



2018 Highlights of ACS Achievements

An annual report from Thomas Connelly
Executive Director and Chief Executive Officer
American Chemical Society

2018 proved to be a year of significant progress and great accomplishments for ACS on many fronts. We began the year with the rallying cry 'Membership is Everyone's Responsibility'. Led by the new strategies and tactics of Kate Fryer and her Membership & Society Services team, supported by ACS volunteers and staff across the organization, ACS grew membership for the first time in more than a decade. Our membership growth both contributed to, and benefited from our global expansion. Members based outside the U.S. now comprise 19% of our total. Finally, the strength of our publishing units, combined with excellent cost management across the Society, produced our third consecutive record year for net from operations, and our second consecutive year of achieving all five of our financial guidelines.

Our Core Values were enhanced by our focus on Safety. We held our first Safety Summit, with special emphasis on safety in academic institutions. Safety continues to pervade all of our activities across the Society. Another welcome development was the agreement by ACS Publications to acquire the *Journal of Chemical Health and Safety* from the Division, starting in 2020.

Beyond Safety, the ACS Board decided at the December Board meeting to add 'Respect' alongside 'Diversity and Inclusion'. As our country continues to battle sexual harassment, the term Respect takes on greater significance. All ACS Staff participated in harassment training during 2018. We have also continued our key role in the AAAS Science and Human Rights Committee, with ACS Board Member Dorothy Phillips playing a prominent role.

Our Membership team worked hard to assure that for the first time in more than a decade, total membership in ACS grew very slightly. Innovations such as multi-year renewals, on-site renewals at national meetings, and bundling of membership with non-US symposia registration played key roles. We have also innovated with technology to reduce our footprint at national meetings, and focus our programming at the convention center, reducing our use of over-flow in hotels.

Within Scientific Advancement, the ACS Green Chemistry Institute is hitting its stride after refreshing its strategic plan and streamlining governance. The Green Chemistry & Engineering (GC&E) Conference was back in Portland, OR, with record attendance up 17%

from prior year, and high satisfaction ratings. When the Environmental Protection Agency announced that they were unable to co-sponsor the 2018 Green Chemistry Challenge Awards, ACS stepped forward to run the competition on our own, with outstanding results. Happily, EPA will be joining us again, for the 2019 cycle.

Our Education division had some significant accomplishments in the past year. AACT membership continued its steady growth, up 18% to nearly 6,000 during 2018. An exciting new Bridge Program was launched in collaboration with NSF, in an effort to increase diversity within the graduate student ranks of chemical sciences. Finally, our International Chemistry Olympiad (ICHO) team brought home four gold medals, for the second straight year, and we received some valuable tips on how to improve our ICO camp.

Our Outreach activities were enhanced by the transition to Chemists Celebrate Earth Week from the former Earth Day celebration. More local sections participated than ever before. The second March for Science presented another opportunity for outreach, and our Festival Series brought outreach beyond U.S. shores. We got a running start in the International Year of the Periodic Table (IYPT), as we announced our plans for 2019 during our Boston meeting in August 2018. IYPT opening ceremony was held January 2019 in Paris with President Bonnie Charpentier among those addressing the assembled dignitaries.

HR had an extremely busy year. It started with the rollout of the new Career Management Framework early in 2018. This was followed by an updating and simplification of our position descriptions and salary ranges, the latter making use of a broadband approach. Launch of the new HR information system, Human Capital Management/Payroll Replacement Project occurred around midyear, with a very smooth 'Go-Live'. The second half of 2018 brought a new mid-tier healthcare option, in time for 2019 enrollment, and the new competencies model that will be incorporated into the 2019 assessment cycle.

Our Strategic Planning office enhanced our use of Change Drivers in our planning process, with special emphasis on subjects such as globalization and the future of meetings. Having thoroughly documented the Society strategic planning process, the Committee is now focused on improvements to the ACS Strategic Planning Cycle.

Our Finance team played key roles in the successful launch of the new HR and Payroll systems, as well as the travel and expense reporting system. The Finance team led construction of the much-appreciated fitness center in Washington. Finance announced that the Probable 1 budget forecast will be eliminated for 2019, saving much staff effort. And 2019 will mark the arrival of a new Treasurer and CFO, Al Horvath, as Brian Bernstein retires in February.

The Development team will also be under new leadership, after a mid-year retirement in 2018. Under the capable watch of acting director Mary Bet Dobson, supported by Sir Fraser Stoddart, we successfully completed the *50 Forward* campaign, marking 50 years of Project SEED.

Information Technologies had significant contributions on multiple fronts. Consolidation of platforms between Washington and Columbus continued in areas such as Help Desk ticketing, Mobile Device Management, and Calendar/Address. ACS Publications benefited from ACS Direct Correct (enables authors to enter proof corrections and comments directly into their copy-edited manuscripts) and cen.acs.org enhancements. First steps were also taken to test the application of Artificial Intelligence to ACS Publications. Membership growth was assisted by easier website navigation for joining or renewal of membership. An effort was initiated to envision the data model and repository for the future. We increased our investment in cyber security, and created a map for future enhancements.

CAS generated its fastest revenue growth in more than a decade, through growth of enhanced products such as SciFinderⁿ and STNNext. Net from operations was a record. The new offering pipeline remains full with new service offerings and a retrosynthesis tool (ChemPlanner). CAS continues to enhance its sales and marketing skills and brand image, and CAS continues to lead as ACS expands globally.

ACS Publications also experienced high revenue growth, in its underlying sales. Manuscript submissions grew 12%, published articles grew 11%, and citations increased 8%. Six new titles were launched in 2018, and more than one-third of the journals experienced record impact factors. ACS Publications increased its global programming and representation. New initiatives such as ChemRxiv and ACS *Omega* advanced significantly. *Chemical & Engineering News* launched a new online format, and its C&EN Brand Lab contributed to improved performance.

The practice of chemistry is global, and ACS is making great strides in our Globalization efforts. ACS Board Member Ingrid Montes is leading the Board task force for globalization of our Society programs. 2018 got off to a great start with the first-ever ABCChem, hosted by SQM of Mexico, and produced by ACS. Seven chemical societies from the four Atlantic Basin continents participated in the conference. All seven want to continue ABCChem on roughly a five-year cycle.

Our efforts for Operational Excellence continue to bear fruit. In addition to the new HR information systems, and consolidation of IT platforms for CAS, Publications and the rest of the Society, other important measures have been taken to streamline our operations. We streamlined the Society Program Portfolio Management (SPPM) process, leading to impactful outcomes with less time from volunteers and staff. We introduced Chrome River, our first electronic travel and expense reporting system. We worked with the ACS Federal Credit Union, as it merged with the larger Columbus-based Pathways Financial Credit Union. Simplification was extended to governance, as the Governance Reform Task Force submitted its report.

Thanks to strong revenue growth and operational excellence efforts, financial results were at record levels. All financial guidelines were met, and included a rise in unrestricted net assets, despite the equity market melt-down in December 2018.

Collaboration has been a major theme for ACS staff during the past year, as we work to break down barriers and eliminate siloes. Our 2018 Engagement Survey showed higher staff engagement than in 2016, and above benchmark, at 83%. ‘Challenging’, ‘Rewarding’ and ‘Collaborative’ were among the top terms staff chose to describe ACS. Collaborations, both internal and external to ACS, will be an important theme in 2019.

GOAL 1—Provide Information Solutions – Deliver indispensable chemistry-related information solutions to address global challenges and other issues facing the world’s scientific community.

- **SciFinderⁿ**
CAS’s SciFinderⁿ achieved the mid-year target of 200 sales and finished the year at 400. There were >248 SciFinderⁿ converted customers and 86 new commercial customers. Penetration now amounts to 13.3% of the SciFinder market. New SciFinderⁿ capabilities introduced included commercial customer self-registration, spectral property numeric searching, and full content corpus delivery twice per week.
- **ChemPlanner**
Development progressed on the retrosynthesis (ChemPlanner) capability, positioning CAS for a release in 2019.
- **STNext**
CAS reported uptake on STNext continues with more than 40% of all STN usage through this platform.
- **Science IP**
CAS launched a new Interactive Insights Dashboard for the Science IP service in November 2018. This is a new platform to deliver search results to customers, providing additional value to the ScienceIP business.
- **Application Programming Interface (API)**
CAS completed development on minimum viable integration API, which will enable customers to retrieve substance information by searching with a Registry Number, name, or molfile.
- **Technology**
CAS Technology contributions for 2018 included improvements to our enterprise business and workplace services, improvements to the overall enterprise technology and platform infrastructure, operational improvements to improve overall services delivery, development support for releasing new products, product features, and to support Services pre-sales activities, and improvements to our overall Security, Risk and Governance frameworks.

Some key accomplishments include:

- **Product Delivery:** Completed the integration of SciFinderⁿ with ChemPlanner ARChem 2.0 Engine including CAS Reactions, delivered the revised Formulus

- product for the Early Validation Program, and delivered an enhanced User Profile management capability. Also released new versions of SciFinderⁿ and STNext to include additional features, improved performance and reliability. Optimized the data processing pipeline to reduce annual expenditures and increase frequency of product content delivery.
- ***Enterprise Technology & Information Security***: Implemented common Active Directory, Web Application Firewall & Content Delivery Network, Workforce Member Single Sign-on, Cherwell Incident / Change Management, deployed a 24x7x365 Security Operations Center, and improved Enterprise Device mobility solutions to sustain operational excellence. Increased SciFinder fraudulent registration detection capabilities by 55% per month in 2018.
- **Big Data/Analytics**
A new Data, Analytics, and Insights unit (DAI) was established at CAS in the fall of 2018. The new group is comprised of employees from Product and Content Operations and Technology. Their first charter is to progress a solution to improve patent examiner efficiency by reducing the time needed to evaluate search results.
 - **Brand Elevation**
CAS partnered with a world class PR firm and launched a global brand campaign to create awareness and affinity for the CAS brand among media and influential stake holders. Initiatives included the launch of compelling thought leadership content, strong presence at high visibility events and enablement of a consistent brand narrative via a global brand campaign and employee training.
 - **Database Growth**
There was added growth in content offered via CAS products in 2018. Most notable were again Chinese patent growth (double digit percentage increases for now >3 years), PatentPak additions, and investment in formulations for the Formulus product offering.
 - **Marketing**
In its first full year, the Agile Marketing organization began to independently leverage emerging best practices in business-to-business marketing to generate sales leads and measurably influence revenue. The CAS blog was launched to promote thought leadership and engage C-level executives and has ~3398 subscribers, and five whitepapers were published.
 - **Growth in Author Submissions, Article Output, Usage, and Citations/Impact**
Publishing Group – Journals Publishing Group
In 2018, researchers worldwide provided nearly 178,000 author submissions for editorial consideration, from which more than 51,000 articles were published across the ACS Publications' journals portfolio. The unparalleled quality, relevance, discoverability and accessibility of ACS journals is demonstrated by the exceptional usage figures for 2018. Achieving more than 133 million full text article downloads in 2018, ACS journals ensured that the research findings of authors are widely disseminated and read by the relevant global research communities. With over 3.1M total citations reported; up 8%

from the previous year, over one third of ACS journals achieved their highest Impact Factors (IF) ever.

- **Journals Publishing Group - Product Development and Technology**

- Six new journals were introduced with exceptional community support; one new journal, *ACS Materials Letters*, was approved by the Governing Board for Publishing for introduction in 2019. In the span of 16 months we developed and published in 2018 a total of five new titles under the *ACS Applied Materials & Interfaces* journal brand.
- *ACS Pharmacology & Translational Science* was introduced and published its first issues in 2018.
- ACS Publications upgraded its Digital Publishing Platform and the user interface is being completely redesigned to deliver a modern, highly functioning interface for researchers to discover, peruse and download integrated journal, book, and C&EN content. The redesign will drive additional usage, encourage citation behavior, and enhance ACS brand and product awareness, while also providing a sound framework for further growth and scalability.

- **ACS Direct Correct**

Authors of ACS journals can use the new innovative ACS Direct Correct system to both review and make direct edits to their manuscript immediately prior to publication all within a web browser. The authors' edits are electronically integrated into the work performed by ACS Publications production staff to prepare the article for publication.

- **Artificial Intelligence (AI) Pilots**

Information Technology launched an AI powered tool to assist editors in matching the best journals to transfer manuscripts, and locate relevant reviewers and potential new reviewers from an author pool for any given manuscript. They also implemented an AI-powered related articles engine for cen.acs.org. The dynamic, AI-powered related articles engine replaces 15 years' worth of existing related articles picked manually by editors. This project contributes to C&EN production efficiency by reducing the work of editors and authors who previously searched for and input related articles manually.

- **Expanded Global Presence**

- **ACS Publications Symposia:** The ACS Publications Symposium: *Innovation in Materials Science* was held in partnership with ShanghaiTech University, and attended by more than 180 international researchers from around the world. The Division also convened an ACS Publications Innovation Symposium titled *Innovation at the Frontier of Chemistry and Life Sciences*.
- **Expanded ACSI Staffing:** ACS Publications also advanced the Society's organizational goal for increased global presence, through expansion of ACSI staff in EMEA (Europe, Middle East, Africa), Asia and Latin America.
- **Editorial Appointments:** 67% of new editorial appointments made were scientists who reside outside of North America (up from 60% of new appointments in 2017).

- **India:** ACS Publications partnered with three premier organizations in India, helping to emphasize and differentiate ACS's engagement and outreach over other societies or publishers.
- **Open Access Initiatives**
 - *ACS Omega* is firmly establishing itself and on track for future success:
 - 3,600 submissions (up 75%)
 - 2,044 published articles (more than double 2017 output)
 - 1.5M article downloads (up 210%)
 - *ChemRxiv* developing successfully:
 - Over 1,000 preprints posted
 - Over 1 million article views and downloads
 - Strategic Open Access Developments: Plan S
 - In September, a coalition of thirteen European-based funders announced far-reaching plans to require open access publication of research derived through their grants. Subsequently, implementation plans were released, and a consultation period started, designed to inform actions in time for the 2020 start date of the Plan S program. During December 2018, senior leaders from ACS Publications met with the key EU proponents of Plan S, and separately with the executive for the UK's engagement with the Plan S coalition.
- **Market Outreach and Brand Awareness**
 - **ACS on Campus:** This program had its biggest year to date. Supported as a joint program by ACS Publications, CAS and Membership & Society Services, Publications hosted 54 events at institutions and meetings in 14 countries, engaging with nearly 6,000 researchers in total, and featuring 69 editors drawn from across 37 journals as speakers.
 - **ACS Publishing Center/ACS Reviewer Lab:** As a centralized portal that consolidated functionality previously in *ACS ChemWorx* and resources from the *Author & Reviewer Resource Center*, a new ACS Publishing Center (<https://pubs.acs.org/publish/>) achieved an average of 1249 sessions a day from 552 visitors within a month of launch. Other resource improvements for research authors were *ACS Author University*, a 15-video series showcasing editor advice on all aspects of the publication process, and translated versions of our online course ACS Reviewer Lab.
- **Product Development – C&EN Media Group**
 - **Re-launch of C&EN Online** - In 2018 C&EN accomplished the goal to publish all news content on the web ahead of it being released weekly in print. C&EN's new [web design](#) debuted on March 30. In addition, we launched the redesign of C&EN's website. Built for responsiveness, organized around newly designed taxonomy, and with expanded opportunities for advertising, the new cen.acs.org has greatly enhanced user experience. The project transformed the members-only paywall on the site into a metered paywall that encourages visitors to cen.acs.org to register for more access to C&EN content or to become ACS members for unlimited access.

- **Launch of C&EN's podcast, *Stereo Chemistry*** - C&EN's Multimedia Team created a new monthly podcast, aptly named [Stereo Chemistry](#), available on iTunes, Google Play and Amazon's Alexa. Its goal is to provide a channel to discuss chemistry news and share C&EN reporters' expertise and analysis.
- **Advertising Products and Services**
 - **Awards and International Outreach** - C&EN announced the [2018 class of C&EN's Talented 12](#) at the ACS National meeting in Boston. Currently in its fourth edition, the T12 program has a 2-year sponsorship by Thermo Fisher Scientific. C&EN sponsored and presented the Future Leaders symposium that the European Young Chemists Network organized as part of EUChemS 2018 in Liverpool, UK. In September, C&EN and CAS launched the [Brazilian Women in Chemistry and Related Sciences Award](#), an accolade designed to recognize Brazilian female scientists working in all areas (academic and industry) of the chemical sciences. In October, C&EN awarded poster prizes (certificates and cash awards) to 12 students attending the [Conferencia Latinoamericana de Quimica \(CLAQ\) 2018](#) in Havana, Cuba.
- **National, Expo, Regional & Specialty Meetings (Supports Goals 1 & 2)**

More than 31,000 people combined attended the ACS national meetings in New Orleans, LA and Boston, MA in 2018. In all, nearly 24,000 scientific papers were delivered with nearly 79,000 authors. The overall budget target for these meetings was achieved. For the first time, the Kavli lectures at the Boston National Meeting were streamed as a member benefit via the ACS website and accessed by nearly 150 unique users. The mobile meeting app was used by a growing majority of attendees across both national and selected regional meetings. A new Technical Program Archive site was launched during the year, providing visitors an enhanced resource to research archived abstracts from past national meetings. The Boston National Meeting Exhibitor Prospectus was awarded Art of the Show for 2018 by the International Association of Exhibitions and Events (IAEE). Over 500 companies, encompassing 81,400 net square feet, exhibited. Out of those, over 50 were brand new to ACS.

ACS also enabled the organization of nine ACS regional meetings in 2018, which attracted over 4,300 attendees combined, with over 3,000 scientific papers, and nearly 200 exhibiting companies. A visible ACS presence was created at six of these regional meetings. In 2018, the specialty meetings team restructured which allowed them to support ten meetings during the year with total attendance of 1,900 as well as negotiate venue contracts for nine future specialty meetings.

In addition, Information Technology made the following meeting application technology enhancements to serve National, Regional, and Specialty meetings: a new Mobile Meeting Application, a Single User-friendly Mobile Application that provides functionality to serve meeting types for the ACS; a new Exposition Management tool that provides online trade show logistics and management; a new Conference Management tool that provides a dynamic online solution for conference logistics, room management, onsite changes, request tracking, and reporting; and an enhanced Technical Archives

solution that provides ACS members with access to the archived abstracts from previous National meetings.

- **Kavli Lectures**

At the Spring ACS National Meeting in New Orleans, The Kavli Foundation Emerging Leader in Chemistry Lecture was delivered by Dr. Emily Cranston of McMaster University in Canada. The Fred Kavli Innovations in Chemistry Lecture was presented by Professor Angela Belcher of the Massachusetts Institute of Technology. At the Fall National Meeting in Boston, the Kavli Foundation Emerging Leader in Chemistry Lecture was delivered by Professor Jill Millstone of the University of Pittsburgh. The Fred Kavli Innovations in Chemistry Lecture was presented by Professor Harry Atwater of the California Institute of Technology.

- **National Meeting Initiatives**

ACS partnered with The Kavli Foundation on the symposium Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative at the National Meeting in Boston. This session explored the BRAIN Initiative and the role of chemical sciences in brain research.

ACS also partnered with the National Nanoscience Coordination Office (NNCO) for the National Nanotechnology Initiative (NNI). The town hall, led by Dr. Lisa Friedersdorf, NNCO Director, outlined the NNI and NNCO's plans and priorities in the coming year. The town hall was attended by 24 well-engaged attendees.

- **Delivering Learning Opportunities to Members' Desks (Supports Goals 1 & 2)**

The live broadcasts of 53 [webinars](#) for members and prospective members drew more than 23,000 participant sites (many of which had groups of individuals participating). Thirty-four percent of the audience self-identified as working in industry and 22% reported living outside the United States. The ACS Webinars Archive of edited, recorded webinars attracted more than 17,000 views — a benefit reserved for ACS members. In addition to the standard ACS Webinars, another seven [Spanish language webinars](#) were presented in collaboration with the Sociedad Química de México and *C&EN*, with almost 2,700 registrants. Emails promoting the broadcasts resulted in 234 new member joins or renewals. In addition, a promotional campaign targeting non-member webinar attendees resulted in 128 joins in the last year. Through partnerships, ACS Webinars has worked to empower our members and divisions to promote their work. It has gathered over 14,000 interested leads for various divisions and departments of ACS including the Division of Chemical Health and Safety and Division of Polymer Chemistry.

- **Providing Tools to Support Outreach and Education (Supports Goals 1, 2, & 3)**

ACS produced two live “Program-in-a-Box” virtual events in 2018: the spring “[Opioids – Combating Addiction with Chemistry](#)” and the fall “[Voyage to Mars: Red Planet Chemistry](#).” ACS Program-in-a-Box provides groups of young chemists with the opportunity to enjoy an interactive broadcast featuring stimulating science by subject matter experts, live Q&A, and social media interaction using #ACSPIB with thousands of students around the nation and world. In 2018, these two events attracted over 630 ACS

student chapters and Chem Clubs, totaling nearly 15,000 participants for the live events. Aside from the National Meetings, no other single ACS live event draws more participants than Program-in-a-Box, which is a model for providing live interactive programming to our members in a virtual setting.

- **Engaging Global Chemical Sciences Programs**

Representatives from eight international universities participated in a community exploration focused on the development of students' professional skills. Needs were identified, existing resources were shared, and potential resources considered.

- **ACS Petroleum Research Fund**

The ACS Petroleum Research Fund awarded 176 grants in 2018, providing a total of \$17.605M in research funding. Since the first grants were awarded in 1954, PRF has provided a cumulative total of \$687 million for "advanced scientific education and fundamental research in the petroleum field."

- **Sigal Postdoctoral Fellowship Awarded**

The Office of Research Grants awarded the 12th Irving S. Sigal Postdoctoral Fellowship to Dr. Herdeline Ann M. Ardoña, who completed her doctoral studies in 2017 at Johns Hopkins University under the supervision of Professors John D. Tovar and Hai-Quan Mao. Her 2018-2020 postdoctoral research will be on "Biohybrid Integration of Photoresponsive Polymeric Interfaces" under the supervision of Professor Kevin Kit Parker at the Wyss Institute of Biologically Inspired Engineering, Harvard University.

- **Teva Pharmaceuticals Grant Awarded**

Office of Research Grants awarded the Teva Pharmaceuticals Marc A. Goshko Memorial Grant to Dr. Uttam Tambar of the University of Texas, Southwestern Medical Center. Dr. Tambar proposes to develop a chemical platform to directly convert drug-like molecules that are identified as lead compounds in drug development campaigns into tools for chemical biology.

- **2018 ACS Safety Summit**

In February 2018, ACS President Peter Dorhout sponsored the first ACS Safety Summit since adopting "safety" as one of the Society's core values. ACS governance, technical units, and external stakeholders participated in discussions related to safety culture in academic laboratories. Findings from the Summit informed the ACS strategy in advancing a culture of safety in the chemical enterprise, and helped to identify tools, opportunities, and partnerships that ACS can leverage to support safety cultures.

- **22nd Annual Green Chemistry & Engineering (GC&E) Conference**

The GC&E Conference, chaired by Julie Haack (University of Oregon) and Richard Blackburn (University of Leeds), successfully took place in Portland, OR on June 18-20, 2018. Record-breaking attendance (580) combined with new innovative programming (Interactive Discussions, Product Showcase, workshops, etc.) and excellent keynote speakers led to a very well-received event. Registration was 19% higher than in 2017,

and 92% of attendees who completed the survey were satisfied or very satisfied with the Conference.

- **ACS Green Chemistry Institute (ACS GCI) Industrial Roundtables**

- *Pharmaceutical Roundtable*

- The Roundtable increased to 28 members and associate members, compared to 18 at the end of 2017.
- Two new reagent guides, a solvent selection tool, the Green Chemistry Innovation Scorecard Calculator, and a Process Mass Intensity prediction tool were created by Roundtable members and published in collaboration with ACS IT, Web Strategy & Operations, and other vendors.
- The Roundtable delivered green chemistry workshops at both ACS National Meetings, MIT, Stanford, and at multiple locations in India.
- The Roundtable awarded a total of \$175,000 in research grants in 2018.

- *Chemical Manufacturer's Roundtable*

- The Alternative Separations (AltSep) project held a workshop on October 27-28 with about 12 academic experts to explore free volume theory and diffusion in non-porous polymer membranes for small molecule separations. The final report to NIST is undergoing review by member companies with a view to submission by the end of the first quarter 2019.
- Progress continues on the High Performance Computing for Manufacturing (HPC4Mfg) grant. Phase II is about 40% complete and continuing at a faster pace with sufficient resources allocated on National Energy Research Scientific Computing Center (NERSC) and National Renewable Energy Laboratory (NREL) supercomputers. A no-cost extension has been granted through December 2019.

- *Hydraulic Fracturing Roundtable*

- The roundtable is in the process of setting up a collaboration with the Montana State Center of Biofilms Engineering to advance the Enzymatic Degradation of Biofilms to Reduce Biocides Use project.
- TetraTech was retained to update the 2015 tool for documenting and evaluating chemical use in hydraulic fracturing. The Roundtable intends to make this tool publicly available.

- *Biochemical Technology Leadership Roundtable (BTLR)*

- Two additional companies have joined the BTLR, for a total of eight companies: White Dog Labs, LanzaTech, Calysta, Origin Materials, Qualitas-Health, Oxford Biotrans, Kalion, and Ginkgo Bioworks.
- The BTLR is working on a draft white paper with the Pharmaceutical Roundtable.

GOAL 2—Empower Members and Member Communities – Provide access to opportunities, resources, skills training, and networks to empower our members and member communities to thrive in the global economy.

- **A Robust Membership**

As of year-end 2018, the Society had 151,012 (151,248 was peak December 20) members. Another bright spot was ACS's international membership rising to a record high of over 28,500 members residing outside the United States, now representing 19%

of our total membership. Separately, declines in the number of ACS members working in industry occurred again in 2018. However, the pace slowed in 2018 to a year-over-year decrease of 4.0% from 5.8% and we are committed to finally reversing this trend in 2019.

- **Launching New International Meeting Concepts**

The Atlantic Basin Conference on Chemistry (ABCCChem) was held in January 2018 in Cancun, Mexico. The conference, a combined effort of national eight chemical societies (ACS, CSC, EuCheMS, FASC, FLAQ, SACI, SBQ, and SQM), brought together researchers from Africa, Europe, and North and South America for four days. There were nearly 230 attendees from more than 20 countries. Over 150 scientific papers were presented within four conference themes representing a mixture of both oral and poster sessions.

- **Supporting Students and Student Chapters**

As of year-end 2018, the number of active ACS Student Chapters stands at 521, eclipsing the goal of 450 active chapters. We chartered 27 new student chapters last year. Among the 450 active chapters, 221 participated in seven different ACS grant programs. In sum, 247 grants totaling over \$90K were distributed.

- **Collaborations Enhance Student Programming and Resources**

ACS Education collaborated with ACS on Campus, the Younger Chemists Committee, the International Activities Committee, External Affairs & Communications, and Membership to offer programming to students at ACS national meetings and to expand the portfolio of resources for students. ACS student chapters held roughly 10,000 events in their communities. In 2018, 69 outstanding, 72 commendable, and 145 honorable mentions awards were given to student chapters.

- **Connecting Members to Improved and Streamlined Grant Resources**

In 2018, a new Grant Management platform was launched to provide members with a more consistent experience when applying to available grant programs. Eight unique grant/award programs were launched on the platform, including Local Section Grant Programs, the ACS Heroes of Chemistry, Technical Division Grant Programs and Public Policy Fellowships. Nearly 100 grant/award applications were submitted and successfully processed in 2018 with additional programs scheduled to launch in January 2019.

- **Connecting Members to Online Best Practices Resources**

A new resource was deployed on the ACS Network to connect component groups with online best practices and one another. The site provides not only a resource of links to various sites and tools but also references applicable to ACS Bylaws & practical considerations that will assist them in the areas of outreach, social media, governance and internal communications.

- **Proposal Writing Webinars**

The Office of Research Grants delivered ACS webinars on writing competitive proposals on May 3 and September 6. Approximately 2,000 sites registered for each webinar, with

almost 1,000 live sites joining the May webinar. The online audience included 25-30% international attendees.

- **Learning Management System**

Information Technology launched a new Learning Management tool that provides ACS members and those engaged in the chemistry enterprise with the education, leadership development, and career services they need to succeed and thrive in their professions. Additionally, using the same platform, Moodle, we successfully migrated the functionality of a previous tool – New Teacher Center, to create the Hach Mentoring program which is a mentor-mentee match program for Chemistry teachers (K-12).

- **Helping Members Navigate their Careers**

In 2018, ACS tested a series of events designed to provide ACS career services, resources, and job opportunities to ACS members in their local communities. The 2018 test was run at four locations, serving approximately 350 chemists. Nearly 30% of the attendees took advantage of ACS career services.

- **NSF Awards Innovations in Graduate Education Grant**

A three-year grant of nearly half a million dollars from the NSF is supporting a nationwide project, led by ACS, to develop approaches and tools for assessing and improving the use of individual development plans (IDPs) with graduate students.

- **Use of Online Career Planning Tool ChemIDP™ Grows by 50 Percent**

ChemIDP was showcased at seven campus workshops, three ACS national and regional meeting events, and three conference presentations. The number of users of the online career planning tool increased 50.6% from 2,623 at the end of 2017 to 3,951 at the end of 2018.

- **Career Roadmaps Created**

Two career roadmaps were designed in 2018, one on careers in high school chemistry teaching and the other on careers in the toxicology field. Both provide students and career explorers with a high-level view of career preparation, job searching, networking, and learning and development opportunities that enables growth and advancement.

- **Leadership Courses Sell Out at ACS National Meetings**

For the first time, the ACS Leadership Development System courses offered at both ACS national meetings sold out. As a result of demand, the schedule for the fall national meeting was extended by a day. Spring and fall enrollments increased from 47 and 139 in 2017 (186 total) to 127 and 166 in 2018 (293 total).

- **Professional Education Pathway to ACS Membership**

In 2018, 92 non-member registrants for Professional Education courses were converted to ACS Members, up from 81 in 2017. A new course entitled Chemometric Techniques for Quantitative Analysis was offered at the Spring 2018 ACS National Meeting.

- **www.acs.org Website Transformation**
The ACS website has been updated to create a more customer-centric and engaging experience. The site's information architecture, content strategy, and design were overhauled as part of the process. Elements of brand storytelling were also introduced to present a compelling narrative throughout the site that is emotive and aspirational, connecting the myriad of ACS products and services to our mission and vision.
- **Connecting Division Program Chairs**
At the Fall National Meeting in Boston, ACS President-Elect Bonnie Charpentier hosted a breakfast meeting for program chairs in order to provide them with a venue to collaborate on programming and discuss programming needs and aspirations. The program was well received and had 42 participants representing over 20 technical divisions.
- **2018 ACS Chief Technology Officer Summit**
Staff in Industry Member Programs and External Affairs & Communications provided major support for the successful 2018 Summit by arranging for all of the Summit's programmatic aspects, including (1) three panels where CTOs, along with external experts, exchanged ideas on key topics; (2) an evening welcome reception that connected CTOs with a variety of DC-based policy related individuals from Capitol Hill, federal agencies, scientific and academic societies; (3) breakfast remarks by U.S. Senator Stephen Daines (R-MT) – the only chemical engineer in the Senate and one of the co-founders of the Senate Chemistry Caucus; and (4) an update by EPA Deputy Assistant Administrator Erik Baptist on key new environmental provisions.
- **Global Chemists Code of Ethics Training**
Office of the Secretary and General Council staff hosted a workshop in Kuala Lumpur, Malaysia from October 14-18 as part of the Global Chemists' Code of Ethics (GCCE) grant from the U.S. Department of State's Chemical Security Program (CSP). This workshop served as a capacity-building event for chemical societies from recent conflict zones, and included participants from Somalia, Libya, Iraq, and Malaysia.

GOAL 3—Support Excellence in Education – Foster the development of innovative, relevant, and effective chemistry and chemistry-related education.

- **50th Anniversary of Project SEED Sets the Stage for Future Opportunities**
ACS celebrated the nearly 11,000 economically disadvantaged high school student participants in Project SEED, including 430 selected for summer research experiences in 2018. A new Project SEED website was launched, and eleven Project SEED alumni were featured in *Chemical & Engineering News*. A webinar series for coordinators and mentors was initiated in December.
- **50 Forward Campaign**
Nobel Laureate Sir Fraser Stoddart served as Champion for the campaign of the 50th anniversary of ACS Project SEED, leading a *50 Forward* volunteer committee of ACS members focused on maximizing fundraising efforts.

- Enhancing Networking and Mentoring for ACS Scholars**
 For more than 20 years, ACS has provided renewable scholarships to over 3,199 minority students majoring in chemistry-related disciplines, 307 of whom have since received a PhD or MD/PhD. Expansion of the ACS Scholars profile series, assessment of mentoring, and integration of mentor training into activities are positioning current ACS Scholars to develop their networks and obtain various types of mentoring. In 2018, 143 ACS Scholars were selected for a total of 400 ACS Scholars with over \$1.2 million in scholarship funding and over \$10,000 in travel awards to attend ACS national meetings.
- New Endowed ACS Scholars Program Scholarships Established**
 Four endowed scholarships were established within the ACS Scholars Program in 2018. Individuals and groups raised funds to name scholarships. Named ACS Scholars, a select group of about 20 students who are each supported by a scholarship in an individual donor's name, gathered at the annual Endowment Founders reception and dinner. The event provides an opportunity for these students to meet and personally thank the donors who support them through their endowments.
- NSF Support Obtained for ACS Bridge Project**
 A five-year \$2.3 million grant from NSF is supporting the creation of sustainable transition (bridge) programs, a national network of doctoral granting institutions that provide substantial mentoring for students to successfully complete PhD programs, and ACS Bridge Travel Awards. The project is part of the Inclusive Graduate Education Network (IGEN), formed by ACS and four other scientific societies to increase the participation of women and underrepresented racial and ethnic minorities in graduate studies in the physical sciences.
- Expansion of Workshop Series Engages 137 New Faculty**
 In 2018, two three-day workshops (Denver, CO in June and Washington, DC in August), a one-day workshop (concurrent with the ACS Southwest Regional Meeting in November), and two post-workshop webinars were held for new faculty. The participants were in their first, second, or third year of appointment at research-intensive, comprehensive, primarily undergraduate, minority-serving, and community colleges. Complimentary one-year ACS memberships were offered to the participants who were not ACS members (40).
- Over 1000 Teachers Engaged in Face-to-Face Professional Development**
 ACS Education offered a total of 43 sessions at the three National Science Teachers Association (NSTA) conferences, engaging 1092 elementary, middle, and high school teachers. ACS offered more sessions at each conference than any other organization, with the exception of NSTA. Additional sessions were held at the STEM Forum.
- ACS Workshops on Analyzing Hazards and Risks in High School Chemistry Labs**
 The new workshop was presented at three National Science Teachers Association conferences in 2018. The workshop led teachers through examples and applications of the four principles of safety (RAMP): Recognize the hazard; Analyze the risk of the hazard; Minimize the risk; and Prepare for emergencies.

- Collaboration to Prevent Dangerous ‘Flame Jetting’ Phenomenon**
 ACS partnered with the US Consumer Product Safety Commission, National Fire Protection Association, and ATF Fire Research Laboratory to raise awareness about the flame jetting phenomenon. As part of this collaboration, ACS contributed [a website](#) and [video](#) to this important campaign.
- Green Chemistry Education**

 - Jim Hutchison and Tom Holme published an editorial in the April issue of the *Journal of Chemical Education* on “[A Central Learning Outcome for the Central Science](#)”. The Central Learning Outcome articulated in this article is that “Chemicals have benefits and hazards, and these must be considered together.”
 - The *Journal of Chemical Education* announced a call for papers for an upcoming special issue to report on and guide efforts to reimagine chemistry education through infusing systems thinking approaches throughout educational programs. ACS GCI played a key leadership role in assembling the guest editorial team for this special issue as well as guiding the development of the call for papers: <https://pubs.acs.org/doi/full/10.1021/acs.jchemed.8b00764>
- Green Chemistry Student Awards**
 ACS Green Chemistry Institute recognized the following students and postdoctoral scholars for excellence in their green chemistry research and studies (Note: The deadline for the Breen and Hancock Awards was moved from February 2019 to October 2018, resulting in two sets of awards announced in 2018):

 - The **2018 Joseph Breen Memorial Fellowship** winners are Luke Morriscal, an undergraduate studying chemical engineering at The Ohio State University, and Bonnie Buss, a Ph.D. candidate in chemistry at Colorado State University.
 - The **2018 Kenneth Hancock Memorial Award** winner is Emily Roberts, a Ph.D. candidate in materials chemistry at the University of Southern California.
 - The **2019 Joseph Breen Memorial Fellowship** winners are Hanno Erythropel, a postdoctoral associate at the Department of Chemical and Environmental Engineering at Yale University in New Haven, Connecticut, and Selene Ramer, a junior at George Washington University in Washington, DC.
 - The **2019 Kenneth Hancock Memorial Award** winner is D.M.M. Mevan Dissanayake, a Ph.D. candidate in chemistry at the University of South Carolina in Columbia, South Carolina.
 - The **2019 Ciba Travel Awards in Green Chemistry** are William Joseph Sagues, a Ph.D. student in the Department of Forest Biomaterials at North Carolina State University; Quincy Dougherty, a senior at Gordon College in Wenham, Massachusetts; Reece Johnson, a senior in the Department of Chemistry and Physics at the Florida Gulf Coast University; and Bhavana Pavuluric, a junior at duPont Manual High School in Louisville, Kentucky.
- ACS Green Chemistry Student Chapters**
 ACS GCI acknowledged the green chemistry accomplishments of 75 domestic ACS Student Chapters and four International ACS Student Chapters.

- Summer School on Green Chemistry and Sustainable Energy**
 The Summer School on Green Chemistry and Sustainable Energy was held at the Colorado School of Mines in Golden, CO, from July 10-17. The program engaged 61 graduate students and postdoctoral scholars from the U.S., Canada, and Latin America in lectures, poster sessions, and problem-solving activities designed to enhance the students' abilities to integrate green chemistry into their research and teaching. The Summer School is supported by a generous grant from the ACS Petroleum Research Fund.

GOAL 4—*Communicate Chemistry's Value – Communicate – to the public and to policymakers – the vital role of chemical professionals and chemistry in addressing the world's challenges.*

- Celebration of Earth Day Extends to a Week and Reaches 136 Local Sections**
 ACS's Earth Day outreach campaign was extended to Chemists Celebrate Earth Week (CCEW). Every major aspect grew in 2018, including engagement of ACS local sections (136 in 2018 compared to 113 in 2017), participation in the Illustrated Poem Contest (43 local sections in 2018 compared to 22 in 2017), and the distribution of the CCEW edition of "Celebrating Chemistry" (74,250 copies in 2018 compared to 62,250 copies in 2017).
- 2018 Green Chemistry Challenge Awards**
 ACS GCI ran the Green Chemistry Challenge Awards program in 2018 in continuance of the EPA's long-standing annual awards program. The 2018 winners are:
 - Academic Award – Professors Frank Gupton and Tyler McQuade of Virginia Commonwealth University: Increasing Global Access to the High-volume HIV Drug Nevirapine through Process Intensification.
 - Small Business Award – Chemetry Corporation: The eShuttle™ Technology for Propylene Oxide and Reducing CO₂ Emissions in the PVC Supply Chain.
 - Greener Synthetic Pathways – Merck Research Laboratories: A Sustainable Commercial Manufacturing Process for Doravirine from Commodity Chemicals.
 - Greener Reaction Conditions – Mari Signum Mid-Atlantic, LLC: A Practical Way to Mass Production of Chitin: The Only Facility in the U.S. to Use Ionic Liquid-Based Isolation Process.
 - The Design of Greener Chemicals – Corteva Agriscience™ Agriculture Division of DowDuPont™: Rinskor™ Active – Improving Rice Production While Reducing Environmental Impact.
- New and Improved Green Chemistry Institute Web Presence**
 The fresh, new [Green Chemistry hub](#) on ACS.org launched in October 2018. Serving a wide-ranging audience comprised of students, educators and industry professionals, the Green Chemistry experience is designed to offer unique content and engagement opportunities in an array of areas – from participating in a student chapter to finding a teaching resource to joining an industry roundtable.

- **The Nexus Newsletter and Social Media**
 - The ACS Green Chemistry Institute’s newsletter goes out every other month to an audience of over 18,000 subscribers.
 - There was so much Twitter activity during the GC&E Conference that our hashtag, #gcande, was one of the top trending topics in Portland, Oregon.
 - The ACS GCI Twitter account now has over 21,000 followers.

- **Advancing the ACS Policy and Legislative Agenda**

ACS endorsed and worked closely with stakeholders to advance our legislative agenda as defined in our ACS public policy statements:

 - The Stop Importation and Trafficking of Synthetic Analogues (SITSA) Act passed the House of Representatives towards the end of the year and ACS was successful in helping to block the provision that prevented HHS input on what drugs would be added to the new “Schedule A” category.
 - President Trump signed the Strengthening Career and Technical Education for the 21st Century Act, which reauthorizes the Carl D. Perkins Career and Technical Education Act (CTE). The ACS advocated for two key priorities that were included in the bill which encourage collaboration between education partners and industry to better align funding and to ensure support for hands-on activities in the STEM fields.
 - The Senate passed S. 2503/HR 589, the DOE Research and Innovation Act, a major piece of authorizing legislation for the Office of Science.

- **Promoting Chemistry and Its Practitioners to Media and the Public**

For 2018, External Affairs & Communication provided chemical information to the media, ACS members and directly to the public in the following ways:

 - Media outreach resulted in more than 25,700 articles in print and online news media outlets with a potential audience of more than 40.1 billion online (a single individual can be part of multiple audiences) and 67.5 million in print and broadcast.
 - ACS published 49 *Reactions* videos, with all videos in the series receiving a total of more than 11.5 million views on Facebook and YouTube. Of note, *Reactions*’ Facebook page and YouTube channel each reached the milestone of 300,000 followers in 2018.
 - ACS Experts fulfilled more than 100 requests from the news media for scientists to help with stories. These requests came from news outlets including ABC’s “Good Morning America,” BBC, NOVA, NPR’s “Science Friday” and The New York Times, as well as from general audiences.
 - The National Historic Chemical Landmarks program held a dedication ceremony honoring the production of a plutonium isotope that enabled the exploration of deep space on November 1, 2018 at the Savannah River Lab Museum in Aiken, S.C. Also, planning for three more Landmarks in 2019 was completed.

ALL STRATEGIC PLAN GOALS—Support for ACS Governance and Operations

- **ACS Maintains a Robust and Evolving Strategic Plan**

The *ACS Strategic Plan* was approved by the ACS Board of Directors at their December 2018 meeting and launched on the web (at <http://strategy.acs.org>) in January. It provides the basis for all of the Society's work in support of the Vision, Mission, and Core Values. The four Goals are each supported by a new set of objectives representing the most important priorities for the ACS to pursue. The strategic plan is the result of broad engagement with governance and staff members, consolidated by the Strategic Planning Committee, and approved by the Board of Directors.

- **Process Improvements to the ACS Strategic Planning Cycle**

In an effort to develop an ACS strategic planning process that continues to add value and is less complex, easier to understand, and that takes less time and resources to produce, the Strategic Planning Committee identified several process improvements to the ACS strategic planning process through "Voice of the Customer" interviews, conducted with members of the ACS Board, Executive Leadership Team and Council. Customer responses were evaluated and the top areas for improvement were identified. Areas of highest and lowest added value and opportunities to "bundle" to create added value were identified. The top recommendation was to decrease the frequency of the ACS strategic planning cycle, from an annual process to a multi-year process and therefore the committee will detail a new multi-year planning process that will be brought forward in 2019 and implemented in 2020.

- **Presidential Succession and Board Chair**

In 2018 the Office of the Secretary and General Council (OSGC) staff coordinated arrangements and travel logistics, and prepared presentations and/or remarks for many of the following events where the Presidential Succession and the Board Chair represented ACS, including at two national and seven regional ACS meetings; six local sections; six international trips and visits to scientific societies, forums, and universities; and a National Historical Chemical Landmark designation. Staff also supported and organized their participation in multiple meetings across the US with other chemical and scientific societies, university groups, government entities and other similar groups. Our President took an active role in promoting the ACS Scholars program, Project SEED, water purity and accessibility, chemical and laboratory safety, and ways to communicate science to the public through the organization of Presidential symposia/workshops.

- **Redesigning ACS Governance**

During 2018, OSGC provided administrative support and worked collaboratively with the Joint Board-Council Policy Committee (CPC) Task Force on Governance Design. The task force was charged to position the American Chemical Society (ACS) for the future by reviewing and recommending actions to improve the current national governance structure. Supported by OSGC staff, in 2018 the task force: met by teleconference or in face-to-face meetings on three occasions in 2018 to continue work on its recommendations and to review the feedback from committee meetings and Councilor caucuses. In support of a key recommendation of the task force, a subset of the task force

– including the ACS Secretary - met several times to prepare a petition to amend the Society’s Constitution and Bylaws. The petition is up for Council action in Orlando. As to the task force’s two other focal areas, two special working groups, under the purview of the Committee on Committees and CPC respectively, have begun work on bringing forth one or more models on committee structure and on future Council representation, for consideration by the Board and Council. A final task force report was approved by the task force in early November and submitted to the Board for its December meeting. The Board and CPC each voted to receive the final report of the task force with thanks and endorsed the distribution of the report to the appropriate committees for refinement and elaboration. Board Chair John Adams and President Peter K. Dorhout discharged the task force with the grateful appreciation of the Board and CPC.

- **Legal Activities**

In 2018, the Office of the General Counsel negotiated and reviewed more than 600 intellectual property licenses and agreements, obtained more than 60 new trademarks, processed nearly \$6 million in copyright fees and successfully met the many challenges of representing all facets of the ACS in nearly 250 other varied legal matters. Of particular note, the Office launched the first ACS-wide initiative ensuring that the Society complies with the European Union’s General Data Protection Regulation (“GDPR”). As part of this continuing project, the Office helped to implement organization-wide policies and procedures to enhance the Society’s GDPR compliance.

- **ACS STAR Award**

The program ended its fifth year with its highest number of award submissions – a total of 160 awards were granted in 2018. We achieved 17% overall staff participation; a slight increase from previous years with 15%.

- **Speaker Series**

Focused on the newly launched ACS Competencies with presentations targeting change agility, continuous improvement, and a global mindset. Dr. Kaihan Krippendorff provided insight on a “Mindset Shift: Driving Innovation Within”, and Dr. Afiya Fredericks shared information and experiences for “Reaching New Heights through a Growth Mindset.”

- **Internal Communications**

Coordinated strategic internal communications society-wide, which included the Weekly Digest for staff and promotional materials/graphics for ACS Operational Excellence initiatives launched in 2018: Career Management Framework, Centrifly Single Sign On, Workplace Technology Portal, Work Order Ticketing System, Contracts Management System, Chrome River Travel and Expense Reporting System, Career Development and Competencies Launch, Active Directory Consolidation Project, UltiPro Human Capital Management/Payroll Replacement Project, ACS Workforce Membership, and the Society Ideas Portal.

- **Launched New Contracts Management System**
 By using the existing enterprise system (Laserfiche Forms) ACS was able to leverage existing integrations and automate the process of storing ratified contracts in the records retention repository.
- **Chrome River Implementation (Automated Travel Expense Reimbursement Software)**
 Strong collaboration and cooperation between Washington and Columbus Finance teams successfully implemented and launched the Chrome River travel expense reporting system, as well as transitioning to a common Travel Management Company (i.e., Travel Leaders) for both Columbus and Washington. Both of these projects were successfully completed on-time and on-budget. The system provides a user-friendly interface, ability to capture digital receipts, and robust reporting capabilities. The new solution transforms what used to be an arduous manual task into an easier, faster process for both submitters and approvers, while also reducing errors and improving operational efficiency for the Accounts Payable team. Building upon the success of the implementation, staff is in the process of rolling out the system's functionality to Publications Division's Editors. In addition, Chrome River was made available to members of the Governing Board for Publishing in November. The system has been well received and has delivered on its promises.
- **UltiPro Implementation**
 In 2018, the Society successfully implemented an enterprise-wide HR/Payroll and timekeeping system, UltiPro. The project provides a common software environment for all ACS employees, replacing multiple and disparate HR and Payroll systems. With the implementation, employees were given responsibility for personal data; automated workflow was implemented; enhancements were made to staff compensation statements; certain HR and Payroll processes were streamlined and aligned across multiple locations; a unified chart of accounts structure was implemented; and overall reporting was enhanced. With UltiPro, the Society managed an active open enrollment for 2019 benefits, resulting in more accurate data within the HR/Payroll records.
- **Launched New Facilities Work Order System**
 The new Facilities Work Request System (Wizard) is utilized by ACS staff for all building related services. The streamlined system allows staff to select from prepopulated dropdown menus of the various service categories that are managed and maintained by the Facilities Department.
- **Constructed and Opened Hach Fitness Center**
 The project consisted of utilizing the vacated data center space for the design and construction of a Fitness Center, Recording Studio, and IT Network Room in the sub-basement of the ACS Hach building in Washington. The fitness center has been a popular new benefit for ACS Washington employees and has been well received by staff.