SAE International is a global association committed to advancing mobility knowledge and solutions for the benefit of humanity. By engaging nearly 200,000 engineers, technical experts and volunteers, we connect and educate mobility professionals to enable safe, clean, and accessible mobility solutions. We act on two priorities: encouraging a lifetime of learning for mobility engineering professionals and setting the standards for industry engineering. We strive for a better world through the work of our philanthropic SAE Foundation, including award-winning programs like A World In Motion® and the Collegiate Design Series™.

$90,000,000 Revenue (2019)

200,000 Engineers, Experts and Volunteers Engaged

771 New Standards

191 SAE Sections and Chapters

43 New Staff

21 Engineering Events
EXECUTIVE MESSAGE

2019 was a transformative year filled with many milestones. I am privileged to lead SAE International, an organization that has built a global portfolio and cemented itself as the leader in connecting and educating mobility professionals to enable safe, clean and accessible mobility solutions.

It is an energizing time for the mobility industry. Society’s view of mobility is rapidly evolving. How we move people and goods is changing thanks to technological innovations, but it also results in increased expectations. To ensure continued organizational success and to remain operationally nimble and responsive to the transforming mobility landscape, SAE International has evolved its approach and focus to meet those challenges.

As you will see throughout this annual report, SAE programs are aligned to deliver impactful results for our members, partners and key stakeholders. SAE International ended the year with nearly $90 million in revenue, which represents three percent growth over 2018, along with significant growth in contributions to our net assets from operations. These are healthy numbers, especially considering the notable industry headwinds in both the aerospace and automotive sectors our programs encountered in 2019.

SAE International continued to improve our status as a leader within our network and advanced the conversation about mobility in the broader society. In January, a collaboration was announced with SAE Industry Technologies Consortia on the formation of the Automated Vehicle Safety Consortium™ (AVSC) in partnership with leading automakers and technology organizations.

Our global volunteer base of nearly 60,000 engineering experts continued to make pivotal contributions to our standards, events, professional development content and pre-professional education in STEM disciplines. Without that support, we would not be able to effectively produce our programming. Throughout the year, we worked on 537 new and revised aerospace and systems management standards and 234 ground vehicle standards. Across the globe, SAE held 21 events with 950 technical sessions that reached more than 15,000 participants and 2,200 exhibitors serving the world of mobility engineering. And to promote hands-on STEM education, our pre-professional events impacted more than 110,000 students through a series of programs, many of which highlighted emerging mobility technologies.

We recognized the support from all of our contributors in November during our inaugural Contributor of the Year event where we honored our top 48 contributors and named Robert Ireland from Airlines for America as the winner of the 2019 class.

Our members continue to impress with their tireless passion and dedication for the engineering profession within the larger world of mobility and all its allied sectors. We are pleased to see the engagement with SAE International is strong with our members all across the globe. Our chapters and affiliate organizations around the world have engaging events and programs in their local territories that build and enhance community in the mobility sectors.

Thank you to 2019 Board President Paul Mascarenas and the entire SAE Board of Directors for their tireless dedication and leadership in support of our mission to advance mobility knowledge and solutions for the benefit of humanity. SAE remains committed to pursuing sustainable organic and inorganic growth opportunities to continually advance mobility for humanity, and in so doing, provide increasing value to our members and stakeholders.

There’s never been a more exciting time to be an engineer and to serve the business of mobility engineering. With all your support, SAE International is poised to have a bright future.

Raman Venkatesh, Ph.D.
Executive Vice President & Chief Operating Officer
GROWTH
In 2019, professional member acquisitions reached its highest levels in almost a decade due in part to a new system introduced this year that automatically transfers graduating seniors. As a result, more than 2,900 college graduates became professional members in 2019—a 190 percent increase from 2018. The SAE Propel platform continued to grow and afford volunteer and contributor opportunities. The platform averaged more than 70 volunteer postings each month and received hundreds of unsolicited applications. Interest in becoming a volunteer increased by 25% over 2018, with more than 2,000 individuals signed up for the volunteer pool. Fifty percent of individuals in the volunteer pool have completed a volunteer activity.

SYNERGIES
SAE created the inaugural Contributor of the Year Award in 2019 to recognize contributors for their ongoing commitment to the organization and the mobility industry. The award was bestowed to Robert Ireland from Airlines for America during a reception in Las Vegas in November. The event offered networking and engagement opportunities for the 48 members of the Contributor of the Year Class to share challenges facing the mobility industry and how their collective expertise can deliver solutions.

GLOBAL OUTLOOK
SAE membership is represented across the globe, with a presence in 94 countries and 7,945 cities, as well as all 50 U.S. states. Outside of the North America region, membership includes a heavy concentration in Asia-Pacific (14%) and Europe (6%). Worldwide, SAE members are collaborating through 191 sections—46 SAE Sections of industry professionals and 145 Collegiate Chapters of students. Two professional sections were reactivated in 2019—Texas Gulf Coast and Montreal—and the number of collegiate chapters grew from 122 to 145. Members continue to find long-term benefit in SAE membership with an average membership commitment of 12 years.
In 2019, SAE expanded its mobility focus with the development of a critical and forward-looking portfolio of standards in both the aerospace and global ground vehicles sectors. Nearly 800 new standards in total were worked on, which are critical to the mobility industry and regulatory agencies. This included work initiated on 537 new and revised aerospace and systems management standards, which added to the 7,632 aerospace and systems management standards currently available. In the global ground vehicles sector, work was initiated on 234 new and revised ground vehicle standards, adding to the more than 2,000 ground vehicle standards currently active in SAE’s portfolio.

**SYNERGIES**

- **SAE J3016™ Standard - Levels of Driving Automation** was released and became cited by the industry as the trusted reference for AV classification. Standardization work was initiated in partnership with the US Department of Transportation and industry in the areas of cooperative driving automation. SAE J3194™ Standard - Taxonomy and Classification of Powered Micromobility Vehicles was published to provide clarity and organization around the nomenclature of powered micromobility vehicles. Five additional Aerospace Material Specifications (AMS) on additive manufacturing were published, including SAE AMS7100™ and SAE AMS7101™, the first additive manufacturing polymer specifications for aerospace applications. Two key standards committees, the G-32 Cyber Physical Systems Security and G-34 on Artificial Intelligence in Aviation, were launched and the E-40 Committee on Electrified Propulsion held its first meetings.

**GLOBAL OUTLOOK**

SAE launched the Beta version of its StandardsWorks™ platform, which transforms the standards development process. SAE also engaged with new global partners to help expand the knowledge and influence of SAE standards, including adding Daimler as a new member of the SAE Motor Vehicle Council and adding Bell, Textron Aviation and UPS as new members to the SAE Aerospace Council. SAE Global Ground Vehicle Standards group increased its international involvement through work with global regulatory agencies to assist in the development of a harmonized mobility ecosystem.
Information Products grew its portfolio and increased its leadership position in important areas, such as AV, connectivity and workforce development. The SAE book program was re-designed to focus on improved quality, production efficiency and time-to-market, resulting in a 26% sales increase from 2018. *The Road to the Top is Not on the Map: Conversations with Top Women of the Automotive Industry* was published in October 2019 and quickly sold out in two weeks. Featuring 36 of the most influential women in the automotive industry, the book was SAE’s best seller of 2019. The Road to the Top also earned the distinction of being selected as one of the nine most influential technology books of the year for Gary’s Book Club at CES 2020.

In 2019, Information Products continued its expansion to digital formats, offering robust and leading content to a global customer base. The implementation of digital production and delivery practices included print on-demand as well as sales and fulfilment on leading online marketplaces. The group also strengthened its approach for protecting SAE intellectual property rights. SAE EDGE research papers were launched with 12 new, original reports that provided international, engineer-authored guidance on working with unsettled technologies. Additionally, the technical paper and journal program was expanded to include more than 2,000 new technical papers and a new journal on transportation sustainability.
Professional Development

**GROWTH**
Professional Development expanded its portfolio through on-demand courses and new partnerships. To help the industry address skills gaps in the growing AV workforce, SAE formed a strategic partnership with Argo AI, a leader in automated driving systems, to design a multi-week bootcamp in robotics for software and mechanical engineers entering the workforce. The program, set to launch in 2020, was developed in cooperation with Dr. Venkat Krovi, Michelin Endowed Chair of Vehicle Automation at Clemson University.

**SYNERGIES**
SAE continued to improve the learner experience in 2019. 24 new instructor-led courses, 15 new on-demand eLearning courses, and one new instructional text were developed on SAE key content areas: automated/connected vehicles, vehicle electrification, advanced manufacturing, advanced materials and cybersecurity. The deployment of new mobile capabilities helped deliver online learning assessments and course evaluations through mobile devices. This modern interface proved convenient for the learner by helping reduce customer access issues regarding firewalls and browser compatibility, while prompting the development of new program options.

**GLOBAL OUTLOOK**
In 2019, Professional Development expanded its global learning base in China, Europe and Latin America. SAE grew the Delegated Product Release Verification Training and Certification Program by 35%, expanded its offerings to 43 countries and taught in eight languages. Specifically in China, programs were rolled out to meet the needs of more than 500 learners in the aerospace and automotive sectors.
GROWTH
In 2019, the Engineering Events portfolio evolved to further focus on the expanding view of mobility. Innovations in Mobility was created this year as a forward-looking event that co-located and built upon eight previously-held SAE events with five new technology tracks: Smart Manufacturing, Next Gen Materials, Advanced Propulsion, Smart Mobility and Infrastructure, and Automated and Unmanned Mobility. Held in Novi, Michigan, the event explored the fundamental technological issues facing the mobility industry with leading speakers representing industry, government and higher education.

SYNERGIES
In April, WCX World Congress Experience, the premier global automotive technical event, featured 1,060 technical papers, more than 1,200 presentations and nearly 170 exhibits. Aligned with SAE’s efforts to foster informed decision-making about emerging forms of mobility, WCX featured an SAE Demo Days event, which allowed nearly 1,200 participants to experience self-driving vehicle technology firsthand, as well as a Micromobility Pavilion with demonstrations on electric scooters. Emerging mobility was further promoted at COMVEC in September where attendees rode in commercial trucks outfitted with the latest technology, such as lane assist, platooning and more, around the iconic Indianapolis Motor Speedway.

GLOBAL OUTLOOK
SAE hosted a variety of events worldwide to expand its reach to new markets. In March, the On-Board Diagnostics Symposium was held in Stuttgart, Germany, and in June, the Aviation Technology Forum was held in Shanghai, China. The AeroTech Europe event, held in Bordeaux, France, in September, attracted more than 500 attendees and focused on the European aerospace market. SAE also established a partnership in Israel to hold quarterly one-day meet-ups to discuss the latest trends in mobility impacting that emerging market.
In 2019, SAE’s pre-professional education programs—A World In Motion (AWIM) and Collegiate Design Series (CDS)—served its mission to develop tomorrow’s STEM workforce. SAE programming serviced 100,395 AWIM students and 10,355 CDS students, exceeding the original goal by 38%. Through a four-year, $1.5-million grant from Tesla, AWIM programming will reach 25,000 students in Nevada by 2023. In November, the AutoDrive Challenge™ competition with General Motors was extended to a fourth year, giving participating college students an additional year to develop and demonstrate that their autonomous vehicle can navigate an urban driving course as described by SAE J3016™ Standard Level 4 automation. The CDS portfolio expanded to directly align programming with enterprise-wide technological focus areas to build the workforce of the future. The SAE Foundation held two programs to obtain unrestricted funding. The Annual Celebration in Detroit in May featured a live interview with Roger Penske and John McElroy for Autoline.tv as well as opportunities for AWIM and CDS students to network with industry professionals. A Pi Day campaign in March garnered the most donations from new individual donors.

AWIM programming is now in 17 countries, due in part to a new global expansion plan in partnership with BorgWarner. Outside of the U.S., AWIM’s reach increased by 15% in 2019, compared to 2018, exposing Pre-K to eighth grade students to new STEM concepts in their native language. In addition, AWIM’s new IT program, Cybersecurity: Keeping Our Networks Secure, gave nearly 250 non-U.S. students an opportunity to discover concepts such as internet protocols, encryption and decryption. CDS, which now includes participants from 23 countries, expanded globally, launching Formula SAE North in Ontario, Canada. The new launch increased the competition’s capacity by 20%. Additionally, digital content improved the reach to a global audience. The CDS Podcast Series and targeted YouTube channels expanded to include more than 32,000 CDS Podcast listens and more than 130,000 YouTube views.
### 2019 BOARD OF DIRECTORS

<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Role</th>
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</thead>
<tbody>
<tr>
<td>Paul Mascarenas, OBE</td>
<td>President</td>
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<tr>
<td>Mircea Gradu, Ph.D.</td>
<td>2018 President</td>
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<tr>
<td>Todd Zarfos</td>
<td>2020 President</td>
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<tr>
<td>Pascal Joly</td>
<td>Vice President – Aerospace</td>
</tr>
<tr>
<td>Ken Washington, Ph.D.</td>
<td>Vice President – Automotive</td>
</tr>
<tr>
<td>Landon Sproull</td>
<td>Vice President – Commercial Vehicle</td>
</tr>
<tr>
<td>Pierre Alegre</td>
<td>Treasurer</td>
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<tr>
<td>David L. Schutt, Ph.D.</td>
<td>Chief Executive Officer</td>
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<tr>
<td>Gregory L. Bradley, Esq.</td>
<td>Secretary</td>
</tr>
<tr>
<td>Jeff Varick</td>
<td>2018-2021 Director</td>
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<tr>
<td>Rhonda Walthall</td>
<td>2019-2022 Director</td>
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</tbody>
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### SAE LOCATIONS

#### North America
- Warrendale, PA, USA | Headquarters
- Troy, MI, USA
- Palo Alto, CA, USA
- Washington, DC, USA

#### Europe
- Amsterdam, Netherlands
- London, UK | SAE Aerospace Standards

#### Asia
- Shanghai, PRC

### 2019 SAE MEDAL OF HONOR AWARD RECIPIENT

**Dr. Mohamed El-Sayed, P.E.**
Professor and the Former Director of the School of Engineering Technology
Eastern Michigan University

### 2019 SAE FELLOWS

- **Rami Debouk**
  GM Technical Fellow
  General Motors Company

- **Ali Emadi**
  Professor and Canada Excellence Research Chair Laureate
  McMaster University

- **John Farrell**
  Program Manager, Vehicle Technologies
  National Renewable Energy Laboratory

- **Dr. Krishna Kamasamudram**
  Technical Advisor
  Cummins Inc.

- **Michael D. Kass**
  Senior Research Engineer
  Oak Ridge National Laboratory

- **Dave Knight**
  Global Director, Turf & Utility Platform Engineering
  John Deere

- **Dr. Yucheng Liu**
  Jack Hatcher Chair Professor and Graduate Coordinator
  Mississippi State University

- **Jerzy Merkisz**
  Head of Institute of Combustion Engines and Transport Poznan
  University of Technology

- **Dr. James Parks**
  Group Leader - Applied Catalysis and Emissions Research
  Oak Ridge National Laboratory

- **Dr. Andrew C. Pickard**
  Associate Fellow, Systems Engineering
  Rolls-Royce Corporation

- **Denise M. Rizzo**
  Senior Research Mechanical Engineer
  US Army CCDC Ground Vehicle System Center (GVSC)

- **Saeed Siavoshani**
  Electrification & Hybridization Technical Specialist
  Siemens PLM & Wayne State University Adjunct Professor

- **James Turner**
  Professor of Engines and Energy Systems
  University of Bath

- **John Waraniak**
  Vice President of Vehicle Technology
  Specialty Equipment Market Association (SEMA)

- **Guangqiang Wu**
  Professor & Director
  Tongji University

- **Mingfa Yao**
  Professor & Director
  State Key Laboratory of Engines (SKLE), Tianjin University

- **Yunqing Zhang**
  Professor, School of Mechanical Science and Engineering
  Huazhong University of Science and Technology
SAE Professional Sections | North America

**UNITED STATES**
- Allentown, Pennsylvania
- Atlanta, Georgia
- Austin, Texas
- Baltimore, Maryland
- Buffalo, New York
- Cambridge, Massachusetts
- Cedar Rapids, Iowa
- Charlotte, North Carolina
- Chicago, Illinois
- Cleveland, Ohio
- Columbia, South Carolina
- Dallas, Texas
- Dayton, Ohio
- Denver, Colorado
- Detroit, Michigan
- Fargo, North Dakota
- Flushing, Connecticut
- Flushing, New York
- Fort Wayne, Indiana
- Grand Rapids, Michigan
- Hagerstown, Maryland
- Hampton Roads, Virginia
- Hartford, Connecticut
- Houston, Texas
- Indianapolis, Indiana
- Kansas City, Kansas
- Kansas City, Missouri
- Lansing, Michigan
- Los Angeles, California
- Milwaukee, Wisconsin
- Minneapolis, Minnesota
- Nashville, Tennessee
- Newark, New Jersey
- Oklahoma City, Oklahoma
- Peoria, Illinois
- Philadelphia, Pennsylvania
- Phoenix, Arizona
- Pittsburgh, Pennsylvania
- Portland, Oregon
- Rockford, Illinois
- Salt Lake City, Utah
- San Antonio, Texas
- San Diego, California
- San Francisco, California
- Seattle, Washington
- St. Louis, Missouri
- Syracuse, New York
- Tallahassee, Florida
- Washington, DC, District of Columbia
- Wichita, Kansas

**CANADA**
- Alberta (Calgary/Edmonton), Alberta
- Vancouver, British Columbia
- Winnipeg, Manitoba
- Montreal, Montreal
- Toronto, Ontario
- Ottawa, Ontario
- London, Windsor, Ontario

**MEXICO**
- Mexico City, Mexico
BRAZIL
Organized Under Our Affiliate, SAE Brazil
Campinas, Brazil
Caxias do Sul, Brazil
Minas Gerais, Brazil
Natal, Brazil
Rio de Janeiro, Brazil
Rio Grande do Sul
Parana/Santa Catarina, Brazil
Sao Carlos, Brazil
Sao Jose dos Campos, Brazil
Sao Paulo, Brazil
SAE Professional Sections | Europe and Asia

**ITALY**
Naples, Italy
Torino, Italy

**INDIA**
Organized Under Our Affiliate, SAE India
Bangalore, India
Eastern India
Northern India
Southern India
Western India

**ASIA**
Hong Kong, Hong Kong
Macau, Macau
Kuala Lumpur, Malaysia
Taipei, Taiwan