IEEE-USA

UNLOCKING THE FUTURE:

THE 2017 IEEE-USA ANNUAL REPORT

IEEE

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LETTER FROM THE PRESIDENT

As 2017 IEEE-USA President, I outlined four strategic and operational priorities for the year:

- ★ Charting a Strategy for the Future of IEEE-USA
- ★ Leveraging "Future Leaders" as a Theme to Increase Young Professionals' Engagement, Recruitment and Retention
- ★ Promoting Increasing Diversity in the Membership and EE/CE Workforce
- ★ Increasing Organizational Flexibility and Nimbleness

We have made significant progress in each of these areas, as reflected in the program highlights below. Moreover, we did it on schedule and on budget, despite having to overcome a nearly three percent shortfall in revenues, due to the continuing decline in IEEE's U.S. higher-grade membership.

Our new strategy focuses IEEE-USA's resources over the next five years to maximize our impact on public policy and member careers. Less emphasis will be given to public visibility programs and support for local professional activities.

IEEE-USA's Young Professionals were the focus of a year-long engagement blitz offering targeted, well-received products and services for career and professional development. However, at year-end, we saw that retention of IEEE's Young Professionals in the United States, especially in the first five years following graduation, is continuing to decline.

Our award-winning, *Women in Engineering* e-book series, collaborations with IEEE Women in Engineering, the 500K Coalition, and our K-12 STEM outreach all contributed to the shared goal of advancing diversity within the engineering profession.

We enhanced organizational efficiency and nimbleness by streamlining the IEEE-USA Board of Directors and Assembly, sunsetting inactive standing committees, approaching new projects through judicious use of ad hoc working groups, and simplifying our budget and chart of accounts.

In pursuing these goals, we also sustained a proactive public policy program, offered a robust array of career and professional services for the benefit of U.S. members, and enhanced our online communications with a new website and expanded social media use. Highlights are included in this report.

I hope you find this report enlightening, and you are pleased with what IEEE-USA has accomplished in 2017, to advance the careers and represent the public policy interests of U.S. IEEE members.

Sincerely,

Karen S. Pedersen

Karen S. Pedersen, P.E.
2017 IEEE-USA President

INTRODUCTION

The Institute of Electrical and Electronics Engineers—United States of America (IEEE-USA) is a major organizational unit of the IEEE that traces its origins to the 1973 formation of the IEEE U.S. Activities Committee. IEEE-USA was created to advance the public good and promote the careers and public policy interests of the approximately 180,000 engineers, scientists and allied professionals who are U.S. members of the IEEE. A volunteer Board of Directors leads IEEE-USA, chaired by the member-elected IEEE-USA President. A professional staff based in Washington, D.C., and more than 700 IEEE member volunteers, support IEEE-USA's operations.

MISSION AND PURPOSE

As provided in IEEE's By-Laws, IEEE-USA's mission is to "recommend policies and implement programs specifically intended to serve and benefit the members, engineering professionals, and the general public in the United States. IEEE-USA shall be the organizational unit that represents the professional interests of the IEEE before U.S. governmental bodies. It shall also be responsible for coordinating and reporting, under federal disclosure laws, all official communications with government."

This mission is further described by IEEE-USA Policy 1.2, which defines as our organizational purposes the responsibility to:

- ★ **PROMOTE** the professional, social, economic and ethical status of electrical, electronics, communications and computer engineering, as well as computer science and allied branches of engineering; and also the related arts, sciences and technologies, and related technical professionals in the United States, with a special emphasis on U.S. IEEE members
- ★ **PROVIDE** technical advice and policy perspectives to U.S. policymakers at all levels, in the areas of electrotechnology and information technology, to improve the quality of life, and for the benefit of the public
- ★ **WORK** with U.S. policymakers and regulators to enhance the careers and improve the working conditions of U.S. engineers, and other technical professionals
- ★ **DEVELOP** products and services that support the lifelong professional development and career vitality needs of IEEE's U.S. members, and other technical professionals
- ★ **SUPPORT** communication with and among U.S. IEEE members, potential members, their employers, and the public about IEEE-USA, and the professional issues that affect its members and their professions
- ★ **ENHANCE** public awareness and understanding of electrical, electronics and computer engineering, and related technical fields

FINANCES

IEEE-USA operates on an annual budget approved by the IEEE Board of Directors. IEEE-USA's 2017 operations budget was $5.26 million. This budget supported the programs, volunteer activities and staff highlighted in this annual report.

IEEE-USA's activities are primarily funded through a mandatory assessment of IEEE's U.S. Higher Grade Members, indexed to inflation. The 2017 assessment was $44. This assessment generated approximately 96 percent of IEEE-USA's operating revenues for the year.

In 2017, IEEE-USA was able to offset a revenue shortfall of nearly $150K in assessment income, caused by the accelerating decline in IEEE U.S. higher grade membership. By successfully controlling expenses; downsizing and reorganizing our staff function; through conference revenues; and the sale of products and services—IEEE-USA ended the year with a budget surplus of $704.8K. This surplus includes dividends and interest totaling $564.5K, earned on IEEE-USA's 3.3M reserves.

In addition to IEEE-USA's operating budget, tax-deductible member contributions to the IEEE-USA Fund, the IEEE-USA E-Week Fund, the MOVE Disaster Relief Fund, and/or the IEEE-USA Awards Fund provided seed money for new career and professional programs and services. For information on how you can support IEEE-USA through a voluntary contribution, see: **https://ieeeusa.org/giving-opportunities**.

IEEE-USA's 2017 Treasurer was Bala Prasanna.

CHARTING A STRATEGIC REDIRECTION

Due to the steady decline of IEEE U.S. membership since 2003, and the implications for the next five-year budget planning cycle, IEEE-USA's long-term sustainability was an issue of concern to 2017 IEEE-USA President Karen Pedersen and the IEEE-USA Board of Directors.

The Board appointed an ad hoc working group on Strategic Prioritization, chaired by Scott Tamashiro. The working group outlined several options for how to better prioritize IEEE-USA programs and structure, in light of our assigned mission and foreseeable budget constraints. The Board unanimously approved the working group's recommendations, in June 2017. They reflected the recommendations in the 2018-2022 budget plan, to focus IEEE-USA's resources in two areas: public policy advocacy and career/member services.

With the themes of encouraging collaboration and eliminating unnecessary duplication, we agreed to begin exploring opportunities in 2018 with the IEEE Board and other IEEE OUs to partner, transition or phase out our other programs in the areas of public visibility, regional and student professional activities, and K-12 STEM literacy.

To help drive organizational flexibility and nimbleness, we also:

- ★ Moved to eliminate the position of Member-at-Large on the IEEE-USA Board of Directors and Assembly (since nine Board members are already member-elected)
- ★ Combined the positions of Vice President for Career & Member Services and the Vice President for Professional Activities
- ★ Sunsetted four inactive standing committees
- ★ Tackled new projects and priorities through the judicious use of ad hoc committees and working groups
- ★ Simplified our budgetary chart of accounts, and eliminated an entire program cost center

SHAPING PUBLIC POLICY

In 2017, IEEE-USA focused its government relations outreach and advocacy efforts on resisting major White House proposed cuts to federal R&D budgets, including terminating programs important to technology professionals. IEEE-USA also invested considerable effort in promoting H-1B visa reforms—to discourage using temporary visas to displace skilled American tech workers and exploit non-American guest workers.

Support for Federal R&D Funding: In response to White House proposals calling for draconian cuts to federal R&D programs in FY2018 budget appropriations, IEEE-USA worked aggressively through direct congressional contacts, and in collaboration with advocacy coalitions, to support continued federal investments, with a specific focus on three federal R&D funding agencies:

- ★ **National Science Foundation (NSF)**: IEEE-USA supported a legislative proposal to increase NSF funding in the FY2018 appropriations process, in response to the Trump administration's proposed significant cuts to NSF. The final spending legislation for FY2018 rejected the White House proposals, and it boosted the National Science Foundation budget by four percent, to $7.8 billion.
- ★ **National Institute of Standards and Technology (NIST)**: During the FY2018 budget cycle, IEEE-USA staff took a leadership role in organizing an advocacy coalition of science and engineering societies to support the programs and mission of the National Institute of Standards and Technology, in response to White House proposals to cut NIST funding by 24.6 percent. Congress responded by increasing NIST's FY2018 appropriated funding by $247 million (24 percent above 2017 levels), including a substantial increase for renovating NIST research facilities in Gaithersburg, Md., and Boulder, Colo.—a particular focus of IEEE-USA's efforts.
- ★ **Advanced Research Projects Agency-Energy (ARPA-E)**. President Trump's FY2017 and FY2018 budgets called for eliminating ARPA-E at the Department of Energy (DOE). IEEE-USA joined with other science and engineering groups, in sending letters and making visits to key Members of Congress—resulting in restoration of FY2017 funding, and approving FY2018 appropriations legislation that would continue ARPA-E's work. Funding was also restored for Quantum Computing research in the DOE's Office of Engineering Sciences.

In support of IEEE-USA's R&D advocacy efforts, 45 IEEE members from 17 states, including IEEE-USA President Karen Pedersen and IEEE President-Elect Jim Jefferies, participated in the 2017 Science, Engineering and Technology (SET) Congressional Visits Day (CVD), on 25-26 April. CVD participants visited 73 congressional offices, meeting with Members of Congress and staff, to emphasize the importance of federal SET investments to our national economy, and urge their support. More than 200 scientists and engineers, from a dozen societies, participated in CVD, co-chaired by IEEE-USA and the Alliance for Science and Technology Research in America (ASTRA).

Championing H-1B/V-1 Visa Reform: With respect to ongoing abuses of the H-1B visa program, and its use in displacing U.S. high-tech workers, the White House started the year with strong statements outlining plans to dramatically reform the H-1B visa program, and create a merit-based immigration system that was similar to proposals IEEE-USA made. Despite urging from IEEE-USA, no real proposal materialized. However, a number of smaller reforms were enacted, through regulations and executive orders, including an 18 April executive order calling on the Department of Justice to step up H1-B and L-1 visa enforcement.

IEEE-USA also worked with Representative William Pascrell's (N.J.) office to support his introduction of the *H-1B and L-1 Visa Reform Act of 2017* (H.R. 1303), a companion measure to the Senate Reform Bill (S.180) by Senator Charles Grassley (Iowa) and Richard Durbin (Ill.). IEEE-USA was integral in getting Representative Ro Khanna (Calif.) onboard, as a co-sponsor of the Pascrell bill.

On 15 Nov., the House Judiciary Committees marked up and reported Rep. Darrell Issa's (Calif.) *Protect and Grow American Jobs Act* (H.R. 170). The Act included IEEE-USA's proposed transparency and enforcement provisions to address misuse of the H-1B visa. All bills remained pending House consideration at year-end.

IEEE-USA also addressed a number of other policy issues including:

- ★ Pressuring the U.S. Dept. of Education to encourage state adoption of science and math performance accountability indicators in their K-12 curricula; and encouraging inclusion of computer science/coding in K-12 STEM education
- ★ Supporting reestablishment of the National Space Council, to set needed priority directions for the U.S. Space Program
- ★ Urging STEM-related exceptions to extreme vetting requirements for visa processing (to reduce impact on STEM-related collaborations and on students)
- ★ Supporting adoption of federal DIG ONCE policies (*The Broadband Conduit Deployment Act of 2017*, H.R. 4800)
- ★ Successfully pushing for rollback of federal travel policies limiting participation in STEM conferences
- ★ Monitoring legislative developments related to Open Access mandates on scholarly publishers
- ★ Calling for inclusion of the electric grid and national telecommunications networks in the forthcoming federal infrastructure spending bill

- ★ Reauthorizing/enhancing the federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs
- ★ Continuing the call for comprehensive energy legislation (S. 1460, H.R. 306, H.R. 431, H.R. 589)
- ★ Making professional and trade associations eligible to offer national health insurance plans to members, in the event of Obamacare repeal (H.R. 1101)
- ★ Working with Sen. Maria Cantwell on a draft bill to define Artificial Intelligence (AI) and establish a federal advisory body on AI policy (*The Future of AI Act*, S.2217/H.R. 4625)
- ★ IEEE-USA issued 24 policy communications in total, in 2017—either directly, or through advocacy coalitions. In addition, IEEE-USA's Board of Directors approved nine new or updated IEEE-USA position statements on such topics as AI, manufacturing innovation, competitiveness, SBIR, technology leadership, patent policy reforms, Dig Once, digital rights management, and energy efficiency.

Public Policy Outreach and Education: In addition to policy advocacy, IEEE-USA sponsored or participated in a number of public policy events, activities and programs designed to inform and educate policymakers and the public on important technology policy issues. 2017 highlights included:

- ★ IEEE-USA co-sponsored the Society of Women Engineers' "Diversity and Inclusion Fuels Innovation in STEM" Capitol Hill Day and reception on 15 March. IEEE-USA President-Elect Candy Robinson participated in Hill visits with Senators Ted Cruz (Texas) and John Cornyn (Texas); and Rep. Joe Barton (Texas); to discuss the importance of federal investments in R&D and STEM workforce diversity.
- ★ On 22 March, IEEE-USA joined with *U.S. Inventor* to organize a briefing with exhibits for the Congressional Inventions Caucus on *"Mothers of Invention: Celebrating Women Inventors."* The event featured a number of prominent women inventors, as well as organizations working to advance opportunities for women in entrepreneurship.
- ★ IEEE-USA livestreamed a panel session on Facebook highlighting the Washington Internships for Students of Engineering (WISE) program, held at the 2017 IEEE-HKN Student Leadership Conference on 31 March-2 April, at Purdue University.
- ★ On 12 April, IEEE-USA coordinated a briefing with representatives of the IEEE Internet Initiative and Standards Association, featuring Grace Koh, Special Assistant to the U.S. President for Science and Technology—on the role of standards, with respect to the Internet of Things and cybersecurity.
- ★ IEEE-USA and the Georgia Tech Research Institute co-hosted a Small Business Roundtable on 13 April in Atlanta, featuring a discussion on how federal and state government can better

2017 IEEE-USA President Karen Pedersen visits with Senator Cory Gardner (Colo.) during CVD on 25 April. During the visit, she presented him with the George E. Brown Award for SET Leadership.

assist small technology businesses and start-ups. Senator John Lewis (Ga.) participated in the Forum.

★ IEEE-USA arranged for Executive Director John Havens, IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems, to represent the Global Initiative as a featured speaker, at the National Academy of Engineering's 2017 Convocation of Engineering Societies in Washington, D.C., on 24 April.

★ IEEE-USA President Karen Pedersen represented the SET community in presenting the 2017 George E. Brown Award for SET Leadership to U.S. Senator Cory Gardner (Colo.), during the Congressional Visits Day congressional reception on 25 April.

★ IEEE-USA filed an amicus curiae brief before the U.S. Supreme Court on 1 Sept., in the Oil States Case, concerning the constitutionality of denying Inter Partes Patent judicial reviews that the U.S. Patent and Trademark Office conducts.

★ IEEE-USA AI Policy Committee Chair Mina Hanna authored an Op Ed article for *The Hill* (15 Dec.), highlighting the adverse consequences of a proposal in the House version of the *Tax Cuts and Jobs Act* (H.R. 1)—to tax the value of tuition reductions STEM graduate students receive for serving as teaching or research assistants. The provision was removed from the final legislation passed into law.

★ As part of our year-long effort to sustain and coordinate support for continued federal investments for research and development, IEEE-USA representatives met with the leadership of the Ames, Argonne, National Energy Technology (Houston) and Lawrence Livermore National Laboratories, and engaged the NIST Visiting Committee on Advanced Technology.

★ During the year, IEEE-USA government relations staffers briefed members on IEEE-USA public policy activities at IEEE local Section meetings in Flagstaff, Kansas City, S.E. Michigan, Lincoln, Neb., and Pittsburgh. IEEE-USA's Director of Government Relations, Russell Harrison, also delivered monthly Government Affairs updates to members via IEEE-USA's webinar series.

Congressional Briefings: IEEE-USA currently supports and organizes briefings for six congressional caucuses, and maintains the official websites for three of them. During 2017, IEEE-USA sponsored or co-sponsored the following nine congressional briefings:

★ IEEE-USA co-sponsored a joint briefing of the congressional R&D and Neuroscience Caucuses on BrainMapping on 14 June.

★ IEEE-USA participated in the first briefing of the newly formed congressional AI Caucus, on 28 June. The briefing focused on AI's potential to revitalize U.S. manufacturing. Organized by IBM, and moderated by Dean Garfield (CEO of ITIC), the AI Caucus featured David Kenny (Senior VP of IBM Watson) and Howie Choset (Professor of Robotics at Carnegie-Mellon). Following the briefing, IEEE-USA staff and volunteers made recruiting visits to ten congressional offices, soliciting their participation in the Caucus.

- ★ IEEE-USA staff worked with staff of the congressional R&D Caucus co-chairs – Reps. Barbara Comstock (Va.) and Bill Foster (Ill.) – to recruit twelve new Members of Congress to join the Caucus during a membership drive in early July. The Caucus now has 47 members; and, it is working to develop briefings on the federally-funded technology found in smart watches, and the role of Federal R&D in job creation.
- ★ IEEE-USA sponsored a luncheon briefing on 24 October for the Congressional Robotics Caucus on "Connected & Autonomous Vehicles: Incorporating AVs into Our Transportation Infrastructure."
- ★ IEEE-USA joined SIAA in organizing a briefing for the Congressional Artificial Intelligence Caucus on 7 Nov., on the topic, "Machines that Learn: Can They Also Be Taught Human Value?" The briefing panel featured Kay Firth-Butterfield, vice-chair of IEEE's Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems.

2017 Congressional Briefings	
March 22	Mothers of Innovation
June 7	Gene Mapping
June 14	Brain Mapping
June 14	AI Is Here
June 22	Regulating Research
June 28	AI and Manufacturing
Oct. 24	Autonomous Vehicles
Oct. 25	American-Made Innovation
Nov. 7	Machine Learning

Government Fellowships and WISE: IEEE-USA supports a number of government fellowships, which enable U.S. IEEE members to spend a year working in Congress; or for a U.S. government department or agency, as contributors and advisers on a variety of technology-related, public policy issues. Highlights from 2017 include:

- ★ IEEE-USA selected Jonathan Rayner for a 2017 Engineering and Diplomacy Fellowship at the U.S. State Department. Due to a freeze in hiring and fellowship placements by the new administration, Rayner was able to transition to an IEEE-USA Congressional Fellowship in May 2017, serving as a staff adviser to Rep. Jim Langevin (R.I.).
- ★ Thomas Colvin served as IEEE-USA's 2016-17 Engineering and International Development Fellow at the U.S. Agency for International Development. Colvin was assigned as Research Advisor for the USAID Partnerships for Enhanced Engagement in Research (PEER) program, which provides competitive grants to scientists in developing countries. While there, he partnered with U.S. government-supported collaborators to support research and capacity-building activities, on topics with strong potential development impacts. Colvin managed a portfolio of 27 scientific research grants across six South Asian countries. Cheryl Tulkoff, director of corporate quality at National Instruments in Austin, Texas, has been selected as IEEE-USA's 2017-2018 Engineering and Diplomacy Fellow.
- ★ IEEE-USA's Office of Science and Technology Policy (OSTP) Fellow, Dr. Greg Shannon, completed his Executive Fellowship in early Spring 2017. During his two-year stint at OSTP, supported by IEEE-USA, and in partnership with Carnegie Mellon University and the Department of Homeland Security, Dr. Shannon served as assistant director for cybersecurity strategy. He led OSTP's effort to update the National Cybersecurity R&D Plan.

★ In response to a State Department request, IEEE-USA agreed to extend the term of 2015-16 Engineering and Diplomacy Fellow Benjamin Schmitt for a third year. The State Department subsequently hired Schmitt to serve as a science and technology policy adviser for energy security and resource management across the European and Eurasian region, within the State Department's Bureau of Energy Resources.

★ IEEE-USA's three Congressional Fellows selected for 2017-2018 began their assignments in August/September. Marc Canellas is serving on the staff of Rep. Derek Kilmer (Wash.). Dr. Ronil Hira accepted an assignment with the House Education & Workforce Committee, with a focus on high-skilled labor policy. Dr. Long Lam is serving as a technology policy adviser to Senator Jeff Merkley (Ore.).

★ IEEE-USA worked with Georgetown University and the Federal Communications Commission (FCC) to facilitate the appointment of Dr. Eric Burger to a one-year term as FCC's Chief Technologist, beginning in Oct. 2017. Burger is a member and past chair of the IEEE-USA Communications and Information Policy Committee.

★ The Washington Internships for Students of Engineering (WISE) is a nine-week summer program held in Washington, D.C., that introduces participants to technology policy and shows them how engineers and scientists can contribute to the legislative process and regulatory decision-making.

IEEE/IEEE-USA's 2017 WISE Interns were Taylor Hetrick (Baylor University) and Caroline Trier (Washington University-St. Louis). Hetrick's research focused on the need to enhance STEM (Science, Technology, Engineering and Mathematics) education, through a holistic framework that included emphasis on the liberal arts. Trier focused on policy options to promote telehealth, by enhancing broadband availability in households and healthcare facilities. Their papers, along with papers from 2017 WISE Interns sponsored by other societies, appear in the WISE 2017 Journal of Engineering and Public Policy online at: **http://www.wise-intern.org/journal/2017/WISE2017.html**.

IEEE-USA sponsored two IEEE WISE Interns in 2017 L-R: Taylor Hetrick of Baylor University, and Caroline Trier, of Washington University-St. Louis

SUPPORTING MEMBERS' CAREERS

In 2017, IEEE-USA provided members with complimentary access, to a different career-related e-book title each month, drawn from our catalog of more than 150 e-books. Members downloaded a total of 10,747 e-books in 2017.

IEEE-USA also delivered 27 career and professional webinars in 2017, including a series of webinars delivered in partnership with the federal Small Business Administration, to help support entrepreneurs and small, high-tech start-ups. We also provided members with access to nearly 200 archived webinars, with supporting slides and documents, as a no-cost member benefit. In addition to regular Government Affairs updates, webinar topics on our 2017 schedule included:

- ★ Sustainability at Work (16 February)
- ★ Negotiation Strategies for Women (24 February)
- ★ Pitfalls of a Perfect Life, and the Advantages of Letting Go (2 March)
- ★ Damaging Phrases Women Use in the Office (24 March)
- ★ Trademark: The Keys to Commercialization (13 April)
- ★ Patent Claim Drafting for Beginners (8 June)
- ★ Job Seeker or Opportunity Magnet? (14 June)
- ★ What are HR Professionals Looking for in a Resume? (28 June)
- ★ How to Increase Diversity in STEM Programming (29 June)
- ★ Public Speaking (3 August)
- ★ IEEE Resume Lab (13 September)
- ★ The IEEE Group Insurance Program: Protecting Your Life and Your Business (21 September)
- ★ Selling Technical Sales to Engineering Learners (5 October)
- ★ Intro to IEEE Collabratec (12 October)
- ★ Five Things Every Job Seeker Needs To Be Successful (20 October)
- ★ Contracts and Contract Provisions (Engineering Contracts & Professional Services Agreements) (24 October)
- ★ What Does It Take To Be an IEEE-USA Government Fellow? (9 November)

IEEE-USA's 2017 Salary Survey closed on 12 May, with nearly 8,900 respondents. In September, the *2017 Salary & Benefits Report* was released, and the IEEE-USA Salary Calculator was updated, to reflect the new survey data. As a special membership incentive, IEEE-USA provided newly elevated U.S. student members with free use of the Salary Calculator, to help benchmark salary offers, as they enter the job market. IEEE-USA also released special salary reports on *Power and Energy*, *Telecommunications*, *Computing*, *Young Professionals*, and *Women in Engineering* in October.

IEEE-USA completed its 2017 Employment Survey in May, and published the Survey Report in June. This survey assesses challenges facing unemployed U.S. IEEE members.

In August, IEEE-USA partnered with the American Society of Mechanical Engineers and the American Society of Civil Engineers on a joint venture to develop a multi-disciplinary, "Pan-Engineering Salary Calculator." This calculator will draw on salary and benefit data from surveys conducted of all three engineering disciplines. The new service will be launched in Fall 2018.

IEEE-USA supported IEEE members engaged in consulting with a variety of products and services, including:

- ★ IEEE supports the IEEE Consultants Network, a membership interest group that has steadily grown over the past three years to 5,260 members/subscribers by year-end 2017. Network members receive a free IEEE-USA newsletter, with tips from practitioners, and information on upcoming consultants workshops and webinars.
- ★ IEEE-USA also helps support the IEEE Consultants Exchange, an IEEE Collabratec Community, with more than 550 registered participants in 2017.
- ★ The IEEE-USA Consultants Database helps our member consultants advertise their services, and remains a steady source of income for IEEE-USA, with 338 paid subscribers at year-end. A major database upgrade is planned for 2018. Further, IEEE-USA is exploring ways to enhance the database, and/or partner with a private-sector business to improve and expand this service.
- ★ As a service to database subscribers and survey participants, IEEE-USA published its *2017 IEEE-USA Consultants Fee Survey Report* in August. The 2017 Survey collected data from 467 participants on consulting fees, and other consulting practices.
- ★ Through the IEEE-USA Alliance of Consultants Networks Coordinating Committee (AICNCC), IEEE-USA supported the formation of two new local consultant networks—in East North Carolina and Seattle, Washington. AICNCC also partnered with the Oregon Consultants Network on a full-day workshop, held in October. Plans are underway for consultant workshops in Pittsburgh and Florida in 2018.

In the area of licensure and registration, IEEE-USA's expert volunteers assist the National Council of Examiners for Engineering and Surveying (NCEES), in developing the annual Professional Engineering (PE) examinations for electrical and computer engineering, the fundamentals of engineering and software engineering. IEEE-USA's Licensure and Registration Committee also tracks policy issues related to the practice of engineering, such as the proposals to increase the number of credit hours required to obtain an undergraduate degree in engineering; and proposed revisions to the U.S. government's GS-0800 qualifications document for procuring engineering services. The committee contributed a series of articles to *IEEE-USA InSight* highlighting its efforts, and promoting the practice of licensure and registration.

IEEE-USA held a highly successful Future Leaders Forum in 2016, as the focus of a new programmatic emphasis on serving the career needs of rising students and young professional members. Future Leaders focuses on leadership development and skills for early career technology innovators. 2017 was a planning year for the 2018 Future Leaders Forum, scheduled for 26-28 July 2018, in Austin, Texas. After the 2018 Conference, the Forum will shift to an annual schedule. To keep awareness with the target audience high during 2017, IEEE-USA partnered with the IEEE Young Professionals Committee to provide YP members with monthly offers of targeted career and professional resources, under a "Future Leaders" brand.

In addition, in 2017, IEEE-USA allocated $112K in professional activities funds in support of 108 projects or events, conducted across all six U.S. regions. Those activities included thirteen direct Professional Activities Committees for Engineers (PACE) projects and chapter grants, in addition to formula-driven regional allocations. Further, IEEE-USA provided Region 6 with a special $10,000 allocation, to support student participation in its 2017 Rising Stars Conference.

The IEEE-USA PACE Committee organized Town Hall meetings with the IEEE Santa Clara Valley Section (July), and with the IEEE New Hampshire Section (December), to promote IEEE-USA's visibility with members—and to tap useful member feedback.

IEEE-USA sponsored a total of 57 Student Professional Activities (SPAx), and related events in 2017. Organized by U.S. IEEE Student Branches, SPAx events engaged nearly 5,000 students at 27 different institutions, with career and professional development content.

IEEE-USA volunteers and staff coordinated SPAx events at Cleveland State University (CSU), Ohio Northern University, and Zane State College–among many others. One of the annual events at CSU is the VEX Robot Contest for Junior and Senior high school students–involving more than 240 participating students.

Event Date	University/College/School
1/18/2017	Cleveland State University
1/25/2017	Case Western Reserve University
2/1/2017	University of Southern California
2/3/2017	Cleveland State University
2/10/2017	Cleveland State University
2/11/2017	Cleveland State University
2/24/2017	Case Western Reserve University
2/24/2017	University of Texas at Arlington
2/28/2017	Ohio University
3/7/2017	Case Western Reserve University
3/31/2017	Case Western Reserve University
4/1/2017	Colorado State University
4/7/2017	Cleveland State University
4/7/2017	Cleveland State University
4/8/2017	Rowan University
4/15/2017	University of Maryland Baltimore County
4/28/2017	Case Western Reserve University
6/27/2017	Case Western Reserve University
6/28/2017	Case Western Reserve University
8/28/2017	Cleveland State University
8/28/2017	Cleveland State University
8/30/2017	Cleveland State University
8/31/2017	Cleveland State University
9/8/2017	Cleveland State University
9/8/2017	Cleveland State University
9/12/2017	Ohio Northern University
9/12/2017	Ohio University
9/13/2017	DeVry University-Columbus

Event Date	University/College/School
9/15/2017	Univ. of North Carolina at Charlotte
9/19/2017	University of Dayton
9/26/2017	Capitol Technology University
9/26/2017	Marshall University
9/27/2017	Cleveland State University
9/27/2017	Shawnee State University
9/28/2017	West Virginia University
9/29/2017	Cleveland State University
10/2/2017	Ohio University
10/13/2017	University of Rhode Island
10/14/2017	University of Central Florida, Valencia College and the University of South Florida
10/20/2017	Cleveland State University
10/23/2017	Zane State College
10/24/2017	Marshall University
10/25/2017	Cleveland State University
10/26/2017	University of Dayton
10/30/2017	Cleveland State University
11/2/2017	Cleveland State University
11/3/2017	Cleveland State University
11/4/2017	Case Western Reserve University
11/6/2017	Cleveland State University
11/8/2017	Cleveland State University
11/9/2017	Cleveland State University
11/11/2017	University of Pittsburgh
11/15/2017	The Ohio State University
11/29/2017	University of Memphis
12/1/2017	Case Western Reserve University
12/22/2017	Case Western Reserve University

IEEE-USA held a special multi-Student Branch SPAx event at the Orlando Science Center in Orlando, Florida, on 14 October. The program drew student members from three different Student Branches located in central, southern and western Florida, leveraged IEEE-USA's Future Leaders Forum and its leadership theme, and featured a keynote by Eric S. Ackerman of Magic Leap, Inc.

SERVING THE PUBLIC IN NEED

IEEE-USA is partnered with IEEE Regions 3 and 5, and the U.S. Red Cross, in MOVE Community Outreach—an emergency relief program committed to assisting victims of natural disasters with short-term communications, computer and power solutions. The MOVE vehicle is also used to support community outreach and learning opportunities for students and the general public in STEM. Highlights of 2017 activities include:

- The IEEE-USA MOVE vehicle deployed 24-26 March, as a featured exhibit in the Atlanta Science Festival.
- The IEEE-USA MOVE vehicle began a two-week deployment on 5 May, to provide communications and tech support to the Red Cross, and other agencies assisting victims of heavy flooding in Missouri.
- IEEE-USA's MOVE emergency vehicle and volunteers were on-site at the annual Boy Scout Jamboree (19-25 July) in West Virginia, showcasing the vehicle's technical capabilities, assisting with STEM-related projects, and providing information and advice on STEM-related careers.
- On 20-21 August, the MOVE Vehicle was mobilized to western North Carolina during the total eclipse viewing event, to support local emergency services, in anticipation that large crowds would overwhelm local emergency responders' cell and telephone networks. After providing support to the Cherokee County Emergency Operation Center and the Western Carolina Regional Airport, the MOVE truck relocated to Asheville, N.C., where it opened for public tours.
- IEEE-USA's MOVE Emergency Vehicle was mobilized to Houston (26 August) in the wake of Hurricane Harvey, to provide emergency communications and technical support to Red Cross first-responders there. The MOVE truck redeployed on 11 Sept., to support ongoing Red Cross disaster recovery efforts in Florida, following Hurricane Irma. It stopped en route in Birmingham, Alabama, where the MOVE truck and its volunteers were featured in a local CBS affiliate TV news story. IEEE-USA also streamed a live video interview in the early hours of deployment, with Volunteer Grayson Randall, who explained the challenges facing the MOVE team in Texas.

  A team of local IEEE MOVE volunteers remained deployed in southern Texas, supporting Red Cross operations centers and shelters, and helping update and repair communication systems on Red Cross Emergency Response Vehicles.

★ MOVE rolled out in October and November to support local North Carolina Red Cross "Sound the Alarm" home fire campaigns, engaging the public on electrical safety, and enlisting volunteers to install home fire alarms in targeted communities. The MOVE Vehicle also made an appearance on 16 December at the Greenville (N.C.) Convention Center for a STEM event showcasing engineering, technology and computing.

★ In late November, IEEE-USA MOVE volunteers Tim Forrest and Steve Kemp deployed to Puerto Rico, where they helped fulfill communications infrastructure needs in support of the Red Cross' continuing recovery assistance operations there, in the wake of Hurricane Maria.

IEEE-USA's MOVE Emergency Vehicle was very active in 2017, deployed to Florida, Houston and Missouri, to provide disaster relief. MOVE volunteers also provided educational services at a STEM event in N.C.; to the National Boy Scout Jamboree in West Virginia; and to a Science Festival in Atlanta.

In addition to the MOVE outreach program, IEEE-USA engages in a number of public outreach activities designed to promote awareness of engineers' professional contributions to society. 2017 highlights include:

- The IEEE-USA-supported DiscoverE Future Cities Competition finals, held on 21 Feb., in Washington, D.C., featured more than one thousand 6th-8th grade participants on 43 teams from four countries, with more than 16,000 people viewing the live-stream event. IEEE-USA President Karen Pedersen and Past President Pete Eckstein served as finals judges; Pedersen presented the Future Cities Most Advanced Smart Grid Award to the team from Franklin Middle School in Cascadia, Iowa.
- IEEE-USA also co-sponsored the 25th annual Discover Engineering Family Day on 18 Feb., at the National Building Museum in Washington, D.C., where more than 6,000 pre-teens, parents and teachers participated in activities designed to introduce children four to 12 years old to the wonders of engineering.
- IEEE-USA named IEEE members Dr. Aaron Young, director of the Exoskeleton and Prosthetic Intelligent Controls Lab at Georgia Tech; and Katelyn Brinker, engineering student and participant on the Missouri University of Science and Technology Mars Rover Design Team, as the New Faces of Engineering for 2017, in conjunction with the DiscoverE-New Faces program and 2017 National Engineers Week.
- Volunteers and staff also supported IEEE-USA's public presence at the Bay Area Maker Faire (19-21 May), AwesomeCon (6-8 June), and the World MakerFaire New York (23-24 Sept.).

IEEE-USA President Karen Pedersen served as a Finals Judge at the DiscoverE Future Cities Competition during National Engineers Week. Pedersen also presented the Future Cities Most Advanced Smart Grid Award to the team from Franklin Middle School in Cascadia, Iowa.

SPONSORING TECHNICAL CONFERENCES

Working in partnership with IEEE technical societies, U.S. Regions and Sections, IEEE-USA sponsored, or technically co-sponsored, 12 technical/ professional conferences in 2017:

- ★ IEEE Computing and Communications Workshop and Conference (9-11 Jan.)
- ★ IEEE Green Technologies Conference (29-31 March)
- ★ IEEE International Symposium on Technologies for Homeland Security (25-26 April)
- ★ IEEE Photovoltaic Specialists Conference (25-30 June)
- ★ Carbon Management Technology Conference (17-20 July)
- ★ IEEE Conference on Wireless for Space & Extreme Environments (10-12 Oct.)
- ★ IEEE TechEthics Conference (13 Oct.)
- ★ IEEE Ubiquitous Computing, Electronics & Mobile Communications Conference (19-21 Oct.)
- ★ IEEE Global Humanitarian Technology Conference (19-22 Oct.)
- ★ IEEE Intrepid Drones Conference (3 Nov.)
- ★ IEEE Conference on Technologies for Sustainability (12-14 Nov.)
- ★ 2017 IEEE Women in Engineering Forum East (30 Nov.-2 Dec.)
- ★ IEEE Signal Processing in Medicine and Biology Symposium (2 Dec.)

As part of its conference outreach, IEEE-USA hosted a booth at the IEEE Rising Stars Conference (4 Jan.), IEEE-USA SoutheastCon (31 March-2 April), the IEEE Region 1 Student Conference (7-9 April), Bay Area Maker Faire (19-21 May), AwesomeCon (6-8 June), the IEEE Power & Energy Society General Meeting (16-20 July), IEEE Sections Congress (11-13 Aug.), the World MakerFaire New York (23-24 Sept.), and IEEE GlobeCom (4-8 Dec).

IEEE-USA also partnered in a successful Founder Societies' proposal to the United Engineering Foundation to hold a workshop on *Technical and Engineering Challenges of Addressing the United Nations' Sustainable Development Goals* in 2018.

COMMUNICATING WHAT WE DO

IEEE-USA's communications highlights for 2017 include:

★ In July, IEEE-USA launched its new website with integrated webstore, developed in collaboration with IEEE IT. The new website was a culmination of almost two years of work, and features a modern look, with responsive design—to facilitate mobile access, improved search, better organization, and user-friendly content navigation. It greatly streamlines the presentation of IEEE-USA's offerings to U.S. members, as well as external audiences, with a strong focus on careers and public policy advocacy.

As an adjunct to the main IEEE-USA website development, we made substantial progress in establishing a new website to secure the Board's resource and agenda materials, using a web platform shared with TA, MGA, and other IEEE Boards.

★ In conjunction with the development of the new IEEE-USA website, IEEE-USA enhanced its flagship online publication—*IEEE-USA InSight*. The revamped publication was rebuilt from the ground up—with a clean, modern and responsive (mobile-friendly) design. New interactive elements (polls, commenting, and more) were added, and the site was fully social media enabled. The site is also integrated into the IEEE single sign-on to facilitate member access.

★ To strengthen engagement with IEEE's Young Professional members, IEEE-USA launched a monthly "Future Leaders Connection" newsletter, which also serves to reinforce the "Future Leaders" brand. This offering is mailed monthly to 30-55,000 subscribers, and it has open rates at 37 percent (very high for direct email). The career-related content shared in this newsletter is also promoted via our Future Leaders social account and website.

★ With the hire of Social Media Associate Victoria Bannon, in Oct. 2016, IEEE-USA embarked on a campaign to expand its presence in social media in 2017, and to use it more effectively in support of IEEE-USA's key messages and program goals. That effort has seen a rapid improvement in social media-empowered communication, as well as productive engagements with members. Some key elements or measures include:

» IEEE-USA has had more than three million Facebook views, one million Twitter impressions, and 18,000 Likes on Instagram, since launching its enhanced focus on social media, late last year.

» IEEE-USA added its official LinkedIn company pages, and a new Snapchat account.

» More than 12 successful Facebook advertising campaigns and popular recurring segments, such as Ted Talk Tuesday, Fall into Your Career, Women in STEM, and Engineering America have been launched.

» IEEE-USA also debuted an "IEEE-USA Influencer" campaign that recruits some of our best brand advocates to tell their IEEE-USA stories—from how we helped them in their professional life, to the benefits of membership, and more.

★ In April, IEEE-USA published IEEE's first audio e-book, *Tips for Staying Sharp Inside Your Company,* by Harry T. Roman. The audio format is proving to be very popular, averaging nearly one-third of our total e-book downloads in 2017. In December, IEEE-USA released its second professionally produced and narrated audio e-book, *Follow Your Curiosities–Finding Success Through Learning,* by Jacquelyn Nagel.

★ In June, IEEE-USA promoted a new e-book series from Disney Imagineers—*Secrets to Being a World-Changer, Parts 1 & 2*. Further, in July, we released the e-book: *Developing Your Path:*

Landing Your Dream Career—by John Collins of Snapchat, Inc. (formerly of Microsoft). Both books are targeted at early career professionals.

★ On 6 September, IEEE-USA published Sonali Ranaweera's *Abigail and The Fish Tree*, an illustrated children's e-book that tells the story of a young girl who uses her curiosity and creativity to produce a gardening wonder in her family's backyard. The book emphasizes themes of invention and problem-solving, to encourage interest in science, technology, engineering and math (STEM).

★ Currently, IEEE-USA E-BOOKS is producing a series of engineering crossword puzzles, and an e-book series on Thomas Edison. These series are part of our continued experimentation in new/innovative ways to break through the clutter of modern digital life—to reach our members with a variety of products that inform, educate and entertain.

★ IEEE-USA continues to publish some of the most successful e-newsletters in the Institute (based on comparative recipient open rates). These include the *IEEE-USA InSight Update*, *Future Leaders Connection*, *AICN Consultants Newsletter*, and the *IEEE-USA Conference Brief*.

★ IEEE-USA's digital publications, graphic designs and video/audio productions received more than 30 awards for excellence during 2017, from media organizations such as APEX, the International Academy of Interactive Visual Arts and Sciences, HERMES Creative and MARCOM—our most successful year for awards and recognitions in IEEE-USA's 44-year history.

AMERICAN ASSOCIATION OF ENGINEERING SOCIETIES

IEEE-USA is a member of the American Association of Engineering Societies (AAES), a confederation of the major U.S. engineering disciplinary societies. 2017 AAES highlights include:

★ **Financial Outlook**: In September, IEEE-USA learned that the American Association of Engineering Societies ended their fiscal year with a significant deficit and no reserves, with the American Society of Civil Engineers holding nearly $250,000 in AAES debt, as their services contractor. A meeting of member society executive directors was held in October, followed by an AAES Assembly meeting on 2 November. At the November meeting, the AAES member societies voted to form a Committee on the Future of AAES—with the charge to examine the options, and make recommendations on the future of the organization. IEEE-USA Managing Director Chris Brantley was named to the AAES ad hoc committee, which will hold its first meeting in January 2018.

★ **Role of Professional Societies in Supporting Engineering Education**: IEEE-USA arranged for an IEEE Educational Activities representative to participate on an AAES Committee on Engineering Education, which is working in partnership with an NSF-funded National Academy of Engineering study, to explore the role of professional engineering societies in supporting engineering education.

★ **National Society of Black Engineers (NSBE)**: IEEE-USA partnered with NSBE, and other engineering societies, in support of the 50K Coalition, a multi-society effort to produce 50,000 diverse engineering graduates annually, by 2025. IEEE-USA representatives participated in the 50K Coalition Convening Summit on 26-27 April, in Washington, D.C. Spearheaded by the National Society of Black Engineers, The Society of Women Engineers, the Society of Hispanic Engineers, and the American Indian Science and Engineering Society, the coalition brings together interdisciplinary engineering societies, universities, companies, and others who share a joint commitment to achieve the goal of 50,000 diverse engineers graduating from U.S. institutions annually by 2025.

★ **U.S. Advisory Committee to the United Nations Educational, Scientific and Cultural Organization (UNESCO)**: Former IEEE-USA and IEEE President Gordon Day continues to serve as IEEE-USA's representative to the U.S. Advisory Committee to UNESCO, which advises the State Department on U.S. participation in UNESCO, and its development programs.

APPENDIX I

2017 IEEE-USA BOARD OF DIRECTORS

Front Row (L-R): Kathleen Kramer, Maura Moran, Karen Pedersen, Candy Robinson, Bala Prasanna, Mauro Togneri. **Middle Row (L-R):** Bernard Sander, James Conrad, Dan Donahue, Peter Winokur, Ronald Tabroff, Ron Jensen. **Rear Row (L-R):** Chris Brantley, Francis Grosz, Roger Fujii, Tom Coughlin, Tim Worboys, Kate Duncan.

APPENDIX II

2017 PRESIDENTIAL ENGAGEMENTS

In addition to chairing the IEEE-USA Board of Directors, and overseeing volunteer and staff structure responsible for implementing the activities described in this Report—in her role as IEEE-USA President, Karen Pedersen participated in a full calendar of outreach activities and events to advance IEEE-USA's member engagement and public visibility goals, including:

- IEEE Rising Stars Conference (2-4 Jan.)
- IEEE Region 4 Meeting (Virtual) (28 Jan.)
- IEEE Region 6 OpCom Meeting (3-5 Feb.)
- Future City Competition National Finals (18-21 Feb.)
- National Academy of Engineering's Annual Gala (25 Feb.)
- Discover Engineering Family Day at the Nat'l Building Museum (25 Feb.)
- IEEE Industry Outreach (Brazil) (18-24 March)
- IEEE Region 1 ExCom (24-25 March)
- Region 3 Meeting/SouthEastCon (31 March-2 Apr.)
- IEEE-USA Awards Banquet (1 April)
- Presentation of Region 5 Stepping Stone Award to SW Research Institute (12 April)
- National Academy Convocation of Engineering Societies (12 April)
- AAES Awards Banquet (12 April)
- Engineering Societies Public Policy Forum (13 April)
- AAES Assembly (13 April)
- SET Congressional Visits Day (25-26 April)
- NSPE 2017 Professional Engineers Conference (19-23 July)
- IEEE Sections Congress (11-13 Aug.)
- NCEES Annual Meeting (23-26 Aug.)
- Iowa State University (Faculty, Dean's Leadership Class, HKN) (22 Sept.)
- NSPE Women's Leadership Retreat (29 Sept.-1 Oct.)
- AAES Assembly (2 Nov.)
- IEEE Women in Engineering East Summit (30 Oct.-2 Nov.)

APPENDIX III

2017 AWARDS AND RECOGNITIONS

IEEE Award for Distinguished Public Service

The Honorable Senator Lisa Murkowski

For outstanding leadership protecting and improving America's electrical grid and power systems, and for ongoing commitment to K-12 STEM education, especially in rural America

IEEE-USA George F. McClure Citation of Honor

Dr. Hamid Vakilzadian (Region 4)

For unequaled commitment to the growth and prosperity of the Electro-Information Technology (EIT) Conference, and for leadership in Region 4 Technical and Professional Activities

IEEE-USA Harry Diamond Memorial Award

Paul C. Manz (Region 1)

For outstanding contributions and exceptional technical leadership in the development, engineering, and transition of enabling electrotechnologies required for combat overmatch critical to the National Defense

IEEE-USA K-12 STEM Literacy Educator-Engineer Partnership Award

Erick Maxwell and Porsha Denson (Region 3)

For partnership and development of a successful, ongoing Electronic Parking Monitor Prototype Design Curriculum

IEEE-USA Jim Watson Student Professional Awareness Achievement Award

Barney Adler (Region 2)

For exemplary service in the development of a sense of professional awareness in thousands of IEEE student members

IEEE-USA Entrepreneur Achievement Award for Leadership in Entrepreneurial Spirit

Jackie Adams (Region 5)

For passionate efforts protecting human dignity through empowerment and innovation

IEEE-USA Regional Professional Leadership Award

Fawzi Behmann (Region 5)

For unwavering dedication and inspirational advocacy of professional activities in Region 5

Brian Berg (Region 6)

For outstanding services to the Consulting and Electrical Engineering professions

Gregg L Vaughn (Region 3)

For long-term service to IEEE professional activities, including Technical Lead of the design of the IEEE MOVE Truck

IEEE-USA Divisional Professional Leadership Award

Byung K. Yi (Region 6)

For prominent leadership in industry, government, standards and professional organizations, and for outstanding contributions to wireless communication research

IEEE-USA Professional Achievement Award

Subramaniam Ganesan (Region 4)

For outstanding continuous support of the Embedded Systems Workshop organization, contributing to the development of the local talent pool, which drives the economy of the region

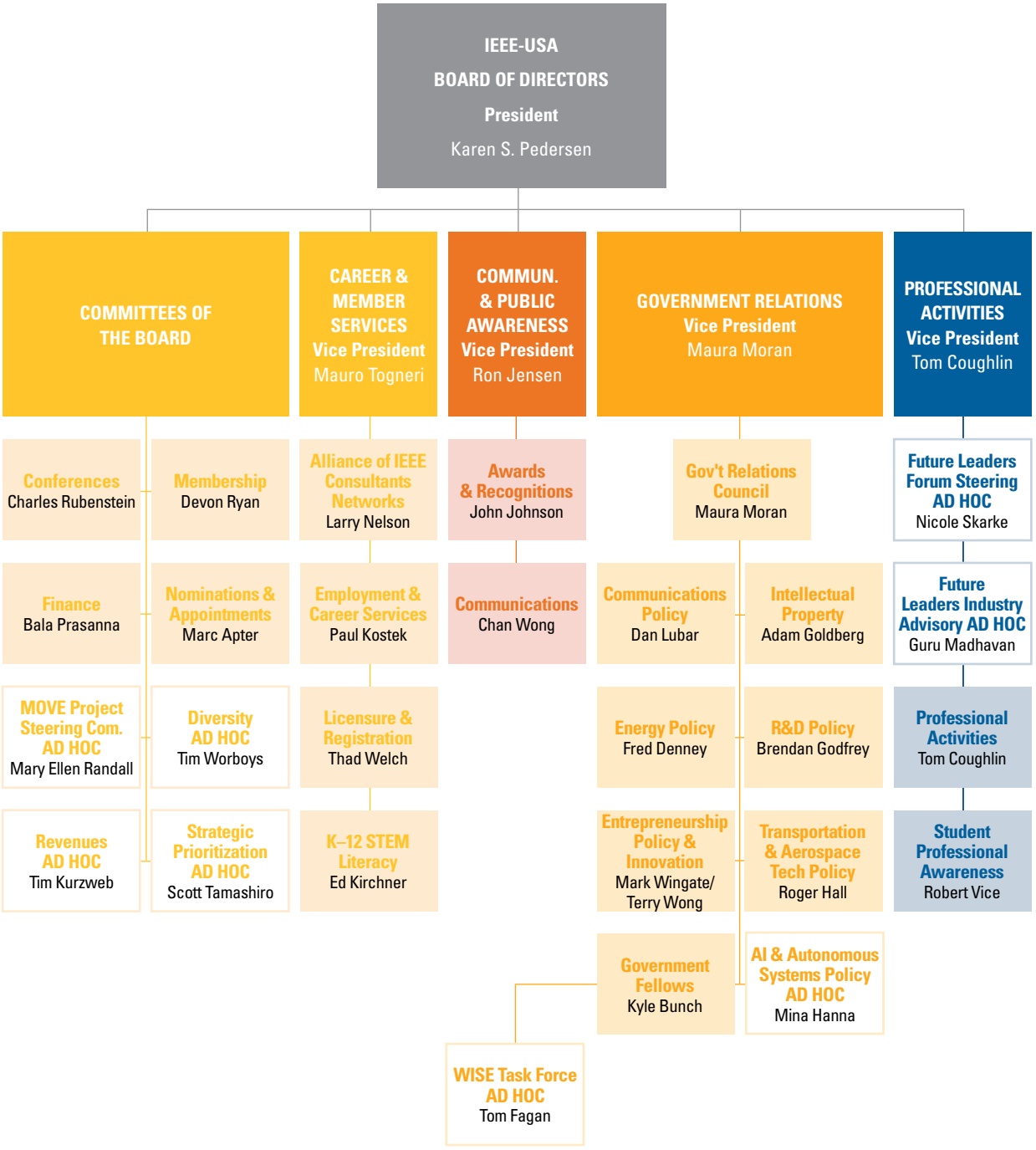
IEEE-USA Board Citation

Grayson Randall (Region 3)

In recognition of efforts raising public awareness of IEEE-USA professional activities, and for his selfless dedication in support of the MOVE Initiative

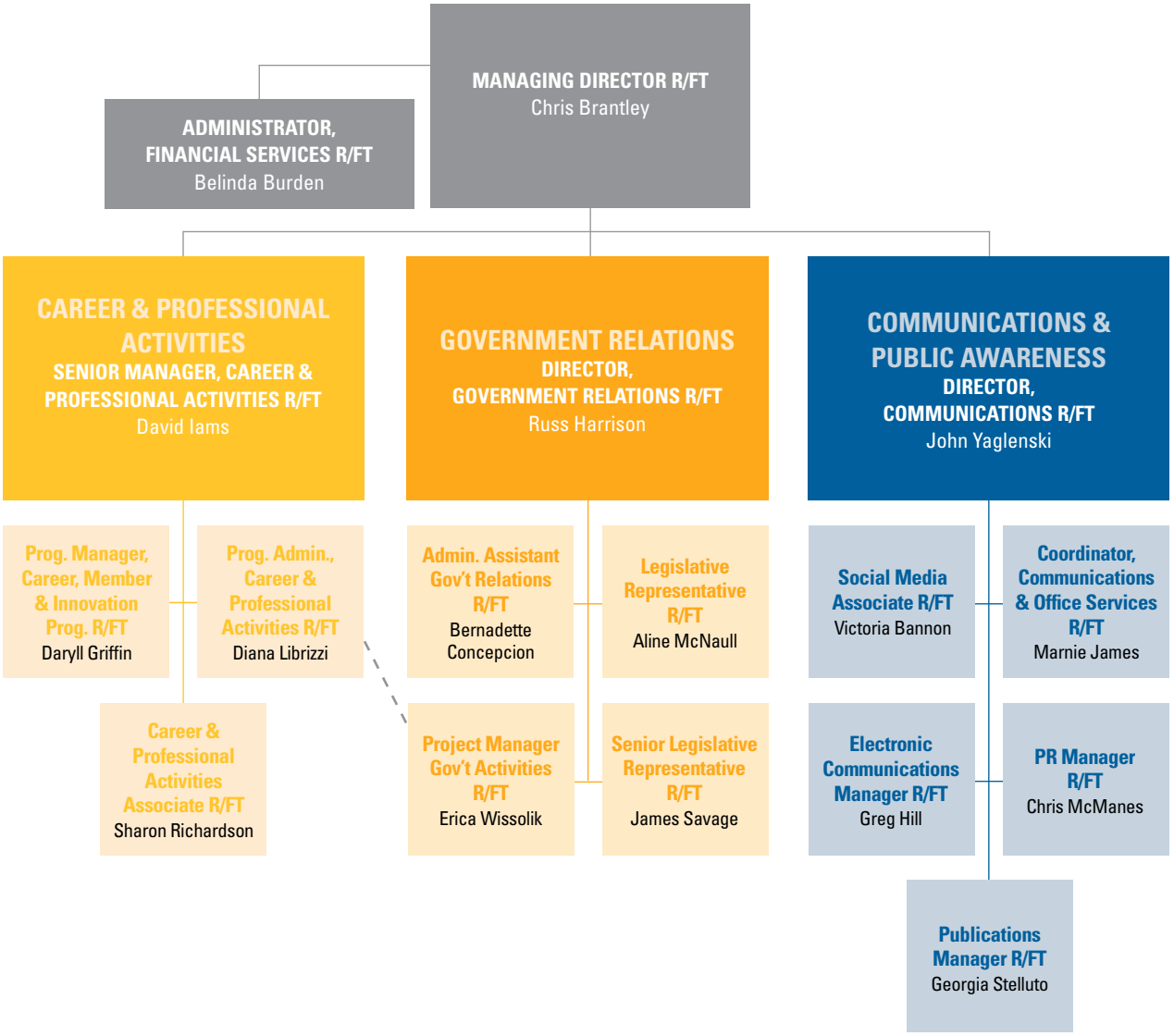
APPENDIX IV

2017 VOLUNTEER ORGANIZATION



APPENDIX V

2017 STAFF ORGANIZATION



ABOUT THE ANNUAL REPORT

The *2017 IEEE-USA Annual Report* highlights the mission, goals and programs of IEEE-USA, and its activities and achievements in 2017. This Report was developed, produced and published as a benefit to IEEE members—to increase both member and non-member awareness of the programs and services IEEE-USA provides to advance the profession—and for the benefit of U.S. IEEE members. It also serves as a reference for members seeking information on specific programs or issues, or for those seeking opportunities to volunteer their time and expertise, in support of their profession.

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ABOUT IEEE-USA

IEEE-USA advances the public good and promotes the careers and public policy interests of nearly 180,000 engineering, computing and technology professionals, who are U.S. members of IEEE. With more than 430,000 members, in over 160 countries, IEEE is dedicated to advancing technological innovation and excellence for the benefit of humanity. More information about IEEE-USA can be found online at: **https://www.ieeeusa.org**.

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