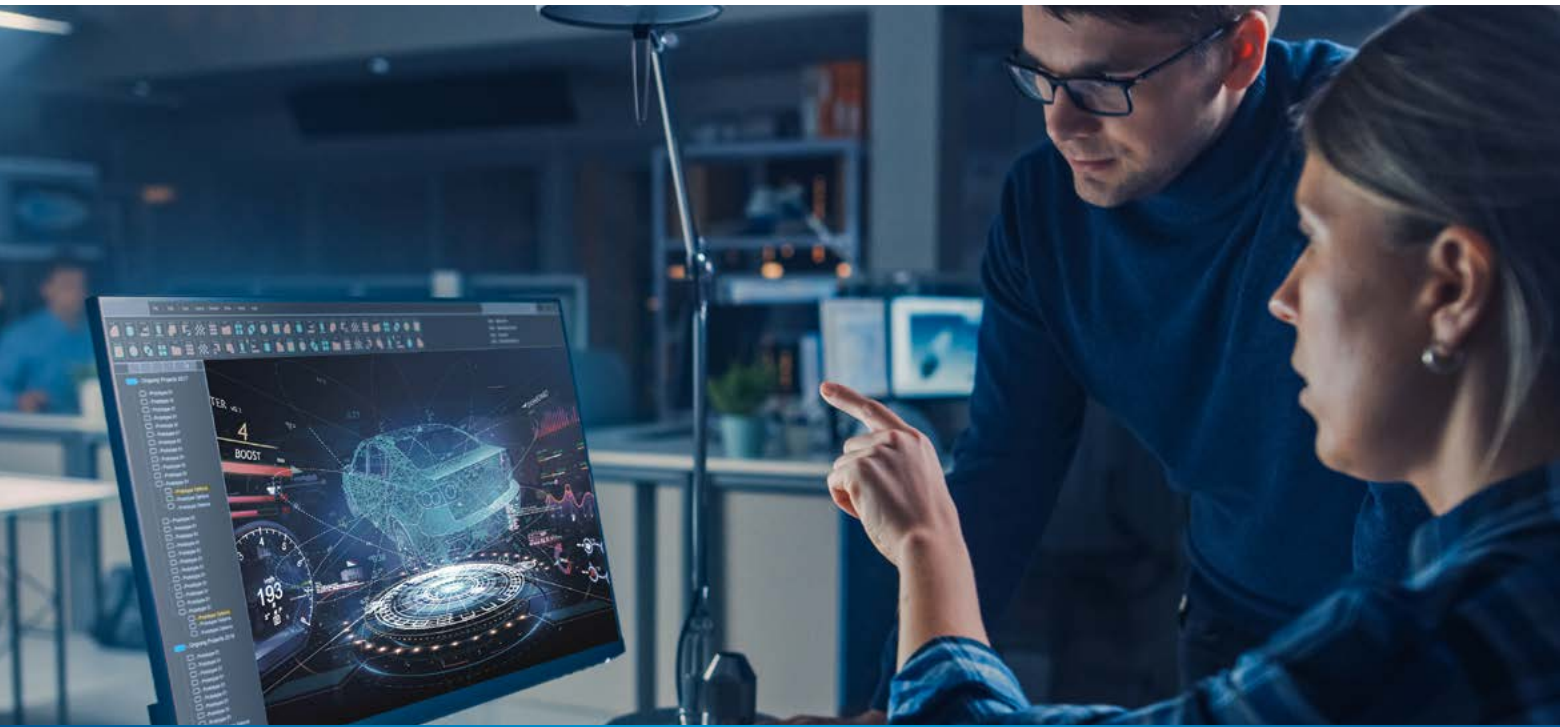




SAE International
2020 Annual Report



About SAE International

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™.



\$80,000,000 Revenue (2020)



200,000 Engineers, Experts and Volunteers Engaged



880 New Standards



154 SAE Sections



36 New Hires



8 Digital Engineering Events



Raman Venkatesh, Ph.D.
Executive Vice President & Chief Operating Officer



David L. Schutt, Ph.D.
Chief Executive Officer

EXECUTIVE MESSAGE

The COVID-19 pandemic dominated headlines in 2020 as every aspect of our lives was radically altered, from the way we work to how we interact with friends, family and colleagues. For the mobility industries that SAE International serves, a new set of unprecedented challenges were presented that could only be overcome through ingenuity and flexibility. Like all other organizations, SAE was not immune to these challenges as our business also felt the impacts of the global pandemic. Much like mobility itself, we took the challenges head on and moved forward by rejuvenating our programs to better support our members and stakeholders during a time of uncertainty. What we are most grateful for is that SAE navigated 2020 without needing to cut any mission program.

The world reconditioned itself to digital channels and we remained in lockstep, positioning our products and services with a “digital first” approach. This realignment allowed us to continue to deliver impactful results for our members, partners and key stakeholders. SAE International ended the year with nearly \$80 million in revenue and sustainable margins, which exceeded forecasts, despite the notable industry headwinds in both the aerospace and automotive sectors.

As you will read throughout our 2020 Annual Report, our shift to a technology-centric pathway enabled us to connect with audiences across the globe with an approach that focused on delivering the right content to the right audience in the right formats. Late last year, we launched the revolutionary SAE OnQue™ Digital Standards System, a first-of-its-kind system that seamlessly integrates our expansive library of engineering standards digitally to our customers. We also looked at new ways to connect directly with our members and stakeholders, launching the SAE Tomorrow Today™ podcast, which convened some of the leading voices in mobility across 38 episodes in 2020, as well as the SAE@Home video series on our website.

Despite the global pandemic that disrupted in-person activities, more than 51,000 engineering experts still stepped up to virtually support SAE’s mission through contributions in standards, events, professional development content and pre-professional education in STEM disciplines. That support allowed us to successfully pivot our approach to digital formats. Throughout the year, our standards committees took their meetings virtual and developed 657 new and revised aerospace and systems management standards and 223 ground vehicle standards. After three successful in-person events at the beginning of the year, we quickly responded to the changing landscape and pivoted eight events to digital platforms, supporting a wide-range of mobility engineering topics. Our professional development group also made sure training continued effectively, as more than 100 courses were shifted to digital platforms. Our pre-professional education team impacted more than 75,000 students, most of whom were forced to attend classes online instead of

in-school, by shifting a dozen Collegiate Design Series events to digital platforms and launching SAE STEM@Home™ with educational resources available online.

Even during a difficult year, our members were committed to supporting the engineering profession with a passion and dedication to knowledge sharing and growth. The global mobility industry is better off because of your engagement with SAE International, from supporting our events, publications, education programs and participating in your local chapters and affiliate organizations, all of which build community in the mobility sectors. To recognize the support from all of our contributors, in November, we held our second annual Contributor of the Year event virtually, where we honored our top 26 contributors and named Dean Case as the winner of the 2020 class.

SAE benefited greatly from the strong leadership of the Board of Directors, led by 2020 Board President Todd Zarfos. This was a year like no other, but through your efforts and support, SAE remained committed to pursuing sustainable organic and inorganic growth opportunities to continually advance our mission of mobility for all of humanity. We have emerged stronger in 2021 with a renewed focus on our mission and stakeholders and will look to implement new products and services that add more value.

As we look back on the past year and to what’s ahead, we are proud of the role that SAE played in supporting our partners, as we continued to sustainably advance our mission for the entire mobility industry. With your support, SAE International will continue to grow and evolve to realize an exciting future.

Raman Venkatesh, Ph.D.
Executive Vice President & Chief Operating Officer

David L. Schutt, Ph.D.
Chief Executive Officer



190 Section Events



3,300 College Graduate Members



12 Average Years of Membership



Membership & Community Engagement



GROWTH

Despite a global pandemic that disrupted in-person activities, more than 51,000 individuals virtually engaged with SAE in 2020. Interest in becoming a volunteer increased by 30% over 2019, with more than 2,600 individuals signed up for the volunteer pool. About 50% of individuals in the volunteer pool have completed a volunteer activity. The SAE Propel platform continued to grow and afford volunteer and contributor opportunities. The platform averaged more than 80 volunteer postings each month and received hundreds of unsolicited applications. As part of the system that automatically transfers graduating seniors into professional members, more than 3,300 graduating student members became professional members.

SYNERGIES

SAE held the second annual Contributor of the Year Award in 2020 to recognize contributors for their ongoing commitment to the organization and the mobility industry. The award was presented to communications consultant Dean Case during a virtual awards reception in November, which saw 26 members of the Contributor of the Year Class recognized for their ongoing support of SAE. An additional emphasis was placed on attracting and engaging dynamic female students and professionals in 2020 to further promote and encourage diversity and inclusion in the engineering field. Activities included a “Women in Leadership Chat” and a “Women in Engineering and Effective Communication” virtual mentor mixer through Member Connection™ as well as feature articles in *Update* magazine.

GLOBAL OUTLOOK

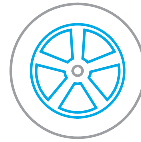
SAE membership is represented across the globe, with a presence in 86 countries as well as all 50 U.S. states. Worldwide, SAE members are collaborating through 154 sections—47 SAE Sections of industry professionals and 107 Collegiate Chapters of students. A new section, SAE Austin, was formed in 2020, while SAE Virginia was absorbed into the Washington, D.C., section to provide additional support from a gold-rated section. Members and sections remained connected in 2020, utilizing digital platforms for meetings and events. Nearly 190 professional section events were held virtually in 2020, with sections encouraging cross-section invitations that promoted collaboration and learning with peers from across the globe.



4,600 Virtual Committee Meetings



657 Aerospace Standards



223 Ground Vehicle Standards



Standards



GROWTH

The necessary shift to virtual engagement increased the number of meetings conducted by the standards development teams as compared to 2019—over 2,600 virtual aerospace and systems management meetings and nearly 2,000 virtual global ground vehicle meetings. This increased number of meetings led to more work initiated across all forms of engineering standards in 2020. Work was initiated on 657 new and revised aerospace and systems management standards, which added to the more than 7,600 aerospace and systems management standards currently available. In the global ground vehicles sector, we initiated work on 223 new and revised ground vehicle standards, adding to the more than 2,200 ground vehicle standards currently active in SAE's portfolio. Additionally, 35 new ground vehicle committees and task forces were formed in 2020.

SYNERGIES

Increased attention was put on standardization in the electric vehicle market. SAE J2954™ Standard: Wireless Power Transfer & Alignment for Light Duty Vehicles laid out requirements for EVs and infrastructure for safe charging, and the SAE EV Charging PKI Cooperative Research Project was launched in partnership with industry leaders to strengthen electric vehicle charging system security. We defined terms for Cooperative Driving Automation with SAE J3216™ to improve the safety and traffic flow of multiple vehicles in proximity to one another. In aerospace, electrification was also a key focus with two information reports on energy storage published and Aircraft High Voltage Levels finalized. The AMS-AM committee maintained significant momentum in publishing six documents and starting 15 new WIPs on additive manufacturing, and SAE collaborated with IAEG to publish AMS2461 – Plating, Zinc-Nickel Alloy (12 to 16% Ni) as an alternative to cadmium plating on industry standard parts.

GLOBAL OUTLOOK

SAE collaborated with government and industry to advance global standardization across both aerospace and global ground vehicles. To support airlines during the global pandemic, SAE specifications for aircraft cleaning were referenced by IATA and FAA, while new research work with SAE cabin, seats and cockpit committees is underway in collaboration with FAA and NIAR on safe and effective cleaning and disinfecting procedures for all parts of an airplane. SAE brought FAA, EASA and industry together to publish a new minimum operational performance standard—AS6342™—on Helicopter Hoists and new guidance on composite seats, and formalized partnerships with RTCA and IEEE to progress cohesive and collaborative standards development. SAE also worked directly with ISO, AVCC, IEEE and UL on new ground vehicle standards projects, and received USDOT FHWA funding approval to develop 17 new standards to support the foundation and advancement of V2X Communications, ADS and CADs.



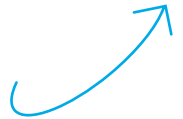
4,800,000 MOBILUS Page Views



4,000 Technical Content Published



26 EDGE Research Papers



GROWTH

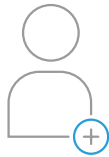
Information Products continued efforts to grow its portfolio and increase its leadership position in important areas, such as AV, connectivity and workforce development. Efforts around SAE EDGE™ Research Reports grew with 26 reports published in 2020, offering state-of-industry examinations of the most significant topics facing the mobility industry today. The *SAE International Journal of Sustainable Transportation, Energy, Environment & Policy* was launched, focusing on sustainability from environmental, energy, engineering, public policy, social and economic perspectives over the entire life cycle of mobility systems. The *SAE International Journal of Alternative Powertrains* was renamed *SAE International Journal of Electrified Vehicles* to emphasize the organization's increased focus on the components, systems and technologies concerning electrified powertrains.

SYNERGIES

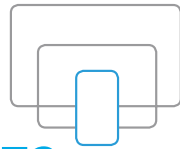
Operational efficiency remained a focus for Information Products in 2020 as collaboration and support from the industry helped guide editorial content and best practices. Open access uptake from authors doubled from 2019 to 2020 and was made available for technical papers and journals. The Journals Special Issues Program was launched to publish topically curated issues managed by expert guest editors. The SAE Books program continued to attract international attention, signing 22 new authors and over 100 contributors, to develop books around a wide range of topics. Information Products also expanded its reach with the startup community by launching the SuperPak product, an online subscription offering that grants access to the scope of SAE's technical publications for startups and smaller companies.

GLOBAL OUTLOOK

In 2020, Information Products further expanded to digital formats, offering robust and leading content to a global customer base. In late-2020, SAE's first patented product, SAE OnQue™ Digital Standards System, was launched as the first-of-its-kind cloud-based system that provides actionable standards data that can be fully integrated with customers' development and workflow tools. For the first time in its history, SAE Books published solely original works—17 in total—with a number immediately adopted by such leading universities as Michigan State University, University of Wisconsin-Madison and Purdue University. In July, the SAE book *Motorcycle Accident Reconstruction* won the 2020 Benjamin Franklin Silver Award of Publishing Excellence by the Independent Book Publishers Association.



12,500 Participants



272 Total Courses



1,550 CEUs Awarded



Professional Development



GROWTH

Professional Development prioritized providing continued high-impact, industry-applicable training programs and credentials specifically designed to advance career development. In 2020, 14 new programs were launched in key content areas, including automated/connected vehicles, vehicle electrification, advanced manufacturing, advanced materials and cybersecurity. The Robotics for Autonomous Vehicles Bootcamp was launched as a completely virtual program, and undeterred by the constraints of the pandemic, deployed small mobile robots to facilitate hands-on learning with the robotics hardware. The Delegated Product Release Verification (DPRV) courses were delivered to global audiences with 2,369 participants joining to maintain or earn the DPRV credential.

SYNERGIES

In partnership with SAE ITC's Aerospace Engine Supply Group (AESQ) and the SAE G-22 Aerospace Engine Supplier Quality Standards Committee, Professional Development was selected to develop a program to train the supply chain on the new AS13100™ standard. Using rich multimedia, including video and interactive exercises, the e-learning course development kicked off in Q3 2020 and engaged more than 20 members of the AESQ as course collaborators. Additionally, Professional Development collaborated with Membership to launch an organizational partnership with Navistar to provide more than 200 engineers with continuing education opportunities in addition to expanded membership benefits.

GLOBAL OUTLOOK

To maintain momentum and accommodate remote learning, Professional Development successfully pivoted to a fully virtual environment by converting 109 courses from instructor-led to virtually-delivered. Throughout 2020, Professional Development supported the delivery of training for participants in more than 20 countries through virtual offerings. The Shanghai-based operations team expanded its in-country instructor pool and added courses exclusively for the China market in key areas such as Model-Based System Engineering and EV/HEV technologies.



11 Engineering Events



8,500 Attendees



1,800 Papers Produced



Engineering Events



GROWTH

In 2020, Engineering Events, much like events around the world, faced immense challenges due to the pandemic. However, a focus was placed on three critical areas—the successful transition from in-person to fully immersive digital events, delivering premier technical content and implementing operational improvements to ensure safety and value. Three in-person events were held prior to pandemic-related lockdowns and eight events were shifted to digital experiences, designed to expand interactivity and equip participants with global, 24/7 access to mission-critical skills and knowledge. In March, the team postponed the in-person AeroTech® event and transitioned to a fully digital event in less than three months. To optimize the attendee, speaker and sponsor experience, three digital events platforms were used to ensure scalability from small symposia to large congresses.

SYNERGIES

An increased focus on cross-business collaboration allowed event content to be repurposed for use on Member Connection as well as several Detroit Section digital events. Engineering Events worked closely with Information Products to combine efforts on Call for Papers. In addition, collaboration with Professional Development and SAE's Media Group were advanced to offer a bespoke experience to event participants, the impact of which will be seen in 2021 and beyond.

GLOBAL OUTLOOK

In 2020, a strategic initiative was employed to expand product offerings in new markets. To support the changing needs and demands of the global engineering industry, the digital event model offered personalized experiences in which to learn, discuss and collaborate on the critical topics impacting the global mobility industry with leading organizations and thought leaders from around the world. The eight digital events held in 2020 became more globalized in nature with a diverse group of speakers and leading-edge technical content across multiple disciplines.



23 Countries with PPE Programs



76,500 Students Impacted



49 Students Earned Scholarships



Pre-Professional Education/SAE Foundation

GROWTH

Pre-Professional Education's STEM resources evolved to meet the changing landscape of 2020. Through the SAE STEM@Home™ series, the A World In Motion® (AWIM) program was pivoted for at-home and hybrid learning with curriculum guides and videos for teachers, families and students, focused on PreK-12 education. SAE's #QuaranTEAM Challenge and #COVIDcantstopgood initiatives were additions to the participation of 251 collegiate teams who took part virtually in presentations, report submissions and industry networking that created an inclusive environment for all Collegiate Design Series™ (CDS) student competitors. The Emerging Technology Series (ETS) was launched with the SAE AeroConnect Challenge™ as its inaugural program. ETS created an opportunity for teams of multi-disciplinary engineers to collaborate, design, present and defend conceptual designs with the goal of growing future mobility professionals.

SYNERGIES

To help today's students become tomorrow's innovators, AWIM established key partnerships in both industry and academia that propelled challenges like JetToy, Programming Each Other, Glider, Motorized Toy Car, Making Music and Gravity Cruiser. The Programming Each Other challenge alone reached 1,450 students in more than 540 classrooms. The CDS announced the AutoDrive Challenge™ II as another four-year competition, in partnership with General Motors. As part of a continued effort to build the pipeline of future engineers, the SAE AeroConnect Challenge™ was built to focus on emerging topics within the aerospace industry and will continue with a 2021 mission of urban air mobility.

GLOBAL OUTLOOK

Benchmarked to international standards, pre-professional programs incorporate integrated STEM learning experiences through hands-on activities that reinforce classroom STEM learning. 2020 called for the development of virtual learning experiences, allowing the programs to expand and address a global market through new and existing efforts. AWIM and CDS teams engaged with students, families and teachers from 23 countries. Whether local or global, conceptual or applied, SAE STEM solutions created opportunities for students to innovate, problem solve and engage with peers.

2020 BOARD OF DIRECTORS

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2021 President-Elect

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Landon Sproull
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Jeff Varick
2018-2021 Director

Rhonda Walthall
2019-2022 Director

Ken Washington, Ph.D.
2019-2021 Vice President – Automotive

Michael Weinert
2020-2022 Vice President –
Commercial Vehicle

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

2020 SAE MEDAL OF HONOR AWARD RECIPIENT

Richard Kleine

Vice President, Quality and
Business Enterprise (Retired)
Cummins Inc.

2020 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

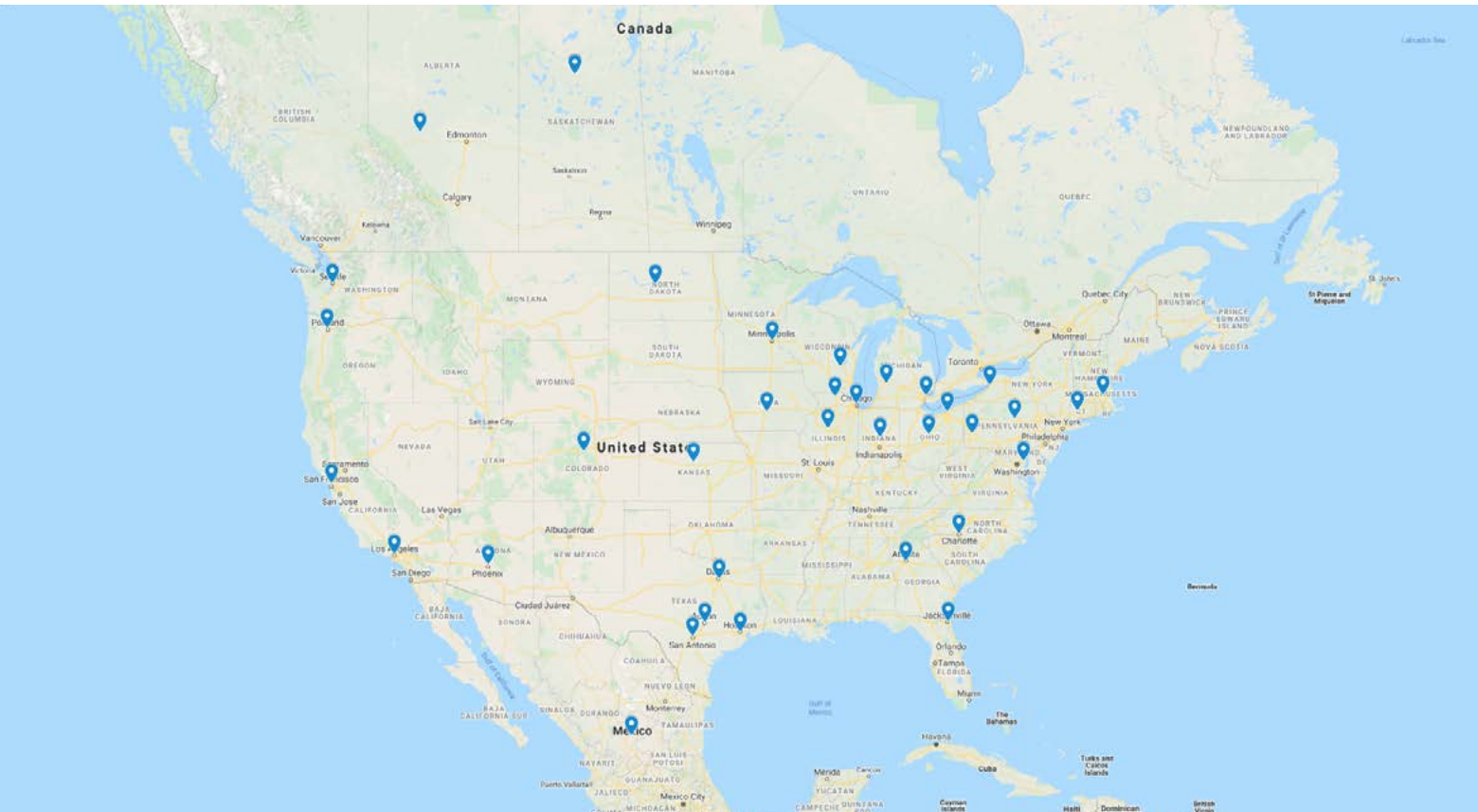
Professor & Director
Tongji University

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

Atlanta, Georgia
 Austin, Texas
 Baltimore, Maryland
 Buffalo, New York
 Cambridge, Massachusetts
 Cedar Rapids, Iowa
 Charlotte, North Carolina
 Chicago, Illinois
 Cleveland, Ohio
 Cumberland Valley, Maryland
 Dallas, Texas
 Dayton, Ohio
 Denver, Colorado
 Detroit, Michigan
 East Hartford, Connecticut
 Fargo, North Dakota
 Flushing, Connecticut
 Fort Wayne, Indiana
 Grand Rapids, Michigan
 Houston, Texas

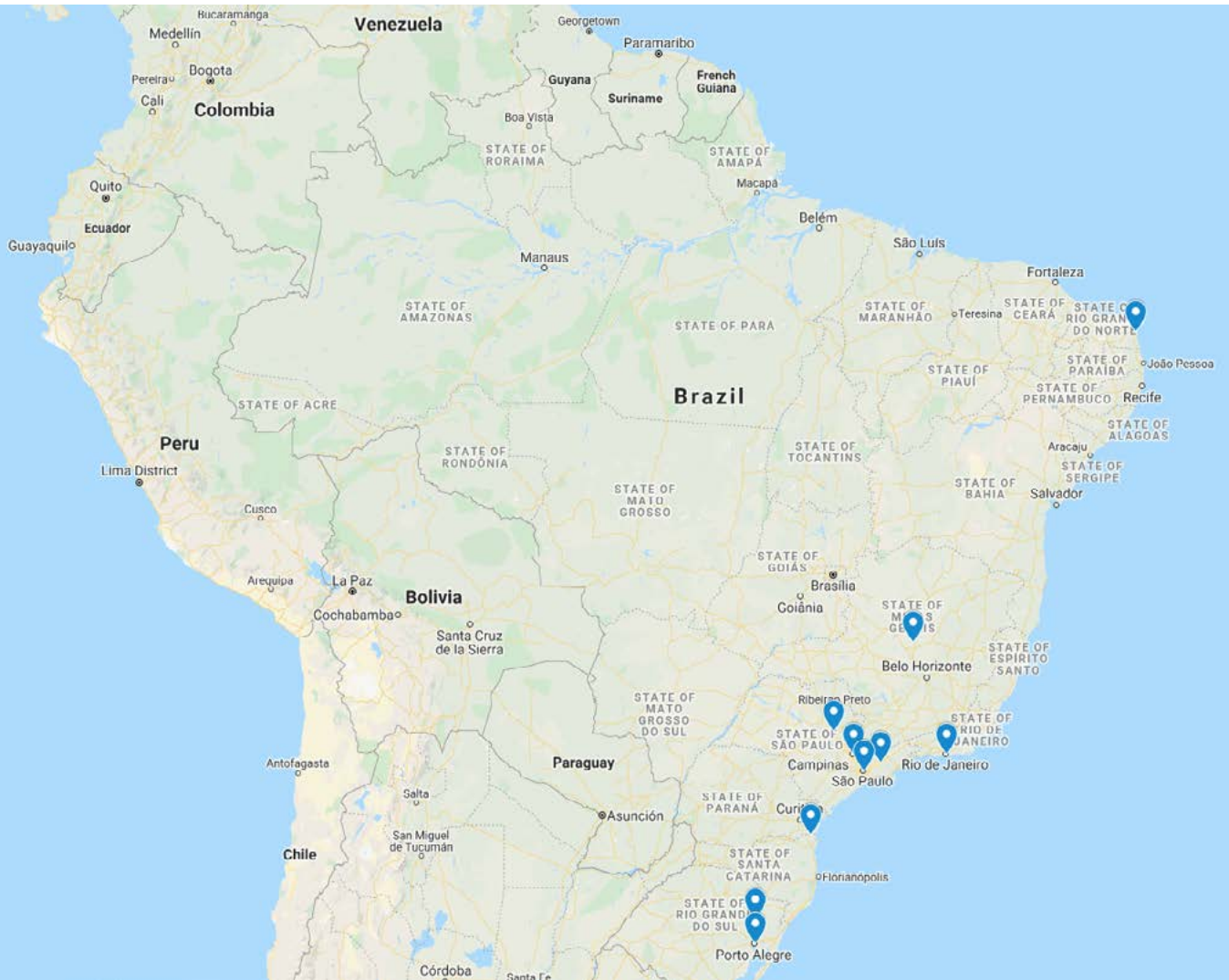
Indianapolis, Indiana
 Jacksonville, Florida
 Lehigh Valley, Pennsylvania
 Los Angeles, California
 Milwaukee, Wisconsin
 Minneapolis, Minnesota
 Peoria, Illinois
 Phoenix, Arizona
 Pittsburgh, Pennsylvania
 Portland, Oregon
 Rockford-Beloit, Illinois
 San Antonio, Texas
 San Francisco, California
 Seattle, Washington
 Washington, D.C.
 Wichita, Kansas

CANADA

Alberta
 British Columbia
 Central Ontario
 Manitoba
 Montreal
 Wichita

MEXICO

Mexico City, Mexico

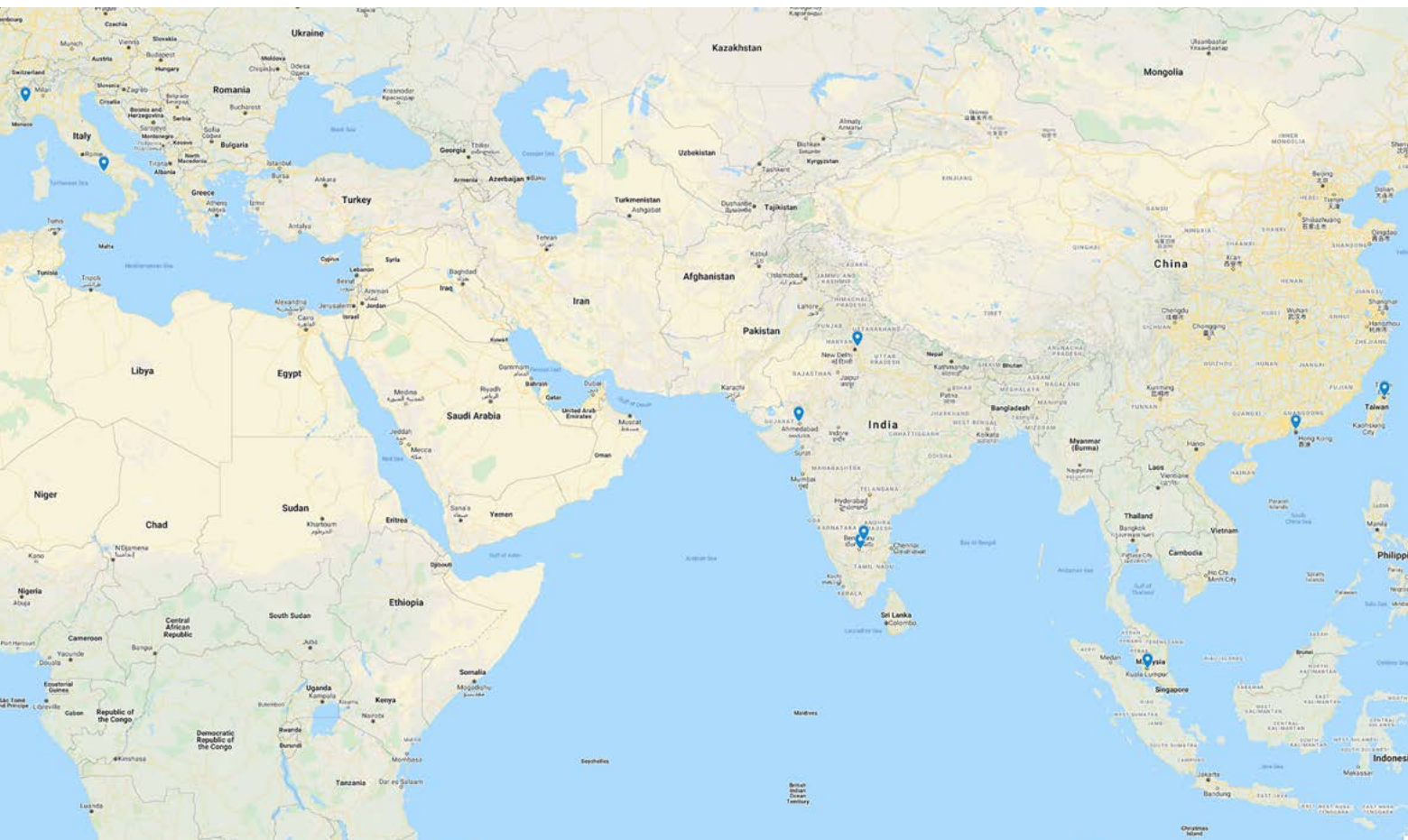


SAE Professional Sections | South America

BRAZIL

Organized Under Our Strategic Alliance Partner, SAE BRASIL

- 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
Turin, Italy

INDIA

Organized Under Our Strategic
Alliance Partner, SAEINDIA

Bangalore Section
Northern India Section
Southern India Section
Western India Section

ASIA

Hong Kong, China
Kuala Lumpur, Malaysia
Taipei, Taiwan