



'15

YEAR OF ACTION
ON DIVERSITY

**AMERICAN SOCIETY FOR
ENGINEERING EDUCATION**

OCTOBER 2014 - SEPTEMBER 2015
ANNUAL REPORT

PRESIDENT'S LETTER



I was honored to serve as your president during ASEE's Society year 2014-2015.

As president, I had the opportunity to interact with all aspects of the organization, and in doing so I was pleased to observe the significant effort put forward by Society members, leaders, and staff. Watching so many people work so hard for the betterment of our organization—and engineering education writ large—reinforced the pride I have in being part of such a remarkable community.

Let me first report on our Year of Action on Diversity. During the year, ASEE's Diversity Committee encouraged members to discuss, engage in, and highlight individual and collective activities that serve to advance the Society's diversity efforts and inclusivity. In part, we have done this through:

- An updated and expanded diversity statement;
- A diversity session at the Engineering Deans Institute;
- Creation of a "Best of the Best Diversity Resources" webpage;
- Weekly clips of diversity-themed videos from ASEE headquarters;
- A Diversity Committee newsletter;
- Diversity Committee articles in *Prism's* ASEE Today section;
- Diversity-related objectives added to the bylaws of seven divisions;
- And, at the June Annual Conference, diversity-focused speakers, Safe Zone workshops, and recognition of a Best Diversity Paper.

While the problem is by no means solved, we have raised awareness of important issues and have started a conversation that has the momentum to continue.

You have seen many communications from me about the Board's Strategic Doing efforts. As I wrote in *Prism* magazine last year, given the changing role of professional associations in the 21st century, the financial challenges those changes can bring about, and a desire to be nimble and proactive, the board is using Strategic Doing to reexamine the entire Society and how it operates. ASEE does some things very well, but are they the right things? We are a necessary resource for many engineering educators and strategic partners, but are we providing the right things to the right people? We have impactful reports and programs, but do these efforts fall in the scope of what we should be doing? Without deep introspection, ASEE may go along with what has worked fine for decades, missing the opportunity to evolve into something better.

Our members weighed in online during an open comment period with feedback and ideas. At the annual conference we held a Strategic Doing listening session, where the Board of Directors talked about the beta version of the plan and then met with members in breakout groups to talk through the next steps.

As of this writing (fall 2015), subgroups of interested members are having periodic conference calls, and ASEE headquarters has created a website to be the online home of the strategic doing effort. The Purdue Center for Regional Development is graciously donating time to guide this effort, which will help us create a new ASEE over the next several years. I'm sure my successor as president, Joe Rencis, will have encouraging updates over the course of this year.

I was encouraged this year by a staff grassroots efforts at headquarters called the Employee Involvement Initiative (EII). ASEE conducts an employee satisfaction survey annually and the EII was created to address three themes arising from the 2014 survey: Incentives, Culture, and Communications. A working group was created to address each theme, with the EII conducting subsequent staff surveys, holding focus groups, and reporting regularly on their findings to both all ASEE staff members and the Board.

A number of employees expressed the desire for more cross-departmental cooperation, which would benefit the organization and ensure that all staff members were working toward a shared goal. This led to perhaps the most important recommendation, which the executive director endorsed and which supports a Board goal: an interdepartmental staff effort to generate ideas for increasing membership. This effort began in August and continues.

I had the sobering task at the Annual Conference of sharing serious news about ASEE's financial situation. For many years ASEE has relied on funds generated from the management of federal fellowship programs to grow and support core functions of the Society. Revenue from these programs is shrinking and, in the current federal environment, not a reliable income stream on which ASEE should build its core budget. ASEE thus faces a structural deficit. For the 2016 fiscal year, the board has directed headquarters to produce a balanced budget, not relying on funds from the contracts, which will be used to pay down existing debt and to build up a reserve. In getting to a balanced budget we have asked for shared sacrifice: Headquarters

will be implementing contractions, and members of the Engineering Deans Council (EDC) and Engineering Technology Council (ETC) supported an increase in academic institutional membership fees.

I cannot write to you from the context of pretending ASEE does not have challenges ahead. However, there is much reason for optimism. We firmly remain the premier organization for engineering and engineering technology education across all disciplines. The Board

of Directors is actively engaged in forward-looking activities to keep ASEE relevant and responsive to members. And we are committed to putting our financial house in order.

Again, many thanks for your support during my year as president, and I look forward to our continued interactions.

- Nicholas J. Altiero

EXECUTIVE DIRECTOR'S LETTER

ASEE's 2015 fiscal year was filled with, as the song says, sunshine (joy) and rain (pain). The Year of Action on Diversity was incredibly productive and illuminating. Our members stepped up in numerous creative and engaging ways to develop and promote the Society's commitment to the development of the broadest possible array of human talent among engineering and engineering technology students, faculty, and staff. President Altiero's letter provides some of the specifics on these measures.

FY15 also revealed, in greater depth than previously known, the extent of the Society's financial challenges. As President Altiero indicated at the closing President's Reception during the 2015 Annual Conference, the Society has a significant structural deficit as a result of overdependence on revenue from federal contracts. But even here, our members have stepped forward in an exemplary fashion. The Engineering Deans Council and Engineering Technology Council forwarded to the ASEE Board a recommendation to increase their dues substantially in order to (a) address the transition time expected before full revenue from the new dues structure would be received, (b) retire short-term debt in as timely a manner as possible, and (c) build reserves and, eventually, an endowment. Headquarters staff are doing their part as well to cut expenses. Five positions have been eliminated, staff benefits are being reduced, and an effort is underway to consolidate office space so as to achieve a substantial reduction in rent. The intent is to make these cuts while maintaining a high level of service and support to our members.

Last year saw the initiation of Strategic Doing as an effort to engage the Society's membership more directly in taking those actions that will build a stronger, more vigorous Society that reflects the desires and priorities of our members. President Altiero's letter details the accomplishments achieved thus far.

In addition, as indicated by President Altiero, the headquarters staff is engaged in an Employee Involvement Initiative, an internal process somewhat akin to Strategic Doing. The staff have taken great ownership and initiative, and we look forward to continued positive results.

I opened this letter with a reference to sunshine and rain, and I'm reminded that it takes both to make a rainbow. Though it may be slow, we are making progress and may yet find a substantial reward at the end of the rainbow. - Norman L. Fortenberry



CONVENING MEMBERS

It was a year of milestones for ASEE's Annual Conference. For the first time, total attendance at the meeting topped 4,000. Also for the first time, attendees at the opening plenary session enjoyed a virtuoso violin presentation delivered by Kai Kight, who followed his performance by discussing the meeting point of engineering and music with creativity and the ability to break molds important for success in both.

The Annual Conference was the culmination of the Society's Year of Action on Diversity, and diversity-related issues were prominent throughout the week. The keynote speaker at the opening session was Harvey Mudd College President Maria Klawe, a leader in achieving results in diversifying faculty and enrollment. She remarked, "I'm thrilled about the focus in our community on things that make a big difference in diversity, such as experiential learning, a focus on real-world problems, and an emphasis on active learning." On retention, she said, "students who feel confident and who feel like they belong — they stay."

ASEE's Diversity Committee literally left its footprint on the conference, placing large latex cutout "feet" on the floor around the convention center, each with text forcing the reader (or walker) to consider diversity issues and statistics. A number of "SafeZone" workshops were offered, for the second year in a row.

Boeing CTO John Tracy, in his Tuesday plenary talk, addressed the state of manufacturing in America from his role as a member of the National Academy of Engineering study committee for "Making Value for America," a report that served as inspiration for the conference theme. He predicted that "in the future, manufacturing is going to be a much more all-inclusive act, where engineering is going to be a central part of it." Tracy noted that this message is relevant to ASEE members as they educate the engineers and engineering technologists of the future.

For the second year, ASEE assembled high school winners of national STEM-focused contests. These bright future inventors and leaders were applauded on the plenary stage and then held a Q&A session in the Exhibit Hall.

Behind the scenes, ASEE's Information Technology department provided important infrastructure to the conference. Numerous enhancements were added to the paper management system; also improved were the interfaces and algorithms used by staff and program chairs to assign sessions to rooms. Choosing Exhibit Hall booths was moved from paper to computer, bringing additional improvements in invoicing, payments, and reporting.

COMMUNICATING NEWS AND RESEARCH

PRISM MAGAZINE

ASEE's flagship publication, *Prism*, won more than a dozen awards for design and writing this year, including a "Communicator Award of Distinction" for a special section on trailblazing young faculty entitled "20 Under 40." Articles explored such current topics as the paucity of African-American men in engineering, the current relevance of engineering technology, and the ethical implications of General Motors' faulty ignition switch. On the international front, *Prism* reported on Chile's push to give engineering education an entrepreneurial thrust, Ethiopia's headlong expansion of engineering schools, and France's next-generation nuclear reactor. In alignment with ASEE's Year of Action on Diversity, each issue of the magazine contained an article prepared by members of the Diversity Committee. A distinguished Editorial Advisory Board stayed in regular communication with *Prism* editors and offered wise counsel on sensitive decisions. And lastly, with an eye toward publishing *Prism* as cost-efficiently as possible, we obtained a new three-year printing agreement that will bring a significant savings. *Connections*, the *eGFI Teachers Newsletter*, and *Capitol Shorts* maintained strong readership with varied and timely content.



AEE

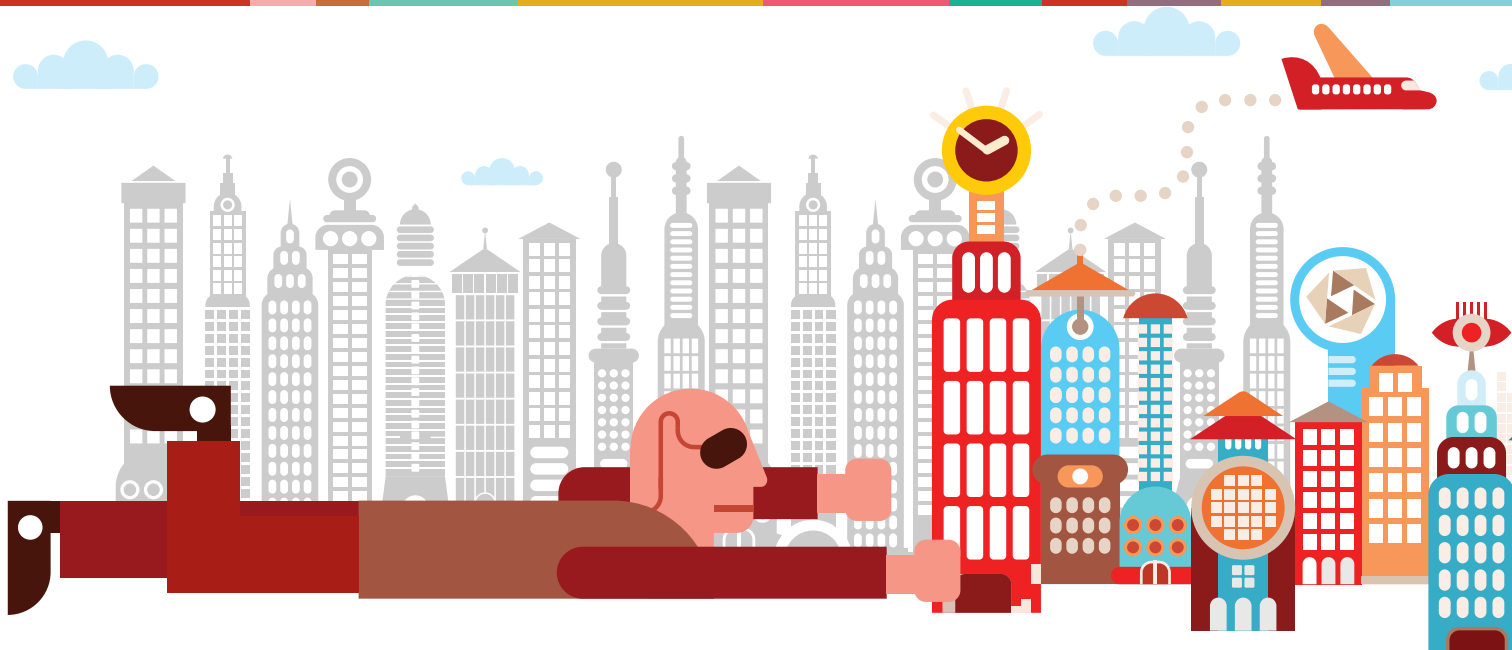
Documenting and disseminating true “advances” informed by research of engineering education practices is the purpose of the peer-reviewed *Advances in Engineering Education*. Of particular uniqueness to *AEE* is that authors are encouraged to submit papers incorporating the creative use of media, including animation, audio, graphics, and video. This marked *AEE*'s seventh year; the journal has received over 600 submissions, with an acceptance rate of approximately 25 percent and an increasing number of submissions from overseas. Three issues of the journal were published this year with a total of 27 papers. Topics addressed included Georgia Tech's “Invention Studio” (subsequently translated into Chinese), “Design Heuristics” developed at the University of Michigan, “Co-Instructed Capstone Design,” and the “AIChE Concept Warehouse.” Upcoming issues will feature entrepreneurship, data sharing, flipping the classroom, and the midyears' education experience.

JEE

Sharing quality research on the form and delivery of engineering education—doing engineering on engineering education, so to speak—is at the core of what ASEE is about. ASEE's *Journal on Engineering Education* is widely recognized as the premier journal for scholarly research on engineering education. Published quarterly, the journal receives about 300 new submissions annually from authors in more than 40 countries. The journal has an international editorial board that coordinates the peer review process. ASEE partners with John Wiley & Sons to publish the journal, with the generous support of the College of Engineering at the University of Illinois, Urbana-Champaign.

During the past 12 months, the journal published articles on why incorporating group design projects into core courses can improve students' intentions to become engineers; on how instructor feedback about professional skills can enculturate students into engineering communities of practice; and on what students experienced as they entered and dropped out of engineering, but eventually succeeded in other majors. Summaries of these and other articles have appeared as “*JEE Selects*” columns in ASEE's *Prism* magazine. These summaries show how the results of research can inform the practice of engineering education.





TRANSFORMING THE COMMUNITY

ASEE collaborates with a variety of institutions to further efforts of engineering and engineering technology education. We are considered a trusted partner to manage and administer large, complex, high-profile projects.

Lightweight Innovations for Tomorrow (LIFT) is part of a national network of research institutions and companies focused on lightweight metals in manufacturing, one of seven institutes established as part of the National Network for Manufacturing Innovation (NNMI). ASEE is administering a LIFT team from the five states (Michigan, Indiana, Ohio, Kentucky, and Tennessee) conducting a gap analysis on educational materials available at engineering colleges related to lightweight metals. The center will speed development of new lightweight metal manufacturing processes from laboratories to factories for products using lightweight metal. An equally important mission is to advance research and facilitate education and training of engineers, technologists, technicians, and factory-floor workers.

ASEE continues to manage the National Science Foundation's **I-Corps™ for Learning (ICL)** program, an accelerated version of Stanford University's Lean LaunchPad course. ICL is designed for STEM educators with innovative teaching strategies, technologies, or set of curriculum materials, with a goal of fostering an entrepreneurial mindset. Jenna Gorlewicz of St. Louis University, a recent participant, says, "Academics don't think translationally, but this gives you the space and freedom to talk to end users about your ideas." ICL scales

teaching and learning innovations by using established strategies for start-ups. Teams are forced "out of the classroom" to study customer needs, collect feedback, find partnership opportunities, and conduct 100 interviews to determine product need. Gorlewicz says her team's initial reaction to that number was shock. "To put yourself out there and ask what people don't like about what I'm working on—that's hard to do."

Participants leave the program with tools to evaluate and translate their research into applicable methods for educational transformation. Since winning the Top Team award for her cohort with a device that turns digital images, like graphs, into nonvisual representations so students can access them through touch and sound, Gorlewicz and colleagues have participated in the Start Up Next St. Louis program, received a Small Business Innovation Research award, and formed an LLC. "It has changed the way I do my day job for the better. It changes your perspective on the research questions that you ask and how you do research. It's valuable to take a step out of your little world for a moment." ASEE has managed the program for two years.

A recognition that short-term, one-shot, face-to-face faculty workshops are not scalable and not ideal given modern technology

has led ASEE to oversee a project on **Virtual Communities of Practice (VCP)**, with funding from NSF. In the VCP effort, 20 to 30 faculty members meet virtually over two semesters, developing knowledge and skills required for creating new instructional approaches in their classrooms. ASEE is currently evaluating the project to gauge involvement and satisfaction of the VCP participants, as well as the relationship between the characteristics of the VCPs and changes in the participants' instructional activities.

For decades, ASEE has managed a number of **fellowship and research opportunities** with funding provided by federal agencies, including the Department of Defense, NASA, and NSF. These range from programs that provide summer internships for high school students to research programs for faculty members during the summer or while on sabbatical. Programs include undergraduate and graduate research support and postdoctoral research programs for recent Ph.D.'s at government and industrial research facilities. ASEE provides support tasks that include outreach and promotion activities, application processing support, application review activities, and administration of stipend and tuition payments for program participants.

DONOR LIST

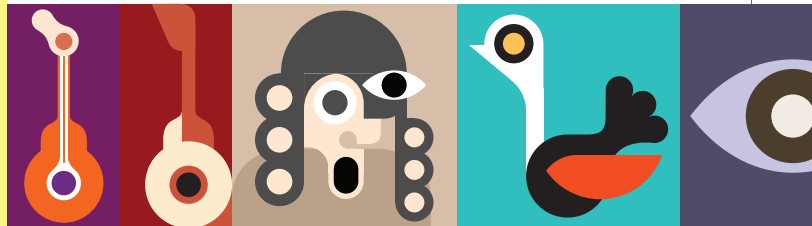
ASEE GRATEFULLY RECOGNIZES MEMBERS DONATING AT LEAST \$50 IN FISCAL YEAR 2015.

Thomas Adams
Alva Addy
Olusegun Adeyemi
Mario Amani
Kendrick Aung
Lionel Baldwin
Joanie Banks-Hunt
Richard Bannerot
Ronald Barr
Robert Bartkowiak
James Becker
Eric Bell
Andrew Biaglow
J Bowen
Ray Bowen
Stanley Brodsky
William Callister
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Marleen Troy
Joseph Waddell
Thomas Weber
John Weese
William Wepfer
Carl Wick
William Wilhelm
Melvin Williams
Hong Zhou
Jamie Zipay
Paul Zsombor-Murray



FILLING THE PIPELINE

ASEE published a new edition of *eGFI* (*Engineering, Go For It*) magazine. This popular publication, designed to explain engineering and generate interest in the field among middle and high school students, has been widely used over the years by universities, school districts, teachers, and government agencies. Along with helpful guides to preparing for college-level engineering, the new edition contains student profiles and lavishly illustrated features on engineering technology, advanced manufacturing, service learning, the fusion of engineering and art, biomimicry, assistive technology, and the latest in roller coasters. Its publication coincided with efforts around the country to incorporate engineering into K-12 curricula, and an initiative to develop an Advanced Placement course in engineering.

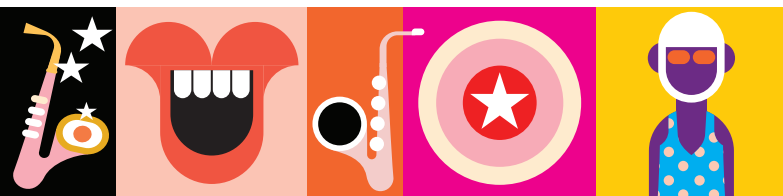
ASEE's Board of Directors appointed a committee of board members to direct future activities in the P-12 area. After months of research and analysis, the committee has approved a comprehensive strategic plan for ASEE's expansion in this community. In parallel, ASEE expanded the national effort to define standards by promoting the Standards for Professional Development for K-12 Teachers of Engineering. This comprehensive description of professional development for preparing teachers of engineering, and a program evaluation matrix has been distributed and applied in programs in nearly all 50 states.

ASEE held its 12th annual K-12 workshop prior to the Annual Conference in Seattle. This flagship outreach activity was well-attended by local teachers and administrators. The agenda for the day-long event included hands-on learning sessions with multiple supplementary sessions. Speakers from industry and other organizations led discussions on curriculum and outreach in the K-12 communities. Members of the American Association of Engineering Societies K-12 Committee, with whom ASEE works to collect and share resources, exhibited at the workshop. ASEE volunteers also provided an engineering day at the regional National Science Teachers Association (NSTA) conferences. These included multiple sessions of hands-on learning activities targeting science teachers who are interested in integrating engineering into their science classes.



MAKING A DIFFERENCE

The ASEE Annual Conference was held in conjunction with the White House Week of Making. We livestreamed two events, supported by Tennessee Technological University, each featuring Maker projects from meeting attendees. Given the enthusiasm so many of our members have for the Maker Movement—both in the classroom and personally—and recognizing the growing importance of Maker-influenced activities in engineering education, we look forward to institutionalizing Maker-focused activities in future conferences. In addition, ASEE spoke at the Higher Education Maker Summit at Arizona State University in October 2014. Moving into Society Year 2016, ASEE has been tasked by the National Science Foundation with running Maker workshops.





REPORTING DATA TRENDS

ASEE's office of Assessment, Evaluation, & Institutional Research continues to administer the annual *Profiles of Engineering and Engineering Technology Colleges*, collecting data from ABET-accredited U.S. and Canadian engineering schools in a variety of areas. The resulting directory can be used by both students and administrators to compare schools using a range of characteristics. Participating institutions receive access to the ASEE Data Management System, an interactive, longitudinal database tracking college profile information since 1998.

ASEE collects engineering faculty salary data with an annual salary survey, gathering information by engineering department. Schools providing data can create reports aggregating salaries from a group of selected schools at the 90th, 75th, 25th, and 10th percentiles, as well as the average and median salaries for each department.

In addition, ASEE's Undergraduate Student Retention and Time-to-Graduation Survey provides national-level information for undergraduate engineering retention rates and time-to-graduation.

COUNCIL REPORTS

The primary activity of the **Engineering Research Council** (ERC) is its conference on Engineering Research, held this year on March 9-11, 2015, attended mainly by associate deans for research. The meeting provides an overview of federal R&D budgets and upcoming priorities, and equips research leaders with tools to more effectively lead their research programs. More than 20 speakers provided overviews of major federal engineering research funding organizations, including NSF, NIH, DOE, DoD, and NIST. In addition, the conference included a session focusing on various challenges facing academic research leaders and some best practices for addressing these challenges.

The council also managed the nomination and selection process for the ASEE Curtis McGraw award. The 2015 winner, Steven R. Little at the University of Pittsburgh, was selected from a field of more than 20 outstanding candidates. Professor Little was recognized for his exceptional contributions to fundamentals in the field of controlled drug release and his contributions to the establishment of the nascent field of biomimetic delivery. At the ASEE annual meeting in June 2015, the ERC hosted a panel session entitled "Enhancing Proposal Development and Finding Funding Opportunities," aimed primarily at early-career faculty members. The panel focused on strategies to obtain sponsored research funding.

The ERC also co-sponsored a distinguished lecture series at the 2015 annual meeting entitled "Unifying the Enablers for Innovation and the Talent for Making Value for America" that summarized findings of the recent National Academy of Engineering's "Making Value for America" project.

The **Engineering Technology Council** (ETC) is composed of ASEE's technical college members and is the national entity that speaks for engineering technology education. In October 2014, ETC conducted its 38th Engineering Technology Leadership Institute (ETLI), bringing together engineering technology educators, industry leaders, and government officials in Washington, D.C., to discuss topics of importance for future engineers. The theme for the meeting was "Engineering Technology: Pathways, Perspectives, and Roles." ETLI featured three panels: Developing Pathways to Professions in Engineering; Professional Societies' Perspectives on ET Graduates; and Government and Industry Roles in Employing Engineering Technology Graduates.

Meetings of the ETC Executive Board were held at the 2015 ETLI meeting and the 2015 Conference on Industry Education Collaboration in Palm Springs, California, as well as at the Annual Conference. Also at the conference, we presented the annual Frederick J. Berger Award, given in recognition of programmatic and individual excellence in engineering technology education, to Scott Dunning of the University of Maine.

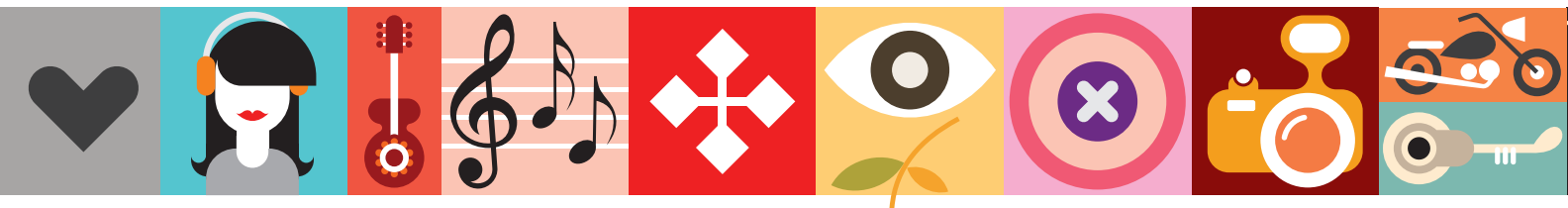
The members of the Engineering Technology National Forum continue to explore ways to increase opportunities for ET graduates, both in their professional careers and in their continuing education. ETC continues to work with the Office of Personnel Management and other agencies. Work with the NAE study on the "Engineering Technology Education in the United States" is still underway, with a report expected in 2016. The ETNF continues to refine the ET value proposition, and the conversation at ETLI, as described above, has identified new approaches needed. Both ABET and ASEE were identified as key players.

The **Engineering Deans Council** launched the Deans' Diversity Initiative in 2015. At the first-ever White House "Demo Day," the deans presented to President Barack Obama a pledge to increase diversity at their institutions. To date, the letter has been signed by over 150 deans of engineering.

"Engineering is empowering society in unprecedented ways," the deans wrote. "It is at the core of all innovation, resulting in tremendous societal and economic benefits; it is the most important discipline to address current and emerging challenges in the U.S. and on a global scale; and it provides new, imaginative ways to enrich life."

In recognizing that "diversity and inclusiveness are essential for the development of creative solutions to the world's challenges and to enrich life," the deans committed to developing:

- A diversity plan for their engineering programs with the help and input of national organizations
- At least one K-12 or community college pipeline activity
- Strong partnerships between research-intensive engineering schools and non-Ph.D.-granting engineering schools serving populations underrepresented in engineering
- Proactive strategies to increase the representation of women and underrepresented minorities in their faculty.



EXPANDING MEMBER SERVICES

The Information Technology department has been active in serving our constituents, both external and internal to headquarters. The IT department has implemented new services and enhanced others to improve the member experience. The Papers on Engineering Education Repository (PEER - <http://peer.asee.org>) is ASEE's new document repository, containing all Annual Conference papers published since 1996. It offers advanced search, multiple citation formats, and DOI records for 2015 onward.

Other IT-driven improvements include making the main ASEE website mobile-compatible, introducing online voting for Board positions, and responding to a desire in the Member Needs Assessment for an improved search function on the ASEE website by moving it to Google Custom Search. In addition, Internet bandwidth was increased by 300 percent, improving responsiveness when members access our servers.

