support of Engineering Licensure**

AAEES supports NCEES and the engineering licensing boards in individual jurisdictions in maintaining and enhancing appropriate and rigorous qualification requirements for licensure as a professional engineer, for facilitating the practice of engineering in multiple jurisdictions through expedited comity and uniform continuing professional development requirements and for the continuation of licensure systems that regulate licensure as a professional engineer, with advanced qualifications recognized post-licensure through independent and rigorous processes.

### **American Institute of Chemical Engineers**

#### **FE and PE Committee Support**

The NCEES Principles and Practice of Engineering (PE) Chemical exam development committee continued writing, reviewing, and approving items for the PE Chemical exam throughout 2019. The results of the cut-score meeting held in 2019 have been used to determine the passing score for 2020 exam takers. The number of takers and passing rates seem to be normalizing to pre-CBT levels. There will be a concerted effort to reduce the size of the *Standard Reference Handbook* in 2020. Membership of the committee is now at 40 volunteers. Members of the committee will now generally attend just one meeting a year, or less.

The Fundamentals of Engineering (FE) exam team also continued its work and the FE Chemical Engineering module continued to perform very well (first-time examinee pass rate of 75 percent). The entire FE committee (seven disciplines) conducted a professional activities and knowledge study (PAKS) in 2018 and had its new specifications approved by the NCEES Examinations for Professional Engineers Committee (EPE) in January 2019. FE cut-score workshops were held in August 2019. The FE exam compiled to the new specifications will begin administration on July 1, 2020. The 2020 specifications, new *FE Reference Handbook 10.0*, and updated discipline-specific practice exams are now available on the NCEES website.

Unlike the PE Chemical exam team, the workload has actually increased for the FE Chemical exam team. Prior to computer-based testing (CBT), the FE Chemical exam team was producing two 60-item exams per year (FE Chemical depth portion). These exams contained a mix of new and reused items with a required 20 percent being equators (reuse items), so there is a maximum of 96 new items per year. With the CBT linear-on-the-fly testing (LOFT) Chemical exam, the FE Chemical exam team is now developing 130 new items for pretesting each year. The team has recruited several new members identified during the three PAKS meetings.

The number of FE exam takers has ranged from 2,200 to 2,700 during the last four years. The repeat examinee volume has increased relative to the total candidate volume. FE exam volumes and pass rates for each discipline are posted every six months on the NCEES website.

### **Other Licensure Support Activities**

AIChE continues to view service on these committees as equivalent to service to AIChE and to the profession. The organization also continues to send representatives to EPE meetings, the NCEES annual meeting, and this annual POLC meeting.

AIChE continues to oppose any implementation of a master's-or-equivalent requirement as a prerequisite for initial P.E. licensure and strongly believes that a bachelor's degree in engineering from an accredited program, along with demonstration of experience in the field and passage of the FE and PE exams, adequately assures the protection of the public.

AIChE continues to participate in the consortium of organizations known as Licensing that Works, which closely monitors developments relating to licensing requirements.

The AIChE Licensing and Professional Development Committee follows licensure and continually works to raise the awareness of chemical engineering students on the importance and benefits of licensing. A presentation to several hundred juniors and seniors has become a fixture of the annual student conference. Issues relating to licensing, ethics, credentialing, comity, and other professional development issues are routinely programmed at national meetings. In addition, AIChE's board of directors approved sending a letter to selected state licensing boards and governors in support of continued licensure of professional engineers.

#### **Other AIChE Educational, Professional and Outreach Initiatives**

AIChE continues to implement projects designed to serve the evolving interests of its more than 38,000 professional and young professional members and over 60,000 total members across 110 countries. Nearly 10,000 are also members of at least one technical division or forum, and thousands of members participate in local sections—in person and online. AIChE publishes articles of special interest to P.E.s or prospective P.E.s in its monthly magazine, *Chemical Engineering Progress*. The AIChE Academy (also referenced below) examines in-depth solutions to best assist chemical engineers in preparation for the PE exam. However, in the interim, AIChE is planning to host on its website a preparation course presented by an experienced P.E.

In 2019, AIChE expanded the reach of its technical content offerings through international conferences, highlighting new technologies and fields such as CRISPR, epigenetics, microbiomes, synthetic biology, and cell therapies. In addition, the Institute's Annual Meeting and Spring Meeting/Global Congress on Process Safety added innovative program tracks, collectively attracting more than 8,400 attendees from dozens of countries; attendees participated in nearly 1,000 sessions.

The AIChE Academy offers scores of courses and hundreds of educational products (webinars, online proceedings, and more) aimed at chemical engineers' ongoing professional and technical development. Working closely with the Institute's foundation and its Center for Chemical Process Safety (CCPS), the Institute has enriched undergraduate safety education by offering eight new Safety in Chemical Engineering Education modules and multiple faculty safety workshops and student boot camps.

In addition to safety education, the AIChE Foundation's "Doing a World of Good" and "All for Good" campaigns continue to engage thousands of chemical engineers to advance the profession and address societal needs. In 2019, the Foundation continued its focus on diversity and inclusion initiatives. Among many programs, the 2019 Doing a World of Good gala proved very successful and instrumental to the advancement of the chemical engineering profession, including programs to help recruit, retain, and promote the equitable inclusion of women and other underrepresented groups in their pursuit of careers in STEM.

In other areas, the Institute established new technical entities including the Center for Hydrogen Safety and the Climate Solutions Community.

The RAPID Manufacturing Institute for Process Intensification continues its growth, with more than 80 member companies and 32 funded projects. In 2019, AIChE launched the *Journal of Advanced Manufacturing and Processing*, which focuses on cutting-edge manufacturing techniques and technologies. Further supporting this area, AIChE launched the Advanced Manufacturing and Processing Society for individual members.

AIChE anticipates that the efforts outlined above will continue to grow and mature throughout 2020.

#### **American Nuclear Society**

The ANS Professional Engineering Examination Committee (PEEC) has been responsible for encouraging professional licensure of nuclear engineers and maintaining consistent and reasonable standards for the content of the PE Nuclear exam since 1973. To ensure adequate turnover and effective leadership, the chair of PEEC is designed as a three-year commitment. Joshua Vajda is the current chair. The vice-chair is Steven Arndt, Ph.D., P.E., who will assume the chair position in mid-June 2022.

## **Encouraging Professional Licensure**

ANS actively encourages professional licensure of nuclear engineers through a number of avenues. In the past, the primary method of communicating with its members on a regular basis was *ANS News*. However, in recent years, new e-services such as broadcast email, online collaboration tools, and the ANS Cafe blog have offered new approaches for the PEEC to promote licensure. PEEC members also prepare related articles for journals such as *Nuclear Plant Journal* to promote professional licensure. PEEC maintains a dedicated webpage on the ANS website ([www.ans.org/pe](http://www.ans.org/pe)), which identifies the advantages of P.E. licensure and describes the pathway to P.E. licensure. Links to recent articles by nuclear engineering P.E.s are also provided on the website.

In 2019, PEEC volunteers started developing a new study aid to help prepare engineers who are interested in becoming licensed in nuclear engineering. The PE Nuclear Exam Preparation Module Program aims to be a comprehensive study resource. The video-based online program replaces and expands upon the nuclear engineering PE exam study workshop formerly held each June at the ANS annual meeting. Each module presents content that follows a list of learning objectives and is aligned with the nuclear engineering PE exam specifications.

Three modules are currently available for purchase at [www.ans.org/pe/modules](http://www.ans.org/pe/modules):

- Specification Area 1: Nuclear Power Systems, which covers steam, fluids, pumps, heat exchangers, and probabilistic risk assessment
- Specification Area 4: Nuclear Criticality/Kinetics/Neutronics
- General Knowledge, which provides an introduction, general information, and science background material

Modules for the remaining two specification areas—“Specification Area 2: Nuclear Fuel Cycle” and “Specification Area 3: Interaction of Radiation with Matter”—are still under development and will be available for purchase in April 2020.

In addition to the ANS online study modules, NCEES is offering a PE Nuclear practice exam for purchase in April 2020. The NCEES practice exam contains 80 questions from past exams; simulates the format, style, and level of difficulty of exam questions; and provides solutions to enhance examinee understanding for each topic area. The PE Nuclear practice exam will be available for purchase through a link provided on the NCEES website <https://account.ncees.org/exam-prep/>.

The ANS board of directors maintains a supporting position on professional licensure and the NCEES organization as follows:

- ANS provides financial support for one PEEC member to travel to the ANS Student Conference each year. PEEC representative typically hosts a lunch-and-learn session on licensure, participates in the career fair, and often acts as a judge for student research presentations.
- ANS provides financial support for one PEEC member to attend the annual NCEES POLC meeting
- ANS established the nuclear reference library at NCEES headquarter by donating 17 text books published by ANS and provides other reference materials as they become available (in addition, NCEES provides a modest budget to acquire other references that have been recommended by the exam committee).
- PEEC organizes periodic technical sessions at ANS national meetings to promote P.E. licensure.

## **Professional Activities and Knowledge Study (PAKS)**

A PAKS panel met in Orlando, Florida, in November 2018 to develop the PAKS survey instrument for updating the PE Nuclear exam specifications. The PAKS survey results were used to develop new exam specifications for the PE Nuclear exam, which was presented to the NCEES Examinations for Professional Engineers (EPE) Committee for approval in November 2019. PEEC met in Clemson, South Carolina, in February 2020 to respecify the exam bank according to the new specification topical areas. The new exam specifications will take effect starting in 2021 after the 2020 exam administration.

ANS thanks the NCEES for its support and interest, especially in the matter of ensuring examination quality. We appreciate the NCEES-sponsored opportunities the last several years for Group 2 exam committee meetings at NCEES. These meetings have offered invaluable access to the exam bank to correct apparent documentation deficiencies and allowed us to successfully complete the transition to CBT on schedule.

## **American Society of Agricultural and Biological Engineers**

### **ASABE Membership Profile**

ASABE currently has 6,756 members (82 percent male and 18 percent female), including 1,418 undergraduate and graduate students. Approximately 35 percent of nonstudent members hold P.E. licensure in one or more states.

### **Venues for Licensure Discussion**

- ASABE EOPD-414 Fall SRH Review Workshop, September 17–18, 2019, Clemson, South Carolina
- ASABE EOPD-414 Winter Item-Writing Workshop, February 10–11, 2020, Clemson, South Carolina
- ASABE Annual International Meeting, July 12–15, 2020, Omaha, Nebraska

### **Examinations**

The majority of students and graduates from ABET-accredited agricultural and biological engineering programs sit for the Other Disciplines module of the NCEES FE examination. Two society members participate on the Other Disciplines exam development committee. The FE Other Disciplines exam had a 75 percent pass rate for the July–December 2019 administrations for 607 examinees. Historically, the FE Other Disciplines exam has had pass rates ranging from 77 percent to 85 percent for first-time takers. Of the 607 examinees in the July–December 2019 time period, 38 individuals self-reported to be from an agricultural engineering program and 101 individuals self-reported to be from a biological (nonbiomedical) program (or about 23 percent of all examinees of the FE Other Disciplines exam). Pass rates for first-time takers were 84 percent and 80 percent, respectively.

The ASABE EOPD-414 Engineering Licensure Committee is responsible for maintaining and enhancing the professionalism of the members of ASABE by providing services related to the PE Agricultural and Biological Engineering exam. Major activities for EOPD-414 this past year included the April PE exam offering, assembling a draft supplied reference handbook, and beginning a PAKS study.

The EOP-414 committee built and pretested the last pencil-and-paper PE exam, which is to be offered on April 17, 2020. It provided a copy of the draft SRH to the April examinees and other Professional Engineering Institute of ASABE (PEI) members for proofing and critique ahead of its use in the first CBT offering in October 2021. In preparation also for the CBT offering, the committee is continuing to build up the bank of active exam items and revising the practice exam. Additionally, a PAKS began for the PE Agricultural and Biological Engineering exam. The online survey for the PAKS is currently open for completion by licensed professional engineers practicing agricultural and biological engineering.

### **Licensure Promotion and Encouragement**

PEI, a not-for-profit professional and technical institution within ASABE, strives to foster the ideals of the professional engineer and to help the public understand the diverse and unique knowledge base of agricultural and biological engineers (109 PEI members). PEI annually recognizes a licensed engineer who has made outstanding contributions to the engineering profession, the public welfare, and/or humankind with the PEI Professional Engineer of the Year Award. Discussions have occurred concerning what efforts PEI might undertake to thwart threats to licensure and to get more academics licensed however no actions have resulted.

Sessions are held at ASABE annual international meetings on topics such as Incentivizing and Facilitating Undergraduates to Take the FE Exam and a Guide to Professional Licensure. PEI, the Dale Wm. Zimmerman PE Fund of the ASABE Foundation, and the ASABE board of trustees have partnered to provide the following incentives for first-time candidates:

- Reimbursing PE Agricultural and Biological exam registration fees up to \$300
- Giving \$150 to examinees to be used in any way they see fit

### **Continuing Education**

ASABE trained more than 2,000 participants in conferences and webinars in 2019. ASABE training complies with the International Association for Continuing Education and Training (IACET) standards. Through IACET, ASABE can offer CEUs that qualify under ANSI/IACET standards. ASABE continues to offer a number of free services for takers of the PE exam for agricultural and biological engineering and continues to provide economic incentives to both first-time and repeat test-takers.

Training occurs through continuing professional development sessions preceding ASABE annual international meetings and in partnership with PDHengineer.com (<https://asabe.pdhengineer.com>), which offers online

courses and webinars designed specifically to help professional engineers expand their knowledge base and meet the continuing education mandates of all state engineering boards.

### **Committee Assignments**

The chair of the ASABE Professional Engineering Institute is Carolyn Jones, while Terry Howell Jr. chairs the ASABE EOPD-414 Professional Licensure Committee. Thomas Brumm chairs the ASABE EOPD-204 ABET accreditation committee. ASABE past-president Mary Leigh Wolfe, professor and former head of the Department of Biological Systems Engineering at Virginia Tech, is the 2019–20 ABET past president.

### **Standards and Codes**

ASABE's standards program continues to thrive, thanks to the dedicated efforts of committee members and the longstanding support of industry partners. The committee work is powered by almost 2,000 unique volunteer positions. The 2019 ASABE standards CD includes 275 standards, with 47 standards projects in the queue. In comparison, 15 years ago, the 2004 standards collection comprised 217 standards. Additionally, ASABE has nationally adopted 57 ISO standards as American National Standards; in 2004, there were four such national adoptions.

In the United States, the right to nationally adopt ISO standards is granted to the organization that administers the U.S. position for a specific ISO technical committee or subcommittee. ASABE currently has responsibility for 14 ISO/US technical advisory groups (TAGs); in 2004, ASABE administered only two TAGs.

### **Publications**

ASABE's new editor-in-chief for journals, Garey Fox, P.E., began his term in January 2019 and immediately laid out a vision for ASABE refereed publications, beginning with the launch of the "Submit One" program for academic institutions. ASABE now has web pages for each of its journals. These pages contain specific information about the journals, including upcoming collections, frequently cited articles, recent articles, statistics, and links to related pages. The restructured P-511 journal editorial board has renamed and added content categories for ASABE publications, which now include *Frontier*, *Perspective*, *Research*, and *Review* articles, along with *Research Briefs*.

Editorials will also be published in each journal. ASABE partners with Publons to provide an independent, verified record of each reviewer's activity, which can be invaluable to reviewers for tenure and promotion. Publons is used by more than 675 ASABE reviews, resulting in more than 1,600 ASABE reviews completed. A recent switch to the new Publons Reviewer Connect, a reviewer search tool, should reduce the effort in identifying reviewers. Transactions of the ASABE and Applied Engineering in Agriculture are now publishing many journal articles online as soon as they are in final form, prior to the print edition.

ASABE posts accepted manuscripts online, which makes the manuscript content searchable and citable prior to publication. Both processes are especially helpful in accelerating exposure for manuscripts in collections, which would otherwise wait for traditional publication. These changes increase the opportunity for citation within the impact-factor time window. The most recent impact factor for *Transactions of ASABE* has increased for the fifth year in a row and now stands at 1.153.

The average number of days to first decision over a recent six-month evaluation is holding steady at 66 days. In addition, record lows have been set since the last report for peer-review benchmarks, all 12-month averages. They are as follows:

- Average reviewer turnaround for original manuscript
- Average turnaround for revisions
- Average time to assign reviewers for original manuscripts

Several special issues of *Resource* magazine were produced over the past year, including a well-received issue focusing on women of ASABE. Published in March 2019, this first-of-its kind issue comprised articles written by and about women in the agricultural and biological engineering profession. Another special publication was the September/October "Discover" issue of *Resource*, which promotes the profession to prospective students. Published every third year, this special career issue includes first-person accounts of internships and study-abroad experiences, describes up-to-date career possibilities, and lists the universities and colleges that offer relevant degree programs. The November/December issue presented the stories behind 21 new ag tech startup companies that reflect the wide variety of technology being applied in agriculture.



## Global Initiative

ASABE continues to make strides in its global initiative, which was launched in 2014, by planning the third international conference focusing on sustainable energy. The conference will be held in Costa Rica on May 17–20, 2021.

## K–12 STEM Programs

ASABE reaches out to students and educators throughout the year through staff- and member-led activities. The society produces a variety of printed and digital career-related materials that include flyers, brochures, and special issues of *Resource* magazine that focus on career options in agricultural and biological engineering and technology. ASABE members are encouraged to use these materials in local Engineers Week and other STEM-related events.

In addition, ASABE supports DiscoverE and the national FFA organization. Through DiscoverE, ASABE participates in Discover Engineering Family Day and the Future City Competition. It also supports other programs, including National Engineers Week, Introduce a Girl to Engineering Day, and the Global Marathon. At the annual FFA Expo, ASABE recruits judges for engineering-related competitions. The society hosts an impressive exhibit that engages ASABE student and professional members with FFA members and their educators and advisors.

The exhibit always includes displays, materials, and hands-on activities that illustrate the varied and impactful work carried out by agricultural and biological engineers throughout the world.

## American Society of Civil Engineers

Supporting professional licensure is integral to the ASCE's mission to advance civil engineering and protect the public health, safety, and welfare. Some of ASCE's programs to further that mission are described below.

### Promoting P.E. Licensure

ASCE strongly supports professional licensure and actively encourages all civil engineers to become licensed. ASCE has numerous programs to support licensure to provide for the public's health, safety, and welfare. Some of these include the following:

- Policy Statements—ASCE has 10 policy statements that address various aspects of licensure and help it to promote licensure. Additionally, in October 2019, the ASCE board of directors passed an updated version of Policy Statement 465—The Civil Engineering Body of Knowledge and the Practice of Civil Engineering. The updated policy states that ASCE has a responsibility to establish the Civil Engineering Body of Knowledge to describe the knowledge, skills and attitudes necessary for responsible charge in the practice of civil engineering and a credentialing system to recognize individuals who meet this standard. All of ASCE's policy statements can be viewed on our website at [http://www.asce.org/public\\_policy\\_statements/](http://www.asce.org/public_policy_statements/).
- ASCE's Committee on Licensure promotes the licensure of civil engineers; collaborates with other key stakeholders, such as the Alliance for Responsible Professional Licensing; and monitors, supports, and encourages licensure activities and policies.
- Published Resources—Copies of publications may be requested from [professional@asce.org](mailto:professional@asce.org). They include the following:
  - “Guidance on Licensing and Ethical Responsibilities for Civil Engineers” provides guidance on the licensing process, the importance of licensure, and technical and ethical responsibilities of licensed civil engineers. [https://www.asce.org/uploadedFiles/Education\\_and\\_Careers/Licensure/Content\\_Pieces/licensing-ethics-brochure.pdf](https://www.asce.org/uploadedFiles/Education_and_Careers/Licensure/Content_Pieces/licensing-ethics-brochure.pdf)
  - “Guide to Professional Engineering Licensure for the Construction Engineer” is intended to assist the engineer working in construction in the process of pursuing licensure as a professional engineer. [https://www.asce.org/uploadedFiles/News\\_Articles/Const%20Engr%20PE%20Guide%20Web.pdf](https://www.asce.org/uploadedFiles/News_Articles/Const%20Engr%20PE%20Guide%20Web.pdf)
  - “Engineers Guide to Pre-Licensure Experience” is intended to be a resource for both engineer interns and their employers and mentors. The guidelines note that, while not required by licensing boards, the capabilities described are important for career development. [https://www.asce.org/uploadedFiles/Education\\_and\\_Careers/Licensure/Content\\_Pieces/Engineers%20Guide-flierFINAL.pdf](https://www.asce.org/uploadedFiles/Education_and_Careers/Licensure/Content_Pieces/Engineers%20Guide-flierFINAL.pdf)
- Accreditation—Through its membership in ABET, ASCE supports accreditation of engineering degree programs, a vital component of licensure requirements in many jurisdictions. ASCE is the lead society for all civil engineering, architectural engineering, construction engineering, civil engineering technology, architectural engineering technology, and construction engineering technology programs accredited through ABET. This means that ASCE develops and proposes program criteria for programs in those areas, as well as

recruits and coordinates volunteer program evaluators to visit and evaluate each program on a regular schedule.

- Recognition—ASCE’s Walter LeFevre Award is made annually to a program at an academic institution that offers an ABET-accredited civil or related undergraduate engineering program. Recipients are recognized for their actions in promoting licensure, ethics, and professionalism, and ASCE membership is not a consideration for this award. In addition, many of ASCE’s awards require the individuals who are recipients to be licensed. <https://www.asce.org/awards/>
- Dream Big Content—After *Dream Big: Engineering Our World* premiered on giant screens across the world in 2017, the film began streaming on Netflix in June 2018. To date, more than 3 million viewers have experienced the film at a theatrical screening. With the support from the United Engineering Foundation, ASCE shifted its focus toward placing DVDs of the film, accompanied by educational toolkits, in every U.S. public school. By the start of the 2019 school year, we achieved that goal, distributing approximately 117,000 copies of the film to all public, charter and U.S. DOD schools, as well as many private and parochial schools in the United States and abroad. Meanwhile, local Dream Big events continue to be organized by ASCE and other engineering organization, including one by the ASCE Los Angeles Younger Member Forum, which hosted more than 200 Girl Scouts for a red-carpet screening of the film. For Engineers Week 2020, many museums and giant screen theaters are again programming Dream Big screenings and events. The film includes specific reference to professional engineers, and a companion web video and lesson plan describe the role of professional licensure in protecting public health, safety and welfare. The educator’s guide also includes information about licensure as part of the section on becoming an engineer. See more and download the educator guide at <https://dreambigfilm.com/education/>.

## **Vision for the Future of the Civil Engineering Profession**

### Civil Engineering Body of Knowledge

The third edition of ASCE’s *Civil Engineering Body of Knowledge for the 21st Century* was published in 2019. The *Civil Engineering Body of Knowledge for the 21st Century* defines the knowledge, skills, and attitudes necessary for entry into the professional practice of civil engineering. It is comprised of outcomes accomplished through formal education, experience, and self-development. It establishes standards for education and experience that address the educational reform discussed in *The Vision for Civil Engineering in 2025* and *Achieving the Vision for Civil Engineering in 2025*. It reinforces the need for enhanced educational requirements for the professional practice of civil engineering.

The *Civil Engineering Body of Knowledge* has been discussed at many of the major gatherings of ASCE members since the first edition was published in 2004 and has served as a useful reference to others developing their own bodies of knowledge, such as NSPE. Many civil engineering university programs within the United States have used elements of the publication to design and implement their undergraduate curricula.

### Engineer Tomorrow

ASCE’s Engineer Tomorrow initiative is focused on ensuring that today’s civil engineers gain the necessary knowledge, skills, attitudes, and experience to sustain the profession in the future. For decades, ASCE has been central to examining and shaping civil engineering education. Through its forward-thinking *Civil Engineering Body of Knowledge for the 21st Century*, ASCE has defined the knowledge, skills, and attitudes that civil engineers need for entry into professional practice.

ASCE affirmed what the National Academy of Engineering had also concluded in the following:

- The exploding body of science and engineering knowledge cannot be accommodated within the context of the traditional four-year baccalaureate degree. *Educating the Engineer of 2020*.
- U.S. civil engineers currently rely on an early-1900s educational model to face 21st-century challenges. The engineering education of the present is not sufficient to prepare civil engineers to address the civil engineering challenges of the future.

### Civil Engineering Technologist Body of Knowledge

ASCE has engaged in an effort to explore the opportunities and challenges of technologists within the civil engineering field for the past 10 years. ASCE recognizes the civil engineering professional, the civil engineering technologist, and the civil engineering technician as important members of the civil engineering project team and defines each of those in its Policy Statement 535, available at <http://www.asce.org/issues-and-advocacy/public-policy/policy-statement-535---defining-the-civil-engineering-team/>.

While there is a well-developed civil engineering body of knowledge that defines the knowledge, skills, and attitudes needed for professional civil engineering practice, there is no equivalent description of the body of knowledge that a civil engineering technologist should have to be considered competent in that role. There are formal international agreements that provide information about engineering technologists, but that information was developed for accreditation—not as a foundation for a body of knowledge. In addition, the international agreements have not been found to align well with U.S. practice and are not sufficiently specific to inform at a body of knowledge level.

ASCE developed the *Civil Engineering Technologist Body of Knowledge* to describe functional areas a civil engineering technologist might work in and the skills required to perform in those areas at a professional level. The *Civil Engineering Technologist Body of Knowledge* was published in 2019 and can be downloaded for free from the ASCE library at <https://ascelibrary.org/doi/book/10.1061/9780784415382>.

### **Specialty Certification for Civil Engineers**

- Civil Engineering Certification, Inc., a separately incorporated and wholly owned subsidiary of ASCE, was established in August 2004 to support professional certification academies for civil engineering specialties. The American Academy of Water Resources Engineers; the Academy of Geo-Professionals; and the Academy of Coastal, Ocean, Port and Navigation Engineers were created and are led by Civil Engineering Certification, Inc. Diplomate credentials are awarded by these academies to professional engineers who demonstrate fulfillment of the specialized bodies of knowledge in their respective areas of civil engineering. Requirements include licensure as a professional engineer, a post-graduate degree, eight years' experience beyond the first P.E. license, and a commitment to professional development and ethics. Information on the specialty certifications and their requirements can be found at [http://www.asce.org/professional\\_certifications/](http://www.asce.org/professional_certifications/).
- ASCE's Sustainable Infrastructure Certificate program provides knowledge, tools, and techniques needed to design, build, and manage sustainable projects and to take a leadership role in making our infrastructure sustainable. All courses in the certificate program are offered online and can be accessed 24 hours a day, seven days a week, providing flexibility to take the courses at times that are most convenient. Completion of four core courses and one elective course are required to earn the Sustainable Infrastructure Certificate. Information is available at <http://www.asce.org/sustainable-infrastructure-certificate-program/>.
- ASCE's Construction Engineering Certificate program provides knowledge, skills, and techniques needed to take a leadership role in construction project management. The program includes asynchronous online video lectures as well as synchronous online interactive sessions with an instructor. Completion of four core courses and two elective courses is required to earn 6.0 continuing education units (CEUs) and the Construction Engineering Certificate. Information is available at <https://www.asce.org/continuing-education/construction-engineering-certificate-program/>.
- ASCE's Geographic Information Systems for Asset Management Certificate program is designed for practicing engineers to develop in-demand skills used to manage GIS applications for infrastructure assets. Upon completion, participants will earn 12 CEUs/120 professional development hours (PDHs) and are able to apply the fundamental concepts of GIS, including development of GIS applications, implementation of GIS data within existing networks, process improvement using geospatial analysis, and proper maintenance and operation of spatial databases. Information is available at <https://www.asce.org/continuing-education/geographic-information-systems-for-asset-management-certificate-program/>.
- ASCE's Port Engineering Certificate program is a series of career-focused courses taught by practicing engineers and university professors providing professional engineers in-demand skills used in the field of port engineering. Upon completion, participants will earn 12 CEUs/120 PDHs and will learn the fundamental concepts of port engineering, the design, construction, and management of port facilities, types of seismic design classifications, and how to interpret geotechnical data. Information is available at <https://www.asce.org/continuing-education/port-engineering-certificate-program/>.
- ASCE's Structural Engineering for Buildings Certificate program is a series of career-focused courses taught by practicing engineers and university professors and provides professional engineers in-demand skills used in the field of seismic engineering. Upon completion, participants will earn 12 CEUs/120 PDHs and will learn the fundamental concepts of earthquake engineering, seismic analysis of buildings, and design and detailing of steel and concrete structures. Information is provided for both new and existing buildings. Information is available at <https://www.asce.org/continuing-education/structural-earthquake-engineering-for-buildings-certificate-program/>.
- ASCE's Water Treatment Certificate program is designed for the practicing engineer. Upon completion, participants will earn 12 CEUs/120 PDHs and will learn how to use the technology to make drinking water from groundwater, lakes, rivers, streams, oceans, stormwater, and wastewater reuse to all the planning

aspects required to lay the groundwork for a new water treatment plan. Information is available at <https://www.asce.org/continuing-education/water-treatment-certificate-program/>.

## **Other ASCE Initiatives**

### Communications and State Legislative Activities

ASCE state government relations staff monitors legislative and regulatory trends in the states and watches for new developments in recent efforts to erode all occupational and professional licensure. ASCE staff works with local ASCE groups and members to oppose new state legislative proposals that could weaken the contribution of P.E. licensing to the health, safety, and welfare of the public.

Last year, ASCE became a founding member of the Alliance for Responsible Professional Licensing. The alliance promotes a balanced approach to professional licensing and aims to educate policymakers and the public on the importance of high standards, rigorous education, and extensive experience within highly complex, technical professions that are relied on to protect public safety and enhance public trust.

### Infrastructure Advocacy

Eleven state and local infrastructure report cards were released in 2019, each with a set of grades and information on regional infrastructure needs and opportunities. These report cards included California, Georgia, Hawaii, Kentucky, Iowa, North Dakota, Northeast Ohio, Oregon, Puerto Rico, Vermont, and Washington. Twelve groups are working on report cards to be released in 2020. <https://www.infrastructurereportcard.org/>

Throughout 2019, ASCE also testified before congressional committees four times on topics ranging from funding for clean and drinking water programs, sustainable infrastructure funding, resiliency, and innovations in engineering.

More than 250 ASCE leaders met with over 300 congressional offices to advocate support for fixing the Federal Highway Trust Fund and promoting full funding and sound policy for key infrastructure programs during ASCE's annual spring fly-in. <https://www.asce.org/advocacy/>

### ASCE's Grand Challenge to Civil Engineers and the Industry

ASCE has taken on the challenge to find ways to significantly enhance the performance and value of infrastructure projects over their life cycles by 2025 and to foster the optimization of infrastructure investments for society in its Grand Challenge initiative.

ASCE's Industry Leaders Council continues to lead the effort to advance this initiative to help influence major policy changes and infrastructure funding levels, encourage civil engineers to focus on innovation, rethink life cycle costs, build in resilience, adopt performance-based standards, and drive transformational change. Details are available at [www.ascegrandchallenge.com](http://www.ascegrandchallenge.com).

The deadline to submit entries for ASCE's fifth Innovation Contest is May 18, 2020. Developed as part of the ASCE Grand Challenge, it is an avenue to bring together the best ideas, projects, and theories and has already developed a track record of reaching a worldwide audience and attracting industry attention. New for 2020 is that the final competitions for the ASCE Innovation Contest and the ASCE Regional Student Innovation Contest, now in its second year, will take place during the ASCE Convention, October 29–31 in Anaheim, California. To learn more about the ASCE Innovation Contest, read a related *ASCE News* article at the following: <https://news.asce.org/2020-innovation-contest-now-open-asce-convention-to-host-competition-finals/>

### New Student Competitions

ASCE's National Concrete Canoe Competition continues to draw top performing teams from 19 regional student conferences and for the second year will also include qualified wildcard teams from other well-rounded ASCE student chapters across the country. The competition provides engineering students an opportunity to gain hands-on technical experience and develop teamwork, management, and leadership skills. This year's competition rules underwent a significant overhaul, requiring students to submit and present a professional quality proposal of their design.

In 2020, the Sustainable Solutions Competition provides a fun, creative challenge relating to the concept of Tactical Urbanism. The Blue Sky Competition challenges students to develop visionary ideas that address smart mobility transportation challenges. ASCE's Utility Engineering and Surveying Institute (UESI) is sponsoring the UESI Surveying Competition, giving students the opportunity to demonstrate their ability applying the

techniques of land surveying. This year, UESI will hold societywide finals at the 2020 UESI Surveying and Geomatics Conference in May. Finally, the Grand Challenge Student Innovation Contest pilot is being expanded to five student conferences, with the continued goal of expanding interest in this competition throughout the student population. Information on ASCE student conferences and competitions can be found at [https://www.asce.org/student\\_conferences/](https://www.asce.org/student_conferences/).

### **ASCE Annual Convention**

ASCE's 2020 convention will be held October 28–31, 2020, in Anaheim, California.

### **American Society for Engineering Education**

We are honored to be writing to you as ASEE moves ahead on its journey of another 125 years. In June 2019, ASEE closed out a year-long celebration of our first 125 years—our quasiquintennial—during which we examined our past in celebration and anticipated our future with plans and goals for staying relevant for you, our members, for decades to come.

Part of changing and adapting our society, of course, is focusing on diversity and welcoming all people into ASEE. Looking beyond traditional notions of diversity is critical, and one area of focus this year was a group of people we refer to as “professional-track faculty,” though they have recently been more commonly called “non-tenure-track faculty.” This term stems from what is called “deficit thinking,” or being defined by what you are not instead of what you are. ASEE wants to recognize these teaching-focused faculty for the expertise they bring and the contributions they make to educating our students.

Professional-track faculty comprise a significant percentage of the faculty in engineering and engineering technology programs and they teach a growing share of courses in the curriculum. ASEE continues to explore what models work best in managing and embracing these faculty members by creating best practices. The Monday keynote speaker at the 2019 annual conference was Dr. Emily Boyd, who focused on this topic.

On the topic of diversity, in this report you'll find information about ongoing developments in this area. Co-located with the Engineering Deans Institute in 2019 was the Engineering Deans Gender Equity meeting, a project that seeks to reduce barriers to effective recruitment, retention, and advancement of women engineering faculty. Further, we launched the ASEE Diversity Recognition Program to publicly recognize those engineering and engineering technology colleges that make significant, measurable progress in increasing the diversity, inclusion, and degree attainment outcomes of their programs. Recognition occurs at three levels—bronze, silver, and gold—and more than 70 institutions were recognized in year one.

The board of directors continued its effort of long-range strategic planning this year. ASEE's objectives are clear and direct:

- Communication and communities
- Innovation and excellence
- Access, diversity, and inclusion
- Advocacy and public policy
- Financial sustainability and internal organization

With these goals in mind, the board held numerous strategic planning sessions last year as we honed our focus under these objectives.

The education of future engineering professionals is changing quickly. Whether it's the evolving characteristics of incoming student cohorts, instructional technology, or the new and challenging needs of employers, ASEE must remain nimble to meet the needs of our members and our community. With numerous constituent groups among our members, we are working hard to lead ASEE in a direction that benefits all.

### **International Activities**

The Global Forum at the 2019 ASEE annual conference had the theme “Engineering Education Reform Towards Active Learning.” Krishna Vedula, executive director of the Indo Universal Collaboration for Engineering Education, delivered the luncheon keynote and chaired a panel of five experts representing four continents.

ASEE members and leaders traveled widely this year. Several staff and members attended the World Engineering Education Forum-Global Engineering Deans Council meetings in Albuquerque, N.M., in November

2018. In addition, we sent leadership delegations to conferences in China, Hungary, Jamaica, Japan, and Nigeria.

ASEE launched the ASEE Specialist program this year, a response to growing requests for American expertise from international partners. This program connects ASEE members with international colleagues seeking aid with pedagogical and/or technical training for faculty, as well as curriculum and program development. The program has received nearly 100 applicants. Growing interest has led us to offer it to U.S.-based institutions as well.

### **Policy Engagement**

Funding and political support for engineering, engineering technology, and engineering education research are important to most ASEE members. In addition, ASEE and its members are concerned with policies that further the technological literacy of Americans. ASEE leverages partnerships inside and outside Washington, D.C., to maintain our influence and further the interests of our members. These partners include Lewis-Burke Associates LLC, our government relations firm; the STEM Education Coalition; the Alliance for Science and Technology Research in America; and the Coalition for National Science Funding.

In 2019, ASEE's annual Public Policy Colloquium of engineering deans brought almost 200 participants to Washington for a two-day event of briefings on the federal landscape as it relates to STEM funding and support. The event culminated with trips to Capitol Hill to hear from members of Congress and to meet with representatives.

The Engineering Technology Council now uses its annual meeting, the Engineering Technology Leaders Institute (ETLI), as an opportunity for policy discussion. The October 2018 meeting, "Engineering Technology Leaders: Expanding the Brand," explored how engineering technology, at its 50-year anniversary, can look forward to its next 50 years. ETLI participants visited their congressional representatives as part of this meeting. The event also included a presentation from Victor McCrary of the National Science Board.

### **Diversity, Equity, and Inclusion**

ASEE, with support from engineering deans and engineering technology councils, launched the ASEE Diversity Recognition Program (ADRP) to publicly recognize engineering and engineering technology colleges that make significant, measurable progress in increasing the diversity, inclusion, and degree attainment outcomes of their programs. We recognize institutions at the bronze, silver, and gold levels, with only bronze achievable in this initial year.

For the second year, ASEE's Minorities in Engineering and Women in Engineering divisions joined in a collaborative effort of the National Association of Multicultural Engineering Program Advocates and the Women in Engineering Proactive Network to host the CoNECD (Collaborative Network for Engineering and Computing Diversity) Conference. CoNECD is the only event that explores current research and practices to enhance diversity and inclusion of all underrepresented populations in the engineering and computing professions. CoNECD includes women, individuals of diverse racial, ethnic, and socioeconomic backgrounds as well as varied gender identities and expressions, the LGBTQ+ community, people with disabilities, veterans, and first-generation college students.

Featuring a new logo and website, the ASEE's LGBTQ+ in STEM Advocacy project has reached important milestones: 1,100 participants in Safe Zone Ally training workshops (via more than 10 online and 60 face-to-face workshops), a second NSF award, and additional support by Chevron to offer Safe Zone training sessions at zone and section meetings. Our online community of practice for allies and advocates continues to grow, and we are currently developing an advocacy toolkit for academic administrators.

### **Expanding Engagement**

ASEE has produced webinars on student success, inclusive teaching, and research impact. Registration and attendance have been increasing, reaching individual benchmarks of 200-plus registrants and 100 attendees. As our library of webinars grows, we will revise our strategies to market on-demand webinars, highlighting value for ASEE members. We will also explore opportunities to feature ASEE products and services in future webinars, and we will soon offer a webinar on salary negotiations, featuring the results of our salary survey.

Tau Alpha Pi, the honor society for engineering technology, is administered by ASEE headquarters. Last year, it inducted 365 new members and restarted five chapters that had previously been inactive. It is currently

undergoing a restructuring of its activities with an increased emphasis on participation and service among its members.

### **Data Analytics and Institutional Research**

ASEE is the premier source of information for industry, academic, and government leaders who need to know what the potential engineering and engineering technology workforce looks like today and could be tomorrow. ASEE data do the following:

- Help our industry partners identify new recruits for employment and areas where the graduating workforce can support new technological expansion
- Give institutional leaders the tools to show government stakeholders progress and identify new targets of opportunity
- Enable local, state, and federal decision makers to make sound judgments in developing the current and future engineering workforce

### **Journal of Engineering Education**

Cultivating, disseminating, and archiving quality research in ways that reflect the diversity of experiences and perspectives of the engineering education community is at the core of what ASEE is about. This is also the mission of ASEE's *Journal of Engineering Education*. The Journal is widely recognized as the premier publication for scholarly research on engineering education. Published quarterly through John Wiley and Sons, the Journal receives about 300 new submissions annually from authors in more than 40 countries. It has an international editorial board that coordinates the peer review process. Under the editorship of Lisa Benson, the College of Engineering, Computing, and Applied Sciences and the Department of Engineering and Science Education at Clemson University have provided generous support of the Journal. During the past 12 months, the Journal has published articles on best practices in mentoring and training engineering graduate teaching assistants; the challenges faced by engineering professionals who return for advanced study after significant time in the workforce; a new survey tool that can help understand key factors to student success, support, and integration into engineering programs; and how interdisciplinary approaches and biosensors can help gauge student engagement in the engineering classroom. Summaries of these and other articles have appeared as JEE Selects columns in ASEE's *Prism* magazine. These summaries show how research can inform the practice of educating a diverse population of students to become the next generation of leaders in engineering. The Journal launched new initiatives this year to expand its reviewer and author base, including a Star Reviewer program and networking and workshops at international conferences to identify and train new reviewers and authors.

### **Advances in Engineering Education (AEE)**

Documenting and disseminating true advances informed by research in engineering education practices and pedagogy is the purpose of the peer reviewed *Advances in Engineering Education*. In that way, AEE focuses on the implementation of research results rather than the research itself. Of particular uniqueness to AEE is that authors are encouraged to submit papers incorporating the creative use of media, including animation, audio, graphics, and video. This marked AEE's eighth year; the journal has received more than 1,000 submissions, with an acceptance rate of 25 percent and an increasing number of submissions from overseas. Two issues of the journal were published this year, with a total of 22 papers. The papers covered a wide range of topics focusing on relevant learning experiences from freshman to graduate student. The fall issue featured a set of papers on the entrepreneurial mindset. The spring issue addressed a variety of subjects including project-based learning, online videos, and asynchronous peer-to-peer learning. Upcoming issues will feature the midyears' education experience, engineering ethics, social entrepreneurship, and most innovative engineering programs.

### **Communicating for the Community**

ASEE's Art and Editorial departments continue their successful collaboration in the society's standout magazine, *Prism*, the voice for the engineering education community. *Prism* won numerous awards this year, including the following:

#### APEX

- Publication Excellence—Writing: "The Mind's Eye"
- Publication Excellence—Writing: "The Last Straw"

#### Association Trends

- All Media Contest—Commemoration/Tribute, 125th Anniversary Issue

### Communicator Awards

- Award of Excellence for Writing for “Slow to Bite” and “Young Pacesetters”
- Award of Distinction for Design Features/Overall Design for “Faster, Smarter, Lighter”
- Award of Distinction for Employee Publication Magazine for the October 2018 issue

The ASEE Art Department keeps ASEE’s branding and messaging on point through its work on branding and logos for events and meetings; onsite displays; social media campaigns; program design and layout; and marketing materials, among other products our members see, read, and interact with.

### **Communicators Conference**

In July 2019, ASEE held its second annual Engineering Communicators Conference, convening over 100 communications professionals from colleges of engineering and engineering technology around the country. This event is the only one of its kind for communicators and, over two days, covered topics including effectively using social media, considering diversity in communications products, and dealing with the media. The community building from this event laid the groundwork for the creation of a new constituent committee for engineering communicators within ASEE.

### **Annual Conference**

ASEE’s showcase event and gathering place for 4,000 community members is our annual conference, held in Tampa in 2019. In the “lightning capital of the world,” we were Charged Up for the Next 125 Years, noting the closing of our year-long anniversary celebration and looking forward to what is next for ASEE.

Among the highlights of the conference were as follows:

- Two great plenary speakers, one of whom addressed professional-track faculty and the other telling her story of overcoming obstacles on her way to becoming a CEO
- A welcome from Tampa mayor Jane Castor
- Presenting our student video-contest winners
- The taste of Tampa, featuring a variety of local culinary delights
- The annual community engagement division outreach activity, this year at a local middle school
- Numerous social events, including our popular division mixer
- Ceremonies for our society award winners and fellows
- Sunrise yoga and other group physical activities

### **ASEE Position Statement on Professional Licensure of Baccalaureate ETAC/ABET Graduates** Issue

P.E. licensing is regulated by the states. Model laws for states to adopt are created by NCEES. Currently, all states permit EAC/ABET engineering graduates to become licensed professional engineers. However, only some states permit baccalaureate graduates from ETAC/ABET-accredited engineering technology (ET) programs to obtain professional licensure despite the fact that with only minor exceptions, examinations to become a P.E. are the same in all states. A majority of states that permit ET baccalaureate graduates to attain professional licensure do so only after imposing additional course, work experience, or even degree requirements on ET baccalaureate graduates.

Those states that have prohibitions or additional requirements create economic hardship for ET baccalaureate graduates by making the licensure process longer or impossible. Lengthening or restricting the licensure process keeps engineering technology baccalaureate graduates from well-paying engineering jobs.

A 2017 report by the National Academy of Engineering indicates that ET baccalaureate programs have at least twice the percentage of African American students and significantly more economically disadvantaged students than EAC/ABET engineering programs. NSPE regularly reports that licensed professional engineers earn more money and have more opportunities than unlicensed engineers. A recent tagline from NCEES boasts, “P.E.: Prove yourself without saying a word.”

### Position

ASEE, a society made up of educators in both engineering and engineering technology programs, strongly supports the position that baccalaureate graduates from ETAC/ABET-accredited engineering technology programs are fully capable of protecting the health, safety, and welfare of the public and should, therefore, be eligible, without additional requirements, to become licensed professional engineers.



## Qualifying Statements

There is no expectation that any of the requirements for licensure be changed other than to make ETAC/ABET baccalaureate graduates eligible to sit for all required exams and be able to accrue experience in the same way and at the same rate as EAC/ABET graduates. Nor is there an expectation that any industry-based need for licensing be changed.

## **American Society of Heating, Refrigeration, and Air-Conditioning Engineers**

### **Mission**

To serve humanity by advancing the arts and sciences of heating, ventilating, air conditioning, refrigeration, and their related fields

### **Vision**

A healthy and sustainable built environment for all

### **ASHRAE Stance on a Master's Degree for P.E. Registration**

A master's degree has no advantage to engineers practicing in the HVAC design industry unless a master's is desired for advancement to management position. ASHRAE is resoundingly against this proposed change to the requirements for P.E. registration.

### **ASHRAE Report**

It is my great pleasure to share with you some updates that speak to the outstanding work of our more than 57,000 members worldwide who make up our great society and strive to fulfill our mission and support our Vision. Our society is led by our president, Daryl Boyce, P.Eng., whose theme for this society year is "Building for People and Performance. Achieving Operational Excellence."

### **ASHRAE Winter Conference**

In January of this year, ASHRAE held its 2020 Winter Conference and AHR Expo at the Hilton Orlando and the Orange County Convention Center in Orlando, Florida. The conference was attended by more than 2,700 attendees. ASHRAE celebrated its 125th anniversary with paper sessions chronicling the progress of key industries and the evolution of energy modeling. An updated edition of the society book, *Proclaiming the Truth*, was released at the conference in addition to a composite video highlighting ASHRAE's history, which debuted at the plenary session. The conference technical program consisted of 75 seminars, 25 conference paper sessions, six expo sessions presented at the convention center, two debates, two workshops, and one forum in eight tracks. Twenty-one professional development short courses and seminars were offered at the conference. Seven certification examinations were offered. The expo had participation by over 1,900 exhibitors occupying more than 506,000 square feet of exhibit space, with more than 300 companies exhibiting for the first time.

### **ASHRAE Announces its 2020–21 Slate of Officers and Directors**

ASHRAE announced its nominees for the 2020–21 slate of officers and directors during its 2020 ASHRAE Winter Conference in Orlando, Florida. ASHRAE members will vote on the nominees via electronic ballot in late April. Chuck Gulledge will serve as ASHRAE president for the 2020–21 society year.

### **ASHRAE Headquarters**

ASHRAE broke ground on a \$20 million, 66,600-square-foot renovation project for the development of its new world headquarters building in metro Atlanta, Georgia. The building has been designed and is being constructed with the intent of being net-zero energy efficient. Occupancy is planned for October 2020. This is the largest capital project in ASHRAE's history.

To date, over \$8 million has been raised in monetary and equipment donations in support of our headquarters goal. Swedish company NIBE has committed \$5 million to the project, in addition to critical equipment from two of its North American brands, ClimaCool and ClimateMaster.

"With the opportunity to create a new ASHRAE global headquarters building, we are living the real-world challenge of designing and building a great environment for our staff, volunteers, and industry visitors from around the world, that will operate effectively and not waste energy," said Society President Daryl Boyce at the recently held conference in Orlando.

Goals of the renovation project are to

- Upgrade an existing building to operate at a higher sustainability level—anticipating net-zero operation—which may be substantiated through available certification programs such as LEED, Green Globes, WELL Building or Living Building Challenge. For this effort, ASHRAE will work to reduce energy consumption to a level below 22 kbtu/sq. ft./year, with a limit of maximum daytime plug load to 0.5 W/sq. ft.
- Exceed ASHRAE standards, where possible and economically justifiable, by including ASHRAE Standards 90.1-2016, 62.1-2016, and 55-2017.
- Be a model for reducing the carbon and environmental impacts of business operations in a cost-effective and replicable way.

### **Government Outreach**

ASHRAE continues to have a strong government outreach program with more than 45 visits to local, state and federal legislators planned in the 2019–20 fiscal year. Meetings with government officials continue to grow.

- Society year 2018–19: 296 meetings
- Society year 2018–19: 174 member participants

### **ASHRAE Signed Memoranda of Understanding**

ASHRAE has strong global ties to our profession which is proven by our memoranda of understanding (MOU) with 59 organizations around the world. MOU agreements signed during society 2019–20 include the following:

- American Chemistry Council (ACC)
- APPA: Leadership in Educational Facilities (APPA)
- International Facility Management Association (IFMA)
- National Environmental Balancing Bureau (NEBB)
- National Institute of Standards and Technology—U.S. Department of Commerce (NIST)
- Smart Cities Council
- United Nations Environment Programme (UNEP)

### **ASHRAE Strategic Plan 2019–24**

ASHRAE has developed and released a new strategic plan to guide the society's work over the next five years. The new strategic plan outlines two initiative areas:

- Built environment of the future
  - Resilient buildings and communities
  - Indoor environmental quality
- Future of ASHRAE
  - Organizational streamlining
  - Improve chapter engagement, capacity, and support
- Action items highlighted in the plan include
  - Higher levels of member engagement, satisfaction and loyalty
  - Increased operational efficiency and market responsiveness
  - Demonstrated leadership in meeting societal needs through expanded research, application to practice, and strategic partnerships
  - Increased awareness of ASHRAE and use of its technical resources among priority stakeholders
  - Increased global adaptation of ASHRAE standards
  - Increased breadth in ASHRAE product offerings

### **ASHRAE Released Its Schedule for the Very Popular HVAC Design Training**

ASHRAE Learning Institute, provider of high-quality, authoritative and credible training backed by real world applications, announced the release its 2020 HVAC Design and Operations training schedule. Between March and June, this training will take place in six U. S. locations and as many as five locations internationally

### **ASHRAE Publications**

ASHRAE has recently released seven new or updated publications:

- *ANSI/ASHRAE/IES Standard 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings* (I-P Edition)
- *ANSI/ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality*
- *ANSI/ASHRAE Standard 62.2-2019, Ventilation and Acceptable Indoor Air Quality in Residential Buildings*
- *ASHRAE Guideline 0-2019, The Commissioning Process*
- High-Performance Buildings Simplified

- *Air-Conditioning System Design Manual*, 3rd ed.
- *Smart Grid Application Guide: Integrating Facilities with the Electric Grid*
- Soon to be released, the following publications
  - *Duct Systems Design Guide*
  - *ASHRAE Design Guide for Multifamily Residential Buildings*
  - *ASHRAE Design Guide for Tall, Supertall and Megatall Buildings Design Guide*, 2nd ed.

### **New and Improved eLearning Opportunities**

ASHRAE is in the process of updating its current eLearning opportunities. These courses are designed to permit students to learn at their own pace and schedule by offering entry level and advanced learning opportunities on-line. More than 90 courses are available. For the complete course catalog, visit [elearning.ashrae.org](http://elearning.ashrae.org)

### **ASHRAE Building EQ**

ASHRAE continues to improve on its building rating program, Building EQ. This program

- Provides a benchmarking, assessment and asset rating tool that performs both “In Operation” and “As Designed Ratings”
- Helps make bad buildings good and good buildings great
- Aligns with ASHRAE Standard 211 Level 1 Energy Audits
- Allows for consistent benchmarking and audit formats from a group of contractors

There are now more than 1,000 registered users and 657 projects active in the Building EQ portal.

### **ASHRAE Certification**

ASHRAE certification programs continue to grow, highlighted by the introduction of a digital badging program. ASHRAE will partner with CIBSE (the UK’s Chartered Institute of Building Services Engineers) to run the technical symposium “Engineering Buildings, Systems and Environments for Effective Operations,” to be held April 16–17 in Glasgow.

ASHRAE will partner with IBPSA to run the 2020 Building Performance Analysis Conference and Simbuild this August in Chicago.

### **ASHRAE 365 App**

In May 2018, ASHRAE launched a new app, providing year-round updates on all things ASHRAE. The app offers one-tap access to standards and guidelines, continuing education, industry jobs; fully integrated events section with information on ASHRAE conferences, CRCs, topical conferences, event calendars and virtual conferences; and quick access to all of ASHRAE’s social media platforms and many other features.

### **ASHRAE Introduces Tech Hour**

Tech Hour introduces the latest technical content presented by some of ASHRAE’s brightest minds. Tech Hour videos are one hour and conveniently available through the ASHRAE 365 app.

- Receive one professional development hour (PDH) within the first 30 days after each video’s publication
- Submit questions to each presenter and read viewer feedback
- New videos published quarterly
  - Tech Hour 1: Optimize Occupant Health, Building Energy Performance and Revenue through Indoor-Air Hydration
  - Tech Hour 2 coming February 25, 2020: Where Have All the Ethics Gone?

### **ASHRAE Region XIV/European Office**

In early November, ASHRAE and UN Environment Programme announced the selection of five projects for the 2019 Lower Global Warming Potential Refrigeration and Air Conditioning Innovation Award. The award promotes innovative design, research and practice by recognizing people who have developed or implemented innovative technological concepts applied in developing countries to minimize global warming potential (GWP) through refrigeration and air-conditioning management.

### **ASHRAE Celebrates Incorporation of IEQ-GA**

ASHRAE announced the incorporation of the Indoor Environmental Quality Global Alliance (IEQ-GA) as a legal entity. The mission of the IEQ-GA is to promote and advocate for acceptable indoor environmental quality (thermal environment, air quality, lighting and acoustics) for building occupants globally, while ensuring the knowledge from IEQ research is implemented in practice. The creation of IEQ-GA was the result of a

presidential initiative of Bill Bahnfleth, 2013–14 ASHRAE presidential member and current IEQ-GA vice president, based on the report of a presidential ad hoc committee chaired by Bjarne Olesen, 2017–18 ASHRAE presidential member and current ASHRAE IEQ-GA alternate director.

### **New ASHRAE Chapters**

ASHRAE has added two new chapters and two new sections at its 2020 Winter Conference.

- Oman chapter
- Libya chapter
- Vietnam section
- Ghana section

Additional chapters and sections added in 2019

- Brazil chapter
- Israel chapter
- East India chapter
- Rajasthan chapter
- Chandigarh chapter
- Abuja section

ASHRAE has a total of 197 chapters and 38 sections.

### **ASHRAE Student Members**

- ASHRAE added 17 new student branches at in the fall of 2019, for a total of 433 student branches.
- A total of 26 new student branches have been added so far during the 2019–20 society year.
- Of the 26 new student branches added, seven new student branches were added in India.

### **ASHRAE Announces 2019–20 Society Scholarship Recipients**

ASHRAE has announced the recipients of 33 Society scholarships, totaling \$166,000, for the 2019–20 academic year.

ASHRAE had a presence at the following conferences:

- International Congress of Refrigeration 2019: August 24–30, 2019—Montréal, Québec, Canada
- 2019 ASHRAE Building Performance Analysis Conference: September 25–27, 2019—Denver, Colorado
- 7th International Conference on Energy Research and Development: November 19–21, 2019—State of Kuwait
- Greenbuild International Conference and Expo: November 20–22, 2019—Atlanta, Georgia
- 2019 Building XIV International Conference: December 9–12, 2019—Clearwater, Florida
- 2020 ASHRAE Winter Conference and AHR Expo: February 1–5, 2020, Orlando, Florida
- RESNET: February 24–25, 2020—Scottsdale, Arizona
- ACREX India: February 27–29, 2020—Noida, Delhi, India

## **American Society of Mechanical Engineers**

### **ASME Membership Profile**

ASME currently has 100,000 members, including 28,000 student members. Approximately 33 percent of nonstudent members in the United States hold P.E. licensure in one or more states. An additional 14 percent have passed the FE exam. An analysis of membership data shows that members with a P.E. license or who had passed the F.E. exam renew their ASME membership at a higher rate (94 percent) than non-P.E.s and F.E.s (80 percent). The average tenure of membership for those with a P.E. license or who have passed the F.E. is 12 years longer than the average ASME member.

### **Conferences That Are Venues for Licensure Discussions**

- International Mechanical Engineering Education Leadership Summit: April 16–18, 2020, San Juan, Puerto Rico
- ASME Annual Meeting: June 12–16, 2020, Boston, Massachusetts
- International Mechanical Engineering Congress and Exposition (IMECE): November 14–19, 2020, Portland, Oregon
- ASME Student Conferences, known as “EFests”: April 3–5, 2020, E. Lansing, Michigan, and April 24–26, 2020, Perry, Georgia. Over 1,000 students attend each of the EFests and we urge NCEES to consider exhibiting at these events.

### **Vision 2030 Project Survey**

From the ASME Vision 2030 project survey involving over 2,500 experienced mechanical engineers and engineering managers in practice in the United States:

- 51 percent of the respondents were licensed professional engineers
- 79 percent did not agree that increasing the educational requirements from a bachelor's degree to a master's or equivalent requirement for professional engineer registration was needed. (57 percent did not agree, and another 22 percent were unsure.)
- The study brought out a perception gap relative to where entry-level mechanical engineers meet, exceed, and fall short of meeting the needs of industry practice among surveyed industry managers, young engineers in industry and university mechanical engineering department heads for Vision 2030.

The following four high-level recommendations have officially become part of the ASME Engineering Education advocacy strategy:

- Richer practice-based engineering experience for students
  - Increase student exposure to practicing engineers and their experiences
  - Increase student design/build project experiences in all four years of their degree program
- New balance of faculty research/practice skills within a program
  - Increase the employment of full-time "Professor of Practice" positions for professors with significant industry experience.
  - Increase legacy faculty expertise in professional practice
- Greater innovation and creativity
  - Increasing active, discovery-based learning, teaming, open-ended problems and problem formulation
  - Collaboration and Innovation as a fundamental tenet of an engineering education
- Increased curricular flexibility
  - More technical electives and areas of concentration within ME undergraduate programs
  - The growing availability of professional master's degrees, as oppose to thesis-based, research-oriented master's degrees provides increased flexibility for those who elect to pursue a graduate degree.

### **Licensing That Works (LTW) Coalition**

As reported at POLC meetings annually since 2008, ASME and several other professional societies remain unconvinced that a master's degree or equivalent as the minimum education requirement for a P.E. license is a remedy to any current or projected public safety concern or is in the best interests of either the public or the profession.

The ASME board of governors has issued a policy statement that describes the ASME position. That position has been formally endorsed by the following organizations:

- American Institute of Chemical Engineers (AIChE)
- American Society of Agricultural and Biological Engineers (ASABE)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- American Society of Plumbing Engineers (ASPE)
- Illuminating Engineering Society (IES)
- Institute of Industrial and Systems Engineers (IISE)
- International Society of Automation (ISA)
- Society for Mining, Metallurgy and Exploration Inc. (SME)
- Society of Naval Architects and Marine Engineers (SNAME)
- The Minerals, Metals and Materials Society (TMS).

In addition, The ASEE Engineering Deans Council's Executive Board endorsed the position statement; and the IEEE-USA and the American Council of Engineering Companies have taken similar positions against the master's or equivalent requirement.

LTW was formed to support this position and has been active for more than 12 years.

### LTW Response to Master's-or-Equivalent Inclusion Efforts

The LTW Coalition is prepared to address the master's-or-equivalent issue jurisdiction-by-jurisdiction if it comes before individual legislatures and/or licensing boards, as was done in February 2015 in Vermont and in February 2008 in Nebraska. In both cases, the LTW team prevailed.

The coalition mobilized a response in New Jersey when it learned of efforts to require a master's degree for all disciplines as the education requirement for licensure. Additional information can be found at the LTW website (LicensingThatWorks.org).

It is unlikely that the New Jersey State Board of Professional Engineers and Land Surveyors will endorse this legislation. Its records state, "At the current time the Board was of the general opinion it does not support the need to increase the education requirement for licensure as a professional engineer. The Board has not observed a significant volume of complaints filed against licensees based upon a lack of competency in their academic training. Thus, it does not appear that the consumers in the State of New Jersey are being harmed or damaged as a result of its current education law set forth in N.J.S.A. 45:8-35."

#### LTW Analysis of Apparent B.S. Credit Decline

In contrast to a depiction of B.S. credit hours linearly declining through 2025, an analysis of the change in credit hours between the 1950s and 2010s on the LTW site shows that the linear extrapolation of the decline in credit hours to the year 2025 shown in one organization's website is misleading. The LTW analysis shows that the technical content of the bachelor's degree now is about equal to or greater than the technical content of the bachelor's degree 60 years ago. Most of the decrease in credits is a result of the removal of physical education, ROTC, and basic math and science courses that are now taught in high schools. The extrapolation to 2025 is not supported because the average number of degree credit hours has been constant for several years.

There has been and will likely continue to be an exploding body of engineering knowledge. This has been and will continue to be addressed through curriculum changes and modernization of pedagogical technology through the efforts of the technical societies working cooperatively with EAC/ABET. The outcomes-based assessment of the content of engineering programs used to accredit engineering programs has resulted in better, more focused coursework

#### NCEES Position Statement (PS) 35

ASME opposes the content of PS 35, which outlines pathways for implementing master's or equivalent and the 2017 change that adds an overly stringent and logically flawed alternative to the formal education requirements for master's or equivalent defined previously by the model regulations. LTW believes that PS 35 should be rescinded completely or amended to read: "One of the goals of NCEES is to advance licensure standards for all professional engineers. Those standards describe the technical and professional competency needed to safeguard the health, safety, and welfare of the public. Those advanced standards are best addressed through the actions of relevant technical societies interacting with EAC/ABET to address and change educational outcomes for accrediting specific engineering programs. NCEES recognizes that future demands for increasing technical and professional skills for those in a specialist area of the engineering profession may result in the need for additional education beyond the bachelor's degree."

#### **Codes and Standards**

In keeping with the results of the ASME Vision 2030 survey, calling for richer practice-based engineering experience for students, eight teaching modules have been developed relating to the value and use of codes and standards. Four additional modules are being developed on additive manufacturing, computational simulation, piping design, and fluid flow measurement.

Faculty members have been field-testing the material that has been developed to enhance and revise it, as needed. After field testing, the modules will be made available to reach and assess impact on as many faculty and students as practical worldwide and to determine the next set of standards and courses for development. We will share these modules with the FE and PE exam writers so they may consider developing questions in this area.

While all of the modules have been successfully piloted by the respective faculty developers, the challenge is to provide enough material for a faculty member at another engineering school, who may have limited knowledge of industry standards development, to readily access and easily apply the module in their own course with minimal help. To address this situation, the ASME Standards Infusion Project Team agreed to have the following materials typically contained in each module:

- Instructor's guide with module learning objectives and outcomes, module format, suggested approach and preparation, class time required, student prerequisite material, and included materials
- ABET criteria for both ME and MET degree programs
- Lecture slides in MS PowerPoint format with notes
- Homework or exam problems with solutions

- ASME standards excerpts within ASME policy of lesser of 25 pages or 10 percent of standard
- Supplementary materials including other documents, drawings, or videos, as applicable

### **Continuing Education**

ASME Education Sector trained more than 5,000 participants in fiscal year 2019. ASME training complies with International Association for Continuing Education and Training (IACET) standards. Through IACET, ASME can offer CEUs that qualify under ANSI/IACET standards. There are over 200 different courses and over 120 eLearning courses.

### **Examinations**

- The NCEES FE Mechanical exam development committee has consistently prepared exams with high psychometric measures. Historically, the FE exam has had pass rates ranging from 77 percent–85 percent for first-time takers. A total of 11,808 individuals took the exam last year.
- A total of 4,590 individuals took one of the three mechanical PE exams. The pass rates for the exams for first-time takers ranged from 68 percent to 75 percent and for repeat takers, 36 percent to 43 percent.
- The PE Mechanical exam committee transitioned the exam to CBT starting in April 2020.
- We have been working with our standards and certification staff to allow more excerpts from ASME standards to be included in the reference documents for both the FE and PE exams, including the PE Metallurgical and Materials exam.

### **Committee Assignments**

- ASME Past President Bob Sims and Dave Soukup of the ASME staff are ASME’s representatives to the Engineering Change Lab.

### **K–12 STEM programs**

- ASME INSPIRE instructional modules are now used in 1,380 schools across the United States. Over the six years of its existence, it has reached over 325,000 middle and high school students.
- ASME provides 12 \$5,000 scholarships to graduating high school students who were involved in the FIRST Robotics Program for their freshman year in any mechanical engineering undergraduate program. Nominations must come from an ASME member or student member.

## **American Society for Photogrammetry and Remote Sensing**

### **ASPRS—Photogrammetric Licensure Updates**

- Since last year, no new licensing initiatives have been presented.
- Florida: Legislation has been introduced, HB 6073 (SB 1826), that would eliminate all education requirements to take the exam for Florida licensure. These bills propose the deregulation of surveyors. They would eliminate the degree requirement for surveyors, eliminate the education requirement for a surveyor intern, and reduce the continuing education requirement from 24 hours to 12 hours. These are active bills in the current 2020 legislative session. The Florida Surveying and Mapping Society opposes both of these bills and is closely monitoring these items.

### **ASPRS—Certifications**

- ASPRS certification program is fully accredited by the Council of Scientific and Engineering Specialty Boards (CESB).
- Both the CMS (Certified Mapping Scientist)—UAS certification and the CMS-Lidar are being reviewed by ASPRS in hopes of being submitted to the CESB for accreditation.
- Six of the current certifications are CESB accredited (professional and technologist level): Certified Photogrammetrist, Certified Mapping Scientist-Remote Sensing, Certified Mapping Scientist-GIS/LIS.
- Interest in the certification program continues to grow. The society processed more applications last year for Certified Photogrammetrists than in 2018. The LiDAR certification program (Certified Mapping Scientist and Certified Mapping Technologist) is close to matching the number of Certified Photogrammetrists with respect to new certifications.

### **ASPRS—General News**

- Conferences: The annual conference will be held in Washington, D.C. next month and is part of the GEO Week, which bring together MAPPS, ILMF, and ASPRS. Last year, the combined conference had over 1,600 attendees, 104 exhibitors (exhibit hall was sold out), and over 200 presentations/posters—as well as 14 workshops.

- The 21st annual Pecora Remote Sensing Symposium and the 38th International Symposium on Remote Sensing of the Environment was held in Baltimore, Maryland, this past fall from October 6–11, 2019. Pecora was established by the USGS and NASA in 1970 as a forum to foster the exchange of scientific information and results derived from applications of Earth-observing data and to discuss ideas, policies, and strategies concerning land remote sensing. There were over 400 presentations.
- ASPRS was an active participant of the Future of Surveying Forum through NCEES/NSPS.
  - 2019 update summary: At the 2019 annual meeting of NCEES, members of this forum (ASPRS, NSPS, North Carolina Board of Surveyors, Florida Board, Colonial States, and NCEES) determined the work of the forum was complete. Future marketing and promotional opportunities will move forward via funding provided by NCEES and NSPS, based in part from the work and recommendations from the Future of Surveying forum.
- New board of directors (March 2020): Dr. Tommy Jordan, past president; Jeff Lovin, president; and Jason Stoker, vice president.

### Threats to Licensure

The Professional Practice Division (PPD) of ASPRS maintains a list via maps on the PPD section of the ASPRS website. Both the professional work of photogrammetrists and surveyors continue to be under threat from unqualified UAV operators producing maps without the knowledge nor the expertise and most important, licensure, and qualifications to produce topographic surveys. Many of the UAV operators function in a commercial environment without even the proper and required FAA license.

### **ASPRS—General Notes**

- Organization promote/encourage licensure: ASPRS encourages licensure by promoting our certification program. Currently, five states—Florida, North Carolina, Oregon, South Carolina, and Virginia require photogrammetrists to be licensed as surveyors (practicing only in their field of expertise). In Florida, they are linked with land surveyors as “professional surveyor/mapper.” The rest are listed as “registered/professional photogrammetric surveyor” or “land surveyor—photogrammetrist” (VA).
- ASPRS maintains a database of certified professionals (active only) which is available on the website.
- At the past conference, ASPRS offered a workshop directly related to our certifications. These have also been available as online workshops.
- ASPRS offers webinars—Geobytes—for PDHs as well as accepting credits for industry webinars, conference attendance (ASPRS, state surveying and engineering conference, GIS conferences) as well as credits for active roles in the society such as a division director.
- The PPD of ASPRS deals specifically with licensure. Within PPD, there is the Photogrammetric Licensure Plan Committee, comprised of several past directors and certification/evaluation committee members who advise/review and monitor each process.
- ASPRS actively promotes the NCEES *Model Law* as a basis for licensure.

### **Council of Engineering and Scientific Specialty Boards**

CESB membership includes 16 member boards and two associate member organizations. These boards operate a total of 57 accredited programs.

### **Accreditation Activities**

The primary mission of CESB is to accredit certification programs operated by organizations serving the engineering profession and allied specialties. Accreditation assures the public and employers that certification programs are administered consistent with recognized credentialing practices. Accreditation of certification programs by CESB is a separate action from membership and is available to only member boards.

CESB accredits certification programs in four categories: licensed engineers, graduate engineers, scientific specialties related to engineering, and engineering technicians. Accreditation is granted for periods of two to five years maximum. The 57 accredited certification programs, according to their categories, consist of:

- Licensed engineers: 9
- Graduate engineers: 1
- Engineering-related specialties: 25
- Engineering technicians: 22

Certification programs and the accreditation thereof are totally separate from the licensure of professional engineers. Certification of professional engineers under a program accredited by the CESB is attestation to



specialty qualifications of the engineers in addition to professional licensure or registration. However, all CESB accredited certification programs for licensed engineers require professional licensure.

CESB remains the only organization offering certification program accreditation specifically tailored to the unique needs of engineering and engineering-related certification programs. Additionally, its operating philosophy—include and improve—continues to increase the quality of the certification programs of its member boards and certification in the professions.

CESB has a policy requiring annual reporting on all accredited programs. These reports are reviewed by the Accreditations Committee and help ensure that all programs remain in compliance with CESB's accreditation guidelines during the period that accreditation applies.

### **Member Services**

CESB updates CESB Members on organization activities and the credentialing industry through quarterly newsletters sent via email.

A Strategic Planning Development session for member boards will be held on March 17th before the official annual meeting to assist in developing a Strategic Plan to layout a pathway for the future of CESB.

CESB has a Certification Program Administrators Committee, organized and modeled on the NCEES Member Board Administrators Committee. The committee is intended to provide a forum for discussion, information and best practice sharing among program administrators. The committee meets the day before the annual meeting of the CESB board of directors. This year the theme of the exchange will be in relation to the update to the Strategic Plan and getting input from the program administrators.

### **Future Members**

Accreditation is voluntary. Therefore, not every organization is willing to subject its certification activities to independent evaluation. However, those that do find the process improves the quality of its operations and the value of their certification program(s). Once accreditation is achieved, it provides a valuable mark of distinction that separates accredited programs from their competitors in the marketplace.

### **Institute of Electrical and Electronics Engineers–USA**

IEEE–USA, an organizational unit of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) created in 1973, advances the public good and promotes the careers and public policy interests of the nearly 200,000 engineering, computing and allied professionals who are U.S. members of the IEEE. IEEE–USA continued its strong support for NCEES in 2019 by providing item writers and subject matter experts for the Fundamentals of Engineering (FE) and Principles and Practices of Engineering (PE) examination programs and volunteer leaders for related NCEES policy committees. Key events and developments of special interest to IEEE's U.S. members include the following:

### **NCEES Annual Meeting**

IEEE-USA President-elect James Conrad attended the 2019 NCEES Annual Meeting.

### **Participating Organizations Liaison Council (POLC)**

One member of the IEEE-USA Licensing and Registration Committee ("LRC") continues to attend the annual POLC meetings. Nikhil Bodhankar, P.E., L.C., LEED AP will represent IEEE–USA at the March 2020 POLC meeting.

The October 2019 EPE meeting was attended by Glenn Parker (LRC Chair) and January 2019 EPE meetings were attended by IEEE–USA LRC members Glenn Parker and Thad Welch. A 20 percent surge in FE exam examinees was reported in 2019.

### **Electrical and Computer Engineering (ECE) Committee**

The exam committee is being trained on the new software and are finalizing the reference material for publication and continue to write questions for the exams. The exam committee will appoint new officers in early 2020.

The ECE PE exams are working towards migration to computer-based testing (CBT). Projected launch dates are January 2021 for the Power module, which will be administered in linear-on-the-fly (LOFT) format, and April

2021 for the Computer and Electronics/Controls/Communications modules, which will be via a linear fixed form (LFF) format. Reference material for the Power module has already been supplied to the NCEES publications department, and corresponding material for the other two modules was submitted and published in 2019. Publishing of the supplied reference manuals in advance of CBT launch will allow the committee to begin receiving examinee feedback for at least the last two paper-and-pencil exam cycles before this document becomes the sole reference that an examinee will have access to under computer-based administration.

### **Software Engineering Professional Committee**

The final PE Software exam was administered in April 2019. NCEES has a process to develop rules and recommendations on how to bring back a defunct exam if there was sufficient interest to bring it back. NCEES inquired about the path forward for this committee. The LandR committee believes software engineering licensure is important and necessary for public safety therefore trying to pursue this issue is still worthwhile. After a long discussion, LandR Committee will maintain this subcommittee and continue to look for opportunities to resurrect the exam. For the current instant, LandR committee will try and point people in the direction of taking the computer PE exam in lieu of the software PE Exam.

### **Fundamentals of Engineering (FE) Committee**

The committee is in the middle of a PAKS. The FE Committee has been working on coming up with a new sample exam. It is scheduled for publication in 2020. The next specs will go into effect for those candidates that take the FE exam after July 1, 2020. The FE exam development committee had a cut-score meeting in August 2019 and regular writing meeting in August 2019 as well.

### **Position on Educational Requirements for Licensure**

IEEE–USA continues to oppose NCEES Position Statement 35, which promotes a future requirement that engineers complete additional engineering coursework beyond that of an accredited baccalaureate-degree educational program to become eligible for licensure. Our position is that ABET/EAC, with significant input from IEEE-USA, will continue to adapt its educational program accreditation criteria to meet the evolving needs for an electrical and computer engineering career path.

### **Education and Outreach Initiatives**

The IEEE–USA Licensing and Registration Committee continues to write and publish articles informing IEEE members and other interested professionals on current issues concerning licensure on an approximately bimonthly basis in the online publication <https://insight.ieeeusa.org/category/careers/licensure-registration/>. Following articles were posted in 2019:

- “How to prepare for the NCEES Exams,” by David C. Cotton, Jr., P.E., P.Eng., CEng, MIET 17 Jun 2019

### **IEEE–USA Position Statement: The Use of the Title “engineer”**

On November 22, 2019, the IEEE–USA board of directors adopted and issued the position statement on the use of the title “engineer.” The position statement can be found using the following link: <https://ieeusa.org/wp-content/uploads/2019/11/EngineerTitle1119.pdf>

### **IEEE–USA Position Statement: Educational Requirements for Engineering Licensure**

On November 22, 2019, the IEEE-USA board of directors approved and issued the position statement on educational requirements for engineering licensure. The position statement can be found using the following link: <https://ieeusa.org/wp-content/uploads/2019/11/LicensureEducation1119.pdf>

### **IEEE–USA Position Statement—Continued Professional Competence of IEEE’s U.S. Members**

On November 22, 2019, the IEEE-USA board of directors adopted and issued the position statement on continuing professional competency of IEEE’s U.S. members. The position statement can be found using the following link: <https://ieeusa.org/wp-content/uploads/2019/11/ProfessionalCompetence1119.pdf>

### **National Electrical Safety Code**

NCEES requested IEEE to allow the use of the National Electrical Safety Code as a reference material on exam, available only during the exam on computer to candidate, for no cost. The NESC is published exclusively by IEEE and updated every five years to keep the code up to date with changes in the industry and technology. NESC sets the ground rules and guidelines for practical safeguarding of utility workers and the public during the installation, operation, and maintenance of electric supply, communication lines and associated equipment. NCEES is still engaged in discussion with IEEE to support NCEES’ objective to provide the reference for exam candidates on their exam computer terminal—at no cost.

### **Next IEEE–USA LandR Committee meeting**

The IEEE–USA LandR committee meets in person two times every year. The next meeting is on June 18, 2020, in Greenville, South Carolina.

### **Institute of Industrial and Systems Engineers**

IISE is the world’s largest professional society dedicated solely to the support of the industrial and systems engineering profession and individuals involved with improving quality and productivity. Founded in 1948, IISE is an international, nonprofit association that provides leadership for the application, education, training, research, and development of industrial engineering. IEs figure out a better way to do things and work in an array of professional areas, including management, manufacturing, logistics, health systems, retail, service and ergonomics. They influence policy and implementation issues regarding topics such as sustainability, innovation and Six Sigma. And like the profession, IEs are rooted in the sciences of engineering, the analysis of systems, and the management of people.

The institute has roughly 13,000 members comprising students, practicing professionals, academics and retired members. Institute members come from over 71 countries throughout the world.

### **New Committee Leadership**

The PE examination development committee is chaired Joe Michels, Ph.D., P.E., C.P.L. Michels has served on the committee for 10 years and was the previous vice chair. The vice chair of the committee is Mimi Pabon, Ph.D., P.E., a committee member with 19 years of committee service. Michels is a former university dean and professor now in private supply chain management practice. Pabon is the dean of the graduate school at the Polytechnic University of Puerto Rico.

### **Committee Meetings**

The PE exam development committee has met twice in 2019, both times at NCEES headquarters in Clemson, South Carolina. The committee continued to work diligently on developing a computer-based PE reference manual for the PE Industrial Systems examination. After three years of development, V1.0 has been published for examination candidates to review for the October 2020 examination. As with other committees, this task is ongoing. The committee received laudatory comments from the NCEES publications staff on the quality and caliber of the initial reference manual V1.0. The committee’s intent is to continue to refine, enrich and enhance the manual in the upcoming year. The committee has had trouble in obtaining copyright permissions for some of the reference material needed to be included in the reference manual. As of January 2020, the committee is awaiting approval of permission for only one remaining document. The committee has worked over 14 months obtaining subject reference material copyright permissions.

### **CBT Transition**

The PE Industrial and Systems Engineering exam will be administered in the computer-based format in the October 2020 examination. NCEES desired to have a rich statistical base to analyze for the initial CBT examination. There is an 18-month lag (April 2019–October 2020) between subsequent administrations of the PE Industrial and Systems Engineering examination. This information has been disseminated to prospective candidates during the past year, using the IISE webinar, IISE magazine, and associated and various conferences attended by PE Industrial and Systems Engineering committee members. All state licensing boards were provided with this information. The committee understands approximately 10 candidates are signed up, as of January 2020, to take the ISE 2020 CBT examination. The goal of NCEES and the examination development committee is to have more than 125 candidates take the examination in October 2020.

### **PAKS Study**

A PAKS study was conducted during the 2017–18 timeframe. A PAKS review meeting was held at NCEES headquarters in June 2019 to review the results of the study. The study received over 240 valid responses, allowing for statistical significance of the survey results. The study response timeframe was left open for several months to attain adequate survey responses.

### **New Examination Specification**

A new PE Industrial and Systems Engineering examination specification resulted from the PAKS study. With the field of industrial and systems engineering changing rapidly, the existing examination specification was modified to address new changes in the discipline. However, no major significant changes were required to the

examination specification because of the PAKS survey results. The new examination specification will be released to state boards in May 2020.

### **Cut-Score Meeting**

With developing a new examination specification, a cut-score meeting was held at NCEES headquarters in February 2020 to establish a new cut score for the examinations using the newly developed examination specification. The meeting took two days and was attended by the requisite personnel identified by NCEES. Lots of discussion ensued regarding the new specification, however, all participants to the cut score meeting are excited to see how the new computer-based administration of the ISE examination performs in identifying the minimally competent licensing candidate.

### **Examination Committee Participation in Licensing Advocacy**

The IE/PE examination committee held a worldwide webinar, hosted by IISE and attended by approximately 104 individuals in October 2019 to address the value and benefits of professional engineering licensure. The increased interest in ISE engineers becoming licensed is strong. The webinar had participants practicing industrial engineers and students from throughout the United States, Canada, and Asia. One reason this increase in interest in licensure is that many millennial age individuals are very concerned about licenses and certificates as contrasted with degrees.

NCEES reported that the number of candidates taking and successfully passing the FE Industrial and Systems exam has grown about 8 percent per year, for the past three years. The examination committee uses this data as a “marker” for the future ISE professional engineering candidates. The committee’s expectation is that more candidates will attempt and complete the PE examination.

A five-day intensive IISE/PE review course for the PE examination is scheduled to be conducted by professional staff at IISE headquarters in July 2020. This course is part of the extensive training suite that IISE provides to engineers worldwide. This course can also be taken in an on-line digital format.

ISE committee members conducted and participated in a panel discussion on professional engineering licensure at the IISE annual conference held in May 2019. Five P.E.s were on a panel, attended by over 36 conference attendees. A similar panel discussion is currently underway for presentation at the 2020 IISE annual conference in New Orleans, Louisiana in late May 2020.

The December 2019 edition of the ISE magazine had a section addressing the benefits of becoming a licensed industrial engineer. This series resulted from several ISE committee members strong motivation and desire to advocate for professional engineering licensure. The ISE magazine published monthly by the society runs a column every other month on professional engineering licensure. This column is written by an examination development committee member and features professional engineers who have become licensed. These featured individuals cite the benefits to possessing a professional engineering license, the benefits that each licensee has achieved and why a nonlicensed candidate should strongly consider professional engineering licensure.

NCEES public affairs, with licensing committee support, developed a seven-minute You Tube video on the merits and rationale for professional engineering licensure. IISE student chapters have used the video to educate, enrich, enhance and motivate ISE students to pursue professional engineering licensure.

The IISE board of directors and the IE PE development committee has reviewed and discussed the master’s-or-equivalent proposal in the NCEES *Model Law* and does not support this measure. IISE feels that adding 30 upper division/graduate credits, as a requirement for sitting for the PE exam, will provide no greater safeguard for public safety, health, or welfare. The practical work experience gained by an engineer during the first four years of involvement in the industrial and systems field is more necessary than additional educational hours for successful completion of the exam and to assure competent practice for the professional engineer candidate in the industrial and systems engineering field of practice.

Examination committee members are active in advocacy of professional engineering licensure. Committee members serve on NSPE national committees, Future Cities National Finals Judge, MITRE scout engineers, DISCOVER E day participants, MATHCOUNTS volunteers and holding office in the Puget Sound chapter of IISE.

Joe Michels, Ph.D., P.E., C.P.L., the IISE and the IISE/PE development committee chair, is working with NSPE's Project Lead the Way to address the issues arising by some jurisdictions on increasing the number of credit hours a candidate must have attained in becoming a licensed professional engineer. IISE is one of several professional engineering societies contributing to NSPE to fight increased academic credit requirements to become a licensed professional engineer.

### **International Society of Automation**

ISA is the primary technical association for professionals involved with the automation, instrumentation and control fields of work. With over 30,000 members in over 80 countries of the world, ISA has five primary core interests of certification, training, standards, publishing and technical conferences. ISA was established in 1945 as the Instrument Society of America and changed the official name at its annual meeting in October of 2008.

ISA promotes and encourages professional engineer registration and license, by participating in the activities of the National Council of Examiners for Engineers and Surveyors (NCEES) and supporting the Control Systems (CS) professional engineer examination process. The volunteer leadership and professional staff provide funding, people, and efforts to enhance the value and need for the licensure of engineers working in process control and automation. To this end, ISA is active with the Examinations for Professional Engineers (EPE) Committee, POLC, state registration boards, and other professional societies. Also, ISA is a major supporter of National Engineers Week, both on a national level and at the local section level. This includes recognitions of outstanding engineers, local displays at schools, and assisting with other promotions.

One of the primary areas of interest is the maintenance and improvement of the PE Control Systems exam. The PE Control Systems exam committee conducts an annual meeting of practicing engineers to develop new exam items and review the testing procedure and results. The content of each exam is audited for quality purposes and has shown steady improvement over the past four years. The number of engineers taking the CSE PE exam has increased each year and continues to gain in popularity among automation professionals. The control systems professional engineer exam is one of the most popular of the Group 2 exams offered by NCEES based on the 2019 statistics, with 297 test takers and a 66 percent pass rate.

The most recent PAKS survey was performed in 2016 under the direction and guidance of the EPE Committee of NCEES. ISA provided the funds, personnel, and resources for the survey, which was conducted electronically in May and June of 2016. The results were used to establish a new exam specification for the test content and this specification was approved by the EPE Committee at the 2017 fall meeting in Atlanta. This specification is used to inform prospective examinees of the exam content and is now posted on the NCEES website. The new exam specification was incorporated into the ISA training materials and went into effect for the first time with the October 2019 exam administration.

The PE Control Systems exam committee conducted an item writing session in Clemson, South Carolina, on March 6–7, 2020, in preparation for the October 2020 administration. The plan calls for similar meetings with new members being enlisted to update the exam and maintain the quality of the final results. The Control Systems exam committee continues to work toward computer-based testing for the control systems professional engineer exam, with a current target date of 2022.

The Professional Development Department of ISA has developed and operates a certification effort for those in the automation field. This is the Certified Automation Professional, which has been accepted as the means to display the qualifications for someone in this area of work. The testing is available at any time during the year using computer-based testing techniques. ISA develops the exams, establishes the qualifications, evaluates the applications, provides training sessions, and awards the certificates. Also, a certification is offered to practicing technicians in the automation field and it is called the Certified Control System Technician. This is a computer-based test that is administered at various test centers located throughout the country.

ISA offers a broad range of continuing education courses to those in the automation and controls field. These classes are offered at the ISA headquarters in Research Triangle Park, NC, and in regional locations around the country. These training classes are complemented with a wealth of published books, reference materials and technical information exchanges. In addition, there has been an increase in the distance learning classes offered by the society, and this is expected to continue to increase in the future. The training and educational activity is conducted by a segment of ISA known as the ISA Training Institute.

The PE Control Systems exam is supported with various training and educational endeavors by ISA. A study guide has been developed, published, and has been updated to the 6th edition to provide information and practice problems for those preparing for the exam. This study guide is updated to reflect the new 2018 specification for the exam and was effective for the first time in 2019 as the new sixth edition. The Publications Department of ISA has several books that are designed to provide assistance to prospective registrants. In addition, the three-day Control Systems PE Exam Review Course was offered two times in 2019 with sites in North Carolina and Wisconsin.

Also, an instructor assisted online training class was developed in 2014 that consists of 20 one-hour pre-recorded sessions, which may be viewed by the participant at any time convenient to their schedule. Each offering is over a 12-week period and includes five teleconference sessions with the instructor and the participants. This is a major step in the distance learning initiative and the course was offered two times in 2019 with good reviews and excellent participation.

The training and education plans for 2020 essentially remain the same as 2019, with offerings of the three-day instructor led review class (North Carolina, Texas, and Wisconsin). The online, instructor assisted course is being offered two times in 2020, starting in April and June. This is a 12-week course with 5 call-in sessions for problem solving and discussions among the participants.

The ISA executive board has reviewed and discussed the master's-or-equivalent proposal that has now been removed from the NCEES *Model Law* and does not support this type of measure. ISA feels that the current educational requirement, combined with the continuing education requirement of professional development hours each year, will provide the necessary safeguard for public safety, health, and welfare. The practical work experience, gained by an engineer during the first four years of involvement in the control systems field, is more necessary than additional educational hours for successful completion of the exam and to assure competent practice for the professional engineer candidate in the control systems engineering field of practice. For that reason, ISA does not favor or encourage individuals to take the professional engineer exam until the four years of experience has been obtained.

## **Michigan Society of Professional Surveyors**

### **General**

This year, we celebrated our 79th annual convention of the Michigan Society of Professional Surveyors. Our annual meeting was held at the Radisson Plaza hotel in Kalamazoo.

The Association Management Resources (AMR) is in its third year as the MSPS' management group. It provides expertise to us on a daily basis and performs the multifarious tasks as needed.

### **Current Membership**

As of the end of December 2019, our current membership is as follows:

- Professional 441, down from 453 last year
- Sustaining 22, up from 20 last year
- Life 148, down from 160 last year
- Associate/affiliate 119, up from 92 last year
- Student 39, down from 59 last year
- Overall 769, down from 784 last year

### **Legislative Committee Highlights**

- Legislative Day was held in Lansing on April 17, 2019.
- January: New LARA (OLSR) Survey and Rezonumentation Rules took effect.
- February: Governor Whitmer restructured the Michigan Department of Environmental Quality (DEQ) into the Michigan Department of Environment, Great Lakes, and Energy (EGLE).
- New MDOT Director: Paul C. Ajegba, PE
- H-1 Substitute for HB4055 (2019) Land Division Act changes introduced.
- March: MSPS participates at LARA (BPL) PS Licensing Rules Committee Workgroup.
- LARA (OLSR) opens Land Division Act Rules and are under review.
- April: 25th AESLC Lobby Day. Key Topics: Certificate of Merit, Restoration of Historic Tax Credits, Transportation Funding, Water Infrastructure Funding. (see below for more on this topic)
- MSPS participates at LARA (BPL) PS Licensing Rules Committee Workgroup.
- June: Land Division Act amendment passed and signed by Governor (2019 PA 23).

- September: Land Division Act amendment (2019 PA 23) goes into effect.
- October: AESLC HB5169 (Certificate of Merit) introduced.
- November: LARA (BPL) Draft Rule Language for PS Licensing made publicly available.
- December: MSPS attends Public Hearing for LARA (BPL) Draft Rule Language for PS Licensing.
- January: Total # of PS's licensed to practice within Michigan: 800 (as of 1/3/2020). (800 includes non-resident MI PS license holders.)
- MSPS reviewing potential changes to PA132 (Certified Surveys).
- MSPS to attend public hearings in possible support of MARD against combining the positions of Register of Deeds with County Clerk for various counties around the state.

### **2022 Datum Committee**

- This committee has been spearheaded by Bob Burtch. He and the committee members have worked diligently this year to develop the parameters for state plane coordinate systems we would like for Michigan in connection with the proposed 2022 Datum.
- Bob has compiled information from other states and been in contact with NGS to help develop a system amenable to Michigan relative to a possible Low Distortion datum. There have also been meetings and contact with other Michigan stakeholders to make sure we are also addressing their concerns

### **Education and Outreach**

#### TRIG-STAR

- This year Michigan had 11 high schools participate in the competition, thanks to the 10 professional surveyors who brought the exam to their local school. In total, 343 students attempted the exam this year.
- TwiST
- The TwiST (Teaching with Spatial Technology) instructional workshop took place at Michigan Tech in Houghton on June 24-28 with ten teachers.

#### Reenactment Group

The MSPS Foundation has a Surveying Re-enactment Group that displays antique surveying instruments and equipment to educate and promote surveying to the public.

- State Historic Museum in Lansing—January
- Feast of Saint Clair in Port Huron - May 25 and 26 • Curwood Festival, Owosso - June 8 and 9
- Wood Shaving Days, Hartwick Pines - Grayling - July 20 and 21
- Rendezvous in the Sault, Sault Saint Marie - July 27 and 28

#### Career Quests

MSPS volunteers actively participated in the following events during 2019:

- Michigan Construction Career Days held in Howell on May 1-2
- Career Quest by Network Northwest at the Grand Traverse Civic Center in Traverse City on May 22, 2019
- MiCareer Quest Southwest—October 29-30 at Kalamazoo County Expo Center
- MiCareer Quest Southeast—November 9 at Suburban Collection Showplace, Novi A big thank you goes out to those persons who lent their time and expertise to reach out and explain the surveying profession to thousands of career minded school kids and their teachers. Be on the lookout for more of these events slated for 2020!

#### MSPS Foundation Scholarship Report

- Scholarship University 2019 Amount
- MSPS FSU \$2,000
- MSPS MTU \$2,000
- John Niederhauser Memorial FSU \$1,000
- Upper Peninsula Chapter MTU \$1,000
- SE Chapter MTU \$1,000
- SE Chapter FSU \$1,000
- Central Chapter FSU \$500
- Central Chapter MTU \$500
- Northern Chapter FSU \$500
- Northern Chapter MTU \$500
- Mid-Michigan Chapter FSU \$500
- West Central Chapter FSU \$500

- Saginaw Valley Chapter FSU \$500
- Southwestern Chapter FSU or MTU \$500

At the end of 2016, we started a drive to raise \$200,000. The scholarship funds are around \$130,000 as of January 2, 2020.

### **National Academy of Forensic Engineer**

NAFE was formed to identify and bring together professional engineers having qualifications and expertise as practicing forensic engineers to further their continuing education and promote high standards of professional ethics and excellence of practice. It seeks to improve the practice, elevate the standards, and advance the cause of forensic engineering. Full membership in the Academy is limited to Registered Professional Engineers who are also members of the National Society of Professional Engineers (NSPE). They must also be members in an acceptable grade of a recognized major technical engineering society. NAFE also offers Affiliate grades of membership to those who do not yet qualify for Member grade. NAFE is formally affiliated with NSPE, but is an independent organization incorporated in the State of Virginia.

The National Academy of Forensic Engineers and its members are committed to:

- Serving the public by advancing the ethical and professional practice of forensic engineering;
- Serving the jurisprudential system by certifying individuals having achieved expertise in forensic engineering;
- Serving Academy members and furthering the development of forensic engineers through education and the publication of peer-reviewed technical literature.

Among the programs and activities of NAFE include the following:

- Twice each year, NAFE members meet in different locations around the US for two full days of Forensic Engineering seminars. Fourteen hours of technical and professional continuing education credits are available, along with the opportunity to network with others in the field of forensic engineering.
- The 2020 NAFE Winter Conference was held at the San Diego Marriott La Jolla, San Diego, California on January 10-12, 2020 with a special focus on civil/structural, mechanical and marine engineering.
- The 2020 NAFE Summer Conference will be held at the Providence Hilton, Providence, Rhode Island July 31 - August 1, 2020 with a special focus on interactions with the jurisprudential system (depositions, trial practice/testimony, direct/cross examination techniques and strategies, etc.
- The 2021 NAFE Winter Conference will be held at the Hilton El Conquistador, Tucson, Arizona. Program focus will be announced in the near future.
- The 2021 NAFE Summer Conference location will be determined in the very near future. Potential locations include Chicago, Nashville, and Toronto.
- NAFE is accredited by the Council of Engineering and Scientific Specialty Boards (CESB). NAFE's Diplomate Forensic Engineer (DFE) certification program has been reaccredited by the CESB until the end of 2021.
- Since its establishment in 1982, NAFE has published the NAFE Journal, a compilation of papers presented by NAFE members of technical as well as professional issues relating forensic engineering practice. The NAFE Journal is available online by visiting [www.nafe.org](http://www.nafe.org).
- Most NAFE members are licensed as professional engineers in multiple jurisdictions in addition to their state of residence or employment. On occasion, some NAFE members are offered opportunities to conduct forensic investigations and testify in courts in jurisdictions in which they may not be currently licensed. Because of the unique role forensic engineers play within the nation's judicial system, NAFE advocates for enhanced comity/reciprocity flexibility for forensic engineers performing these functions.
- NAFE currently has the following position statement: It is the position of the National Academy of Forensic Engineers (NAFE) that the practice of forensic engineering constitutes the "practice of engineering" under state laws and regulations and that professional engineers performing forensic engineering services should fully comply with state engineering licensing laws and board rules and regulations.
- NAFE recently completed an extensive membership audit with the assistance of Mark Levin of B.A.I., Inc. As a result, NAFE is in the process of undertaking significant changes in the following areas:
  - New member recruitment
  - Intake/onboarding of new members
  - Member engagement
  - Retention
  - Marketing/Branding
  - Administration
  - Website coordination



For more information about NAFE membership, conferences, publications or other information, please visit [www.nafe.org](http://www.nafe.org).

## **National Council of Structural Engineering Associations**

### **Mission**

NCSEA advances the practice of structural engineering by representing and strengthening its member organizations.

### **Vision**

The National Council of Structural Engineers Associations will be recognized as the leading advocate for the practice of structural engineering.

NCSEA is the parent organization and coordinating council for 44 state structural engineering associations. The activities of these member organizations are coordinated and represented by NCSEA in activities such as building code development and simplification, continuing education, licensure, participation in the structural engineering emergency response program, and promotion of the structural engineering profession to students as well as the public-at-large.

NCSEA continues to actively:

- Provide practicing engineers access to the development and revision process for codes and standards
- Advocate positive changes in the build code development process
- Convey accurate information to the general public relative to structural engineering-related events
- Educate elected official about the importance of structural engineers in order to gain their support of legislation for S.E. licensure, Good Samaritan Acts, mandatory peer review and QBS
- Educate the media to encourage them to seek structural engineers for commentary on issues that pertain to structural engineering.
- Educate other design professionals about the role, value, and importance of structural engineers
- Develop publications to assist engineers with difficult or poorly understood areas of practice
- Advocate for structural engineering degree programs
- Provide meaningful, practical and convenient continuing education opportunities at reasonable prices
- Provide national support for pursuing structural engineer licensure on a state-by-state basis
- Pursue improvement in the level of competence and standard of practice of the structural engineering profession throughout the United States
- Work toward establishing a national Structural Engineering Emergency Response (SEER) network
- Publish *STRUCTURE*, the leading monthly publication for, by and about structural engineers and their practice
- Participate in ASCE's Professional Activities Committee to develop common goals for structural engineers.
- Participate in the development of revisions to the International Building Code (IBC), International Residential Code (IRC) and International Existing Building Code (IEBC)
- Provide online review/refresher courses, specifically designed for the NCEES Structural Engineering (SE) examination, twice a year.

### **NCSEA Licensure Committee**

The committee remains committed to tracking the latest licensure activities, setting meaningful goals, and empowering states to adopt consistent licensure laws that improve mobility. Currently there are 23 states with some form of structural licensure distinction and 13 that have an active SE licensure effort. The committee has set goals to understand the unique set of conditions and stakeholders in each state and to help others recognize the collective importance of holding structural engineers to a higher standard of practice.

In November of 2019, the committee met during the NCSEA Summit in Anaheim, California, where each represented state gave a comprehensive report on their progress. The annual meeting provided an excellent forum for the exchange of ideas which fostered many meaningful discussions about current licensure activities. Among the issues discussed was a common definition for significant Structures. These structures are generally viewed as those which pose a significant risk to the public due to their size, importance or complexity. NCSEA has been collaborating with ASCE's Structural Engineering Institute (SEI) to develop standards for Significant Structures based on risk categories recognized by the International Building Code and ASCE's published design criteria.

Other issues discussed at the summit included the following:

- Committee successes in 2019
- Positive trends in Structural Licensure
- Cooperative efforts with ASCE to recognize structural licensure

Momentum from the summit helped shape our priorities for 2020. Our first goal is to continue helping states who are pursuing structural licensure. The committee has deep knowledge in issues that relate to structural licensure and endeavors to share the objectives of structural licensure with all stakeholders, including outside organizations. Next, we are continuing to monitor ongoing opposition to licensure and legislative efforts that aim to weaken existing licensure regulations. Cooperation with ASCE, NSPE and the recently formed Joint Committee of Design Professionals is viewed as extremely important and the committee remains fully committed to remaining engaged in these issues. Finally, we encourage state organizations to become more active with local politicians. Improving our position in public forums requires effective communication with those outside of the engineering industry, and frequently this effort involves positive interaction with state lawmakers.

The next summit will be in Las Vegas, Nevada. The committee continues to work on meaningful articles that provide insightful points for anyone who wants to become a persuasive voice in their community. We will visit Member Organizations that are not pursuing S.E. licensure to discuss efforts moving forward and hope to pick up some new members along the way.

### **Structural Engineering Certification Board (SECB)**

SECB is an independent, national board certification program for structural engineers, originally established by NCSEA, but now operating as an autonomous body. SECB was established because

- Structural engineering is indeed a recognizable profession
- Competent practice of structural engineering is essential to protection of the public
- Generic engineering licensing laws adopted by some states that do not recognize structural engineering as a unique discipline fail to protect the public to fullest extent possible

Although the SECB licensing requirements reflect the NCEES Model Law Structural Engineer criteria, they also establish more rigorous goals for primary structural engineering education, continued structural practice and continuing professional development. They are intended eventually to serve as the basis for national uniformity in the qualifications required for S.E. licensure.

### **National Society of Professional Engineers**

NSPE recently adopted a three-year strategic plan based on the organization's four core values: ethics and accountability, qualifications, professional advancement, and unity. The cornerstone of the new strategic plan is an updated vision that reflects NSPE's commitment not only to the profession, but to the public its members serve:

A world where the public can be confident that engineering decisions affecting their lives are made by qualified and ethically accountable professionals. The four key focus areas of the plan—champion, guide, advance, and unite—provide the structure for meeting NSPE's vision. for all of the organization's activities in the coming years. NSPE's policy and advocacy efforts set ambitious goals for shaping public policy, increasing member engagement in advocacy, supporting and improving current licensing structures, and educating the public and policy makers on the vital role professional engineers have in protecting public health, safety and welfare. Key areas of NSPE focus are summarized below.

### **Champion (Protecting the P.E. License)**

Attacks against professional licensure continue at both the federal and state levels, taking many forms. These include legislation requiring review of all forms of licensure, with unreasonable evidentiary burdens to preserve the license from repeal; consumer choice legislation allowing unlicensed practice as long as the consumer is informed; right-to-earn-a-living legislation, allowing any individual to challenge any licensure regulation and recover litigation costs; and other approaches.

### **Old Threats**

NSPE continues working closely with its state societies to address new or recurring efforts to undermine the value of the PE license. The "consumer choice" bills that were prevalent in last year's legislative sessions continue to be an issue in this year's legislative sessions. The language allows any person to practice any

occupation he or she wishes, regardless of whether that person is licensed. It requires anyone unlicensed to disclose that fact; however, bills that have been introduced in various state legislatures allow for different types of disclosures, not all of which require consumer consent. NSPE and its alliance partners have begun referring to this as “consumer beware” legislation, as these bills offer no real protection to consumers. In states where this legislation has been introduced, NSPE collaborates with state societies and other organizations to ensure its defeat.

NSPE continues to see state legislative efforts to sunset licensing boards based on the assumption that market competition is sufficient to protect the public. While sunset provisions are not new, they have taken a dangerous turn in recent years, as think tanks like Institute for Justice have begun aggressively pushing the idea that market competition will weed out bad actors, thus protecting the public and eliminating the need for licensure. What this solution lacks, however, is preemptive protections. Market competition is a post hoc solution that only protects the public after the public has already been harmed. NSPE works closely with state societies when market competition bills are introduced, in an effort to eliminate those provisions.

Protecting the P.E. license is of the utmost importance, and NSPE is actively opposing these and similar threats to the P.E. license, especially those provisions that impact public health, safety, and welfare.

### **New Threats**

While protecting and strengthening the PE license is NSPE’s primary legislative focus, the organization keeps a watchful eye for non-licensure-related threats as well. As previously mentioned, NSPE has sought to strengthen qualifications-based selection and ensure inclusion of professional engineers in the development of emerging technologies and pushed back against EPA regulations that lessen the role of PEs.

The New Jersey society, in collaboration with NSPE national has been fighting a non-licensure related bill that poses significant privacy risks to all government contractors, including professional engineers. It is a tracking software bill that requires government contractors to install software on their work computers that logs every keystroke and takes a screen shot every three minutes. Dozens of similar bills were introduced across the country last year, and all were defeated—most due to strong public pushback. Thus far, New Jersey is the only state in which similar legislation has been re-introduced.

### **Guide—P.E.s in Emerging Technologies**

NSPE has been working on multiple fronts to promote and protect public safety in the development and implementation of emerging technologies. The society has taken action to give professional engineers a leading voice in ensuring that the same attention to safety and reliability that went into the nation’s built transportation infrastructure is incorporated into the implementation of emerging technologies.

NSPE is collaborating with Congress, the Department of Transportation (NHTSA), state DMVs, state societies, and national organizations to take a comprehensive and informed approach to testing, development, and deployment of emerging technologies, incorporating the key role of the licensed professional engineer on both the state and federal levels.

Last year, NSPE submitted comments to NHTSA regarding FMVSS exemption requests it received from General Motors and a company called Nuro, Inc. Both are developing autonomous vehicles and sought exemptions to requirements that—in their view—did not or should not apply to driverless vehicles. NHTSA recently granted exemptions to Nuro, and in its response, cited—among others—NSPE’s concerns over cybersecurity as its reasoning for establishing cybersecurity reporting and safety requirements as conditions for granting the exemptions.

NSPE’s Emerging Technology Task Force has developed a policy guide intended to help legislative and regulatory bodies begin thinking through the changes that must be made in order to adequately protect the public as industry competitors race to market autonomous, A.I., and related technologies. The guide was reviewed and approved by both NSPE’s Committee on Policy and Advocacy and the Board of Directors.

NSPE has been and will continue to be a leading advocate on the need to place the public health, safety, and welfare first, advocating for licensed professional engineers to play key roles in the development, testing, and safety certification of emerging technologies.

## **Advance**

### **Strengthening the License**

NSPE continues working to strengthen the PE license. Professional engineers in responsible charge of design/build projects provide a layer of protection to the public, using their unique technical expertise to flag potential issues and offer solutions. This is the conclusion that the National Transportation Safety Board came to, after consulting with NSPE during its investigation of the Merrick Valley, Massachusetts, gas pipeline explosion. NTSB's final report included recommendations that all 31 states identified as having public utility exemptions close that loophole and require natural gas project plans to be signed and sealed by a professional engineer.

Shortly after NTSB issued its final report, it went a step further and sent letters to the governors of those 31 states, requesting that action be taken, and that NTSB receive an update within 90 days. NSPE reached out separately to those state societies, offering to support their efforts to end the licensing exemption for natural gas pipelines. Since then, related legislation has been introduced in a handful of states, and NSPE continues to be in conversation with both NTSB and the state societies.

### **Improving Access to Licensure**

Included in NSPE's strategy to grow the profession is a commitment to improve access to professional licensing. NSPE has been actively working to find solutions to the challenge of license mobility, both domestically and internationally. As reported last year, NSPE received a copy of a letter sent from the Armed Forces to the National Governors Association, outlining concerns regarding license mobility for military families. During the ensuing year, NSPE tracked dozens of state bills aimed at addressing the mobility issue for military families. NSPE strongly supports efforts to make licensing easier for military family members when they move into a new state. Some of these bills, however, would weaken licensing regulations and put the public at risk. In those instances, NSPE has worked with state societies to strengthen legislation so that improved license mobility is achieved while still protecting public health, safety and welfare.

Similarly, there have been numerous legislative efforts at making it easier for people with criminal histories to obtain professional licenses. NSPE has supported these state-level efforts to ease restrictions while maintaining the authority of licensing boards to make those determinations on a case-by-case basis.

### **Unite (Collaborations)**

The concern regarding threats to professional licensure extends beyond NSPE, not only to other engineering associations, but also to other professional organizations. Because speaking with a unified voice increases our influence at both the state and federal levels, NSPE continues its involvement in coalitions.

At the national level, NSPE co-founded a coalition called the Alliance for Responsible Professional Licensing (ARPL). ARPL exists to promote a responsible, balanced approach to professional licensing, and to educate policymakers and the public on the importance of high standards, rigorous education, and extensive experience within highly complex, technical professions. The Alliance advocates for licensing practices within professions that deliver uniform qualifications, standards, safety, and consistency, while providing individuals with a clear career path and fair opportunities to pursue and maintain that career. Additionally, creating a national alliance ensures that highly technical licensed professions are speaking with a unified voice, driving a consistent, positive message, and ultimately, changing the narrative around professional licensure. The alliance has succeeded in getting Op-Eds and Letters to the Editor placed in several newspapers and has had positive introductory meetings with The Wall Street Journal, Bloomberg and Route Fifty. ARPL has also participated in several panel discussions where licensure is the primary topic.

NSPE remains very engaged in the Professional Certification Coalition, which comprises more than 100 member organizations. Founded by the Institute for Credentialing Excellence and the American Society of Association Executives and supported by a legal team from Pillsbury Winthrop Shaw Pittman LLP, the coalition actively engages with state legislatures and outside organizations that seek to undermine certification and licensure. Additionally, NSPE is a member of the Resilience Building Coalition, which studies industry best-practices for mitigating the effects of climate change via sustainable building practices. The coalition is comprised of over 50 organizations that represent nearly all aspects of the built environment, including, but not limited to, architects, landscape architects, plumbers, electrical workers, roofers, and ecologists.

NSPE also consistently collaborates with state societies, helping to promote and defend licensure. Recently, NSPE partnered with the Ohio society to develop presentation materials and leave behinds for a meeting with

the Buckeye Institute, a libertarian think tank that regularly attempts to eliminate licensure. NSPE also continues to work with the Georgia state society on a package of bills aimed at improving license mobility for military spouses. Government relations staff submitted a proposed amendment that ensures the Georgia Board has oversight of incoming licensees. In Virginia, NSPE national has worked with state staff on the passage of a bill that would eliminate the license exemption for “engineering services rendered in connection with gas pipeline facilities.” NSPE will continue working with state societies and others to protect the PE license

### **National Society of Professional Surveyors**

#### **Education Issues**

NSPS maintains a listing of schools throughout that country that provide degree programs in Land Surveying and Geomatics. We are also constantly monitoring these programs to provide support, where needed, to encourage the continuation of the program where threatened by budget cost.

NSPS recently submitted a letter of support for the surveying program at the University of Alaska Anchorage. The program supplies graduates who seek licensure, not only in Alaska where the demand is high, but also for other parts of the country. Even with such a strong presence, there was consideration regarding whether to continue the program. As of the last report we received the program will remain, but there was recommendation for a name change from Geomatics (Applied Science and Natural Science Commission—ANSAC accreditation from ABET) to Geospatial Engineering and pursue ABET accreditation in the ABET Engineering Accreditation Commission—EAC.

NSPS continues its annual student competition for surveying-related programs. Typically, 10–15 teams participate. In some instances, the competition is based on a project that each school performs, then prepares report for the competition. In other years, the competition is a head-to-head field and office exercise undertaken during the NSPS spring meetings. In 2020, the head-to-head competition will be held at the NGS Facility (formerly known as “Corbin”) near Fredericksburg, Virginia.

Our Certified Survey Technician (CST) program continues to be one of the most successful certification programs we offer. This is a four-level testing program NSPS offers to technicians, with either on field path or an office path. We are in the process of putting together a letter which will be sent to the appropriate DOT contact in each state, to encourage those departments to require the appropriate level of CST certification as demonstration of competence in hopes of growing the program even further.

#### **Licensing Issues**

NSPS continues to receive alerts from across the country related to proposed (or actual) action by state legislatures/officials to undermine, even eliminate, licensure requirements. Among the most egregious is an attempt in West Virginia to allow anyone to practice professional services as long as they inform clients that they are not licensed. No report on current status.

Arizona has recently passed legislation to grant a license to individuals who have moved into the State and are licensed in another jurisdiction. NSPS has also sent a letter in support of the Arizona Professional Land Surveyors Association who are concerned that proposed legislation that will dictate the make-up of the Professional Licensing Board will have at least one licensed land surveyor.

The licensing board in Kentucky has decided to drop the requirement to pass a state-specific exam in order to be licensed as a surveyor in the state. Surveying societies across the country have discussed concerns about the impact of this action.

#### **Specialty Licensing**

NSPS continues to monitor and participate in discussions on both the state and national levels regarding whether state licensing laws and procurement laws, as currently written, are appropriate for addressing the use of technological advancements for land data collection, processing, interpreting, and dissemination. This issue comes up repeatedly in legislation that is impacted by the use of geospatial data concerning whether there should be specialty categories in licensure (if licenses should be required at all) instead of the long-established overarching definitions. The topic is under discussion on many levels, including within NCEES where a group is discussing the concept of licensing divisions (categories).

A more recent discussion between NSPS directors concerns the possibility of universal licensing. The thought being you become licensed in a Colonial state, like New Hampshire, or a PLSS state like Montana, you could practice in any other state where you meet the requirements for licensure, such as education and experience.

### **Promotions**

An updated version of the Be A Surveyor ([www.beasurveyor.com](http://www.beasurveyor.com)) website can also be found under the Resources tab on the NSPS website. NSPS has agreed with the North Carolina Society of Surveyors Foundation to manage the site henceforth.

NSPS is the American distributor for the *Get Kids into Survey* posters created by Elaine Ball (UK). Four posters have been completed and are available. They include smart cities, forestry, civil engineering, and mining. Posters can be ordered through [www.getkidsintosurvey.com](http://www.getkidsintosurvey.com). Contact Trish Milburn ([trisha.milburn@nsps.us.com](mailto:trisha.milburn@nsps.us.com)) in the NSPS office with questions. This project has continued to grow with surveyors across the country utilizing them. A new crime scene poster will be coming soon.

NSPS once again attended the American School Counselors Association conference, our fourth year, which this year was held in Boston. We received many compliments on our booth space and the quality of the material we were handing out, which included Getting Kids into Surveying posters, information on Trig-Star and the CST programs—as well as related stickers, coloring sheets and associated bling for the conference attendees. A number of the attendees—and these were mostly guidance counselors—had not really thought of surveying as a suggested career path for their students, asked about the availability of jobs and how much can a surveyor make.

NSPS is working on programs aimed at a wide spectrum of individuals, from grade school to military veterans, through the Getting Kids into Surveying posters, our Trig-Star math competition and the Be a Surveyor.com website.

### **Outreach/Collaboration**

The NSPS radio hour has been discontinued and has been replaced with a podcast. The radio hour ran continuously from 2011 till early July of last year, and upon request for additional financial support from the station owner it was decided that NSPS could more effectively reach our constituents through social media outlets, the first of which featured interviews with our Vice Presidential candidates, there is an ongoing series featuring Curt Sumner and Gary Kent discussing and answering questions on ALTA/NSPS Land Title Surveys and a number of other topics concerning the surveying and mapping profession.

Last year, NSPS was asked to submit an amicus curiae brief on a court case, entitled *Crooks v. State of Louisiana*, involving Lake Catahoula in Louisiana. In reviewing the decision of the court, we felt this case could upend the survey system that is used by three-fourths of the country and needed to be addressed to avoid confusion by our members when making boundary decisions. Essentially this case boils down to the court ruling that a cartographic map prepared in 1817, which depicted Lake Catahoula with a distinct channel running through it, has more legal weight than the GLO map, based on actual field surveys, that does not. Our brief does not take a position on the mapping but rather that if the GLO map is in error, there are procedures for dealing with omitted lands. As of this date the case is still being litigated.

NSPS has agreed to an association partnership agreement with the Association of Unmanned Vehicle Systems International (AUVSI) to engage in mutually beneficial promotional exchanges and engage in mutually agreed upon lobbying efforts.

NSPS has entered into an agreement with the Association of Professional Pipeline Surveyors (APPS) regarding how the two organizations might work together to contribute to, and promote, the fledgling Pipeline Surveying Certification program recently established by APPS.

NSPS has entered into affiliation with the Pan American Association of Surveying and Topographic Professionals (APPT).

NSPS continues its quarterly meetings with the National Geodetic Survey (NGS) for discussions on collaboration and information on common interests; such as the 2022 datum change and how state legislation will need to be revised in some states to indicate compliance with the 2022 datum.

## **Society of Fire Protection Engineers**

SFPE thanks the dedicated staff at NCEES for all its hard work in supporting the PE Fire Protection exam and the fire protection engineering profession. Over the last year, SFPE completed the following activities that promoted licensure and the profession of fire protection engineering.

### **Industry Core Competencies**

Working with the core competencies for fire protection engineering is an ongoing effort for SFPE and our members. At the end of 2018, SFPE published the Recommended Minimum Technical Core Competencies for the Practice of Fire Protection Engineering. 2019 has been focused on awareness of this document and understanding how it can assist fire protection professionals in different regions of the world, especially with recognition of the profession and the roles of fire protection engineers. The initial areas of focus have been in locations that are just beginning to implement requirements to identify these roles and qualifications for competency of fire protection (or fire safety) engineers.

The competencies parallel the specification used for the examination for fire protection engineering within NCEES. The document divides fire protection engineering into four main categories of knowledge:

- Human behavior and evacuation
- Fire science
- Fire protection systems
- Fire protection analysis

The committee will soon be embarking to further define roles and specific knowledge needed for different functions of fire protection engineering.

The committee continues to work with many organizations to best understand how to collaborate and support improving the quality of fire protection engineering in order to strive for a fire safe world. This includes education, resources to understand the competencies, and credentialing.

### **Advocacy Efforts**

Advocacy is a continued effort for SFPE as the quality of fire protection engineering in the field is of high importance. Ensuring that qualified people are the ones practicing fire protection engineering correlates to quality products and designs for fire protection. This work involves many partner organizations and much vigilance.

Many presentations and articles that SFPE was involved in focused on this subject of competent fire protection engineers. As an example, at the SFPE Annual Conference in October, there was a panel presentation and discussion focusing on licensure that included NCEES and NSPE to help the membership better understand some of the threats to licensure, yet why it was so important. This session received high marks with attendees and the discussion continued following the conference.

In order to focus on areas beyond the United States where licensing is common, SFPE has been working with a Director in Europe to further conversations about incorporating qualifications for the practice of fire protection engineering within the European systems. Discussions are ongoing with CFPA, FEANI, and IFSS. In addition, this outreach will help local authorities to understand what is needed in order to be a fire protection engineering so that qualified people are the ones performing the work. Additional market research is being planned to understand the demand for microcredentials and credentials to improve the quality of fire protection engineering in the field.

### **Peer Review Guide**

SFPE is revising the Guidelines for Peer Review in the Fire Protection Design Process. It is expected that the new edition will be published in early 2020. The document aids professionals in the evaluation of the conceptual and technical soundness of a design by helping the stakeholders to establish and conduct a peer review. It discusses the scope of a peer review, many of the practical aspects, and the documentation needed. This is often a critical step where performance-based designs are used in fire protection.

### **Compensation Survey**

The SFPE conducted its 19th survey of fire protection professionals in Spring 2019. There were over 1100 respondents for the survey comprised of both members of the Society and nonmembers in 52 different

countries. On average, base salary results showed a 3 percent increase in the past year and a 7.9 percent increase since the last survey in 2016.

Some additional statistics from this report include the following:

- Average FPE starting salary: \$72,250
- 54 percent hold bachelor's degrees; 39 percent hold master's degrees
- 66 percent of U.S. respondents (employed full-time) have a P.E.

The next survey will be conducted in 2022.

### **Fire Protection PE Exam**

SFPE continues to promote the principles and practice of engineering (PE) exam in fire protection. In 2019, the society sponsored a web-based preparation course for the fire protection exam, as they have done for many years now. Approximately 120 students participated in this course, which was slightly higher as expected with the last pencil and paper administration of the exam. Additionally, in 2019, seven SFPE chapters sponsored PE Exam Problem writing sessions across the nation. With the new systems in place, these questions are gathered and brought to the committee that evaluates them and inputs them into the computer-based system.

Also, SFPE has been working with our volunteers to complete the supplied reference that will be needed for the computer-based test in 2020.

### **Higher Education Participation**

SFPE continues to remain active with higher education for fire protection engineering. They serve as part of the Industry Advisory Boards for Oklahoma State University and Eastern Kentucky University fire protection engineering technology programs. In addition, SFPE continues to work with ABET, and this year participated with the reaccreditation of the Oklahoma State University fire protection engineering technology program. The committee has put together model curricula for BS and MS degree programs in fire protection engineering as well as a model for a BS in fire protection engineering technology. They have been gathering information on universities that are offering courses in fire protection engineering or minors in the subject in order to better reach students and future professionals. There is a desire to increase the number of programs as fire protection engineers remain in demand in the industry.

In order to help the next generation learn about fire protection engineering and hopefully pursue the field, they are currently updating the career information web space and revising the handout material that gets used by members/universities in many regions. This will be completed in the third quarter of 2020

### **Structural Engineering Institute**

The following report is a summary of the licensing-related activities of the Structural Engineering Institute (SEI) for the year 2019–20. Chun Lau, P.E., S.E., F.SEI is the new chair of the SEI Professional Activities Committee (SEI-PAC) which is the committee tasked with furthering the mission of SEI related to licensing, regulatory issues, and professional development activities for individual structural engineers. Mr. Lau is a former a member of the Washington State Board of Professional Engineers and Surveyors and he continues as a consultant to that board. He is also on the NCEES Structural Examination Committee which is currently evaluating and planning the transition from a constructed-response exam to a computer-based exam with a target date of 2024.

### **Threats to Licensure**

SEI is still very concerned about the threats to licensure couched in efforts to deregulate occupations and improve the economy. The licensure of engineers including structural engineers is not an effort to regulate employment in the field so as to improve salaries for a few. The structural engineering license was originally created and continues to exist to protect the life, health and safety of the public. The requirements of education, experience and examination for licensure were formulated to prevent inadequately trained individuals from providing designs for the built environment as safe, when, in fact, they did not meet the standards of safety used by the engineering profession.

SEI is actively participating in the Structural Engineering Licensure Coalition (SELC) which consists of SEI along with the National Council of Structural Engineers Associations (NCSEA), the Coalition of American Structural Engineers (CASE) and the Structural Engineering Certification Board (SECB). SELC is finishing up its report on the Vision for the Future of Structural Engineering Licensing. One of several topics discussed in the



report will be the threat to licensure. This report will among other things investigate the adequacy and need for SE licensure as compared to other modes of credentialing; compare engineering licensure to other professions like doctors and accountants; investigate the methods of credentialing used in other parts of the world; and address trends in education, globalization, employment, etc. The report is expected to be released the second quarter of 2020.

#### **Additional Activities Related to SE Licensing**

SELC has developed a consensus document that defines “Significant Structures.” Several jurisdictions require that “Significant Structures” be designed by licensed structural engineers. While this definition varies from jurisdiction to jurisdiction, there are many similarities between the various definitions. This effort, which has taken several years to complete, was an attempt to distill and define what a “Significant Structure” is, so that other jurisdictions that may be considering adopting similar legislation will have a well-reasoned and widely accepted definition to use as a starting point.

The SEI Professional Activities Committee currently has several policy statements in progress. These statements (some of which relate to continuing professional development and the recommended composition of engineering licensing boards) are in various stages of development and review within SEI.

SEI has been one of the sponsors of the Structural Licensing Caucus which has become a well-attended event at the NCEES annual meetings. The 4th Annual Structural Licensing Caucus will be held on the morning of Wednesday, August 26th at the NCEES Annual Meeting at the Chicago Marriott Downtown Magnificent Mile.

#### **The Minerals, Metals and Materials Society**

In October 2019, The Principles and Practice of Engineering Metallurgical Materials PE exam performed well according to exam indicators. There were 67 exam takers.

TMS offered the fifth Metallurgical and Materials PE Exam Review Course in August 2019 in Pittsburgh, Pennsylvania. Eighteen people attended the course and five instructors collaborated to present the teachings in a three-and-a-half-day course. The course will most likely be offered again in 2020.

The Professional Registration Committee (exam development committee) continues to meet to write, review and perform other exam management functions. The committee met twice in 2019 in conjunction with the TMS Annual Meeting and Materials Science and Technology Conference 2019. Members also met at NCEES Clemson headquarters once in 2019. In addition to accomplishing the customary exam responsibilities, committee members dedicated a considerable amount of time to working on the supplied reference handbook that will be used by exam takers when the exam moves to a computer-based format in October 2022.

The TMS Professional Registration Committee continues its support of the Licensing That Works Coalition of engineering societies that opposes increasing the educational requirements for Professional Engineering licensure beyond a four-year ABET-EAC accredited bachelor’s degree. The TMS Professional Registration Committee supports maintaining the current four-year degree requirement.

TMS continued its collaboration with four professional societies, Association for Iron and Steel (AIST), The American Ceramic Society (ACerS), ASM International, and NACE, the Corrosion Society, at the Materials Science and Technology 2019 Conference (MSandT’19) held in October in Portland, Oregon.

The Accreditation Committee continues as the lead ABET member society in the accreditation of university metallurgical and materials engineering programs. The committee assigned program evaluators to 22 university programs in fall 2019.

#### **NCEES Activity Update**

##### **CEO Report**

CEO Cox provided the following comments about NCEES and how it is addressing threats to public protection.

As you are aware, NCEES is made up of the licensing boards that regulate the engineering and surveying professions in the United States. Since its founding in 1920, NCEES has been committed to advancing licensure for engineers and surveyors in order to safeguard the health, safety, and welfare of the public.

Each of you has a copy of our 2019 annual report, which highlights our activities for the past year. You also have a copy of *Squared*, the official NCEES source for engineering and surveying licensure statistics. This issue features data from the 2018–19 fiscal year, including the number of U.S. licensees and the pass rates and volumes for NCEES exams.

#### Alliance for Responsible Professional Licensing (ARPL)

NCEES is one of the founding members of ARPL, which launched in July 2019. ARPL is a coalition of national associations that represent highly complex, technical professions and their national licensing boards. It was created to ensure that a unified voice for the advanced professions is heard around the appropriate level of licensure for professions and occupations. Lawmakers around the country are taking steps to weaken or even eliminate occupational licensing laws. While these laws may not intentionally target the professions of engineering and surveying, we are at risk of being swept up in overly broad legislation. ARPL members include NCEES, NSPE, ASCE, and our counterparts in the professions of architecture, accountancy, landscape architecture.

ARPL's overarching goal is to educate policymakers and the public on the importance of—and the need to maintain—clear, responsible licensing standards within our professions. Specifically, ARPL is driving a coordinated, national communications and engagement strategy to

- Inject our perspective into media coverage concerning the issue,
- Ensure the advanced professions are at the table in forums where the issue is being discussed,
- Provide messages, tools, and materials to help individual state organizations and complement their own activities on the issue, and
- Connect state stakeholders and state-level boards and chapters

ARPL is engaging on two levels:

- First, it serves a central communications committee, providing template support materials and communications tips and tools available for use by anyone. These resources are available on the ARPL website, [ResponsibleLicensing.org](http://ResponsibleLicensing.org).
- Additionally, in priority states, ARPL is coordinating with state partners to offer an amplified presence through media outreach, paid advertising, and other communications tools as needed.

#### Threats to Public Protection

NCEES' support of ARPL is a major step to combat the increasing threat to public protection through the weakening or elimination of licensing laws. With our mission to advance licensure for engineers and surveyors, this issue is a concern for NCEES and its member boards.

Today, about 30 percent of U.S. workers are required to be licensed. A major problem with the public perception of occupational licensure is that the licensed professions vary greatly. While many people agree that licensing doctors or engineers protects the public, they may be less sure about the benefits of licensing florists or tour guides. The growing public concern that, in some cases, licensing protects the occupation—rather than the public—has resulted in a growing threat to all public protections for licensed occupations and professions, including engineering and surveying.

Amid this debate, new research from ARPL shows that the vast majority of voters disagree with a broad-brush, one-size-fits-all approach to deregulating licensure. Last month, ARPL announced the results of a national survey. The results indicate widespread public support for maintaining rigorous professional licensing standards for professions that have a clear impact on public health, safety, and welfare.

Key findings from the survey include that

- 75 percent of voters believe that it is important to ensure qualifications for professionals in certain industries. A majority of voters believe that current professional licensing requirements protect the public and should not be reformed.
- 70 percent of voters believe that regulating professionals in accounting, engineering, architecture, landscape architecture, and related fields with high impact on public safety and welfare is important.
- 71 percent of voters believe that professional licensing should be required unless it can be proven that eliminating licensing will not have a negative impact on public health and safety. The public is wary of the alternative approach: requiring licensing only when it is proven necessary for health and safety.
- 67 percent of voters believe that consumers are best protected by a system that regulates education, examination, and experience standards—all of which are overseen by a professional licensing board.

These findings were announced as many state legislatures are considering broad proposals to overhaul or eliminate state licensing requirements in the current legislative session. As the recent “Consumer Beware” bill filed in the West Virginia legislature shows, the call for wholesale weakening of licensing requirements is alive and well in statehouses across the United States. Eliminating licensing has become a top priority of groups such as the conservative American Legislative Exchange Council, or ALEC, and the Koch-funded Americans for Prosperity. But studies such as the one conducted by ARPL clearly show that voters recognize that professional licensing is the best way to protect the public’s health, safety, and welfare and that they want it to remain rigorous.

To combat threats to public protection, NCEES member boards have been focusing on ensuring that their requirements and processes do not create unnecessary barriers to the professions of engineering and surveying. But education and communication about how licensure benefits society are also key, and NCEES is committed to helping boards with their education and advocacy efforts.

NCEES has curated a range of advocacy resources available through ARPL. This includes a central communications resource and the ARPL Advocacy Toolkit. These online resources were designed to help promote professional licensure. They include tools and guidance on how to use them. Boards can access a range of communications materials, including sample letters to the editor, social media posts, talking points and handouts for communicating with lawmakers, as well as videos promoting professional licensure and the important role of licensing boards. The Advocacy Resources section of the NCEES website also allows boards to track the status of proposed legislation and regulations that could impact professional licensure across the United States and its territories.

Looking ahead, ARPL is planning additional research. The first will be a follow-up to the survey on public support for licensure and public protection. Another will focus on the economic impact of professional licensure. Other groups regularly opine that licensure has a negative economic impact and costs the economy jobs. ARPL wants to develop a plan and fund impartial third-party research on this topic.

As lawmakers debate the extent of licensing needed, or if it is needed at all, NCEES will continue to work with our partners at ARPL to ensure that the public’s health, safety, and welfare is considered.

After CEO Cox spoke, NCEES President Ringle addressed the group. He then asked COO McDowell to provide updates on NCEES exams.

### **NCEES Exam Updates**

#### Computer-Based Testing (CBT) Update

The move to CBT for our licensing exams continues to be a major initiative for NCEES. The Fundamentals of Engineering (FE) and Fundamentals of Surveying (FS) exams moved to CBT in 2014, and the Principles and Practice of Surveying (PS) followed in 2016.

NCEES now offers nine Principles and Practice of Engineering (PE) exams via CBT. Five of these exams—PE Chemical, PE Environmental, and three PE Mechanical disciplines—as well as the FE, FS, and PS exams, are offered year-round at Pearson VUE test centers. The other four—PE Nuclear, PE Petroleum, PE Fire Protection, and PE Industrial and Systems exams—are single-day exams. These four are smaller-volume exams that are offered at Pearson VUE test centers one day each year.

The conversion schedule for the remaining PE exams is posted on the NCEES website at [ncees.org/cbt](https://www.ncees.org/cbt).

#### Other Exam Updates

In addition to focusing on the CBT transition over the past year, NCEES conducted professional activities and knowledge studies (PAKS) for several exams to keep them relevant to current professional practice. These studies are used to update exam specifications. NCEES updated specifications for the PE Control Systems exam in October 2019 and for the PE Chemical exam in January 2020. We will introduce updated specs for the FE and FS exams in July 2020 and for the PE Industrial and Systems exam in October 2020.

## **NCEES President Report**

President Ringle then provided the following updates.

### NCEES Committee/Task Forces Updates

NCEES has 12 standing committees and one task force addressing a range of issues this year.

The Committee on Examinations for Professional Surveyors is working on an initiative to restructure the PS exam. At the 2019 annual meeting, delegates voted to restructure the PS exam into the following separately scored divisions:

- Core PS
- Boundary
- Public Land Survey System
- Mapping science
- Incidental drainage design

This year, the Committee on Examinations for Professional Surveyors is developing and beginning to implement a plan to restructure the PS exam to accommodate these five divisions. The committee is currently getting input from our psychometric consultant and seeking information from member boards on which divisions would be used in their respective states to license a professional surveyor.

This is an ongoing initiative to ensure that our exams continue to meet the needs of surveying licensure.

In other committee news, the Committee on Member Board Administrators is working with NCEES staff to develop a communications plan and long-term strategy to promote actions to increase licensure mobility and reduce barriers to licensure. As we celebrate our centennial this year, NCEES remains committed to the fostering cooperation among member boards and facilitating mobility.

The full reports of NCEES committees and task forces will be published this summer in the *NCEES Action Items and Conference Reports*.

### Engineering/Surveying Awards

NCEES outreach initiatives are an important part of the organization's efforts to promote licensure. Two of these outreach initiatives are our engineering and surveying education awards.

The Engineering Education Award recognizes engineering programs that encourage collaboration between college students and professional engineers. Since 2009, NCEES has awarded more than \$750,000 in prize money to engineering programs across the United States. The University of Nebraska—Lincoln's school of architectural engineering and construction won the \$25,000 grand prize for 2019, and seven other winners received \$10,000 awards.

NCEES has offered the Surveying Education Award since 2016. This award recognizes surveying and geomatics programs that best reflect the NCEES mission to advance licensure for surveyors in order to safeguard the health, safety, and welfare of the public. New Mexico State University's geomatics and surveying engineering program received the \$25,000 grand prize for 2019. Three additional programs received \$15,000 awards, and three received \$10,000 awards to assist with their efforts to promote surveying licensure.

### Public Outreach Task Force

Promoting licensure's value and its benefits to public protection remains a strategic initiative of NCEES. The Public Outreach Task Force is continuing its work this year to address issues related to promoting licensure. The group is developing a communication plan to inform member boards about the outreach activities that NCEES staff are participating in and to inform them of outreach resources available through NCEES. It is also developing a plan for getting member boards involved in outreach activities within their own jurisdictions.

Advancing licensure for engineers and surveyors is our mission, and effective communication is key to this effort. Through this task force, we want to develop ways to communicate better and provide NCEES member boards the tools to do so.

### NCEES Board's Leadership Visit Project

Increasing effective participation of members and member boards to improve national engagement is another important strategic initiative for NCEES. To this end, NCEES launched a board visitation program in September 2016. The board of directors extended invitations to all member boards to have a member of NCEES leadership or senior staff attend a member board meeting at no cost to the board. The goal is to improve communication, increase awareness of the range of services and leadership opportunities within the organization, and address questions. Since the program started, members of the board of directors, the chief executive officer, and the chief operating officer have completed 62 visits to boards across the country. The program is continuing in 2020, with a number of board visits already scheduled.

### Exam Volunteers

NCEES depends on our volunteers to fulfill our mission of advancing licensure for engineers and surveyors. Developing and maintaining our exams require the work of more than a thousand licensed professionals who volunteer their time and expertise. We need a cross-section of professionals in terms of geography, years of experience, and practice areas. One demographic that we could especially use more participation from is young professionals—those who have been licensed less than five years. I ask you to encourage the young professionals in your organization to help us with this important work. It's a unique opportunity to strengthen their profession while meeting colleagues from a variety of professional backgrounds and earning professional development hours. It's really simple to volunteer. Just click on the Volunteering link at the bottom left of our homepage, [ncees.org](http://ncees.org). Exams are at the heart of our work at NCEES, and we need your members to keep our exam development program strong.

### **NCEES President-Elect Report**

NCEES President-Elect Knotts, provided the following report.

### Anticipated Directions for NCEES

I am very happy to be here and pleased to see so many organizations represented here today. As you heard, NCEES will celebrate our 100th anniversary this year at our annual meeting in August. We first offered national exams starting with the FE exam in 1965 and the PE exam in 1966. Since that time, our licensure model has remained fairly consistent. I plan to take the occasion of our 100th anniversary to form a task force to revisit our licensure model to determine if it remains the best it can be or whether we should perhaps consider changes, as our professions have evolved. Other professions' licensure models have adapted and are more encompassing with different levels of authority by associated groups. The medical profession comes to mind with its M.D., P.A., and R.N. licenses—basically all team members are represented in the licensure model. I will charge this task force with exploring all options as it carries out its evaluation to ensure that NCEES is well positioned to move forward into its second century.

NCEES includes the professions of engineering and surveying. Because of this, the emerging disciplines that Patty Mamola and Lance Kinney discussed at the beginning of this affect us on two fronts. I will charge one of our existing committees to review the issue of emerging disciplines to ensure that we capture activities that should be licensed to protect the public. Hopefully, this will be a recurring charge by presidents after me to always keep NCEES current with the ever-changing professional/technical landscape.

Public protection and advancement of licensure for engineers and surveyors got NCES through its first hundred years. We must continue that mission with agility to get to the next 100 years.

### **Conclusion**

With no new business to be brought before the group, President Ringle thanked all attendees for their participation. The next POLC meeting will be held March 5, 2021, in Greenville, South Carolina, at the new NCEES headquarters building.

## **APPENDIX**

### **PRESENTATION: LICENSING EMERGING DISCIPLINES**

*Texas Board Executive Director Lance Kinney, Ph.D., P.E.*

*Nevada Board Executive Director and NCEES Past President Patty Mamola, P.E.*

#### **What are we here to talk about?**

- How to license new and emerging disciplines of engineering
- To do so, we need to do more than look at process.
- We need to look at this from a more foundational perspective.
- The future of engineering and regulation
  - What does “new” or “emerging” discipline of engineering even mean?
  - What is ENGINEERING in the context of technology and rapid technology changes?
  - What is the purpose of regulation?
- What is the “right” way to do regulation?

#### **What are we NOT here to talk about?**

- Not here to prescribe a specific process to add a new engineering discipline to the current NCEES model
  - That exists. We have one already.
  - Does it work? Not necessarily.
  - We WILL talk about that...

#### **What are we here to talk about?**

- Change
  - It is happening in education.
  - It is happening in regulation/legislation.
  - It is happening in public opinion.
  - It is happening in technology.

#### **The Problem: Technology and Change**

- The world is experiencing an unprecedented and growing wave of change.
- Accelerating technological progress, rapidly evolving societal needs and expectations, and growing environmental imperatives all present significant, fundamental challenges and opportunities.
- Status quo of engineering is no longer an option.
- Engineers are stewards of technology, the natural and built environments, and the public health, safety, and welfare as an uncertain future unfolds.
- The time is now to drive the systemwide changes that will support the engineering community in execution of this vital role.

#### **Change: Technology and Engineering**

- What are some technology and engineering trends that will be coming in the next five years?
  - 20 years? 50 years?
- What are the things we see as normal today that could be completely gone or in retreat in the next 20 years?
- Education—We are teaching students for technology and jobs that don’t exist yet.

#### **Change: Perspectives**

- Real, transformational, revolutionary, disruptive change
- Be open to new thoughts.
- Ideas of others
- Regulatory blasphemy
- Change for the future, not for us in this room
- GOAL: How to best protect the health, safety, and welfare of the public in a changing world

#### **Changes in Technology**

- *The Fourth Industrial Revolution*—Klaus Schwab (2016)
- *Shaping the Fourth Industrial Revolution*—Schwab (2018)
- *The War on Normal People*—Andrew Yang (2018)
- World Economic Forum—[www.weforum.org](http://www.weforum.org)

## **Fourth Industrial Revolution**

- First
  - Mechanization
  - Water/steam power
- Second
  - Mass production
  - Electricity
- Third
  - Electronics
  - IT systems
  - Automation
- Fourth
  - Cyberphysical systems
  - AI
  - IoT
  - Big data
  - Networks

## **Engineering, Regulation, Licensure in Fourth Revolution**

- Digital native
- NCEES app

## **Fourth Industrial Revolution**

- *Agile Governance: Reimagining Policymaking in the Fourth Industrial Revolution* (April 2018)
  - [www.weforum.org/whitepapers/agile-governance-reimagining-policy-making-in-the-fourth-industrial-revolution](http://www.weforum.org/whitepapers/agile-governance-reimagining-policy-making-in-the-fourth-industrial-revolution)

## **Fourth Industrial Revolution [www.weforum.org](http://www.weforum.org)**

- Unprecedented advances in technology transforming the way individuals and groups across society live, work, and interact.
- New principles, protocols, rules, and policies are needed to accelerate the positive and inclusive impacts of these technologies, while minimizing or eliminating their negative consequences.
- The institutions that have traditionally had the responsibility of shaping the societal impacts of these technologies—including governments, companies, and civil society organizations—are struggling to keep up with the rapid change and exponential impact.
- There is an urgent need for a more agile approach to governing emerging technologies and the business models and social interaction structures they enable.

## **Regulation in Fourth Revolution**

- Who checks the systems?
- Do they have ethics?
- What happens if/when they fail?
- Do they need to be licensed? Regulated?
- By whom?
- And how?
- BIM
- AI
- Software that designs for you
  - Roadbotics, OPTICS
- Blockchain
- Autonomous Vehicles
- Smart Cities
- MEMS
- Mechatronics
- “Tech Giants' New Appeal to Governments: Please Regulate Us” *WSJ*—Jan 27, 2020
- “Top executives of big technology companies are presenting global policy makers with an unusual message from an industry once antagonistic to government intervention: Regulate us.”
- “There is no question in my mind that artificial intelligence needs to be regulated,” Alphabet CEO Sundar Pichai said in a policy speech. “The question is how best to approach this.”

## Questions

Guest Provocateur—Markus Weidner, chief innovation officer Pennoni

- What if engineers' role in the future looks more and more like technology solutions consulting and technology integration?
- What does this mean for the future of engineering licensure?

## Timeless Expectations

- The public relies on the professional judgment of engineers to keep them safe
- Professional engineers must regard their duty to public welfare as paramount
- Regulators protect the public by:
  - setting standards of technical competence and professional conduct for engineers
  - ensuring that license holders meet these standards
  - holding practitioners accountable if they are incompetent or unethical
- Applicants for registration are governed by registration practices that are transparent, objective, impartial, fair and timely

## A Few Key Definitions

- “Technology” is the means by which humans adapt their environment to meet their needs or wants.
- “Engineering” is the process of creating or maintaining technologies.
- “Public interest” is inclusive of all people and the environment and refers to the safeguarding of life, health, property, economic interests, and public welfare balanced with social interests that change as society's values and preferences evolve over time.
- Tim Berners-Lee on the huge sociotechnical design challenge
- “As we're designing the [technological] system, we're designing society. Ethical rules that we choose to put in that design [impact the society] ... Nothing is self-evident. Everything has to be put out there as something that we think will be a good idea as a component of our society.”

## Questions

Guest Provocateur, Theresa Maldonado, Ph.D., P.E., dean of Engineering, University of Texas—El Paso

- How are emerging areas of engineering blended into the FE and PE exam portfolio?
- How can we partner with engineering programs more effectively to update PE licensure even re-imagine it for 21st century relevance?
- How do we reemphasize the importance of the engineering profession to protect the health, safety, and welfare of the public as we prepare our next generation of engineers?

## Software Engineering—Case Study

- Did software go away? Did it stop having an impact on society?
- Issues
  - Process takes too long
  - Process starts too late
  - Process is reactive
  - Area of practice is unregulated/path to licensure doesn't exist, so that when it finally does, no one is interested or it isn't useful.
- What will happen next time?
- What is the next big thing?
- Is the exam process relevant or appropriate for new areas of practice?
- “Every system is perfectly designed to get the results it gets.”—Attributed to W. Edward Deming

## De facto Standards

Practice with competence and integrity

## Education—Accredited Degree

- Mutual recognition flows from confidence of the parties in the definition and achievement of the following:
  - Substantially equivalent accreditation processes
  - Substantially equivalent graduate outcome standards
- IEA has 19 full members and 5 provisional status
  - Mutual recognition of ~8,000 engineering programs



- Substantially equivalent to European Network for Accreditation of Engineering Education standards
  - 17 full members (including four IEA members); four associate members
  - 1,800+ engineering programmes, delivered in more than 300 universities in 30 countries

### **Experience**

- 4 years of internship under a professional engineer
- Mobility requires an additional three years of responsible charge after attaining professional status

### **Ethics**

- Agree to adhere to code of ethics/code of conduct

### **Professional Registration Model**

- Many jurisdictions worldwide, do not regulate the practice of engineering
- It is more common to regulate the use of the title “engineer” or its affiliates —professional engineering, chartered engineer, registered engineer, etc.
- Often two tiers—Registered Engineer on Graduation, Professional Engineer with Four Years’ Experience

### **Benefits of Registration Often Cited**

- Demonstration of a professional attitude valued by employers and customers
- Improved career prospects and employability
- Evidence of expertise
- Higher earning potential
- Enhanced status leading to higher self-esteem
- International recognition of competence and commitment
- Greater influence within own organization and industry
- Primarily used to regulate the practice of engineering related to the built environment
- Needs to expand to cover all technology—the means by which humans adapt their environment to meet their needs or wants

### **Principles of Good Regulation**

- **Accountability:** regulators must be able to justify decisions, and be open to public scrutiny
- **Agility:** regulators must look forward and be able to adapt to and anticipate change
- **Consistency:** rules and standards must be aligned and implemented fairly
- **Proportionality:** regulators should only intervene when necessary—remedies should be appropriate to the risk posed and costs identified and minimized
- **Targeting:** regulation should be focused on the problem, and minimize unintended consequences
- **Transparency:** regulators should be open, and keep regulations and regulatory processes simple and user friendly

### **Global Practice of Engineering**

#### A Blended Model

A new model needs to accommodate existing, emerging, and new fields of engineering and technology, (registered) and holding a practitioner publicly accountable for safeguarding and protecting the public interest where required (licensed)

- Common definitions of what constitutes the practice of engineering and professional engineering to provide clarity for the public, applicants, registrants, engineering organizations, and the engineering regulatory bodies

#### **“Engineering” is the process of creating or maintaining technologies.**

The “practice of professional engineering” means any act of creating or maintaining technology that requires the application of engineering principles and that concerns the safeguarding of life, health, property, economic interests, the public welfare and the environment.

### **Global Recognition of Credentials**

Imagine a future where all regulators have access to a blockchain-based system for licensure that provides an immutable record of engineering credentials and professional development validated by experts.

## **Then**

- Resources that are currently being used to assess credentials could be redeployed to regulate the practice
- Licensing professional engineers from other jurisdictions could occur in seconds
- Qualified engineering graduates could register and have a bridge to licensure. Also, they would be obligated by the code of ethics not to practice in an area that requires a license.

## **How Should We License Emerging Disciplines?**

- What do we want regulation to look like?
- Licensure in its current form?
- A new model?

## **Emerging Disciplines**

- Do you think technology, engineering, and society are changing?
- Do you think that regulation is critical to protecting health, safety, and welfare?
- Do you think that engineering licensure is necessary to regulate new technologies?
- If licensure doesn't adapt, it may become antiquated and irrelevant.
- Challenges to licensure are happening NOW.
- We need to challenge our thinking going forward.

## **Innovation**

- Doing the same things, a little bit better...
  - Different number of states?
  - Start earlier?
  - "Expedite" exam development process?
  - Modify other "similar" disciplines for new materials?

## **Disruption**

- Envisioning new things beyond the old things
  - Still use exams?
  - Phased licensing?
  - Tiered licensing?
  - Two different models: "old" engineering and "new" engineering?
  - License for ethics and not for engineering competency?
  - Competency by degree and experience?
  - Only license "core" or "legacy" disciplines?
  - Is licensure of an individual relevant in a new age?
  - Regulate teams and not individuals?
  - Regulate projects and not individuals?

## **How do we best protect the community we serve?**

Guest Provocateur—Clint Robinson, P.E., associate vice president, State and Government Affairs, Black, and Veach