

# ANNUAL REPORT

OCT 2015 - SEPT 2016

**AMERICAN  
SOCIETY FOR  
ENGINEERING  
EDUCATION**

## PRESIDENT'S LETTER



It was a great honor to serve as your president during the 2015-2016 Society Year. ASEE has been central to my professional career for many years, and being President has allowed me to experience the Society and enjoy interactions with fellow members in new and rewarding ways.

ASEE enjoyed a number of successes this year, which I'll enumerate below, but perhaps the most important was the way our members came together to put ASEE on a successful financial footing ensuring stability and vitality for the next several years.

We left the 2015 annual conference facing a deficit of \$1.2 million and a yearly recurring deficit of \$1.5 million. I am happy to report that ASEE is now debt free and is in the black for the first time since fiscal year 2007.

The \$1.2 million deficit was eliminated, primarily through improvements in processes in the accounting department and processing invoices for entities that owed ASEE money. The \$1.5 million recurring deficit was addressed by equally reducing expenditures and increasing revenue. Again, I want to thank you on behalf of ASEE. I personally thank the Engineering Deans Council and Engineering Technology Council for stepping up last year to support a significant increase in their institutional dues. They realized the unique and valuable asset ASEE's existence is for its membership, stakeholders, and the future of engineering and engineering technology education worldwide. Headquarters reduced expenditures by \$750,000. This has largely been achieved through staff reorganization, benefits changes, space consolidation, and the implementation of a telecommuting work plan. I was happy to see that a number of you attended the financial town hall we conducted at the annual conference.

Transparency and openness have been very important to the ASEE leadership throughout this entire process.

As you know, ASEE is undertaking a Strategic Doing process. Over the next three years, we will move toward a more open, flexible, and engaging organization that accelerates our collective ability to connect and learn from each other. The current process promotes experimentation and exploration; we are trying to identify what will work best for ASEE. The Purdue Center for Regional Development has donated its time to guide this effort. At present, several teams are holding periodic conference calls to explore ways the Society can change and evolve, with proposed actions being moved to the Long-Range Planning Committee for potential implementation. Those teams are: Connecting, Diversity, Globalization, Governing, Innovating, P-12, and Transforming. More details can be found at <http://www.asee.org/strategy>. This is an important endeavor for keeping ASEE relevant and moving forward. I encourage you to get involved.

If you were at the 2016 ASEE Annual Conference and Exposition, the one indisputable fact you came away with—other than that late June in New Orleans is hot!—is that ASEE is a very dynamic organization. With more than 50 divisions, various constituent and special interest groups, and educators across the entire spectrum, our members do a lot, with a far-reaching impact. While it can be a challenge to get to every session you have an interest in attending, a packed schedule is a good problem and represents a growing organization. In fact, we had a record-setting conference in New Orleans with nearly 4,400 folks in attendance.

This year's conference had two incredible plenary speakers from leading tech companies, an impressive slate of distinguished lecturers, hundreds of technical papers, and, as usual, many, many opportunities for networking and catching up with old friends. It was hard to walk away from the conference not enthused about ASEE.

ASEE remains a leader and respected partner in our community, as you'll read about in more detail below. Our Fellowships and Research Opportunities department was recently re-awarded two of the federal government's most significant engineering-focused scholarship/fellowship programs. We continue to manage the I-Corps for Learning project; the multi-volume Transforming Undergraduate Education in Engineering report; a virtual communities of practice effort for engineering educators; and many other projects.

Society Year 2016-2017 has been named the year to "Commit to P12: Where Engineering Begins." Much like with our recent Year of Action on Diversity, a volunteer committee has been assembled and

is actively planning events throughout the year to bring attention to this important time in the educational arc of a student. I'm sure my successor, Louis Martin-Vega, will have good things to report in this space next year.

My time as President is done, but I will remain active in ASEE and look forward to interacting with all of you at future events and gatherings. I also look forward to working with Louie in my last year on the Executive Committee and keeping ASEE as a forward-focused organization for engineering and engineering technology education. And once again, I thank you sincerely for entrusting me with the leadership of our historic and important organization.

- Joseph J. Rencis, 2015-2016 President

*"Education is not given for the purpose of earning a living; it's learning what to do with a living after you earn it that counts." - Abraham Lincoln*

## EXECUTIVE DIRECTOR'S LETTER

In this space last year, I closed my letter by saying, "Though it may be slow, we are making progress and may yet find a substantial reward at the end of the rainbow." With cautious optimism I am happy to report that we are making positive headway toward our goals, financial and other.

As part of collaborating with our institutional members to eliminate a structural deficit, we at headquarters agreed to cut expenses by \$750,000. One major endeavor in this regard, begun in FY 2016, has recently been completed. We consolidated staff from two floors to one and have seen positive results in a number of areas:

- We are saving money on rent.
- Out of necessity, we adopted a liberal telecommuting policy, with all staff being provided laptops and the ability to work from home multiple days a week. This allows for better work-life balance and our staffers can reduce the amount of time spent in notorious D.C.-area commutes.
- As part of negotiations with our landlord, we will take over a space on the ground level which will be used for meetings and events, and which we hope will be a revenue generator.

A discussion within the Board has been whether or not it would be desirable for ASEE to own a building of its own. There are pluses and minuses to be considered. I will keep you posted on the Board's deliberations.

ASEE has long been a trusted partner of the federal government, managing major fellowship, internship, and scholarship programs for the Department of Defense (DoD), National Science Foundation (NSF), and others. Over the past year ASEE was awarded a renewal of three such high profile programs. We will oversee NSF's Graduate Research Fellowship Program for another six years; DoD's Science, Mathematics & Research Transformation program for another four years; and DoD's National Defense Science and Engineering Graduate Fellowships for another three years. Our hand in this work serves several purposes—it contributes to accomplishing our mission of advancing innovation, excellence, and access at all levels of education for engineering; it enhances our stature and brand; and it strengthens our connection to the federal

technical community. In addition, funds ASEE receives for managing these programs support the ASEE budget.

Even though the resulting stability in our finances resulted not only from increased institutional dues revenue, but also cuts to staff benefits and staff space consolidation, we have nonetheless seen an increase in headquarters staff morale. As a result, we are able to further sharpen our focus on member services and engagement.

Seeking continuous improvement, we have launched an internal effort to review policies and procedures, initiated as part of an on-going, staff-driven project to improve the way headquarters operates. Each department has offered suggestions for closing internal gaps and identified other institutional areas in need of improvement. We have been working to implement suggestions and creative solutions. While this may not seem like a major milestone, I report it because it is part of a trend over the last few years of ASEE staffers coming together as a team to make sure we are pulling in the right direction, with the end goal of serving you, our members, better.

I look forward to seeing many of you over the next year and, as always, please do not hesitate to get in touch with me for any reason.

- Norman L. Fortenberry



# COMMUNICATING NEWS AND RESEARCH

## PRISM MAGAZINE

ASEE's flagship publication, *Prism* magazine, won eight awards for design and writing this year. These included a pair of Communicator Gold Awards of Excellence for cover stories on engineers engaged in opening up the Arctic's sea-passage routes and the rapid expansion of engineering education in Ethiopia. The latest edition of *eGFI*, ASEE's magazine for K-12 students, won an APEX Grand Award for Publication excellence.

Topics explored by *Prism* included activist engineers who investigate and campaign to correct threats to public health and safety; the prospect of new collaborations as a result of restored U.S.-Cuba relations; growing use of bamboo as a construction material; and proposed changes in ABET accreditation criteria.

ASEE's newsletters—*Connections*, the *eGFI* Teachers Newsletter, *First Bell*, and *Capitol Shorts*—maintained strong readership both domestically and overseas, while a more-active *Accelerator* Facebook page kept undergraduate and graduate members in the loop.

The Editorial Advisory Board, a group of volunteer ASEE members, continued to counsel *Prism* editors.

## CAPITOL SHORTS

*Capitol Shorts* is a weekly newsletter intended to keep ASEE members up-to-date on important developments in Congress and federal agencies affecting engineering education and research. In addition to legislative updates, the newsletter collates information from several inside-the-beltway sources and publications, reporting on research and development news, agency development, and White House initiatives.



## AEE

Documenting and disseminating true “advances” in engineering education informed by research into practices and pedagogy is the purpose of the peer-reviewed, online *Advances in Engineering Education*. Especially unique to *AEE* is the encouraging of authors to creatively use various forms of multimedia—including animation, audio, graphics, and video—in order to make the paper more informative. This marked *AEE*'s seventh year; the journal has received over 600 submissions, with an acceptance rate of 21 percent and an increasing number of submissions from international-based authors. Three issues of the journal were published this year with a total of 28 papers. Each of these issues focused on a particular topic of importance to the greater engineering education community. These were: “Entrepreneurship and Innovation,” guest edited by Phil Weilerstein (VentureWell); Tom Byers' (Stanford) “Data Sharing,” guest edited by Aditya Johri (George Mason), Mikaela Vorvoreanu, and Krishna Madhavan (Purdue); and “Flipping the Classroom,” guest edited by Lorena Barba (George Washington), Autar Kaw (South Florida), and Joseph LeDoux (Georgia Tech). An upcoming issue will feature the midyears' education experience.

## JEE

ASEE's *Journal of Engineering Education* is widely recognized as the premier journal for scholarly research on engineering education, an important product for a society that prides itself on sharing quality research on the form and delivery of 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 at Urbana-Champaign. During the past 12 months, the journal published articles on improving conceptual reasoning skills in thermodynamics, on differences between men and women in learning outcomes from co-curricular experiences, and on student learning in an interdisciplinary design studio co-taught by faculty from engineering and art education. 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.



# CONVENING MEMBERS

ASEE'S ANNUAL CONFERENCE AND EXPOSITION IS THE SOCIETY'S PREMIER EVENT, RECOGNIZED BY OUR MEMBERS AS THE MOST-VALUED BENEFIT OF THEIR MEMBERSHIP.

New Orleans, though it lived up to its reputation of being a sweltering host in late June, was a particularly big draw—the 2016 Annual Conference attracted 4,400 attendees, a record number.

Great events were underway even before the official start of the conference. A number of volunteers headed north to Baton Rouge and volunteered to build a neighborhood playground. Back in the air-conditioned convention center, over 100 local teachers attended our P-12 workshop, “STEM Integration Through Engineering.” At the International Forum, a day-long event blended deep thinking and new teaching techniques from around the world—all aimed at educating the global engineer. The conference officially kicked off Sunday night with the popular Division Mixer, followed by our first-ever Charity Casino night as part of the ASEE Give Back Campaign, with proceeds going to two local organizations.

The two plenary sessions were anchored by industry leaders—the opening plenary was delivered by Lisa Jackson (an alum of nearby Tulane), Apple’s vice president of Environment, Policy, and Social Initiatives, reporting to CEO Tim Cook. Tuesday’s plenary talk was delivered by Joseph Bradley, Uptake’s president for business ventures.

We hosted two robotics activities. Community College students from around the country held their annual competition to build autonomous robots. This year their task was to deposit one ring in each of 12 boxes located along the “parade route” on a specified 8’ x 8’ track. In addition, FIRST Robotics held a competition for NOLA-area high school students.

For the second year in a row, ASEE convened high school-aged winners of national STEM contests. Teenagers from around the country were recognized for their groundbreaking inventions at our opening plenary and later answered questions in the exhibit hall.

This year we piloted a half-day event designed exclusively for engineering and engineering technology chairs. The Chairs Conclave emphasized networking and included presentations on effective techniques for onboarding new faculty, developing and managing external connections, and financial development and management. Given the positive response, we will offer this event again at the 2017 Annual Conference.

Other highlights of the conference include:

- An awards ceremony
- Best PIC and Zone papers
- The Distinguished Lecture Series
- The unique Ideas at Play activities that got participants into the community
- The Dinner Club, promoting social interactions
- The Social Media Contest, drawing dozens of participants
- SafeZone Ally Training Sessions
- #ASEEIncludes\_\_\_\_\_ T-shirts



Participation



Collaboration



Research

4,400 Attendees

# INSTITUTIONAL COUNCIL AFFAIRS

**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 September 2016, ETC conducted its 41st Engineering Technology Leaders Institute (ETLI), bringing together engineering technology educators, industry leaders, and government officials in Washington, D.C., to discuss topics of importance for engineering technology graduates. This was the fourth consecutive ETLI held in the nation's capital, bringing together ET thought leaders to develop strategies to work with legislators to assist the council in its endeavor to advance opportunities for ET graduates.

The theme for the 2016 ETLI was "Engineering Technology: Connecting, Building & Maintaining Relationships" and it featured three panels: Viewpoint of Professional Societies on Engineering Technology Education; Fostering the Innovative and Entrepreneurial Mindset in Engineering Technology Education; and ABET-TAC Criterion 3 and Program Criteria: How Can We Improve? As always, the event provided an opportunity for debate, discussion, and collaboration.

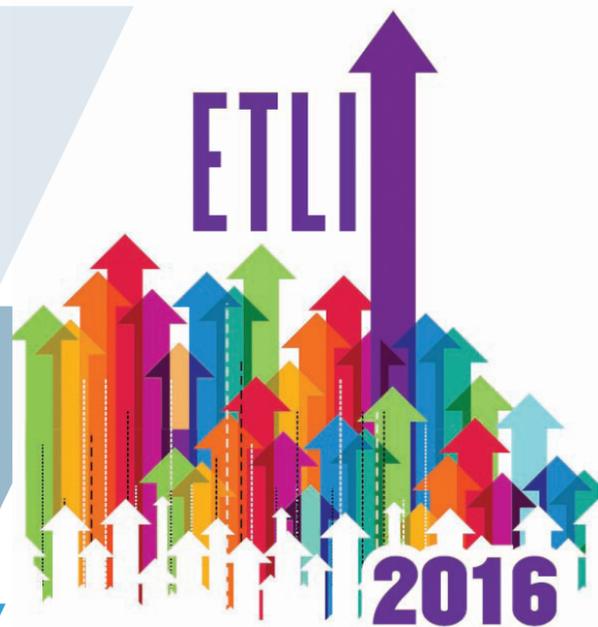
The ETC Executive Committee passed two policy statements at ETLI: Modification of GS-0800

Engineering Qualification Standard maintained by the U.S. Office of Personnel Management and BS-ET Access to Professional Licensure. Members of the Engineering Technology National Forum are working with engineering professional societies to garner support for the Modification of the GS-0800 policy statement and with university government affairs staffers. This is a continuing effort to persuade the Office of Personnel Management to allow ET graduates the opportunity to interview for engineering positions. ETNF and ETC Executive Committee are also working with ABET committee members to gain support for ETC activities.

Meetings of the ETC Executive Board were held at the 2016 ETLI and the ASEE Annual Conference in New Orleans. Also at the conference, ETC and the Engineering Technology Division presented two national awards. The Frederick J. Berger Award, recognizing and encouraging both programmatic and individual excellence in engineering technology education, went to Niaz Latif at Purdue University, Calumet; the James H. McGraw Award, recognizing outstanding service in engineering technology education, went to Carol Richardson, Rochester Institute of Technology.

**THE ENGINEERING RESEARCH COUNCIL'S (ERC)** primary activity is organizing a meeting for associate deans for research concerning research updates and peer-related discussions about best practices. The meeting, on March 7 to 9, 2016, provided an overview of federal R&D budgets and upcoming priorities, and equipped research leaders with tools to more effectively guide their research programs. Speakers from major federal engineering research funding organizations gave presentations, including NSF, NIH, DOE, DoD, NIST, and other organizations. The conference included working sessions about pursuing major funding opportunities, measuring research impact, developing institutional and individual research data management plans, and improving the safety culture in colleges of engineering.

The council also managed the nomination and selection process for the ASEE Curtis McGraw award that recognizes outstanding early achievements by young engineering college research workers. The 2016 winner, Michael Dickey of North Carolina State University, was selected from a field of over 20 outstanding candidates. He was recognized for his exceptional contributions concerning new ways to actuate and pattern soft materials, including polymers, liquid metals, and gels to enable new applications, such as energy harvesting devices, sensors, soft and stretchable electronics, and self-folding sheets in a simple, inexpensive, and scalable manner.



For future planning purposes, the ERC conducted a brief survey of its membership and the foci of upcoming conferences will include mentoring new faculty members; best practices for developing research proposals; and useful methodologies for developing a relationship with a funding source that is new for a faculty member or even a college. The ERC will be continuing a shift in the meeting content to assist the professional development of associate deans for research while still providing insights into the federal funding situation.

**THE ENGINEERING DEANS COUNCIL (EDC)** continued to build on its Deans' Diversity Initiative, initially launched in 2015. In the summer of 2016, ASEE presented the White House (through Yannis Yortsos, EDC Diversity Chair and dean of the Viterbi School of Engineering at the University of Southern California) with a pledge signed by over 200 engineering deans.

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 pathway 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

At the 2016 Engineering Deans Institute meeting in San Francisco, highlights included an opening reception keynote by Qualcomm Chairman Paul Jacobs; an "industry titans" panel moderated by University of California President Janet Napolitano, who discussed the type of education engineers need to solve the grand challenge problems affecting their industries; and a short presentation format "cool ideas" session. At the conclusion of the meeting, participants were able to tour a number of Silicon Valley's high profile businesses.

# TRANSFORMING THE COMMUNITY

ASEE PARTNERS WITH NUMEROUS ORGANIZATIONS TO CREATE PRODUCTS THAT IMPACT OUR ENGINEERING EDUCATION COMMUNITY.

## I-CORPS™ FOR LEARNING

In summer 2016 ASEE ran the 4th iteration of the I-Corps™ for Learning program, an accelerated version of Stanford University's Lean LaunchPad course, designed for engineering educators. In early July we welcomed 21 3-member teams that seek to improve engineering education via their innovative products/programs. In late August they held their follow-up meeting. This continues to be a high profile effort that we manage for NSF.

## MAKER REPORT

In June 2016 we released "Envisioning the Future of the Maker Movement, a Summit Report" right on time for the National Week of Making (June 17-24th). In less than a week from its release, the White House Office of Science, Technology, and Policy requested numerous copies, and ASEE staff presented findings during the National Maker Faire in DC. The activity was funded by NSF.

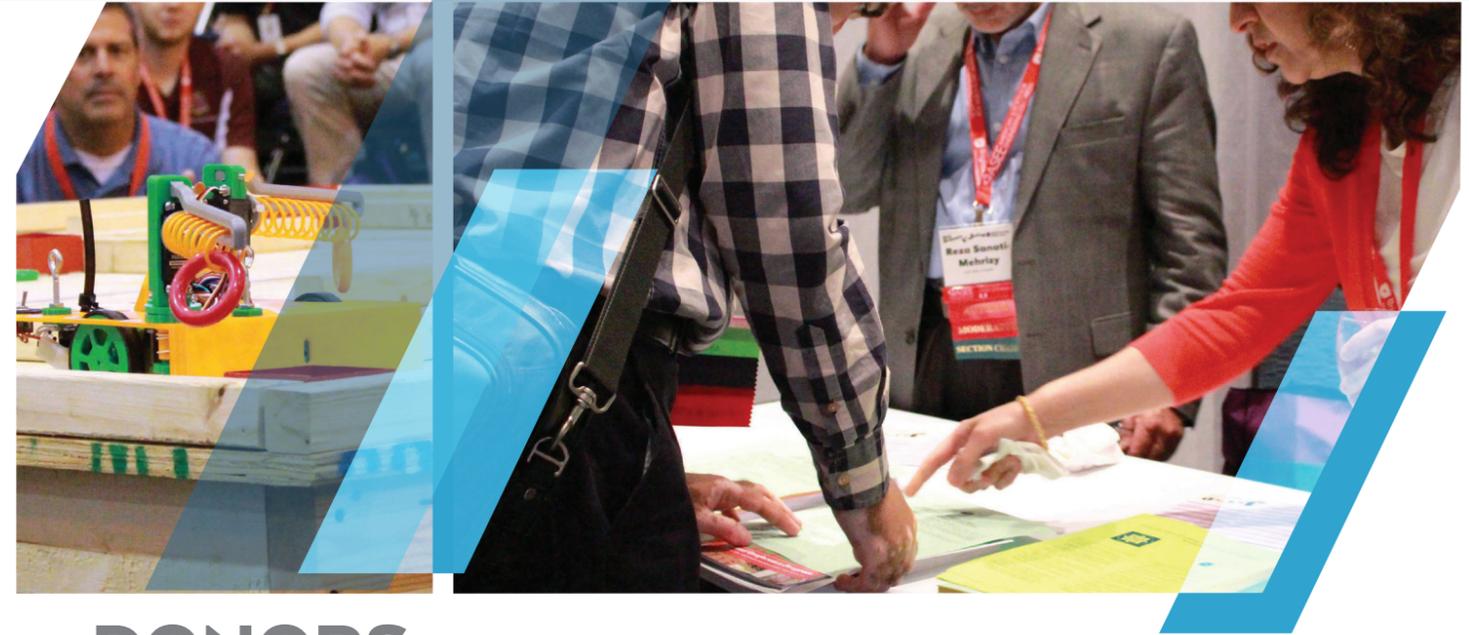
## GERMINATION

Building on our work with key stakeholders in the innovation/maker communities, in late May we hosted a one-and-a-half day workshop to bridge collaborations with the new GERMINATION (Germination of Research Ideas for Large Opportunities and Critical Societal Needs) awardees to increase the capacity of the research community to identify big opportunities, explore novel research formulations, and take intellectual risks.

## DIVERSITY & INCLUSION

In March, ASEE hosted the Geo Opportunities for Leadership in Diversity (GOLD) Ideas Lab in Annapolis, bringing together 36 people to identify new approaches to increase diversity in the geosciences. With some adaptation, several of the lessons learned from this meeting could be applicable within the engineering education ecosystem.

In April, ASEE held two online Safe Zone workshops that were attended by more than 100 participants, with a plan to host three additional online workshops this fall. (ASEE staff are welcome to join.) We also hosted six on-site workshops at the Annual Conference.



# DONORS

ASEE GRATEFULLY RECOGNIZES MEMBERS DONATING AT LEAST \$50 IN FISCAL YEAR 2016\*

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\* Not all donors may be reflected in this list due to a lag in account reconciliation. They will be included next year.



# CREATING PATHWAYS

ASEE continued its growth and outreach into the P-12 education arena. Our 13th annual PreK-12 Workshop (previously called the K-12 Workshop) at the Annual Conference in New Orleans had the theme STEM Integration through Engineering. The daylong workshop introduced classroom teachers to effective, innovative engineering education resources and activities designed to help them integrate engineering, design, and inquiry into the curriculum.

In June, the Pre-College Engineering Education (PCEE) Division (formerly the K-12 and Pre-College Engineering Division) approved a new vision, mission, and set of core beliefs to capture who the division is and what it values. The new statements build upon work of founding division members and define “pre-college engineering education” as engineering education occurring prior to the typical age for college or university students. That includes preschool through high school learners in schools as well as in such informal learning environments as museums or summer camp programs. The division is chaired by Pam Lottero-Perdue of Towson University.

In addition, the Committee on P-12 Engineering Education of the Board of Directors, chaired by Elizabeth Parry of North Carolina State University, continues its work in this area. While the division seeks to build and enrich the community of expertise, the committee’s mission is to provide strategic recommendations to the ASEE Board about proposed initiatives relevant to pre-college engineering education that may draw from ASEE’s human and capital resources. Working together within ASEE, the committee and division seek to have an impact on pre-college engineering education and situate the Society as the premier organization for expertise and action in this arena.

# REPORTING DATA TRENDS

ASEE’s department of Assessment, Evaluation, and Institutional Research administers the annual *Profiles of Engineering and Engineering Technology Colleges*, which compiles data from ABET-accredited U.S. and Canadian engineering and engineering technology schools. The resulting directory is the most comprehensive compilation of data of its kind; ASEE staff frequently field requests from members of the media for information in *Profiles*.

*Profiles* allows administrators – and students – to compare schools using a range of characteristics. Institutions participating in the *Profiles* survey receive access to the ASEE Data Management System, an interactive, longitudinal database tracking college profile information since 1998. ASEE also conducts an annual salary survey, collecting salary data by engineering department. Schools providing data can create reports aggregating salaries from selected schools at the 90th, 75th, 25th, and 10th percentiles, and find average and median salaries by department. ASEE’s Undergraduate Student Retention and Time-to-Graduation surveys provide national-level information on these two topics.

