



# 2019



## Annual Report

# Connecting the World of Applied Geophysics

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“It is important to realize and communicate the impact that geoscience has on nearly every aspect of the life we enjoy today.”

— Nancy House  
SEG past president



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### President

Robert R. Stewart



### “Applied geophysicists can take great pride in our science, its contributions, and our fellowship.”

Applied geophysicists can take great pride in our science, its contributions, and our fellowship. The remarkable clarity of our subsurface pictures, the resources they have uncovered, and the resultant prosperity from their recovery have been a substantial part of humanity’s progress in the last 90 years — SEG’s legacy. While this satisfying retrospective is justified, we are in a time of transition. We now have to revisit our success and ameliorate its results. SEG is wrestling with and responding to economic, professional, and societal changes. In the last year, our Society has made some bold decisions. We sold our Tulsa campus to provide a healthier financial future. We restructured our internal operations

and management to make them more efficient and understandable. We made real our belief in geophysics’ global future and SEG’s place in it by opening offices in Kuala Lumpur and Houston. It was an eventful year and a time for which I’m deeply grateful.

SEG’s 89<sup>th</sup> year of operation began at our Annual Meeting in Anaheim, California. This was a happy homecoming on my end, as I’d worked two summers in neighboring La Habra at Chevron’s Oil Field Research Center as an interning graduate student. The Annual Meeting was a technical and financial success but attracted lower attendance than wished. This was largely on account of economic and political challenges that are classically unforeseen when convention venues are booked many years in advance. Attendance also speaks to ongoing discussions about the role and efficacy of Annual Meetings as well as where to place them. SEG has presciently been a founder or participant in a number of collaborative meetings including the Offshore Technology Conference, Unconventional Resources Technology Conference, International Petroleum Technology Conference, and the inaugural Energy in Data Conference.

Another key SEG-cosponsored event is NAPE. In 2019, the NAPE organization

gave a major donation (US\$1 million) to the NAPE Expo Charities Fund in support of U.S. veterans in the name of the late U.S. President George H.W. Bush. Former President George W. Bush (originally a landman) was on hand to recognize the gift and honor in his late father’s name. As part of that event, we were privileged to have breakfast with Mr. Bush. He was relaxed, engaging, and related several stories. He made one comment, which I think was quite germane and helpful in times of challenge. When he accepted the nomination for president, he didn’t anticipate (nor anyone else) the upcoming tragedy of 9/11. However, after its occurrence, it was the duty of his office to lead. And so he did. Our commitments will bring surprises, hopefully none of that magnitude, but they may seem more manageable in comparison. Mr. Bush did share a personal anecdote about that day when many families were trying to get in touch with their loved ones. As we remember, the nation came to a standstill. He finally connected with his mother, former First Lady Barbara Bush, and asked her where she was. She told him and he responded, “What are you doing there?” She said, “You grounded my airplane!”

A dominant theme of SEG in the last few years was increasing emphasis on

our global outreach and contribution. I was thrilled to see friendly conversations with our colleagues at the Asociación Mexicana de Geofísicos de Exploración (AMGE) result in SEG’s rerelease of AMGE’s book on the history of geophysics in Mexico. We also are delighted with the incredible accomplishment of an armada of volunteers and staff translating the entire Sheriff’s *Encyclopedic Dictionary of Applied Geophysics* into Spanish. It is available on the SEG Wiki.

Further on our international journey, and assisted via a global strategy session convened in London in June 2019, we opened an office in Kuala Lumpur. This facility will help service our southern Asian members and will participate in the vibrant activities in the region. Complementing our offices in Beijing, Dubai, and Kuala Lumpur is the nascent “global hub” office in Houston. We see this office as engaging the international energy industry in Houston, helping enhance our Latin America activities, and leveraging local services for worldwide application (e.g., the EVOLVE program). Many of our meetings and workshops have been organized from the China and Middle East offices. Both offices continue to develop their offerings and services energetically.

Part of the president’s mandate (and true joy) is to connect with as many SEG activities, meetings, and members worldwide as possible. Our SEG offices and associated societies placed approximately 20 trips on my calendar including speaking engagements in Houston, Austin, Midland, Dallas, Denver, Calgary, Kuala Lumpur, Beijing, Tokyo, Dubai, Dhahran, Muscat, Kuwait City, and Perth. While I’m still summarizing the observations and learnings (and catching my breath), it’s fair to say that there is plenty of exciting geophysical activity, capability, need, and opportunity around the world. Geophysics’ future is bright.

One of the foundational aspects of any professional organization is its continuing-education program. Because of employment contraction in the energy industry in the last few years, the community has had fewer job openings. Those who are working seem to have expanded duties, and perhaps less professional-development time. Thus, the enrollment in courses has been limited. SEG is attempting to reconfigure its offering to the demand — different course lengths, topics, locations, instructors, and media. We hope that new initiatives such as destination-learning events (e.g., Western Canadian Resources) and

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university-SEG programs, based on our job task analysis, will kindle interest and satisfy new and ongoing needs.

Along the lines of outreach and communication, it was very pleasing to start a president's "Report from the Field" video series. The idea was to continue to use social media to share SEG activities and associated personnel with our members. I hope that this can continue as a type of fireside chat to engage our membership and highlight the interesting places and people of geophysics. Also, on the fellowship aspect of our Society, was the return of the President's Jam. While we are conscious about budgets and financial prudence, we want to make our meetings memorable on both technical and cultural levels. Creating a happy sound with musically inclined geophysicists has been a wonderful part of many Annual Meetings. We are planning and looking forward to an incredible 2020 Annual Meeting in a few short months and to an expanded jam that will highlight a broad array of SEG musical talents.

Another satisfying aspect of a president's year is the opportunity to recognize particularly outstanding members of our organization. This year had an abundance of individuals who achieved great things. The President's Award was

presented to Yogaani Bhatia, director of SEG's Middle East, Africa, and Asia-Pacific realms, for her enormous energy and initiatives in expanding our activities in the region. She has been an organizational inspiration and reflects the spirit of international development. The President's Award also was given to NASA Astronaut and Geophysicist Andrew Feustel. Feustel is a veteran of three spaceflights, taking his geophysical acumen to astronomical heights. He has promoted geophysics enthusiastically inside the space community in addition to having logged some 226 days in space. Feustel is an exemplary explorer, space mechanic, and geoscientist.

As with Feustel's example, the collegiality, dedication, and good humor of our SEG Board members makes volunteer hours enjoyable and satisfying. The wisdom and character of the upcoming, current, and former presidents whom I have had the pleasure of knowing (Maurice Nessim, Rick Miller, Nancy House, Bill Abriel, John Bradford, Don Steeples, Chris Liner, Brian Russell, Peter Duncan, and Bill Barkhouse) has deeply enriched my presidency. Thank you.

SEG staff are amazing — from Mandi Duckworth's expert coordinations to Laurie Whitesell's and Lance Cole's international savvy to the senior

management team's experience and hard work. Much gratitude to all of you who help us run our science and profession. We're especially thrilled to have had John Koehr join the SEG team as our executive director. He's already making a major impact.

SEG hosts dozens of committees with hundreds of dedicated volunteers. Some of the committees finish their missions, or become inactive, or perhaps have interests better served by other committees. There's a pleasant term for discontinuing these — "sunsetting." To help our Society use its resources in the best places and allow for new initiatives, we have sunsetted some committees. Healthy plants often need pruning. This is sometimes a difficult matter, but in the face of limited resources plus the demand to develop new initiatives, some committees and programs need to ramp down.

An area that was consuming considerable staff and volunteer time was the idea of SEG developing a certification of applied geophysicists. Certification would require a given number of years of experience, an examination, letters of reference, and annual dues. It would have been managed by SEG. State registration or licensing

of exploration geophysicists has been somewhat controversial in jurisdictions where it has been broached or applied. Certification shares many of the characteristics of a license. Ultimately, it appeared that much of the proposed market for certification actually wouldn't be qualified (due to lack of experience) to acquire this credential and would also be challenged to pay for it. The Board's decision was to discontinue the certification thrust. However, there were some important results from the effort. We developed a comprehensive job task analysis outline that informs our continuing-education offerings. As well, we better understand what various sectors of our membership want (internships and good job opportunities).

The great cycles and stages of life joyfully give us new students and colleagues, but sadly take others away. In 2019, we lost some of our dear friends and geophysicists. We hope to be able to honor the memory of these fine scientists in articles, scholarships, and special sessions.

As applied geophysicists, most of us like signal analysis, the natural world, and making a reasonable living while providing useful contributions. But, ultimately, it's the economy that gives

us many of our marching orders. With regular restructurings, mergers, and takeovers in the energy industry, there is a periodic call for SEG to consider doing likewise. However, I believe it is by far better for us to dedicate our time, resources, and wisdom toward improving geophysics, enhancing our geophysical offerings, and finding new applications rather than negotiating and restructuring our profession into a subset of another association. At this stage, applied geophysics has a superb ability to identify new targets, adapt to different demands, and create new techniques. We have been successfully independent for 90 years, and I certainly think applied geophysics will have specialized and critical work to do for the next 90 years.

An organization can be an almost magical entity — living vibrantly for many decades or centuries, changing its shape and size, and arising and thriving in numerous disparate locations. Some of our SEG analysts and interpreters are so bright and imaginative that they seem like wizards conjuring images and treasures from incomprehensible chaos. So, from this enchanted world of glowing computer displays to the realities of planting geophones, we have a healthy and capable SEG. We're adapting to an intense world with more demands and

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constraints. We've had an exciting and productive year, but there's plenty to do as we progress toward our 100<sup>th</sup> birthday in this next decade!

### President-elect Rick Miller



**“The future holds vast potential for diversifying the applications of geophysics and associated subdisciplines, while continuing to improve the fidelity and accuracy of our exploration products.”**

What a year! The global downturn in the industry seems to have stabilized and may be showing glimmers of improvement. A few persistent pockets of concern continue to paint a bleak picture of the role applied geophysics will play in the future of energy discovery and delivery. But, one thing we can all be proud of is SEG's upcoming milestone anniversary, marking 90 years of service to the

profession and professionals engaged in applied geophysics.

Our roots are deeply embedded in exploration, specifically oil and gas. Stability of our future and sustainability of our relevance is reliant on the evolution of our science to meet the emerging challenges posed by the energy and resource industry. Growth, however, will come as we engage a wider range of underserved geophysicists while enlightening professions that don't yet understand the value of our science. SEG needs to expand on our energy roots. That foundation will be essential to powering our growing planet while building a diverse community of applied geophysicists addressing humanitarian, engineering, minerals, environmental, and groundwater problems for the betterment of humanity.

With excellent groundwork put into play by Past Presidents Bill Abriel, Nancy House, and Rob Stewart, the portfolio system of business practices and organization was fully implemented in 2019. This approach latches committees to business units with multiyear business plans that are linked to the SEG strategy. The form of portfolio systems implemented by SEG allow continuity in business decisions, integrated with solid metrics to evaluate performance. These attributes allow

the Society to be nimble in determining product value and in recognizing opportunities to better support Member needs.

Budgeting under this system impacts both current and out years, allowing greater transparency and long-term goal-oriented approaches. Strategy and business planning at the Board level is supported under this new structure through review and recommendations by a strategy and business advisory committee. Equally significant under this system is the ability of the Finance Committee to do a deep dive into finances and budget, providing guidance to the Board on the fiscal solubility of various/specific programs based on current and out year budgets, without the need to make strategy judgments.

Integral to the effective implementation of this portfolio system of business management was the initiation of a strategic refresh cycle by the Board during the third quarter of 2019, which will continue into the future on an annual cycle. Strategic planning undertaken under Past President John Bradford in 2016 provided a solid foundation and minimized the time and cost necessary to get a refreshed plan established in 2020 without starting from scratch. A revised strategic plan with well-defined initiatives is now in

place, with continuing development of associated metrics and enterprise level goals well beyond 2020. Once fully implemented, this method of strategic planning and refreshing of plans and metrics will occur on a regular annual cycle, keeping SEG poised for exploiting opportunities while minimizing negative impacts that threats will have to our mission.

One of the most significant accomplishments of 2019 was the hiring of a new executive director. We undertook an international search facilitated by a search firm and orchestrated by an engaged and talented group of SEG volunteers to ensure we got the best person available. It was my privilege to lead this blue-ribbon committee of SEG volunteers consisting of Anna Shaughnessy, Nancy House, Edith Miller, Peter Annan, Wafik Beydoun, John Bradford, John Eastwood, Jia Zhang, Maitri Erwin, Gretchen Gillis, and Paul Cunningham. This group of highly regarded volunteers spent an enormous number of hours reviewing and assessing each applicant's potential to lead our staff and the business of our Society. It took two in-person interview sessions and much discussion/debate to reach a final decision, which speaks well to the quality of the candidates and the desire that all of the candidates had to lead our staff.

With more than 60 committees that drive and oversee our programs, SEG is truly a member-driven society. As a matter of fact, without the engagement and commitment of our committee members, the Society would not be as vibrant as it is today and would lack direction and the energy necessary to grow applied geophysicists and advance the profession as we have over the last 90 years. During my year as president-elect, I served as liaison to the Board for several standing committees. One of the most enlightening and inspiring of those was my engagement with the SEG Foundation. This group of highly successful professionals and leaders of the business of applied geophysics are committed to finding and optimizing resources for essential SEG programs. They are the builders and growers of our endowment and the Society's future. The efforts and accomplishments of this group are underrecognized. My hat goes off to this talented, influential, and focused group of leaders who work on behalf of SEG to ensure its sustainability deep into this century.

In closing, I wanted to applaud the passion and fortitude of our Members who support and promote SEG and its mission to the profession and professionals. Our science and technology is driven by discovery,

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both in the tools we use and the outcomes of our applications. For our profession to grow and sustain relevance, we must evolve and do what we do best: innovate. As with any change comes immense opportunity to prosper or perish. How change affects an industry or profession depends on how rapidly and smoothly the community evolves and adapts. We have put the business and fiscal wheels in motion to be at the forefront of opportunity. Applied geophysics is rooted in energy exploration, where our successes have provided the resources needed to keep innovation poised to address each new challenge. The future holds vast potential for diversifying the applications of geophysics and associated subdisciplines, while continuing to improve the fidelity and accuracy of our exploration products.

### Past president Nancy House



**“SEG has enabled the exchange and uplift of technology and maintained the professional standing of geophysicists for 90 years.”**

For 90 years, SEG has played a critical role in advancing the science of applied geophysics. Over the past three years, it has been my pleasure to serve as president-elect, president, and past president of SEG. Previously, I served as treasurer and chair and member of the Finance Committee. That experience was critical to my understanding of the inner workings of the Society.

SEG survived the industry downturn in 2015–2018, and the outlook as we emerge seems significantly different than other downturns have been. The rebound in demand for qualified geoscientists isn’t as robust, and there are fewer oil and gas companies that

have geoscience departments. As the world’s focus shifts to renewables and green energy choices, the geoscientists so valued by energy companies in the past must adapt to a new reality. The new structure and focus of SEG must help to enable that critical transition. Geology and geophysics are not solely for the purpose of locating fossil fuels, though the profession has enjoyed significant support from that sector in the past. Geology and geophysics play a critical role in locating the raw materials used for solar panels, batteries, cell phones, and a myriad of other materials, notably water. As the world shifts away from fossil fuels, there still will be a critical need for good geoscience to locate and develop natural resources.

Water is becoming a critical resource, and risk in locating it can be reduced significantly by geophysical surveys. More and more places need to locate and use deep aquifers, and geophysics is a critical tool. The first SEG Craig J. Beasley Award for Social Contribution was given to Paul Bauman (Paul Bauman Geophysics), who used geophysical methods to locate water resources for a large refugee camp in Kenya. It is important to realize and communicate the impact that geoscience has on nearly every aspect of the life we enjoy today. SEG is here

to help facilitate that communication and to share technical knowledge and experiences.

SEG has enabled the exchange and uplift of technology and maintained the professional standing of geophysicists for 90 years. As the role of SEG increased in complexity, it became necessary to sort SEG’s businesses into manageable groups to enable more efficient and flexible budgeting and operations. This was called the “Rebuild” or “SEG 2.0.” It is now implemented.

During my term as past president, Rick Miller (president-elect) conducted a search for a new executive director that resulted in hiring John Koehr. Koehr has successfully implemented the portfolio structure, clarified roles and responsibilities, added critical staff, and promoted deserving staff members in that effort.

SEG has become more aligned with the SEG Foundation, whose funds support programs such as EVOLVE, Distinguished Lecture, Honorary Lecture, Field Camps, and more.

EVOLVE, a highly ranked program, was nearly canceled due to lack of budget in 2019. However, the portfolio budgeting process and tireless efforts

of volunteers and staff enabled the program to complete a successful first year and grow significantly.

EVOLVE is a program that provides teams of students around the world with practical experiences in evaluating geoscience data for exploration of natural resources. The teams meet online and present their results at the Annual Meeting. This serves in some ways like a virtual internship. EVOLVE is a way for SEG to prepare students to enter the workforce as if they already have experienced an internship.

The program has expanded to encompass 20 teams in 2019 and 30 teams in 2020 from around the world.



Paul Bauman (Paul Bauman Geophysics) used geophysical methods to locate water resources for a large refugee camp in Kenya. Many of his projects are supported by Geoscientists *Without Borders*®.

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TABLE 1  
EVOLVE TEAMS FOR 2020

| TEAMS                                            | TEAM<br>NUMBER | SOFTWARE  | SUBAREA        |
|--------------------------------------------------|----------------|-----------|----------------|
| Boise State University                           | 2001           | DSG       | F3             |
| Oklahoma State University                        | 2002           | DSG       | Vermilion      |
| University of Texas at El Paso                   | 2003           | DSG       | F3             |
| University of Houston                            | 2004           | DSG       | Northland      |
| University of Oklahoma                           | 2005           | DSG       | N Taranaki     |
| University of Louisiana at Lafayette             | 2006           | DSG       | Vermilion      |
| Federal University of Rio de Janeiro             | 2007           | DSG       | Vermilion      |
| AGH University of Science and Technology         | 2008           | DSG       | N Taranaki     |
| Montanuniversitat Leoben                         | 2009           | DSG       | N Taranaki     |
| University of Perugia                            | 2010           | DSG       | N Taranaki     |
| Instituto Politecnico Nacional                   | 2011           | Petrel    | Mustang Island |
| University of the West Indies                    | 2012           | Petrel    | East Cameron   |
| University of Birmingham                         | 2013           | Kingdom   | East Cameron   |
| University of Oslo                               | 2014           | Kingdom   | Eugene Island  |
| University of Boumerdes                          | 2015           | Petrel    | Mustang Island |
| University of Ibadan — Nigeria                   | 2016           | Kingdom   | Eugene Island  |
| Ain Shams University — Egypt                     | 2017           | Kingdom   | SNS 01         |
| Kyiv University — Ukraine                        | 2018           | DSC LOCAL | Mustang Island |
| King Abdullah University                         | 2019           | Kingdom   | Eugene Island  |
| Lomonosov Moscow State University                | 2020           | Petrel    | SNS 01         |
| Makerere University — Uganda                     | 2021           | Petrel    | Main Pass      |
| IIT Roorkee — India                              | 2022           | DSC LOCAL | Mustang Island |
| University of Indonesia                          | 2023           | Petrel    | Main Pass      |
| University of Technology PETRONAS<br>— Malaysia  | 2024           | Petrel    | Main Pass      |
| University of Science and Technology of<br>China | 2025           | Petrel    | East Cameron   |
| Nnamdi Azikiwe University                        | 2026           | Petrel    | Galveston      |
| University of Bucharest                          | 2027           | Petrel    | SNS 01         |
| Ain Shama University                             | 2028           | Petrel    | Vermilion      |

EVOLVE Professional, the first industry intern team funded by the industry, will begin in 2020. The model could be expanded to a number of popular programs, increasing access to members globally without relying on insecure funds from a limited number of sources.

Another initiative that grew during my time as past president was adopting a model to duplicate workshops that have been successful in one region to other regions. SEG partnered with the Society of Petroleum Geophysicists (SPG) of India and the European Association of Geoscientists and Engineers to facilitate the workshops with support from the Oil and Natural Gas Corporation. In February 2019, through collaboration with SPG, we held a workshop on foothills and subbasalt imaging. In 2017, a similar workshop was held in Nanjing, China. SPG hosted a fantastic field trip to the Himalayan foothills to top off the workshops. Subsequent collaborative workshops are planned.

The SEG Board made the recommendation to list the Geophysical Resource Center campus for sale in 2018. The sale of the buildings was closed in October 2019, and the SEG Real Estate Corporation was dissolved in December 2019. This allows SEG staff and volunteers

to focus on core aspects of the SEG mission.

It has been a pleasure to serve SEG. I hope that the Society has benefited from the relationship as I have in terms of new connections, ideas, and friendships. I hope that all geophysicists do their best to communicate the essence and value of well-implemented geophysical methods to the success of exploration for and management of water, minerals, and hydrocarbons for the benefit of humankind.

**First vice president**  
Alexander Mihai Popovici



**“SEG is focused on strengthening and expanding geophysics internationally.”**

I joined the SEG Board of Directors at the Annual Meeting in 2017. It has been a great honor to represent and serve the SEG membership as second vice president during the 2017–2018 period and as first vice president during the 2018–2019 period.

During my second year on the Board of Directors, I participated in several Board meetings and served as liaison between the Board and a number of committees. We restored the financial health of the Society by insisting on a balanced budget and by selling the two buildings in Tulsa that were losing money. SEG is not in the real-estate business. We should focus on our core mission to promote the science of exploration geophysics, foster the common scientific interests

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of geophysicists, and maintain a high professional standing among Members. Many thanks to all of the dedicated volunteers who serve our Society and to the outstanding group of professionals on the SEG staff.

SEG is focused on strengthening and expanding geophysics internationally. The next step is to open additional regional offices. This will increase the reach of SEG's membership services to more countries and global areas.

We are trying to copy and adapt to local conditions the successful model of the SEG Middle East office. That office is approaching US\$1 million in local revenue annually from organizing eight to 12 local workshops a year, partnering in local conferences, and reaching several countries in its orbit. The SEG Middle East office is reaching into Southeast Asia and North Africa. The Society opened an office in Kuala Lumpur in 2019.

The potential for each SEG international office is to reach a US\$1–2 million revenue level, increase local SEG membership, engage students and early-career professionals, collaborate with local societies, and increase scientific and innovative activities in each territory. SEG will expand its global

reach by establishing offices in each geographic influence area following the model of the service companies that expand internationally. In the same way that Houston became the energy center for North America, Rio de Janeiro is the center for South America, and London is the gravity center for Western Europe.

Before opening a new office, the SEG president and a member of the business-development staff can visit each market; talk with local companies and establish a level of interest in local workshops, lectures, participation, and sponsorship for local events; and create a budget estimate for each market. The goal for each office is to serve local SEG Members and constituents and deliver on the SEG mission to promote the science of exploration geophysics and related fields, including applications and research, foster the common scientific interests of geophysicists, and maintain a high professional standing among its Members.

### Second vice president Manika Prasad



**“Serving on the SEG Board showed me how much work goes into creating and maintaining an excellent forum that people want to join and in which they want to participate.”**

During my term as SEG second vice president, my aim was to support emerging professionals and students. I also continued as a member of the SEG Women's Network Committee and several other technical committees. I was Board liaison for the Committee on University and Student Programs (CUSP), Scholarships Committee, Travel Grants Committee, and Field Camps Committee. It was interesting to observe how members of these committees volunteer so much of their time to develop new programs and decide on applications for various awards.

Applications for grants to attend the SEG Annual Meeting are handled by the Travel Grants Committee. The committee is responsible for travel grants in three categories including the Student Education Program, Student Leadership Symposium, and Technical Program. The Travel Grants Committee also grants the Near-Surface Research Award. The committee evaluated a total of 239 applications and awarded 104 grants and awards.

The Scholarships Committee manages the application process for various scholarships offered by SEG. The committee evaluated 428 applications and granted 124 student scholarships, totaling US\$578,463. SEG merit-based geoscience scholarships are valued as highly prestigious awards. Members of the committee devote considerable time to serve as advisors to provide students with information about career opportunities and other education and research resources.

The Field Camps Committee saw a 50% increase in applications and reviewed 30 applications in 2019. Of the 30 applications, 17 were selected for funding, with a total of US\$108,455 in committed funds. The committee also is providing valuable feedback for unsuccessful applicants so they may improve their application

and resubmit it the following year. A valuable aspect of field camps is safe operations. Together with the SEG Health, Safety, Security, and Environment (HSSE) Committee, the Field Camps Committee is strengthening the HSSE portion of the proposal-evaluation process.

CUSP had several goals for the past year. Among them was a thrust to convert CUSP from being an advisory committee to an active committee. The committee members organized several peer-to-peer webinars, and they have more planned in 2020. In addition to organizing the webinars, they worked hard to ensure that the information was disseminated to all districts. CUSP also helped promote and staff the International Geoscience Student Conference (IGSC) in Uppsala, Sweden. This is significant because the program was closed in 2016 after the first conference. With CUSP's help, IGSC had 60 attendees and a strong technical program.

Having served as second vice president, I have gained a healthy appreciation for the role of professional societies. Serving on the SEG Board showed me how much work goes into creating and maintaining an excellent forum that people want to join and in which they want to participate.

## REPORTS OF OFFICERS

### Treasurer and Finance Committee

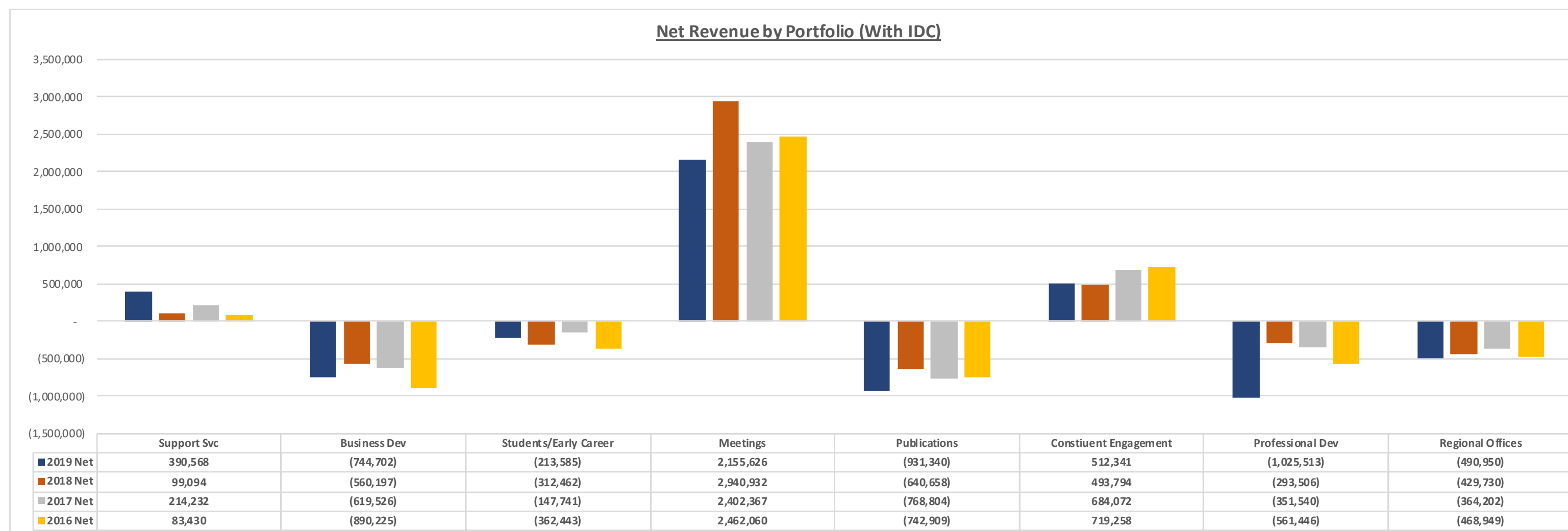
Dan Ebrom and Lee Bell



**“We need to become more global, and we need to include a greater diversity of professionals.”**

The efforts of SEG staff and volunteers to responsibly look after SEG funds are commendable, and the treasurer and Finance Committee wish to recognize their hard work. Working with the new portfolio system, staff have concentrated on budgeting, monitoring, and forecasting cash reserves and cash flow.

There were several large positive financial events of note this year. We received a US\$1 million insurance settlement related to the impact of Hurricane Harvey on the 2017 SEG Annual Meeting in Houston. These funds were placed in our Morgan Stanley Reserve Fund



account. Coupled with unrealized investment gains of US\$1.585 million, our total Reserve Fund grew to US\$10.58 million at the end of 2019. Additionally, proceeds from the sale of the Geophysical Resource Center campus in Tulsa totaled US\$7.1 million, of which US\$6.1 million will be invested in the Reserve Fund at the beginning of 2020.

The 2019 income was US\$17.4 million with the earlier mentioned extraordinary items and US\$14.8 million without. Expenses totaled US\$15.3 million, resulting in a 2019 net gain of US\$2.1 million with the extraordinary items and (US\$0.49 million) without. The 2019 budget net was (US\$0.27 million). There were several budget variances passed

by the Board of Directors for 2019, including financial software, funds for the executive director search, startup amounts for the Houston and Kuala Lumpur offices, and a loan to the Real Estate Corporation for expenses related to the real estate sale. These totaled US\$0.49 million. Without these variations, the final net would have been breakeven.

The 2020 budget will be roughly the same as 2019, with approximately US\$15.4 million in revenues and expenses. However, as a result of President Rick Miller’s strategy initiatives, several new growth directions will be funded. First, the Houston office is being planned to house several people in business development with a focus on

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international events. Additionally, a near-surface/mining manager will be added to promote events in these areas to increase our professional diversity. There also will be new positions in publications and marketing.

The growth initiatives in professional and geographical diversity are important for several reasons. The included chart shows a disturbing trend. The majority of our portfolios are trending net negative to strongly net negative after indirect costs are added. Our only two net revenue income generators, Meetings and Constituent Engagement, are trending down strongly. Our current method of conducting business needs to change, and the growth initiatives are a response to this need. We need to become more global, and we need to include a greater diversity of professionals.

As always, the treasurer and Finance Committee intend to provide the Board of Directors with all of the financial information needed to guide them to make decisions in the best interest of SEG.

### Vice President, Publications Sergey Fomel



#### **“A major upgrade to the SEG Library amplified the work of nearly all aspects of SEG publications.”**

It was my honor to serve the past two years as the first Board member elected as vice president, publications. SEG Bylaws charge the vice president, publications with oversight of all SEG publication and technical dissemination activities, ensuring that all such activities are aligned with SEG’s mission, goals, and policies and that the publications achieve the highest standards for technical and scientific integrity. In this position, I served as Board liaison for all of the Society’s publications boards and committees. These are the editorial boards for *GEOPHYSICS*, *The Leading Edge*, *Interpretation*, and books and the Translations, Reviews, and Wiki committees.

These boards and committees plus the Technical Program Committee all are represented on the Publications Committee, of which I am serving as chair for 2019–2021.

The reports of all of these boards and committees plus the report of the GeoScienceWorld Advisory Council representative describe in detail how each team of editors, chairs, and other member volunteers advanced SEG publications during 2019, so I invite you to examine these reports carefully. The charter of the Wiki Committee was expanded to include an oversight of other member-generated content and social media outreach.

A major upgrade to the SEG Library amplified the work of nearly all aspects of SEG publications, so I will take this opportunity to describe that briefly. SEG’s staff, primarily the publications platform team, worked with SEG’s publishing platform vendor to deliver a fresh online presentation of SEG content. Navigation was simplified, a responsive design that allows for better reading experience on mobile devices was added, new technologies such as auto-generated related articles and altmetrics were added, and optimization for search

engines was improved. The site was relaunched in late February 2019.

As a result, usage has improved remarkably. Usage in each of the final months of 2019 was more than 200% greater than for the same months in 2018. Consistent with a trend of recent years, the number of articles and other content items delivered through the SEG Library grew by 5.6% during 2019.

The SEG Library is a resource that Members long have counted among their most highly treasured, and it has become even more appreciated and will continue to grow in value. The development path includes additional content and technology integrations and discovery improvements that will further serve the Society’s mission of advancing applied geophysics.

As vice president, publications, I dealt with resolving conflicting issues between authors and editors according to the Ethical Guidelines for SEG Publications. The experience suggested the need for reviewing the guidelines. The work will continue by the new vice president, publications and the Publications Committee.

### Chair of the Council Gustavo Jose Carstens



#### **“Three of the sets of Bylaws changes were approved, and one was rejected.”**

I assumed this position at the end of the SEG Council meeting during the 2018 Annual Meeting in Anaheim.

The Council met twice in 2019. The purpose of the first meeting on 27 June was to approve the 2018 Annual Report. It was a virtual meeting via Zoom, and the report was approved without comments.

The second meeting took place during the 2019 Annual Meeting in San Antonio. We had in-person and virtual participation. Four Bylaws modifications were proposed. After a period of discussion, three of the sets of Bylaws changes were approved, and one was rejected. (See Bylaws Committee report.)

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In December 2019, I established a task force to discuss (and improve) the District Representative structure. The task force has been working on this during the first quarter of 2020.

The “President’s Page” in the December 2019 issue of *The Leading Edge* presented a description of the functions of the Council and guidelines for future action.

### Director at large Bob Brook



**“We are well positioned to improve and expand our services into the future.”**

I completed the second year of my three-year term as director at large during the 2019 Annual Meeting. It has been an honor and privilege to work with the impressive group of individuals who volunteer to serve on the SEG Board of Directors.

Big decisions were made in 2019, including the hiring of a new executive director who in turn hired a new chief financial officer, and the sale of the Tulsa real estate. These decisions were part of an overall strategy to position the Society for success in a challenging and evolving environment. With 14 Board members, it is sometimes hard to get agreement on big decisions. It is a credit to the stability and dedication of SEG staff and Board leadership that these tasks have been implemented.

As chair of the Audit Committee, I have the opportunity to take a close look at the SEG financials. We entered 2019 with a budget that was balanced from a cash perspective and approximately US\$255,000 negative on an accrual basis, with revenue comparable to 2017. In some ways this was aggressive, given the state of the oil and gas industry at the start of the year. Challenges in the industry continued through the year, and, as previously discussed, we underwent significant restructuring. Despite this, we completed the year with positive net revenue. This was aided by investment gains and a one-time payment for lost convention revenue resulting from Hurricane Harvey. Net revenue would have been negative without these two items. However, when combined with the sale of the

Tulsa real estate, we enter 2020 with a strong balance sheet and in a good position to expand the many services we provide our global membership.

In 2019, I was appointed Board liaison to the Research Committee. Sadly, the week before the Annual Meeting, we heard the news that the committee chair, Azra Tutuncu, had passed away. Our thoughts go out to her family, friends, and colleagues. Many thanks go to cochair Sergio Chávez-Pérez, who stepped into the role of chair. We are now in the process of appointing a new cochair. I look forward to working with Chávez-Pérez in 2020.

In September, President Rick Miller asked me to head a task force to examine our global growth strategy. This was one of five strategy task forces aimed at defining the Societies’ future direction. The task force was made up of staff and Members from all points of the compass. This made for some interesting scheduling, and I appreciate the sacrifices that were made to participate. The recommendations have been finalized and will be a part of our ongoing strategy discussions in 2020.

There has been much accomplished in 2019. This would not have been possible without the dedication of SEG

staff, management, and volunteers that make the Society function. We are well positioned to improve and expand our services into the future. I look forward to my final year on the Board.

### Director at large Maria A. Capello



**“It was an interesting rollercoaster and productive year that taught me a lot about the commitment toward SEG improvement by the Board, staff, and Members.”**

This was my first year as director at large, and it has been a privilege and a pleasure to serve SEG in this new capacity. The Board is a vibrant compendium of active volunteers with different experiences, perspectives, and characters, all unified in their will to work for the betterment of the Society. I would affirm without hesitation that it has been very interesting to

advance SEG with them. I have enjoyed workshops, discussions, long meetings, and numerous video calls, in which we advanced our agenda, fearless of step changes. It is in this vibrant and debated environment that I serve on the Board.

It was a particularly active year. We sold the real-estate property in Tulsa, hired a new executive director, revamped the SEG strategy, envisioned new roadmaps for our portfolios, and challenged the 2020 budget, propelling net zeroing and impacting the allocation of funds to programs in deficit. I must conclude that it was an interesting rollercoaster and productive year that taught me a lot about the commitment toward SEG improvement by the Board, staff, and Members.

I led a task force dedicated to envision opportunities to enhance the collaboration, participation, and integration of early-career professionals in SEG and geophysics. We produced a series of recommendations ranging from communication strategies to specific continuing-education and representation options. I think we paved some useful paths.

I was the Board liaison for several committees. The list is long but thrilling,

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as they steered key and challenging initiatives of SEG:

- Development and Production Committee, chaired by Andrew Royle
- Gravity and Magnetism Committee, chaired by Luise Sander
- International Association of Oil and Gas Producers Surveying and Positioning Committee, chaired by Victor Ancira
- Membership Committee, chaired by Aldo Vesnaver
- Women's Network Committee, chaired by Hendratta Ali
- Oil and Gas Reserves Committee, chaired by Eric von Lunen

Some of the highlights from their accomplishments merit a mention, as they were key for supporting and leading SEG to better serve its Members.

The Gravity and Magnetism Committee organized three technical sessions and a luncheon at the 2019 Annual Meeting. They steer the Meter Reader column in *The Leading Edge*, and I particularly like their actions in organizing customized workshops, revamping their own policies,

liaising with sister societies, and their commitment to increment their presence on social media.

The Membership Committee engaged in changing key administrative workflows to make SEG membership more appealing for new and returning Members. I was particularly impressed at the vitality of this committee in not only proposing but also implementing new formats to engage Members to bring in more Members. I expect even more accomplishment coming from their creativity to counteract the downslope trend of SEG membership. It is not easy to augment a paid membership in our era, where access to digital solutions and information is incrementally free. I highly appreciate the effort of this committee, propelling changes and envisioning possible enablers of growth.

The Women's Network Committee (WNC) continues its lively activities of energizing the participation, representation, recognition, and leadership of women in geophysics and in SEG. The WNC gives a voice to one of the most important minorities in geophysics, and we need to be proud of their outstanding contributions in 2019. I was particularly impressed with the creation of a WNC fund that was established through the SEG

Foundation to encourage donations to directly support the activities of the committee. Have you already donated? I did and encourage you to do so.

Additionally, 2019 was the launching pad for several ground initiatives around the globe, and this opens our eyes, as WNC is spearheading engagement from a critical segment in SEG: the early-career professionals. WNC propels step changes for SEG. Not only to transform SEG and geophysics to a more inclusive ecosystem but also more modern and adapted to the needs of the current journeys in energy-related careers.

The Development and Production Committee was invigorated during 2019. It is working with the Oil and Gas Reserves Committee to jointly pursue important goals common to both, such as the participation in joint events with sister societies as well as a retake at definitions and workflows pertinent to the Petroleum Resource Management System (PRMS) peer-review process.

In the last month of 2019, I wrote the President's Page that was published in the January issue of *TLE* by invitation of President Miller. I shared some factual data and my own reflections about CO<sub>2</sub>, focusing on the hazards

of not actively participating in the decarbonization initiatives from our individual or corporate stands. My goal was to trigger some reflection about our own participation. It was a first for SEG to engage so openly in a polemic topic. I received good feedback that I appreciate because I like disruptive changes that advocate for noble objectives. And being recognized for that is truly rewarding.

Do not hesitate to contact me to share your feedback, your ideas, or your questions. As 2020 unfolds, I am thrilled to keep contributing to my cherished SEG with my best. Thanks for your support!

### Director at large Paul S. Cunningham



**“Through everyone's efforts, SEG will continue to improve and expand services to its Members while maintaining sound stewardship of its finances.”**

As I completed my third and final year as a director at large, I looked back at all of the challenges SEG has faced and overcome and the many changes for the better that have been implemented over the past couple of years. The reason for this success was twofold. First, SEG has a large, diverse, and dedicated group of volunteers who invest significant time and effort in supporting our many endeavors. Second, SEG is fortunate to have a talented, hardworking, and committed staff who have done their best to carry SEG through financially turbulent times. Without both, the Society would not be able to carry

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out the many programs we have for our Members.

The changes undertaken by SEG should ensure the sustainability of its core programs and services within a system of portfolios so that these activities are better aligned with the Society's mission and strategy and make the best use of resources in serving Members. Equally important, the changes were carried out maintaining financial discipline. Annual budgets were at minimum cash neutral, and any variances were for items considered as investments for the long term. Significant events this year included the sale of the SEG property and buildings at the Tulsa headquarters, which will further stabilize the Society's finances; the transition of the executive director position; and, following extensive cuts in previous years, a small expansion in staff positions to better serve our membership.

In 2019, I had the pleasure to continue as the Board liaison for the SEG Health, Safety, Security, and Environment (HSSE) Committee and be the new liaison for the Bylaws Committee.

The HSSE Committee continued to grow in the number of volunteers interested in safety and health matters related to SEG activities, particularly

for field camps, Geoscientists *Without Borders*®, and other Society-sponsored activities in which HSSE matters are of concern.

The Bylaws Committee approved a number of changes, aimed at simplifying and enhancing clarity for certain sections related to SEG Council operations and Voting Members.

The Near-Surface Geophysics Technical Section (NSTS), for which I also served as the Board liaison, continues to be active. The section is growing to the extent that it has expanded the number of positions in its leadership group and redefined roles and responsibilities. At the 2018 Annual Meeting, NSTS held three special sessions, three poster sessions, and five oral sessions.

Finally, I would like to reiterate my closing statement last year in that SEG's accomplishments this past year would not have been possible without the dedication and effort of the Society's volunteers, staff, and management, as well as the wisdom, thoughtfulness, and commitment of my fellow Board members with whom it has been a pleasure to work. Through everyone's efforts, SEG will continue to improve and expand services to its Members while maintaining sound

stewardship of its finances. Thank you for giving me the opportunity to serve on the SEG Board of Directors.

### Director at large David E. Lumley



**“Geophysicists often state that SEG’s professional-education courses and workshops are among the highest value benefits of being an SEG Member.”**

I joined the SEG Board of Directors for a three-year term as director at large during the 2018 Annual Meeting. My previous service was as first vice president 10 years ago in 2009–2010. At that time, the global financial crisis had hit us hard. I was happy to be able to contribute my business and financial experience (earned as a project manager in a US\$200 billion corporation and as a founder and CEO of a geophysical technology company) to help stabilize and manage SEG's

finances in order to navigate through the crisis. Today, SEG's finances are in reasonably good shape due to the astute actions of current and past Board members over the last decade. Our current Board recently authorized and completed the sale of the SEG real estate, which will provide much-needed funding to invest in innovative new programs for Members.

Today, many of us see a major new challenge facing our Society. SEG is arguably the world's premier nonprofit organization representing applied geophysics. SEG has always had the majority of its membership and funding sources from the energy industry, with additional smaller but equally important representation from environmental, minerals, groundwater, and other applied-geophysics sectors. Many of us are now concerned that the energy industry is undergoing fundamental structural changes and may have entered an irreversible decline curve. Although the energy industry always will be at the forefront of cutting-edge applied geophysics, the opportunities for future employment and funding may continue to decrease. The challenge for SEG will be whether to meet this change by reducing its programs and activities in proportion to declining energy industry membership, merging with other societies to

maintain critical mass, or growing its membership by expanding in more diverse areas of applied geophysics such as environment, water, food, climate-change mitigation, etc. It is in this context that I decided to run for the Board to see if I could help pivot SEG to new directions while simultaneously preserving our core expertise in applied geophysics for natural resources.

In addition to my strategic objectives as director at large, I also serve as Board liaison for several SEG committees, mostly associated with the Professional Development portfolio ably led by SEG staff member Linda Ford. They include the Continuing Education Committee, Distinguished Lecture Committee, Honorary Lecture Committee, Distinguished Instructor Short Course (DISC) Committee, EVOLVE Committee, and Emerging Professionals International Committee (EPIC). As you can see, these committees represent the best of existing and new flagship programs for SEG.

The Distinguished Lecture Committee, chaired by Jerry Shuster, and the DISC Committee, chaired by Adel El-Emam, are two of our brightest flagship programs. Because of their similar but different objectives, I recommended

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and they agreed to meet regularly to more closely coordinate processes and lessons learned regarding nominations, travel, programs, funding, etc. Both programs have experienced recent decreases in funding, which had been previously fully provided by the energy sector. These committees are working well to adapt to their new conditions, and I look forward to helping them develop new delivery methods and funding opportunities.

The Continuing Education Committee, chaired by Malcolm Lansley, continues to play an essential role in support of our Membership. Geophysicists often state that SEG's professional-education courses and workshops are among the highest-value benefits of being an SEG Member. As a university professor, I am aware that there are dramatic changes going on today in the way people want educational courses to be marketed and delivered, and this is no different for SEG Members. I look forward to helping with the update of SEG's educational courses and programs.

Mike Forrest energetically chairs the EVOLVE Committee, with major contributions from Allen Bertagne. Its main purpose is to provide emerging professionals and students with a hands-on boot camp to learn oil and gas exploration techniques using

real seismic, log, core, production, and other data types. This program originally started a few years ago with Forrest's vision to improve the practical training of exploration geophysics students so they could better hit the ground running when hired by oil and gas companies. A new spinoff version, EVOLVE Professional, aspires to replace the in-house training programs that most companies once provided to new hires but no longer can afford to do alone. I am happy to offer advice to Forrest (although he certainly doesn't need it) on how to turn this new idea into a self-funded revenue-generating business, which in turn will help fund the more charitable student program aspects of EVOLVE.

Last, but by no means least, EPIC, chaired by Johannes Douma and recently Kelsey Kidd, is doing a great job of attracting and retaining SEG emerging professionals (those with fewer than eight years in the applied-geophysics profession). This includes growing a professional network of contacts, programs, and activities specially customized for SEG's emerging professionals. I have been working with EPIC to help it establish greater presence and opportunities for contribution at the SEG committee and Board levels. The future is bright.

### Director at large Ruben D. Martinez



**“The Board is an impressive group of volunteers from whom I have learned from their skills and knowledge.”**

At the 2019 Annual Meeting, I completed my last of three years serving SEG as director at large. As in the previous two years, it has been a great honor and privilege to serve.

I had the opportunity to meet new members who joined the SEG Board in 2019. The Board is an impressive group of volunteers from whom I have learned from their skills and knowledge. It was also great to work with the SEG senior management team and staff. Their dedication and hard-working attitude are very impressive. They deserve many thanks from all of us on the Board.

At the end of 2018 and beginning of 2019, I served as chair of the SEG Committee on Nominations. This was an honor with great responsibilities. The committee held several meetings to select highly qualified candidates for positions on the SEG Board. At the end of the process, a fine group of candidates was selected. The results are published in a separate report on page 43.

During 2019, I also contributed in an initiative to revise the current SEG strategy. Several meetings were held, and my participation was at the SEG Global Strategy Workshop held in June. The end result of this effort was the inclusion of amendments to the existing strategy.

As part of my responsibilities as a Board member, I served as Board liaison on several committees of the SEG meetings portfolio. They included the Offshore Technology Conference, Unconventional Resources Technology Conference Management, and Meetings Review and Planning committees.

In another activity, I continued to enhance relationships between SEG and its associated societies in Latin America. This year, I focused on the Mexican Association of Exploration

Geophysicists (AMGE). The objective was to develop closer links between SEG and AMGE. Some initiatives are still in progress between the two societies in areas including membership, publications, meetings, and continuing education. We are looking forward to continuing this close communication throughout 2020.

### Director at large Kenneth M. Tubman



**“I had the privilege of working with a strong Board and a number of committees that delivered excellent results in 2019.”**

I had the privilege of working with a strong Board and a number of committees that delivered excellent results in 2019.

SEG China, operating with SEG Global Inc., successfully ran 10 events during the year. More than 200 new members

were added there in the fourth quarter. Also, the SEG China office expanded its ability to perform transactions in local currency after approval by the Board. This is a big step that is necessary to facilitate more global activities. SEG Middle East also added new members and held 10 events in 2019. SEG Asia Pacific hired an event manager and opened an office in Kuala Lumpur. SEG Asia Pacific continues to ramp up, with an active advisory committee and strong plans for 2020. The success of these and other regional offices is key for SEG's future.

The SEG Advanced Modeling Corporation (SEAM) has continued to make strong technical contributions and huge strides to become financially self-sufficient.

During my time on the Board, my main focus has been and continues to be getting SEG on a strong financial basis to enable a vibrant society. We need healthy core programs to allow investment in new efforts.

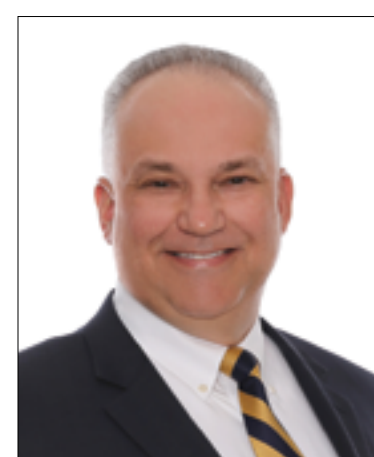
I was asked to lead the SEG Real Estate Task Force. While working with the Real Estate Committee, a lot of effort went into analyzing the performance of our real-estate investments and projecting scenarios for likely future outcomes. The result was the successful sale of the buildings with continuing lease

arrangements. Our staff remain in the same office space, and the Society has an improved financial position.

I also was asked to chair the Committee on Nominations. That work began in the fourth quarter of 2019 and is ongoing today. The committee is assembling a strong slate of candidates for the 2020 elections. We also are looking at ways to improve Board representation for our growing constituencies. More will be discussed on that in the near future.

I am looking forward to helping SEG grow and improve in our response to the changing market in 2020.

## Executive director John Koehr



### **“As a Society, we have much to be proud of in 2019.”**

I'm pleased for the opportunity to report on SEG's 2019 activities and

accomplishments from my perspective as SEG's executive director. I joined SEG in this role in June 2019 and feel genuinely honored and privileged to serve in this capacity. At the end of May 2019, Members may have noted the announcement of my appointment as SEG's new executive director based at our headquarters in Tulsa, Oklahoma. I would like to thank all who have extended such a warm welcome to me. My excitement in the role continues to grow. I presented my initial observations in the President's Page column in the October 2019 issue of *The Leading Edge* and would like to summarize the year and offer a glimpse of 2020.

My efforts in 2019 included learning as much as I could as quickly as possible about the organization, profession, constituents, stakeholders, and markets served. I attended multiple events including the Energy in Data Conference, Unconventional Resources Technology Conference, SEG's Annual Meeting, SEG/SPE Induced Seismicity Workshop, and Offshore Technology Conference Brasil. During these events, I had the opportunity to meet with many of our Members, stakeholders, associated societies, and affiliated societies. My overall impressions have been entirely positive.

As a Society, we have much to be proud of in 2019. You've

already heard some of this from preceding officer reports, but I'd like to summarize key SEG accomplishments from my perspective:

- Finished 2019 with strong statements relative to activities (profit and loss), financial position (balance sheet), and cash flows. We are very fortunate to be in this position, which provides us the foundation on which to grow our mission impact.
- Realigned staff resources with SEG's new portfolio structure. This includes Meetings, Publications, Community Engagement, Professional Development, Student and Early Career Programs, Regional Offices, Business Development and Expanding Markets, and Support.
- Completed a refresh of the SEG strategy including the work of presidential task forces addressing key strategic imperatives. Members can expect more communication as the Board achieves consensus on the roadmap.
- Completed the sale of SEG's Tulsa real estate.
- Expanded SEG's global presence by establishing a new office

in Kuala Lumpur, Malaysia, to address opportunities in the Asia-Pacific region.

- Launched a successful new partner event, Energy In Data, which is managed by SEG and cohosted with our good friends at the American Association of Petroleum Geologists and the Society of Petroleum Engineers.
- Launched the new EVOLVE Professional program.
- Held a successful 2019 Annual Meeting. This was my first SEG Annual Meeting, and I was impressed with all aspects of the event and community including our business and committee meetings, networking and social events, awards ceremony, plenary sessions, technical program, education program, exhibition, student and early-career programs, Student Leadership Symposium, Challenge Bowl, President's Jam, Wrap-Up Party, and member events. I was struck that geophysics is a true community with its own identity.
- Participated in alliance with a number of prestigious societies via GeoScienceWorld to launch a new open-access journal, *Lithosphere*. The journal will cover research in

all areas of earth, planetary, and environmental sciences, providing a unique publishing choice for authors in the geoscience community.

- Launched the SEG Library on a new platform with a completely new design. The SEG Library continues to be cited as a top Member benefit.
- Launched the new SEG Value in Partnering (VIP) program to enable corporate partners to bundle SEG offerings including membership, industry events, education, and global networking opportunities.
- Initiated a new SEG Advanced Modeling (SEAM) project on artificial intelligence.
- Created a new staff Executive Perspectives column for *The Leading Edge*, written monthly by a member of the senior management team to share knowledge about the Society's products, programs, and services.

SEG's purpose is to promote the science of applied geophysics and related fields, to foster the common scientific interests of geophysicists, and to maintain a high professional standing among its Members. In my view, this noble purpose includes engaging and serving our diverse global communities to advance applied

geophysics for the benefit of humanity. Execution on our purpose can achieve a vision where applied geophysics is recognized worldwide for what our Members already know — enabling the best solutions to grand challenges that benefit humankind.

During my brief time with SEG, I have noted that staff and volunteers share values that include preserving the integrity of science; adhering to high standards of ethical professional conduct; embracing diversity of thought, culture, and demographics; treasuring the environment and the world's natural resources; celebrating the proud heritage and contributions of geophysicists; and serving as responsible stewards of Society resources. These shared values form a solid foundation, allowing SEG to confront market realities, advance our purpose, and take on our strategic imperatives.

Some key strategic imperatives that resurfaced through the Board's strategy refresh exercise include expanding global engagement, growing our constituent base in other applied-geophysics industries, engaging students and early-career professionals, attracting the next generation of geophysicists, improving diversity of the profession and membership,

growing humanitarian contributions and impact, creating sustainable product and program solutions, meeting market needs, expanding cross-discipline collaboration and partnerships, enabling adoption of emerging technologies, and increasing utilization of geophysics.

To address these imperatives, SEG will implement a strategy roadmap to advance applied geophysics that includes continuing to grow the impact and excellence of our core knowledge-exchange channels, expanding diversity of our offerings and presence in new markets, expanding our global presence in support of applied-geophysics communities, increasing engagement with early-career professionals, and raising awareness of the role and relevance of applied geophysics. Our plans for 2020 will start us moving more deliberately in this direction, and Members can expect clear communications of the strategy and our progress. A preview includes:

- Celebration of SEG's 90<sup>th</sup> anniversary at the 2020 Annual Meeting
- Expanded SEG global hub office in Houston supporting initiatives across all portfolios

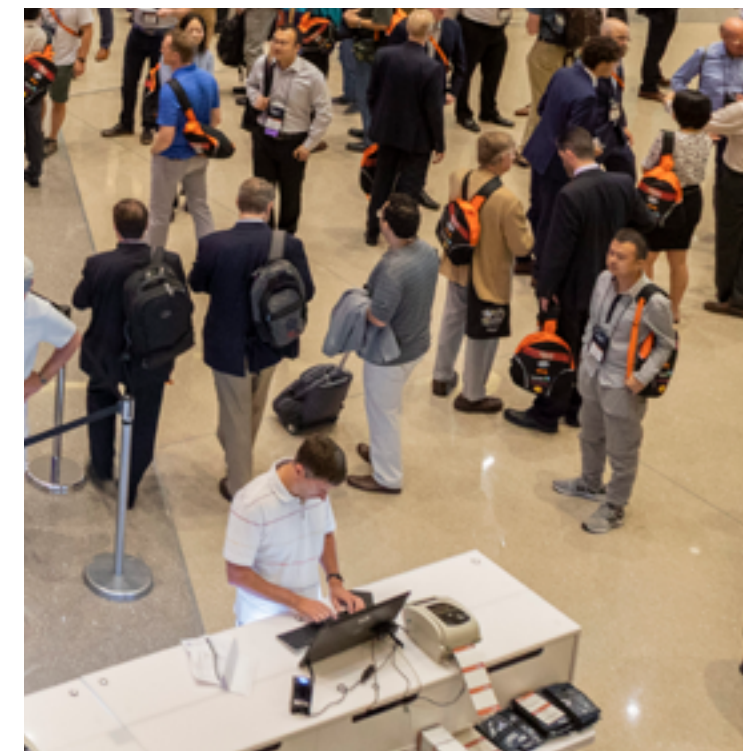
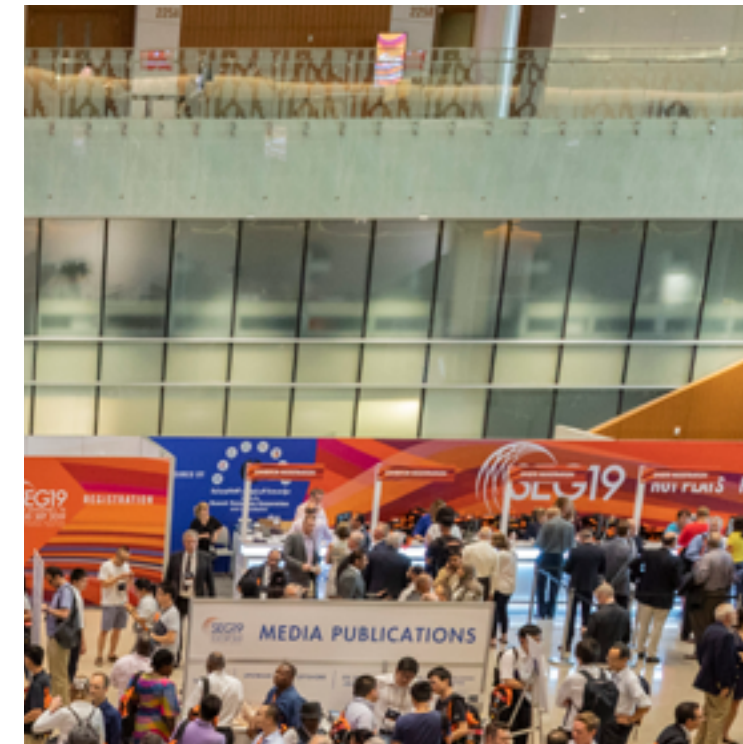
- Further organizational alignment around a strategy addressing our imperatives
- Deeper collaboration with associations representing related science and engineering disciplines
- Renewed opportunities for mission and humanitarian impact enabled through philanthropy
- Focus on ensuring the sustainability of impactful programs within SEG's portfolios

In closing, I would like to acknowledge the inspiring and visionary leadership of our 2019 presidential team: President Rob Stewart, Past President Nancy House, and President-elect Rick Miller. I would also like to acknowledge with sincere thanks the contributions of those outgoing Board members who concluded their terms in 2019: Nancy House, Sergey Fomel, Mihai Popovici, Paul Cunningham, and Ruben Martinez. Additionally, I would like to welcome our new 2020 Board members: Maurice Nessim, Scott Singleton, Baishali Roy, Tad Smith, and Kurt Marfurt. They have already made substantial contributions. I am very pleased to report that our Society is extraordinarily well served by the group of talented, passionate, and committed professionals among our elected volunteer officers.

“WNC has been instrumental in raising the collective awareness of women’s challenges and contributions to geophysics through a series of communicative, informative, and educational strategies.”

— Hendratta Ali

SEG Women’s Network Committee chair



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### AGU–SEG Collaboration

Chi Zhang, cochair

The AGU–SEG Collaboration Committee (ASCC) was established as part of the AGU–SEG Alliance MOU signed in 2010. In the MOU, ASCC was “charged with considering and making recommendations to the respective organizations regarding areas of cooperation, such as joint workshops or programs, publications, continuing education courses, etc.”

AGU and SEG provide complementary support for geophysical sciences, with SEG focusing on methodology development in applied geophysics and AGU primarily supporting geophysics as applied to broader scientific questions.

ASCC identified the following areas of overlap between the two communities: active and passive seismology, gravity and magnetics, electrical and electromagnetic methods, near-surface geophysics, geothermal exploration, and basin analysis.

ASCC meets four times per year, of which two are in person at the major annual meetings of each organization.

### COMMITTEE MEMBERS

- Chi Zhang  
University of Kansas  
SEG cochair
- Xavier Comas  
Florida Atlantic University  
AGU cochair
- John Lane  
USGS
- Fred Day-Lewis  
USGS
- George Tsofilas  
University of Kansas
- John Bradford  
Colorado School of Mines
- Louise Pellerin  
Green Engineering
- Benjamin Drenth  
USGS
- Andrew Lamb  
University of Arkansas
- José Arce  
Arce Geofisicos
- John Louie  
University of Nevada at Las Vegas
- James Irving  
University of Lausanne
- Dimitrios Ntarlagiannis  
Rutgers University
- Anja Klotzsche  
Forschungszentrum Jülich
- Stephen Wilson  
Seismogenic
- Anne Becel  
Columbia University

- Chris Sherman  
Lawrence Livermore National Laboratory
- Dale Bird  
Bird Geophysics
- Esben Auken  
Aarhus University
- John Goff  
University of Texas at Austin
- Jonathan Ajo-Franklin  
Lawrence Berkeley National Laboratory
- Kristina Keating  
Rutgers University
- Michael Behm  
University of Oklahoma
- Nathan Bangs  
University of Texas at Austin
- Sarah Morton-Rupert  
University of Kansas

SEG support was provided by Board Liaison Mihai Popovici and Staff Liaison Laurie Whitesell.

In 2011, SEG and AGU executives approved an MOU that provides a framework for joint meetings and workshops to be held by the two organizations. The first cooperative workshop on hydrogeophysics was held in July 2012. Subsequent annual workshop topics included cryosphere, potential-field and electrical methods, rock physics, airborne geophysics, distributed array acoustics, etc.

Another goal of ASCC is to conduct joint sessions at the major annual meeting of each organization. The standing special session on hydrogeophysics at the SEG Annual Meeting has been held since 2012. Kristina Keating served as lead convener since inception until John Lane took over in 2016, Louise Pellerin in 2017, Chi Zhang in 2018, and Niels Grobbe assumed lead convener for 2019. This standing special session has attracted the brightest hydrogeophysicists. At AGU, an annual joint technical session on exploration geophysics is held and organized by Kennedy Doro and Louise Pellerin. This session continues to grow.

### Annual Meeting Steering Glenn Winters, chair

San Antonio’s Henry B. González Convention Center was the setting for the 2019 SEG International Exposition and 89<sup>th</sup> Annual Meeting held 15–20 September. I was contacted to be the 2019 chair a couple of months before the 2018 Annual Meeting. Attending the meetings allowed me to better understand the relationship of the numerous committee chairs with SEG staff. They pulled off an excellent event in 2018.

Building on this success, Rhianna Collier (SEG’s managing director of global events) and the preselected technical chairs for 2019 made the transition easier to assemble outstanding chairs for the 2019 Annual Meeting. I would especially like to thank Vice Chair Kevin Woller, who was instrumental in working with the technical chair and the Business of Applied Geophysics (BAGs) program, along with several other responsibilities.

### OPENING

The 2019 Annual Meeting started with a mariachi band leading current President Rob Stewart and incoming President Rick Miller, myself, several other SEG leaders, our spouses, and friends around the exhibition floor to shake hands and welcome attendees. Hopefully everyone enjoyed the music, appetizers, and numerous refreshment stands.

The Annual Meeting opened at 8:30 Monday morning with our opening session followed by the opening of the exhibition floor at 10:00 a.m. After my opening remarks, I had the pleasure of introducing Stewart, who provided an informative and inspirational presentation. He then introduced our keynote speaker, Walter Guidroz (program coordinator for the Energy

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Resources Program, U.S. Geological Survey). Even though Guidroz was a substitute for Jim Reilly who canceled late, the Society lost nothing as far as content, as Guidroz was able to speak directly to concerns of the oil and gas community.

### EXHIBITION

One of the first issues that I undertook during the 2018 Annual Meeting was

to better understand the needs and concerns of our exhibitors. Exhibitors have a multitude of opportunities around the world where they can show their cutting-edge technologies while conducting business with clients and seeking new opportunities. A common concern is how to attract more people to the exhibition floor. After visiting 20–30 booths of large and small exhibitors in Anaheim, collected feedback was implemented

in San Antonio. Shorter hours on the exhibition floor, afternoon snacks on the floor in several locations, a free lunch to all registrants, and a better mixing of companies and their products are some of the instituted changes. I'd like to thank all of those who offered suggestions, and hopefully exhibitors will continue to make suggestions to enhance the experience.

Exhibitors are a critical and significant reflection of the success and health of the current state of the geophysical industry. While the number of exhibitors was down (197 in 2019 versus 216 in 2018), the floor space utilized was about the same. I believe the reduction we encountered was partly due to the number of mergers that continue to occur in our business. We also had 34 sponsors (20% increase) who contributed and helped in several ways, sponsoring a range of activities that enhanced the SEG experience in San Antonio. Special thanks to Exhibits Cochair Debbie Mitcham.

### EDUCATION

The 2019 Annual Meeting focused on the unconventional plays of the Permian and Eagle Ford and had a special regional focus on Latin America. In attendance were 5126 registrants representing 68 countries,

of which 509 were students. The number of students was down from the previous year, in addition to several presenters and attendees who were unable to attend because of problems securing visas.

Speaking of presentations, 1472 abstracts were submitted, of which 1077 were accepted for oral or poster. This allowed us to have 151 technical sessions and eight special sessions. The technical sessions consisted of 706 oral and 371 poster presentations. Other education opportunities were available, including 18 postconvention workshops, eight continuing-education courses, six BAGs, two near-surface events, a special global session, and the second annual JAWS competition. While the BAGs had a varying degree of success, we realize that to enhance this program in the future, they need to be closer to other oral presentations and the number of sessions need to be reduced. Thanks to Bill Abriel for his work in championing the BAGs and also to Dimitri Bevc (technical chair) and Olga Nedorub (cochair) for the excellent program that they and their committees produced.

### GLOBAL EVENTS

A big thank you to the global committee chairs, Claudia Duenas

and Ana Curcio, who put together a great session about new plays and challenges in Latin America. During the year, as they were gathering speakers, they encountered many impediments. They worked with countries and companies that limited the range and scope of the presentations because of national secrecy, company confidentiality, travel limitations, and cost to the speakers. They also put together a luncheon that was well attended.

Another change at this year's convention was the Wrap-up Party on Wednesday evening after the last technical session. The Latin-themed party, which was free for students and at a greatly reduced cost to registrants, had 610 attendees. The event featured an outstanding array of appetizers, margarita machines, and great dance music, bringing together geophysicists dancing outdoors on the pavilion steps along the Riverwalk and cruising the San Antonio River with their friends and colleagues.

### SPECIAL ACTIVITIES

Unfortunately, due to commitments as chair, I attended fewer technical sessions than normal. Fortunately, I did attend other events that were fun and well attended. The preconvention



Attendees enjoyed exploring the exhibition floor during the 2019 Annual Meeting.

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golf tournament returned and was held at The Quarry. Though we didn't have a full 18 holes of players, we enjoyed an excellent day on the course with fantastic weather for that time of year. Next year in Houston, we are expecting an even better turnout, so mark your calendars for the Saturday before the 2020 Annual Meeting to play a round. Thanks to Denise Dorsey for her hard work on this event. Several attendees enjoyed the Karst Geophysics and Geology Field Trip and the tour of Comal Creek Vineyards. I'd like to thank Mustafa Saribudak who volunteered his time to lead the field trip.

Tuesday morning was the Applied Science Education program (ASEP), championed by Alf Hawkins. The ASEP program brings high school students to the convention, where they are introduced to the world of geophysics and oil exploration by visiting the exhibition floor and hearing outstanding speakers share vital information about the energy business. A total of 85 students from four San Antonio-area high schools arrived at 9:00 a.m. to spend their morning visiting our Annual Meeting. The students were able to visit four booths (thanks to CGG, Shearwater, PGS, and SHERP), ask questions, and exchange ideas with booth personnel.

I think most students would agree that the highlight of their experience was visiting with Scott Tinker from the Bureau of Economic Geology. Tinker recently released his second movie, and his website [switchon.org](http://switchon.org) should be bookmarked for anyone involved in the oil and gas profession. He stressed to the students the concept of critical thinking, and it was amazing to see these young peoples' attitudes and preconceived notions change as Tinker spoke. He discussed climate change and alternative energy possibilities, batteries, and hydrocarbons. Vice Chair Kevin Woller also presented information about the daily responsibilities of an exploration geophysicist. Woller showed examples and discussed what skills will be needed by future geophysicists.

Tuesday night was the President's Reception and Presidential Jam. There was a good turnout at both events. During the Presidential Jam, several past SEG presidents and Woller went on stage to join the band. Some belted out vocals, while others played instruments.

I also experienced firsthand the excitement generated by the Passport program. Briefly, for those of you who are unacquainted with this program, attendees visited sponsored exhibitor booths and had their SEG-

issued passports stamped. Then, Wednesday afternoon at 1:00 p.m., there was a drawing for participants to win several prizes. I drew names for the prizes. Watching the enthusiasm build for mostly student attendees was an awesome experience.

These are some of the high points from the 2019 SEG International Exposition and 89<sup>th</sup> Annual Meeting. I'm grateful for the opportunity to serve as the general chair. I am appreciative to SEG staff for their diligence and to all of the chairs who took time to be involved with organizing this successful Annual Meeting.

### **Annual Meeting Technical Program**

Dimitri Bevc, chair  
Olga Nedrob, cochair

The 2019 Technical Program Committee initiated its kickoff at the 2018 Annual Meeting in Anaheim. A new tradition was established: the previous year's technical cochair became the technical chair. This will allow for better continuity of the program, mentoring of new chairs, and hopefully a reduced training burden to get new chairs up to speed.

As in previous years, the committee chairs relied heavily on volunteers

and SEG staff to make the technical program a success. Thus, the chairs would like to extend their appreciation to the hard work and commitment of the 47 members of the Technical Program Committee who served as session topic organizers, 1227 reviewers who dedicated their time to reading abstract submissions, 80 postconvention workshop organizers, 310 session chairs, and 90 session monitors. Special thanks to Jenny Cole and the rest of the SEG staff whose hard work, dedication, and positive attitude had a huge imprint on the success of the technical program.

A significant change to the technical program this year is that it ended on Wednesday afternoon rather than Thursday at noon. This allowed postconvention workshops to start Thursday morning rather than Thursday afternoon. Workshops continued through Friday, ending at noon, allowing for Friday travel. Additionally, poster presenters were required to be at their poster station during designated times in addition to their presenting time. This allowed the opportunity for presenters and attendees to engage in discussion about their work outside the presenters' scheduled presentation time.

The abstract submission portal was open from 1 February through 1 April,

and 1472 abstracts were submitted. Of those, 1077 were accepted, 706 were presented as oral presentations, and 371 were posters. This resulted in 90 oral sessions and 65 poster sessions. The rejection rate was 27%, which is significantly lower than last year's rejection rate of 41%. This lower rejection rate was achieved by giving submitting authors the option of electing to have their paper considered for poster presentation if their paper was not accepted as oral. It also was achieved by encouraging topic organizers to first fill their oral quota and then accept all papers that didn't make the oral cut as posters. This was done in an effort to increase overall acceptance, as it is recognized that many attendees require paper acceptance to warrant travel approval, and to make SEG more accessible. It is this chair's opinion that the topic area coordinators did not quite get the message and intent of this initiative, and that if SEG wishes to continue with this strategy, more of an effort needs to be made to implement the higher acceptance rate.

This was the second year that SEG used a new abstract management system (AMS) that was created by SEG and ScholarOne. The system continues to work well, and Jenny Cole deserves special acknowledgment for maintaining and running the system

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and getting the topic area coordinators up and running on it. The AMS portal is a great improvement over previous systems, with fewer complaints about the submission and review process.

The technical program consisted of 90 oral sessions and 65 poster sessions. The oral and poster sessions were spread out over 27 topic areas. There also were nine oral special sessions that included Recent Advances and the Road Ahead and a special global session. To end the convention, the technical program offered 18 postconvention workshops.

In order to provide a technical program that had connection to Texas, in the midst of the large swath of unconventional plays, the theme of the meeting was “Hot Topics and Hot Technologies for Hot Plays.” The hot technologies ranged from machine

learning and full-waveform inversion (FWI) to near surface and environment, with a good representation of all areas of interest in between. The hot plays included tight rocks and unconventional topics, but deep water and conventionals also were well represented, creating a good balance between land and marine technical topics.

One of the hottest topics this year was Machine Learning and Data Analytics (MLDA), with six oral sessions, eight poster sessions, and a special session. Within the MLDA sessions, there were several subtopics including interpretation, processing, and inversion. Last year was the first time we had the MLDA topic. In this era of digital transformation, the machine learning theme also is showing up as a subtopic in other areas including interpretation, near surface, and reservoir characterization. FWI

remained a hot topic, with seven oral sessions and seven poster sessions. There were a wide array of other sessions covering traditional topics of acquisition, amplitude variation with offset, anisotropy, borehole methods, distributed acoustic sensing (DAS), electromagnetics, passive seismic, potential methods, mining, reservoir characterization, rock physics, and the usual array of reflection seismic topics. There were five interpretation oral sessions and three poster sessions. Two new topic areas in 2019 were induced seismicity and distributed acoustic sensing. The special global session was, “Latin America — New plays and challenges.” The eight special sessions were:

- Recent advances and the road ahead
- CO<sub>2</sub> monitoring

- DAS, borehole, and microseismic geophysics for unconventional
- Geoscientists *Without Borders*® and humanitarian geophysics
- Machine learning and artificial intelligence applied to geophysics
- Seismic advancements in the Permian
- SEG/AGU hydrogeophysics
- Surface wave method applications

Besides the obvious digital theme, the program included a greater number of sessions on geomechanics and fracturing, as well as novel acquisition methodologies (such as DAS, drones, and passive and electromagnetic methods) all applied to new and challenging plays including the Permian and other tight rock plays, Latin America, and deep water. The unconventional emphasis is driving many of the technical topics in induced seismicity, shear waves, land acquisition, microseismic, geomechanics, passive seismic, and fracture characterization.

The postconvention workshops came together through the hard work of approximately 80 organizers and the coordination of Cengiz Esmersoy.

- Several workshops had a digital and tight rock theme and included:
- DAS — Part 1: Recent advances in subsurface characterization using distributed acoustic sensing and the road ahead
  - Advances with land seismic for characterizing reservoirs — Part 1
  - Machine learning and data analytics algorithms and workflows for geoscience applications
  - Value of high-frequency FWI models
  - Joint imaging/inversion of S-waves with P-waves: Advances in characterizing overburden, elastic models, and petrophysical properties related to conventional and unconventional reservoir development
  - Frontiers in seismic reservoir characterization
  - Real-time processing for large-scale streaming seismic data
  - New technologies in marine acquisition
  - Misac Nabighian memorial workshop

TABLE 2  
PRESENTATIONS ACCEPTED FOR THE ANNUAL MEETING

| Year | Location    | Submissions | Rejection Rate | Presentations                                               |
|------|-------------|-------------|----------------|-------------------------------------------------------------|
| 2015 | New Orleans |             |                | 1094 accepted for presentation; 50 withdrawals; 5 no-shows  |
| 2016 | Dallas      |             |                | 1103 accepted for presentation; 38 withdrawals; 21 no-shows |
| 2017 | Houston     |             |                | 1163 accepted for presentation; 50 withdrawals; 7 no-shows  |
| 2018 | Anaheim     | 1854        | 41%            | 1090 accepted for presentation; 18 withdrawals; 37 no-shows |
| 2019 | San Antonio | 1472        | 27%            | 1077 accepted for presentation; 33 withdrawals; 18 no-shows |

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- Long-term monitoring of CO<sub>2</sub> geosequestration: Continuous surveillance and quantitative interpretation
- Interpretation and de-risking to support decision making in development and production
- DAS — Part 2: What is next for DAS? Operator needs versus technology suppliers' vision
- Advances with land seismic for characterizing reservoirs — Part 2
- Artificial intelligence frontiers in geosciences
- Seismic attributes in the age of machine learning
- Least-squares migration: The way forward
- Rock physics implications of CO<sub>2</sub> injection in the subsurface
- Ambient noise imaging and monitoring for high-resolution spatial and temporal near-surface characterization and exploration seismology

This was the second year for the new Business of Applied

Geophysics (BAGS) sessions, which are designed to be attractive to geophysics managers, service companies, operators, regulators, and geophysicists focused on the value of applied geophysics. The sessions included the following themes:

- Challenges and solutions in developing resource plays
- Putting diversity to work
- Digital transformation in petroleum geophysics — What impacts are we seeing?
- Latin America and the Caribbean: Business opportunities and challenges
- Improving the business model of land seismic and processing in the United States: Technology, quality, economics
- The changing business climate of marine geophysics: Roadmap to the future

The sessions all received excellent reviews regarding topic, focus, and quality. Although advertising for the sessions was better than at Anaheim, attendance was lighter than anticipated,

and the BAGS organizing team is working to remedy that for 2020.

As illustrated in Table 2, the 2019 withdrawal rate was higher than 2018, but no-shows were significantly less. A factor that continues to be a reason for no-shows and withdrawals is visa and permission issues for delegates coming from countries such as China and Russia, and possible delays in their U.S. visa application time. We recommend that future technical program organizers strongly encourage attendees to obtain permission to travel and to start the U.S. visa application process as soon as possible to avoid the need to cancel.

### Audit Bob Brook, chair

The Audit Committee is a standing committee of the Board of Directors. Its primary function is to assist the Board in fulfilling its oversight responsibilities, specifically in the Society's finance and accounting procedures. It also is tasked with reviewing the independence and performance of the Society's auditors.

The committee is made up of three nonexecutive Board members. In

2019, the committee members were Maria Angela Capello, Dan Ebrom, and Bob Brook.

The Audit Committee works closely with the CFO. In April, there was a transition in this role as Kay Lang stepped down and was replaced by Wendy Hudgens as acting CFO. Derek Williamson was named CFO in August. I am pleased to say that the SEG team did an excellent job managing these changes.

The committee interviewed independent auditors and thoroughly reviewed the 2018 financials in May, and the audited financials were approved by the Board in June.

SEG strives to run a net-neutral budget. We completed 2019 with positive net revenue. This was aided by investment gains and a one-time payment for lost convention revenue resulting from Hurricane Harvey. Net revenue would have been negative without these two items. However, when combined with the sale of the Tulsa real estate, we enter 2020 with a strong balance sheet, well positioned to execute new and exciting goals for the Society.

### Books Editorial Board Mauricio Sacchi, chair

The following books were published during calendar year 2019:

- *Understanding Signals: Basic Waveform Analysis from a Geophysical Perspective* by Michael Burianyk
- *Illustrated Seismic Processing, Volume 1: Imaging* by Stephen J. Hill and Andreas Rueger
- *Numerical Modeling of Seismic Responses from Fractured Reservoirs by the Grid-characteristic Method* by Vladimir Leviant, Igor Kvasov, and Igor Petrov

Books we expect to publish during calendar year 2020:

- *Survey Design and Seismic Acquisition for Land, Marine, and In-Between in Light of New Technology and Techniques* by David J. Monk
- *Physics and Mechanics of Rocks: A Practical Approach* by Manika Prasad

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- *Illustrated Seismic Processing, Volume 2: Preimaging* by Stephen J. Hill and Andreas Rueger
- *Basic Wave Analysis* by Enders A. Robinson and Tijmen Jan Moser
- *Blizzards and Broken Grouzers: A Year of Antarctic Glaciology* by L. R. Denham

Acting as reviewers of book proposals and as managing editors for accepted proposals, Board members identify authors and topics, particularly those that explain geophysical technologies to a broad audience of earth scientists, to keep the SEG Books program topical and successful.

### Committee on University and Student Programs

Joan Marie Blanco, chair

In 2019, the Committee on University and Student Programs (CUSP) successfully reorganized into a structure that has defined roles for members and supports active participation from all on the committee. The new structure was implemented in the first quarter of 2019, and all roles were filled by volunteers. Roles provide members with defined responsibilities that help support the efforts of our student chapters. Additionally, each committee member is assigned several student chapters to maintain communication with and encourage their growth throughout the year.

The committee launched its first webinar for student chapters in 2019. The webinars, conducted by CUSP members and others, provide student chapters with information on SEG and SEG's student programs. The webinars are designed to encourage better understanding of SEG and to provide student chapters with an opportunity to interact with each other. Additional webinars are planned for 2020.

The Student Chapter Excellence Program Subcommittee of CUSP evaluated applications for 2019 Best

Student Chapter. There were 215 active student chapters in 2019. A total of 64 chapters submitted applications for the award. The evaluators selected the University of Oklahoma Geophysical Society as Best Student Chapter and the Universidad Simon Bolivar Geophysical Society (Venezuela) as Most Improved Student Chapter.

### 2020 OBJECTIVES

The three main objectives of CUSP for 2020 are:

- 1) Develop webinars that expand student chapter members' awareness of SEG student programs and encourage interaction between chapters.
- 2) Improve communication with student chapters by identifying the best means for interacting with chapter leadership (Basecamp, Slack, etc.).
- 3) Recruit additional committee members from regions not currently represented.

### Continuing Education

Malcolm Lansley, chair

The Continuing Education (CE) Committee works to provide a curriculum of quality professional courses to the exploration-geophysics community. To ensure that the current and emerging needs and standards of the community are met, the committee is dedicated to developing a high-value, needs-based curriculum while adopting delivery approaches consistent with best practice.

### CE EVENTS

In 2019, CE classes were offered during the five training events listed in Table 3. In addition, six in-house courses were held in support of Saudi Aramco and Chesapeake Energy requirements.

Attendance for the University of Houston/SEG Summer Program and the SEG Annual Meeting failed to meet expectations, prompting a reevaluation of the current market and practice. The following efforts are under way to improve course attendance and schedule efficiencies in 2020.

- Contact instructors concerning asynchronous virtual/live courses
- Poll members and use surveys to determine needs-based training and preferred delivery platforms
- Develop new workflow-based courses
- Decrease current five-year course review cycle to three years to improve the relevancy of content

**TABLE 3**  
CE COURSES HELD IN 2019

| Event                                                          | Dates           | Number of courses | Number of participants |
|----------------------------------------------------------------|-----------------|-------------------|------------------------|
| University of Houston/SEG Summer Program (augmented attendees) | May–Aug         | 3                 | 5                      |
| SEG–GSH Education Week                                         | 26–27 March     | 2                 | 22                     |
| URTeC                                                          | 29–30 May       | 1                 | 11                     |
| SEG Annual Meeting                                             | 14–15 September | 8                 | 86                     |

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- Use Zoom reviewers to validate new courses
- Increase promotion and visibility of CMS and IHRDC courses
- Offer two soft skills courses

**NEW COURSES IN 2019**

The following courses were added to the course catalog.

- “Machine learning techniques for engineering and characterization” by Sid Misra
- “Integrated geologic, seismic, and reservoir engineering

characterization for dual-media simulation in conventional and unconventional fractured reservoirs” by Reinaldo Michelena, Chris Zahm, and James R. Gilman

- “An introduction to perspective seismic interpretation” by Steven Lynch

The following courses are pending a course review.

- “Effective science communication” by Umair bin Waheed and Roel Snieder

- “Affordable full-mode S-wave reflection seismology with P sources” by Bob Hardage
- “Fundamentals of rock physics for exploration” by Aiman Bakhorji
- “The seismic wavelet: Its modeling, acquisition, processing, interpretation, and inversion (in marine, transition, and land environment)” by Osman Hassan

**CSEG/SEG DISTANCE LEARNING  
EVENT**

In December, SEG and the Canadian Society of Exploration Geophysicists (CSEG) entered into a revenue-sharing

venture in support of a ten-day destination learning event to be held 15–24 June 2020 in Calgary, Canada.

**SEG ANNUAL MEETING 2020**

The Professional Development Department is currently gathering data and performing market analysis to provide the CE Committee with information to assist in the selection of Annual Meeting courses. Selection of the courses will be finalized by 15 March 2020.

**SEG ON DEMAND**

With Knowledgette support, five Honorary Lecture (HL) and Distinguished Lecture (DL) recordings were added in 2019. An additional four recordings are in production. Plans are

under way to convert Flash support lectures to MP4 format in 2020.

The lectures in Table 4 have been translated to Mandarin, with an additional block of 2020 candidates under review by BGP and the SEG China office.

**COMPETENCY MANAGEMENT SYSTEM**

Our partnership continues with the International Human Resources Development Corporation (IHRDC), a respected provider of training and competency development solutions for the oil and gas industry, to provide the Competency Management System (CMS) free of charge to SEG Members.

This system allows members to assess their current capabilities against specific competency models for key

**TABLE 4**  
LECTURES THAT HAVE BEEN TRANSLATED TO MANDARIN

| Title                                                                                                    | Lecturer         | Type/Year |
|----------------------------------------------------------------------------------------------------------|------------------|-----------|
| Getting more for less: Frequent low-cost seismic monitoring solutions for offshore fields                | Paul Hatchell    | DL 2017   |
| Imaging the earth’s near surface: The why and how of applied geophysics for the 21 <sup>st</sup> century | Doug Oldenburg   | DL 2011   |
| Looking into the near-surface imaging technologies and results                                           | Michael Kemper   | DL 2016   |
| A pragmatic view of land multiple attenuation technologies                                               | Panos G. Kelamis | DL 2005   |
| Marine seismic acquisition: Expanding the possibilities                                                  | Sandeep Chandola | HL 2014   |
| Integrating well log, seismic, and CSEM data for reservoir characterization                              | Lucy MacGregor   | HL 2011   |
| From imaging to inversion                                                                                | Ian Jones        | HL 2012   |
| The state and future directions of prestack depth migration                                              | Julian Cabera    | HL 2011   |
| Expanding seismic stratigraphy to the full-elastic wavefield                                             | Bob Hardage      | HL 2009   |
| Pitfalls and challenges of seismic imaging                                                               | Evgeny Landa     | HL 2015   |

**TABLE 5**  
USAGE OF THE CMS

|             | Total accounts<br>created | In progress | Assessments<br>completed |
|-------------|---------------------------|-------------|--------------------------|
| <b>2016</b> | 172                       | 114         | 49                       |
| <b>2017</b> | 312                       | 216         | 73                       |
| <b>2018</b> | 440                       | 195         | 83                       |
| <b>2019</b> | 528                       | 234         | 105                      |

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geoscience careers. The software is designed to easily identify competency gaps based on assessment results. It then recommends a learning plan that helps close those gaps. Members are referred to an ever-growing list of SEG training resources including SEG CE courses, e-learning courses, generic third-party course titles, SEG technical papers, books, and on-job work assignments. Per the user progress data report in Table 5, we are seeing an increase in the usage of this resource.

### IACET REACCREDITATION

Efforts are under way to prepare the CE program for a five-year review of its approved provider status in August 2020. The International Association for Continuing Education/Training (IACET) supports best practice through the use of the ANSI/IACET Standard, in-depth research on the learning process, and a nationwide network of experts that help CE and training providers develop a framework for continuous improvement. Currently, more than 60% of those attending SEG CE events continue to find value in the award of CEU credits.

### Development and Production Andrew Royle, chair

The Development and Production Committee continued to promote discussion and interaction on the latest technologies to improve reservoir characterization.

#### 2019 ACTIVITIES

- Two new members were recruited in order to build a strong committee core and to remain active in the dissemination of development and production in geophysics.
- Marianne Rauch will assume the role of chair following the 2020 Annual Meeting. I will continue to be a committee member and help Rauch rotate into the role.
- It has been decided to merge the Oil and Gas Reserves Committee with the Development and Production Committee. Eric von Lunen has carried the committee, but it has had dwindling numbers. It is important to keep initiatives moving, since SEG is a part of the Petroleum Resource Management System peer-review process. This will be a subcommittee, and von Lunen will continue the excellent work he has been doing.

- The 2019 Annual Meeting included a workshop titled, “Interpretation and de-risking to support decision making in development and production.” This event was well attended and spurred good technical discussion. Another workshop titled, “Geophysical monitoring of unconventional reservoirs,” was unfortunately canceled for unforeseen circumstances. The Development and Production luncheon was not held due to low registration numbers.

#### 2020 FOCUS AREAS

- **Committee membership.** Focus will be on rebuilding the committee and looking into ways to attract early-career members.
- **2020 Annual Meeting special sessions/workshops.** Work will continue with the 2020 Technical Program Committee to solidify special sessions/workshops for the Annual Meeting.
- **D&P Forum.** Discussions on possible 2021 and 2022 forums will continue. Houston or Austin will be likely venues due to travel limitations. May or June is being considered in order to include awards at the

Annual Meeting. Engagement with the Society of Petroleum Engineers (SPE), Geophysical Society of Houston, or the American Association of Petroleum Geologists (AAPG) could be an option.

- **Workflows.** The committee will build an oil and gas reserves geophysical workflow knowledge base and share best practice integration with other subsurface disciplines.
- **Definition of seismic for reserves.** We will define examples and put them in a place where they can be shared.
- **Engagement with other societies.** Engagement with other disciplines will continue on the integration and use of geophysics.
  - **Interpretation** (SEG/AAPG). Meetings will be held with the AAPG Reservoir Development and Geophysical Integration Committee during the AAPG Annual Meeting.
  - **Joint workshop with SPE.** Potential topics for the workshop include applications of geophysics in reserves booking and monitoring unconventional reservoirs with geophysical methods.

- **Technical session.** The committee will investigate a possible Offshore Technology Conference technical session.

- **Knowledge share.** Committee members will share the mission of the committee. This may include avenues such as the SEG Wiki, the Doodlebugger, and SEG SmartBrief.

### Distinguished Instructor Short Course

Adel El-Emam, chair

In 2019, Manika Prasad served as the first woman for the Distinguished Instructor Short Course (DISC). Her course, “Physics and mechanics of rocks: A practical approach,” was a great success. The course offered practical instructions and provided working knowledge in the areas of rock physics and rock mechanics for rock characterization. Although the course had a strong focus on rock-physics fundamentals, key principles, and controls for rock properties, Prasad also discussed advanced topics in rock physics, such as attenuation and dispersion, complex electrical properties, and the link of elastic properties to permeability.

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It was a successful and attractive one-day course. A total of 23 stops were held covering 14 different countries including Argentina, Australia, Bahrain, Brazil, Canada, China, India, Japan, Kuwait, Malaysia, Mexico, Singapore, the United Kingdom, and the United States. The total attendance was more than 350.

The 2020 DISC instructor is Dave Monk. Monk retired from Apache Corporation at the end of 2019 and is now affiliated with ACTeQ, Geophysical Technology Inc., and DownUnder GeoSolutions. His course, “Survey design and seismic acquisition for land, marine, and in-between in light of new technology and techniques,” is expected to be a great course covering the fundamentals of survey design. In addition, the course will highlight the changes in technology that we have seen in the past five years and those that are likely to develop in the next few years. The production of the course book has advanced, allowing its readiness by the time of course commencement.

The DISC Committee also has selected the 2021 instructor, Joe Dellinger, for his preliminary topic: forensic data processing. The selection fits nicely following the 2020 course on seismic acquisition by Monk.

During the 2019 Annual Meeting, a luncheon was held 15 September and attended by Tom Agnew, Judy Wall, Professor Gerard Schuster, and Adel El-Emam. The objective of the meeting was to discuss the initiative of combining the DISC Committee and the Distinguished Lecture (DL) Committee.

There has been a common consensus to keep the committees separate and to enhance the cooperation and integration level of the selected topics as well as the instructors. This has been immediately actioned through the attendance of Gerard Schuster at the DISC Committee meeting and the attendance of Adel El-Emam at the DL Committee meeting, both held on 16 September.

The luncheon was conducted by the DISC Committee, where several subjects were reviewed and discussed, including the relationship between the DISC and DL committees, instructor selection, and criteria. Committee members emphasized the following objectives to achieve:

- Attract new candidates/members to join the DISC Committee
- Ensure that top-quality instructors and interesting topics are selected

- Plan the DISC candidate nominations for 2022

I want to thank the committee members and especially SEG staff and instructors for their professional work and tireless efforts to ensure successful continuation of the high-level DISC program.

### Distinguished Lecturer Gerard Schuster, chair

The SEG Lecture program, including Distinguished Lecture (DL), Honorary Lecture (HL), and the Virtual Near-Surface Global Lecture, is considered to be one of the most effective outreach programs of SEG as evidenced by the reported 5332 attendees in 49 countries for the 2019 tours. Attendance of a DL/HL talk is the only opportunity for many young people to directly interact with distinguished SEG speakers. We applaud SEG for continued support of the outstanding program.

The DL program is supported by PGS and Equinor through the SEG Foundation.

### 2019 DISTINGUISHED LECTURERS

- Felix Herrmann, Q1/Q2 DL, 22 lectures, 704 attendees

Countries: Australia, Egypt, India, Indonesia, Israel, Malaysia, Netherlands, Oman, Singapore, United Arab Emirates, United Kingdom, and United States

Title: “Sometimes it pays to be cheap — Compressive time-lapse seismic data acquisition”

Quote: “Great presentation of a complex subject, easy to understand, valuable examples, formulas, video demonstrations, relevant to local workers.” — Olga Nedorub, Apache Corporation, Midland, Texas, United States

- John Etgen, Q3/Q4 DL, 32 lectures, 1559 attendees

Countries: Canada, China, Denmark, France, Indonesia, Italy, Kuwait, Malaysia, Norway, Oman, Saudi Arabia, Singapore, United Arab Emirates, United Kingdom, and United States

Title: “Practical insights and techniques in seismic velocity estimation”

Quote: “The presentation was great, especially the delivery. Dr. Etgen has a natural charismatic presentation style, which creates an enjoyable atmosphere for questions and discussion. The content was really interesting, and I heard from multiple attendees that

they considered the topic to be of critical importance and had even hoped the talk was longer than it was (approximately two hours).” — Matthew Storey, University of Houston, Houston, Texas, United States

### 2020 DISTINGUISHED LECTURERS

- Sergey Fomel, University of Texas at Austin, Q1/Q2 DL
- Aria Abubakar, Schlumberger, Q3/Q4 SEG–AAPG DL

### 2019 HONORARY LECTURERS

The HL program, which includes tours (or virtual lectures) in six regions, is sponsored by Shell through the SEG Foundation. Due to reduced funding in 2019, three of the six honorary lecturers gave virtual lectures instead of traveling tours.

- Latin America (virtual): Gladys Gonzalez, two virtual lectures, 127 attendees

Countries: The virtual lectures were viewed within the region and globally.

Title: “De-risking exploration and development with realistic 3D geologic modeling, geophysical seismic simulation, and imaging”

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Quote: “Very interesting presentation. Dr. Gonzalez captured the history of de-risking exploration and development using real examples of 3D modeling. Many thanks to Dr. Gonzalez and SEG for the excellent lecture.” — Raquel Correa, Schlumberger, Mexico City, Mexico

- Europe (traveling): Dirk Gajewski, 22 lectures, 562 attendees

Countries: Austria, Azerbaijan, Czech Republic, Denmark, France, Germany, Netherlands, Norway, Switzerland, and United Kingdom

Title: “Wavefront attributes — A tool for processing, imaging, and model building”

Quote: “Dirk Gajewski is a very clear and engaging speaker. His supporting materials illustrated his message well.” — Rodney Johnston, BP, Sunbury, United Kingdom

- Middle East and Africa (virtual and trips within Nigeria): Hesham El-Kaliouby, two virtual lectures and three traveling lectures, 209 attendees

Countries: Nigeria. The virtual lectures were viewed within the region and globally.

Title: “Induced polarization effect in time-domain electromagnetic prospecting, noise, or signal?”

Quote: “For someone with limited experience in the field, I appreciated the concise review of the time-domain and frequency-domain platforms as well as the visual discussion of different aspects of the response curves.” — Anonymous

- North America (traveling): Heloise Lynn, 19 lectures, 517 attendees

Countries: United States and Canada

Title: “Azimuthal P-P seismic measurements: Past, present, and future”

Quote: “Dr. Lynn was a fantastic speaker for our student body. It was a pleasure to have one of the pioneers of azimuthal anisotropy come talk about the history of the subject, the breakthroughs that we have made, and the future. She was very clear about complex topics, to the extent that our undergraduate geoscientists were able to grasp the concepts and understand the importance of including azimuthal anisotropy in seismic processing and further analysis. It was also inspirational for our women geoscientists to hear about her experiences and how

she was able to create significant breakthroughs in the industry.” — Julian Chenin, University of Oklahoma, Norman, Oklahoma, United States

- Pacific South (traveling): Boris Gurevich, 29 lectures, 1080 attendees

Countries: Australia, China, Japan, Singapore, and Taiwan

Title: “Seismic attenuation, dispersion, and anisotropy in porous rocks: Mechanisms and models”

Quote: “The lecture was rich in content, excellent in teaching, and highly targeted, which inspired participants. We learned a lot from Dr. Gurevich’s visit.” — Qianzong Bao, Chang’an University, Xi’an, China

- South and East Asia (two virtual lectures and trips within India): Subhashis Mallick, two virtual lectures and six traveling lectures in India, 417 attendees

Countries: India. The virtual lectures were viewed within the region and globally.

Title: “Reservoir characterization for the next generation”

Quote: “I thoroughly enjoyed the lecture and found the presentation very interesting and informative. This is not my field of expertise, so it was nice to learn something new.” — Anonymous

### 2020 HONORARY LECTURERS

- Latin America: Patricia de Lugao, Strataimage Consultoria Ltda, Rio de Janeiro, Brazil

- Europe: Johan Robertsson, ETH, Zürich, Switzerland

- Middle East and Africa: Saleh Al-Dossary, Saudi Aramco, Saudi Arabia

- North America: Anna Shaughnessy, consultant, Boston, Massachusetts, United States

- Pacific South: Lisa Gavin, Woodside Energy Ltd., Perth, Australia

- South and East Asia: Xinming Wu, University of Science and Technology of China, Hefei, China

Due to Shell’s sponsorship of the HL program and a generous contribution by Shiv Dasgupta, each 2020 honorary lecturer will complete a

reduced traveling tour followed by a live virtual lecture.

In 2019, many DL Committee members expressed concern about the reduced effectiveness of virtual HL tours and recommended efforts to restore funding to ensure that all HL tours are live traveling tours. We will be happy to work with SEG and the SEG Foundation to identify options to restore funding.

In 2020, we are asking HL speakers to identify regional organizations that may be willing to cover some of the costs of a tour. Once identified, we will seek local funding prior to a tour.

### VIRTUAL NEAR-SURFACE GLOBAL LECTURER

The virtual near-surface global lecturer is focused on the discipline of near-surface geophysics.

Acting on the suggestion of Louise Pellerin, we are talking to other geoscience organizations, such as the American Geophysical Union, about how to enhance the visibility and impact of the Virtual Near-Surface Global Lecture program.

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- 2019 Virtual Near-Surface Global Lecturer: Rosemary Knight, two virtual lectures, 157 attendees

Countries: Knight's virtual lectures were viewed globally.

Title: "Advancing the use of geophysical methods for sustainable groundwater management"

Quote: "Rosemary delivered an excellent lecture, at the right level for a broad audience, demonstrating the application of near-surface geophysics to real-life water-management problems." — Professor George Tsoflias, University of Kansas, Lawrence, Kansas, United States

2020 Virtual Near-Surface Global Lecturer

- Estella Atekwana, University of Delaware, Newark, Delaware, United States

The DL Committee will now perform online voting for candidates by using Survey Monkey. SEG Members are welcome to submit nominations for DLs and HLs, as well as the Virtual Near-Surface Global Lecturers at any time. To submit a nomination, visit <https://seg.org/education/lectures/nominate-a-lecturer>.

To view SEG lectures online, visit <https://seg.org/education/SEG-on-Demand>. Encourage your friends, colleagues, and students to explore this valuable resource.

### Emerging Professionals International Johannes Douma, chair

The 2018–2019 time period was the fifth year for the Emerging Professionals International Committee (EPIC) of SEG. The committee is made up of members from around the world. EPIC is dedicated to positively increasing SEG's professional, technical, and social impact on the lives of early-career geophysicists. An "emerging professional" is defined as someone who has worked in the industry for eight years or less and may be gaining seniority and increasing responsibility. The main goal for 2019 was self-sustainment.

How do we develop a structure to make EPIC self-sustaining so social events, Annual Meeting technical sessions, Distinguished Instructor Short Course lecture dinners, and EPIC meetings with visiting technical speakers can occur on a regular basis? Members of the committee worked to create an emerging professionals

development chair position in local geophysical societies. The goal of the position is to coordinate local events that contribute to the technical and leadership development of emerging professionals. Over the last year, we established this position in Corpus Christi, Denver, Midland, and Tulsa. EPIC guides and aids all of the chairs. Additionally, the acting chairs have the opportunity to share ideas on how to add value to emerging professionals throughout local societies.

EPIC's third annual Happy Hour event was held during the 2019 Annual Meeting. We invited two guest speakers from Shell and Chevron who have more than eight years of industry experience and senior responsibility at their respective companies to share about their careers. Reynaldo Cardona (Chevron) and Kaijian Liu (Shell) provided great perspectives. We are grateful for their willingness to volunteer and speak to the emerging professionals at the event.

In 2019, we were able to continue several other social events throughout the world. The purpose of these events is to provide emerging professionals with the opportunity to network with one another, develop friendships and professional relationships, and to discuss technical aspects of

geophysics. As members transition from universities and student chapters to their full-time employment, they will be able to quickly build a network if they relocate to a new city for their job.

The committee has been working on creating new events. Kelsey Kidd is championing one of these by working in conjunction with other professional societies in Denver to create an oil and gas speed-mentoring event for emerging professionals. We hope to carry this concept to other local societies around the globe. Another event we are hoping to organize is a dinner for emerging professionals to enjoy with an upper management professional or executive in geoscience.

### EVOLVE

Michael C. Forrest, interim chair

The EVOLVE program offers students direct experience in conducting integrated subsurface analyses using real-world seismic, wireline, production, and other data. The teams use the iEnergy Halliburton Landmark DecisionSpace Cloud platform or locally installed Petrel, Kingdom, or DecisionSpace software. They utilize modern technology, gain an understanding of the exploration technical and business workflows

used by oil companies, and ultimately recommend the best investment opportunities in their assigned data sets.

Each team of four to six students with backgrounds in geology, geophysics, petrophysics, and reservoir engineering, work together reviewing a technical data set. In 2019, six varied data sets from around the world were used. For the third year in a row, the program was technically coordinated by Allen Bertagne from the SEG EVOLVE office in Houston with additional support provided by Jesus Ortiz, a University of Houston graduate, advisors Mike Forrest and Jennifer Thompson, as well as many other experienced mentors. The program expanded to 20 international teams in 2019 and will have 25 international teams plus the EVOLVE Professional program in 2020. To date, 137 students have completed the EVOLVE program. Continuing its support from 2018, several tutorials were donated by the International Human Resources Development Corporation, and teams also had access to a Rose & Associates risk analysis course.

The program culminated in May with presentations of each team's best investment opportunity to the executive committee, a group

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consisting of members of the technical committee, mentors, and select leaders from a variety of exploration and production companies. This committee provides helpful but real-world feedback to all the teams. For many, it is the first taste they get of presentations in a business setting.

Continuing to provide unique and educational opportunities, SEG and donors provided funding for certain teams to attend the SEG Annual Meeting, where they had the opportunity to showcase their new skills over two half-day sessions. At the Annual Meeting, each team made a 15-minute prospect presentation to an international audience, hosted a poster session to discuss their detailed work and conclusions with other professionals, and participated in a

student panel discussion to answer questions from the audience and to give industry leaders recommendations for the future.

In 2020, EVOLVE aims to increase student and university participation, expand in Asia, grow the number of universities offering credit for the program, add additional comprehensive data sets, and increase technology application learning from enhanced data sets.

The 2019 year was highlighted in a January 2020 *The Leading Edge* article written by Andrew Geary, SEG EVOLVE program manager. EVOLVE also was featured in *GEO ExPro*, published in September 2019 and written by Mike Forrest.



Participants in the EVOLVE program showcase what they learn during the Annual Meeting.

## Field Camps

Dylan Mikesell, chair

In 1993, the Field Camp Grant program was established by the SEG Foundation to provide seed money for geophysics faculty and SEG student chapters to create and support field courses that provide students with hands-on experience in data collection and analysis using geophysical instruments and software applications. The 2019 Field Camp Committee provided continued leadership in evaluating applications and awarding grants to eligible applicants, ensuring that geophysics students around the world receive valuable field training in contexts that emphasize safety and high-quality learning.

In 2019, SEG received 30 applications for funding (a 50% increase from 2018). The total funding requested was US\$348,147.97. From the submitted applications, the committee selected 17 to receive awards, totaling US\$108,455, with values ranging between US\$3000 and US\$15,000. This year's awards were given to help sponsor field camps in Bulgaria, Canada, Colombia, Nigeria, Poland, Romania, Russia, South Africa, Turkey, Ukraine, and the United States.

In 2019, more than 200 students participated in field camps sponsored in whole or in part through funding provided by donors to the program.

The committee also completed work on a rubric for evaluating applications. Based on results from the 2019 process, the committee will again make revisions to the application and rubric to ensure equity and fairness across the range of applications. The committee also is working to identify shortcomings and provide feedback to unsuccessful applicants. In 2019, we created the opportunity for applicants to utilize a presubmission application reader. We will again encourage applicants to take advantage of this opportunity.

Finally, the committee continues to work on strengthening the health, safety, security, and environment (HSSE) portion of the proposal evaluation process. The Field Camp Committee teamed up with the HSSE Committee to further refine the guidelines and HSSE application plan requirements. The HSSE Committee also identified red flags during the application evaluation process. This year, we performed a

trial run, and the HSSE Committee was able to provide feedback that will be incorporated in the revised application guidelines for 2020.

The 2019 Field Camp Committee included Dylan Mikesell (chair), Francesca Fazzari, Hendratta Ali, Alex Fick, Joe Estep, and Payson Todd.

## GEOPHYSICS

Valentina Socco, editor

In 2019, GEOPHYSICS proved to be an extremely successful journal with 812 submissions, slightly lower than 2018. This is possible thanks to the commitment of the Editorial Board that includes assistant, associate, special, SWAT, and department editors; guest editors associated with special sections; and the availability of a large number of knowledgeable reviewers. I thank them for their dedication and for their time. The whole process from submission to publication would not be possible without the professionalism and commitment of the staff of SEG's Publications Department, to whom goes my warmhearted gratitude. During 2019, I invited eight

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new associate editors to serve as I completed my term.

The number of submissions to GEOPHYSICS doubled in the last decade. The major contribution to submissions in 2019 comes from China (44%) followed by the United States (15%) and Canada (5%). Europe contributes 16% of submissions, the Middle East contributes 7%, Asia (excluding China) contributes 5%, and Latin America contributes 5% (Table 6). China has the highest number of published papers.

The majority of contributions come from universities (74%) and research centers (14%), while the contributions from oil and service companies continue to be moderate (8%) (Table 7).

The subjects that attract large numbers of manuscripts are seismic inversion and migration, electric and electromagnetic methods, and signal processing. A total of 34 case histories and nine papers accompanied by code in the geophysical software and algorithms category were published in 2019.

The average time required for first review is 73 days (Table 8), down from 80 days in 2018. The average time

between acceptance and publication has slightly increased and is equal

to 70 days (Table 9), although the just-accepted version of papers now

appears online within a couple of days after acceptance.

The 2018 impact factor according to the Science Citation Index Expanded of Clarivate Analytics' *Journal Citation Reports* is 2.793 (Table 10), and it is the highest ever.

In January 2018, GEOPHYSICS adopted a double-blind review process. In double-blind review, the reviewers are anonymous and the authors are unknown to the reviewers. The decision of moving to double blind was taken after long discussion within the Editorial Board and thorough pros and cons analysis carried out by SEG's Publications

TABLE 6  
SUBMISSION AND PUBLICATION BY COUNTRY 1 JANUARY 2019—31 DECEMBER 2019

| Country                                              | Submitted | Published | Country              | Submitted  | Published  |
|------------------------------------------------------|-----------|-----------|----------------------|------------|------------|
| China                                                | 361       | 127       | Taiwan               | 2          | 1          |
| United States                                        | 121       | 92        | Turkey               | 2          | 0          |
| Canada                                               | 40        | 25        | Czech Republic       | 2          | 1          |
| Saudi Arabia                                         | 38        | 30        | Denmark              | 2          | 3          |
| Brazil                                               | 30        | 16        | Chile                | 2          | 0          |
| Norway                                               | 27        | 17        | Colombia             | 2          | 0          |
| Germany                                              | 20        | 12        | Iraq                 | 2          | 0          |
| Australia                                            | 16        | 4         | Hong Kong            | 1          | 0          |
| Netherlands                                          | 16        | 12        | Malaysia             | 1          | 2          |
| Italy                                                | 14        | 7         | Greece               | 1          | 0          |
| France                                               | 13        | 13        | Hungary              | 1          | 0          |
| India                                                | 12        | 3         | Poland               | 1          | 1          |
| United Kingdom of Great Britain and Northern Ireland | 12        | 14        | Portugal             | 1          | 1          |
| Republic of Korea                                    | 11        | 0         | Sweden               | 1          | 3          |
| Islamic Republic of Iran                             | 10        | 9         | Trinidad and Tobago  | 1          | 0          |
| Switzerland                                          | 7         | 4         | Israel               | 1          | 1          |
| Russian Federation                                   | 6         | 4         | Lebanon              | 1          | 0          |
| Japan                                                | 4         | 5         | Oman                 | 1          | 0          |
| Singapore                                            | 4         | 4         | United Arab Emirates | 1          | 3          |
| Spain                                                | 4         | 2         | <b>Total</b>         | <b>812</b> | <b>422</b> |
| Mexico                                               | 4         | 2         |                      |            |            |
| Egypt                                                | 4         | 0         |                      |            |            |
| Austria                                              | 3         | 1         |                      |            |            |
| Argentina                                            | 3         | 2         |                      |            |            |
| Nigeria                                              | 2         | 0         |                      |            |            |
| South Africa                                         | 2         | 1         |                      |            |            |
| Indonesia                                            | 2         | 0         |                      |            |            |

TABLE 7  
ORIGIN OF PAPERS SUBMITTED  
FOR PUBLICATION IN GEOPHYSICS  
BY EMPLOYER 1 JANUARY 2019–  
31 DECEMBER 2019

|                                     |            |
|-------------------------------------|------------|
| Universities                        | 600        |
| Research institutes                 | 112        |
| Oil companies                       | 52         |
| Governments                         | 18         |
| Service companies and manufacturers | 13         |
| Consultants                         | 10         |
| Retired                             | 5          |
| Mining companies                    | 2          |
| <b>Total</b>                        | <b>812</b> |

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Department. The reason was mitigating possible bias due to fame, nationality, and gender in the review process. It was decided to carefully monitor the possible negative effects of double blind, and after one year no reduction in submissions or anomalous change in acceptance rate (49.5% in 2019, 56.6% in 2018,

51.6% in 2017, 57.2% in 2016, 60.3% in 2015) have been evidenced.

SPECIAL SECTIONS

In 2019, GEOPHYSICS published one special section titled “Hydromechanical phenomena at the pore scale and their upscaling.” This special section

**TABLE 8**  
MANUSCRIPT-HANDLING STATISTICS

| Year submitted<br>1 July–30 June | Average number<br>of days required<br>for first review |
|----------------------------------|--------------------------------------------------------|
| 1991–92                          | 172                                                    |
| 1992–93                          | 157                                                    |
| 1993–94                          | 184                                                    |
| 1994–95                          | 182                                                    |
| 1995–96                          | 211                                                    |
| 1996–97                          | 186                                                    |
| 1997–98                          | 205                                                    |
| 1998–99                          | 214                                                    |
| 1999–00                          | 212                                                    |
| 2000–01                          | 211                                                    |
| 2001–02                          | 178                                                    |
| 2002–03                          | 133                                                    |
| 2003–04                          | 141                                                    |
| 2004–05                          | 105                                                    |
| 2005–06                          | 66                                                     |
| 2006–07                          | 53                                                     |
| 2007–08                          | 57                                                     |
| 2008–09                          | 55                                                     |
| 2009–10                          | 66                                                     |
| 2010–11                          | 61                                                     |
| 2011–12                          | 66                                                     |
| 2012–13                          | 61                                                     |

| Year submitted<br>1 July–30 June | Average number<br>of days required<br>for first review |
|----------------------------------|--------------------------------------------------------|
| 2013–14                          | 72                                                     |
| 2014–15                          | 70                                                     |
| 2015–16                          | 66                                                     |

| Year submitted<br>1 January–31 December | Average number<br>of days required<br>for first review |
|-----------------------------------------|--------------------------------------------------------|
| 2016                                    | 66                                                     |
| 2017                                    | 71                                                     |
| 2018                                    | 80                                                     |
| *2019                                   | 73                                                     |

\*First reviews have not been returned for all papers.

**TABLE 9**  
MANUSCRIPT-HANDLING STATISTICS

| Year published<br>1 July–30 June | Average number<br>of days between<br>acceptance and<br>online publication |
|----------------------------------|---------------------------------------------------------------------------|
| 1991–92                          | 176                                                                       |
| 1992–93                          | 181                                                                       |
| 1993–94                          | 178                                                                       |
| 1994–95                          | 210                                                                       |
| 1995–96                          | N/A                                                                       |
| 1996–97                          | N/A                                                                       |
| 1997–98                          | 180                                                                       |
| 1998–99                          | 177                                                                       |
| 1999–00                          | 202                                                                       |
| 2000–01                          | 208                                                                       |
| 2001–02                          | 213                                                                       |

| Year published<br>1 July–30 June | Average number<br>of days between<br>acceptance and<br>online publication |
|----------------------------------|---------------------------------------------------------------------------|
| 2002–03                          | 195                                                                       |
| 2003–04                          | 161                                                                       |
| 2004–05                          | 158                                                                       |
| 2005–06                          | 181                                                                       |
| 2006–07                          | 143                                                                       |
| 2007–08                          | 82                                                                        |
| 2008–09                          | 111                                                                       |
| 2009–10                          | 122                                                                       |
| 2010–11                          | 135                                                                       |
| 2011–12                          | 126                                                                       |
| 2012–13                          | 78                                                                        |

| Year published<br>1 July–30 June | Average number<br>of days between<br>acceptance and<br>online publication |
|----------------------------------|---------------------------------------------------------------------------|
| 2013–14                          | 72                                                                        |
| 2014–15                          | 65                                                                        |
| 2015–16                          | 69                                                                        |

| Year published<br>1 January–31 December | Average number<br>of days between<br>acceptance and<br>online publication |
|-----------------------------------------|---------------------------------------------------------------------------|
| 2016                                    | 66                                                                        |
| 2017                                    | 53                                                                        |
| 2018                                    | 65                                                                        |
| 2019                                    | 70                                                                        |

**TABLE 10**  
IMPACT FACTOR

| Year | Impact factor |
|------|---------------|
| 1975 | 0.629         |
| 1976 | 1.095         |
| 1977 | 0.773         |
| 1978 | 0.591         |
| 1979 | 0.918         |
| 1980 | 0.895         |
| 1981 | 1.087         |
| 1982 | 1.100         |
| 1983 | 1.461         |
| 1984 | 1.193         |
| 1985 | 1.206         |
| 1986 | 0.968         |
| 1987 | 1.084         |
| 1988 | 0.931         |
| 1989 | 1.017         |

| Year  | Impact factor |
|-------|---------------|
| 1990  | 0.905         |
| 1991  | 1.166         |
| 1992  | 0.697         |
| 1993  | 0.919         |
| 1994  | 0.824         |
| 1995  | 0.877         |
| 1996  | 0.867         |
| 1997  | 0.824         |
| 1998  | 0.687         |
| 1999  | 0.818         |
| 2000  | 0.861         |
| 2001  | 0.649         |
| 2002  | 0.834         |
| *2003 | 0.589         |
| 2004  | 1.087         |

| Year | Impact factor |
|------|---------------|
| 2005 | 1.030         |
| 2006 | 1.228         |
| 2007 | 1.167         |
| 2008 | 1.349         |
| 2009 | 1.662         |
| 2010 | 1.404         |
| 2011 | 1.418         |
| 2012 | 1.723         |
| 2013 | 1.759         |
| 2014 | 1.612         |
| 2015 | 2.017         |
| 2016 | 2.391         |
| 2017 | 2.368         |
| 2018 | 2.793         |

\*The impact factor for 2003 is based on a single issue. A recalculation based on all issues in 2003 gives 0.862.

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contains 14 papers, and it is dedicated to investigations of hydromechanical phenomena at the pore scale that complement or extend the classical understanding of rock poroelasticity. In the process of upscaling hydromechanical phenomena of fluid-saturated porous media, classical theories of poroelasticity may suppress certain pore-scale effects that affect geophysical acoustic measurements in the seismic-to-sonic frequency range. Hence, in this special section, the pore scale is revisited to explore mechanical, hydraulic, and coupled hydromechanical phenomena, and it also introduces new upscaling approaches and validates classical ones.

Two other special sections on crucial topics have been launched in 2018 and 2019. “Machine learning and data analytics for geoscience applications” will be published in July–August 2020 and “Shallow void, tunnel, and other anomaly detection” is expected in May–June 2021.

REVIEWER OF THE YEAR

Alexey Stovas has been awarded 2019 Reviewer of the Year. He has been serving as a reviewer for GEOPHYSICS for several years. He contributed a high number of reviews, gave highly relevant feedback, and is extremely

efficient in responding. His scientific and technical knowledge has been an important resource for the journal and for the authors.

Geoscientists Without Borders®

Robert Merrill, chair

Grant applications are done twice a year. The Geoscientists *Without Borders*® (GWB) Committee reviewed 48 grant applications in 2019. Table 11 shows the subject range for these proposals, and the included map shows the global reach of the projects funded in 2019.

Six submittals were ultimately accepted and funded for a total of US\$420,500. The GWB grant application process is a two-phase process. Following the initial screening, requests are made to selected applicants to expand their application, and the Phase II submittals are reviewed for final selection. All of the approved projects have significant student involvement. This year, the following programs were accepted for funding.

PROGRAM 1

“Understanding high mountain aquifers to source drinking water in the Sagarmatha National Park” is led

by Kirsten Nicholson from Ball State University. The project will involve six to eight students per year from Kathmandu University and Ball State University. The objective is to solve the seasonal water problems of the communities Phortse and Lobuche in Sagarmatha National Park. The project involves water-quality and quantity testing, geologic mapping, and an electrical resistivity tomography survey. The primary goal is to improve access to drinking water and improve drinking water quality for the two communities. The project involves characterizing the community aquifers; quantifying seasonal recharge and discharge; assessing the location of locally built filtration systems; and mapping the geology of the basins, including structural geology, rock types, and basin fill. The community plans to build a water-filtration and storage facility, and the project will help with placement and capacity of the system.

PROGRAM 2

“Holocaust mass burial and submarine shtetl mapping in Kaunas and Rumsiskes, Lithuania” is led by Paul Baumann from the University of Hartford. Nine to 12 students from the United States, 30 students from Lithuania, and 10 students from Israel will be involved in the project. The goal is to illuminate the

beginning of the Holocaust in what was then the capital of Lithuania, Kaunas, by providing nondestructive evidence of the mass murders at Fort IX and a snapshot of a Jewish town at the onset of World War II. It is estimated that more than 45,000 victims are buried at Fort

IX. Specific objectives of this project include using geophysical methods to identify, describe, and delineate the mass graves and to map the pre-World War II submerged Jewish town (shtetl) of Rumsiskes.

TABLE 11  
SUBJECT RANGE OF RECEIVED PROPOSALS IN 2019

| Submittal subject                              | Submittals | Accepted |
|------------------------------------------------|------------|----------|
| <b>WASH (WATER, SANITATION, AND HYGIENE)</b>   |            |          |
| Groundwater resource exploration               | 22         | 2        |
| Water resource management                      | 5          |          |
| Water quality                                  | 0          |          |
| <b>DISASTER RISK REDUCTION</b>                 |            |          |
| Earthquake preparedness                        | 4          |          |
| Tsunami preparedness                           | 2          |          |
| Terrain stability                              | 10         | 2        |
| Volcano preparedness                           | 0          |          |
| Flood mitigation                               | 1          |          |
| Natural hazard education                       | 0          |          |
| <b>FOOD SECURITY</b>                           |            |          |
| Soil and agriculture                           | 0          |          |
| <b>ENVIRONMENTAL AND CULTURAL CONSERVATION</b> |            |          |
| Habitat conservation                           | 0          |          |
| Pollution mitigation                           | 2          | 1        |
| Archaeology                                    | 2          | 1        |
| <b>OTHER</b>                                   |            |          |
| Geothermal exploration                         | 0          |          |
| Mineral exploration                            | 0          |          |

## REPORTS OF COMMITTEES

### PROGRAM 3

“Improving water security in Mon State, Myanmar via geophysical capacity building” is led by Douglas Oldenburg from the University of British Columbia. The project will include 10 undergraduate and three graduate students from Mawlamyine University. In addition, the project will train 23 engineers from the Mon Department of Rural Development to incorporate geophysics in their decision-making processes. The goals of the project are to improve water security and well-drilling success rates, and to increase technical capacity in all aspects of DC resistivity surveying for Mon engineers, students, and researchers. The objectives of the project are:

- Perform geophysical surveys in 20 high-priority water-stressed Mon villages, improving water scarcity for an estimated 15,000 people
- Increase well-drilling success rates by 20% by using geophysics in select drilling locations
- Develop an open-source curriculum encompassing all aspects of DC resistivity methods and technology, including data acquisition, analysis, and hydrogeological interpretation

### PROGRAM 4

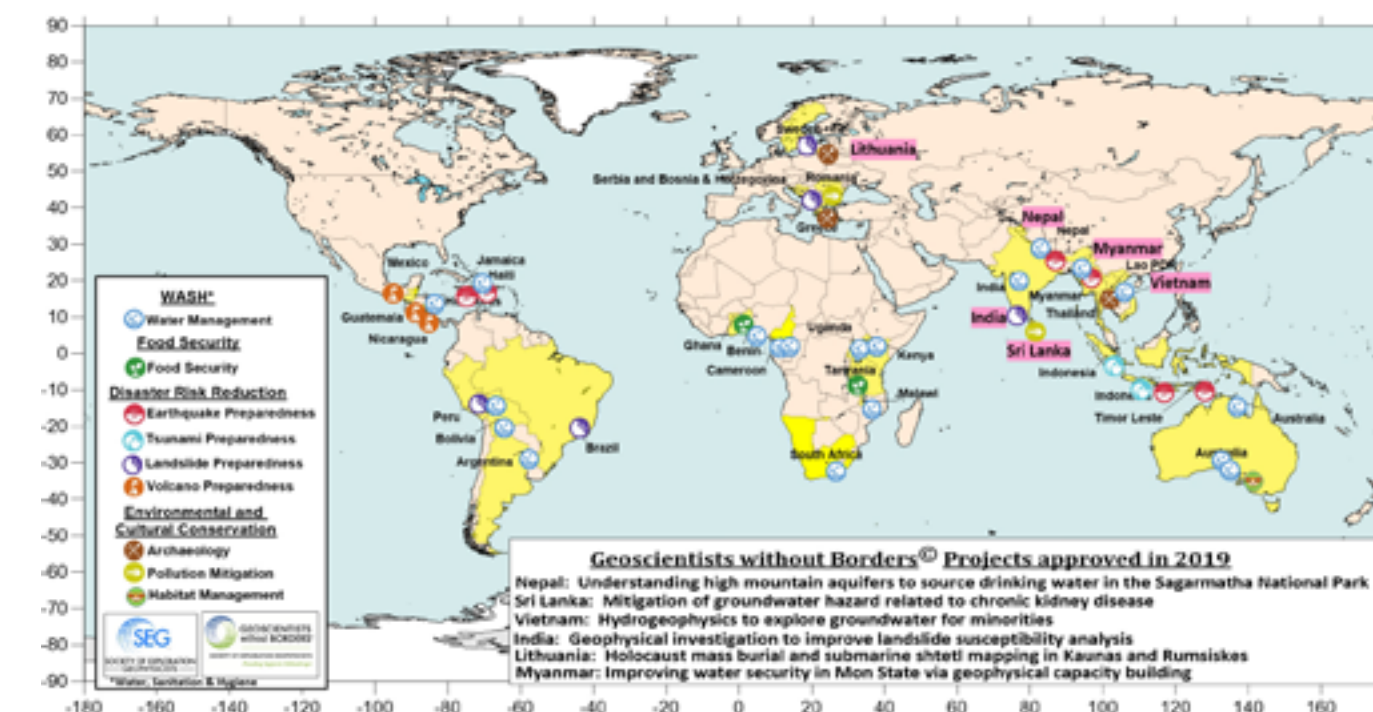
“Hydrogeophysics to explore groundwater for minorities in Huong Lam A Luoi, Thua Thien Hue, Vietnam” is led by Thong Kieu from Hanoi University of Mining and Geology. The project will involve graduate and undergraduate students from Hanoi University of Mining and Geology and Ho Chi Minh City University of Science. The objective of the project is to lay the groundwork needed to establish a sustainable groundwater management scheme for the remote area. The first step of this project will be to characterize the potential aquifers and identify natural barriers to contamination. Additionally, the project will include developing inexpensive geophysical toolkits and transferring knowledge of tool usage, data processing, and interpretation to the local communities involved. This will provide the communities with the ability to monitor and further develop groundwater resources in the future as they develop a sustainability plan.

### PROGRAM 5

“Geophysical investigation to improve the landslide susceptibility analysis in Kerala, India” is led by Thomas

Oommen from Michigan Technological University. At least two graduate students from Michigan Technological University, three graduate students from the University of Kerala, and undergraduate students from Munnar College of Engineering will participate. The objective of the project is to improve landslide hazard analysis in the most vulnerable area within the district of Idukki, Kerala, and help communities reduce landslide risk in future extreme rain events. The objective will be attained through the following goals:

- Utilize geophysical investigation (particularly, electrical resistivity surveys) to characterize geotechnical and groundwater properties of the landslide-prone terrains in the study area
- Develop a rain gauge network in the study area that can be integrated with the satellite-based rainfall forecast system to obtain accurate rainfall estimates
- Develop a landslide hazard nowcasting system with improved geotechnical, groundwater, and rainfall characteristics that can be utilized for reducing landslide risks in the community



This map shows the locations of the GWB projects that were approved in 2019.

### PROGRAM 6

“Mitigation of groundwater hazard related to chronic kidney disease, Sri Lanka” is led by Tom H. Brikowski from the University of Texas at Dallas. Undergraduate and graduate students from the University of Kelaniya will participate in field and laboratory activities. Graduate students from the University of Colombo, undergraduate students from the Institute of Chemistry, and at least one graduate student from the University of Texas at Dallas will be involved in the project. The objective of the project is to minimize public exposure to chronic kidney disease caused by groundwater contamination. Detailed

geochemical sampling and analysis will help characterize aquifer segmentation and correlate aquifer segment geochemistry with local chronic kidney disease risk. A second objective is to characterize adverse groundwater impacts of reverse osmosis plants established in the area, where the brine is disposed on the surface. Efforts also will be made to explore mitigation of the reverse osmosis brine, possibly using solar stills to produce additional fresh water from the waste.

### FINAL REPORTS

Three project completion reports were received in 2019.

**REPORTS OF COMMITTEES**

- “DC resistivity sounding for groundwater development in Leogane, Haiti” was supported by the University of Kentucky, Haiti Engineering, and Engineers Without Borders. Two graduate students from the University of Kentucky and several students from the State University of Haiti were involved in the project.
- “Capacity building in hydrogeophysics at University of Malawi” was supported by the University of Illinois at Urbana-Champaign and the University of Malawi. Four master’s-level students were involved along with several senior-level students.
- “GPS training and application to seismic hazards in southern Haiti” was supported by URGeo/FDS/UEH, Ecole normale supérieure, Seismology Technical Unit of the Bureau of Mines and Energy, and National Center for Geospatial Information. A total of 15 students from the University of Haiti were involved in the project.

**Global Advisory**  
George Buzan, chair

The Global Advisory Committee (GAC) met four times during 2019. Three of the meetings were teleconferences. One was held in person at the 2019 European Association of Geoscientists and Engineers Annual Conference and Exhibition in London. Geospace Engineering Resources International graciously lent us their meeting room. The quarterly teleconferences were scheduled so Regional Advisory Committee (RAC) chairs from the Eastern Hemisphere and Western Hemisphere had more convenient times to attend.

Supplementary teleconferences were organized with chairs of the Europe Regional Advisory Committee and Latin America/Caribbean Regional Advisory Committee. In addition, an in-person

meeting with Alfred Liaw of SEG China was held to update information about their office activities.

GAC leadership nominated three people, including two students from Mexico and an Active Member from Trinidad, to receive travel grants to attend the 2019 Annual Meeting. The grants were made. One of the students from Mexico had a last-minute problem in attending, so his grant was transferred to one of the speakers for the Latin America Business of Applied Geophysics Session.

GAC leadership actively participated in the selection of the speaker and various arrangements for the Latin America and Caribbean luncheon that was held during the Annual Meeting.

At the request of the SEG president, GAC leadership reviewed the SEG

Standard Policies and Procedures with respect to the committee. Suggested changes to improve the functioning of the committee were made.

Finally, GAC leadership participated in the Global Markets Task Force, an ad-hoc task force requested by the president-elect of SEG and headed by Bob Brook and Tom Agnew. Recommendations were made to the task force, and participation ended 15 November.

**Gravity and Magnetism**  
Luise Sander, chair

In 2019, the SEG Gravity and Magnetism Committee was involved in the organization of the Annual Meeting technical sessions, a postconvention workshop, and the Gravity and Magnetism Luncheon. In addition, the committee revised and voted on the updated version of its policies and procedures. Other activities included: reviews of technical publications, continuation of the committee’s dedicated department in *The Leading Edge*, proposing and leading the editing process for a special section in *Interpretation*, and being involved in the organization of a joint summer workshop with the American Geophysical Union (AGU).

The chair of the Gravity and Magnetism Committee for 2017–2019 was Luise Sander. Irina Filina served as vice chair in 2019 and assumed the role of chair in September for a two-year term. The vice chair for 2019–2021 will be Marianne Rauch.

Chuck Campbell has organized the technical oral and poster sessions for many years, with abstract-reviewing assistance from committee members. He continued this task in 2019 and volunteered to do so for 2020. There were three gravity and magnetism technical sessions at the 2019 Annual Meeting in San Antonio: two oral sessions and one poster session.

The committee supports the “Meter Reader” department in *TLE*, focusing on different issues related to potential fields. Alan Morgan has been coordinating the publication of this department. In 2019, there were two articles published in the department, and two more were in review for 2020. One of the papers covered the 2018 postconvention workshop about integrated imaging that triggered a call for papers for a special section in *Interpretation* focused on integrated geophysical imaging. Some committee members served as associate editors for that special section. Overall, 13 papers were submitted and are

**TABLE 12**  
DOCUMENTED TELECONFERENCE ATTENDANCE SINCE THE FOURTH  
QUARTER IN 2018.

| Attendees      | Q4 2018 | Q1 2019 | Q2 2019 | Q3 2019 | Q4 2019 |
|----------------|---------|---------|---------|---------|---------|
| GAC leadership | 2       | 2       | 3       | 1       | 2       |
| RAC chairs     | 1       | 2       | 0       | 0       | 0       |
| SEG staff      | 2       | 3       | 6       | 4       | 1       |

## REPORTS OF COMMITTEE

currently in review. The projected publication date is August 2020.

The 2019 W-10: Misac Nabighian Memorial Workshop was organized in collaboration with the Mining Committee. The organizers were Ed Biegert, Yaoguo Li, Jean M. Legault, Aline Tavares de Melo, Ken Witherly, Cara Schiek-Stewart, and Manik Talwani. The workshop was attended by 50 participants and included a series of invited talks and poster presentations. The organizers did a great job, and the workshop was a success.

The Gravity and Magnetism Luncheon featured Caroline Morley from the Department of Astronomy of the University of Texas at Austin with a talk titled, “The exotic atmospheres of faraway worlds.” The luncheon was well attended and had positive responses from the participants.

Dale Bird is the SEG Gravity and Magnetism Committee representative on the AGU–SEG Collaboration Committee. A joint AGU–SEG workshop on airborne geophysics was held 10–13 June in Florida.

The committee had a goal for 2019 to revise its policies and procedures (voted unanimously). The dedicated committee

page on the SEG Wiki is in progress, and its completion is the committee’s goal for 2020. Another objective for 2020 is to increase the committee’s presence on social media (LinkedIn, Facebook, Twitter, and Instagram).

The committee will continue to support SEG-related activities that promote knowledge and applications of gravity and magnetism methods at the Annual Meeting and throughout the year.

### Health, Safety, Security, and Environment

Luke Decker, chair

#### 2018–2019 ACCOMPLISHMENTS

Luke Decker continued his second year as chair of the committee. The following was accomplished:

- Reviewed the health, safety, security, and environment (HSSE) plan component of field camps proposals and provided feedback to submitters to begin a dialog about safety
- Submitted an article to *The Leading Edge* about committee activities and created a new contact e-mail address (HSSE.seg@gmail.com)

- Provided feedback for a field camps photo contest to ensure selected photos adhered to HSSE standards
- Reviewed international traveler documents and identified opportunities for improvement

#### 2019–2020 OBJECTIVES

- Support the Field Camps Committee
  - Continue to provide feedback on HSSE plan components of field camps proposals
  - Provide an example uncertainty plan to include in the field camps call for proposals
  - Ensure that the field camps request for proposals is clear about HSSE plan expectations
- Create an HSSE game that may be used during SEG student events by asking participants to identify good and bad HSSE practices in old field camps photos
- Explore the idea of bringing Kevin Bohacs’ field safety course to SEG in collaboration with the American Association of Petroleum Geologists and look into the possibility of providing a virtual field safety course

- Locate a vice chair to ensure committee continuity and seek additional committee members

The committee’s mission is, “to help ensure that HSSE is taken into consideration for any activities that the SEG manages or sponsors. The committee will not duplicate the work that the International Association of Geophysical Contractors and International Association of Oil & Gas Producers do with HSSE for geophysical operations, but rather complement it and utilize wherever possible industry guidance already developed.”

### Honors and Awards

Don Steeples, chair

The Honors and Awards Committee consists of the five most recent past presidents of SEG. The 2019 members were Don Steeples (chair), Chris Liner, John Bradford, Bill Abriel, and Nancy House.

Nominations were solicited from the membership at large following the 2018 Annual Meeting in Anaheim. Nominations for certain Best Paper or Best Presentation awards were provided by the Technical Program Committee for the 2018 Annual Meeting, the editor of *GEOPHYSICS*, the

Editorial Board of *Interpretation*, and the Editorial Board of *The Leading Edge*.

The Honors and Awards Committee — following extensive research by each of the committee members — makes and documents recommendations, which must receive approval from the SEG Board of Directors. In some cases, the recommendations must be unanimously approved by both the committee and the Board.

The following awards were conferred at the 2019 Annual Meeting held in San Antonio. Full citations for these awards were published in the November 2019 issue of *The Leading Edge*.

#### MAURICE EWING MEDAL

Robert H. Stolt

#### VIRGIL KAUFFMAN GOLD MEDAL

Mauricio D. Sacchi

#### REGINALD FESSENDEN AWARD

Luis Alonso Gallardo and Max A. Meju

#### J. CLARENCE KARCHER AWARD

Xinding Fang and Hejun Zhu

## REPORTS OF COMMITTEES

### DISTINGUISHED ACHIEVEMENT

Rock Solid Images

### LIFE MEMBERSHIP

Mike Graul

### SPECIAL COMMENDATION

Blair Benson Schneider

### OUTSTANDING EDUCATOR

Laura Valentina Socco

### BEST PAPER IN GEOPHYSICS

“First application of the marine differential electric dipole for groundwater investigations: A case study from Bat Yam, Israel”

Amir Haroon, Klaus Lippert, Vladimir Mogilatov, and Bülent Tezkan

### HONORABLE MENTIONS, GEOPHYSICS

“Time reversal for wave refocusing and scatterer detection using machine learning”

Matan Shustak and Evgeny Landa

“Three-term amplitude-variation-with-offset projections”

Vaughn Ball, Luis Tenorio, Christian Schiøtt, Michelle Thomas, and J. P. Blangy

“Near-surface velocity estimation using source-domain full travelttime inversion and early arrival waveform inversion”

Lu Liu, Yan Wu, Bowen Guo, Song Han, and Yi Luo

“High-resolution gravity measurement aboard an autonomous underwater vehicle”

Takemi Ishihara, Masanao Shinohara, Hiromi Fujimoto, Toshihiko Kanazawa, Akito Araya, Tomoaki Yamada, Kokichi Iizasa, Satoshi Tsukioka, Shinobu Omika, Takeshi Yoshiume, Masashi Mochizuki, and Kenji Uehira

### BEST PAPER IN *THE LEADING EDGE*

“State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity”

Jens-Erik Lund Snee and Mark D. Zoback

### HONORABLE MENTION, *THE LEADING EDGE*

“Time-lapse seismic monitoring of individual hydraulic frac stages using a downhole DAS array”

Grant Byerley, Dave Monk, Peter Aaron, and Mike Yates

### BEST PAPER IN *INTERPRETATION*

“Pore characteristics and dominant controlling factors of overmature shales: A case study of the Wangyinpu and Guanyintang formations in the Jiangxi Xiuwu Basin”

Fenglin Gao, Yan Song, Zhuo Li, Zhenxue Jiang, Zhiye Gao, Xinxin Zhang, Lei Chen, and Qingxin Liu

### TECHNICAL PROGRAM AWARDS FOR THE 2018 ANNUAL MEETING

#### BEST PAPER

“Frac-hits mapped by tube waves: A diagnostic tool to complement microseismic monitoring”

Zhao Zheng, Henry C. Bland, and Sean R. Machovoe

### HONORABLE MENTION, BEST PAPER

“Least-squares seismic horizons with local slopes and multigrid correlations”

Xinming Wu and Sergey Fomel

### BEST POSTER PAPER

“Magnetoseismic resistivity mapping: Fundamentals and challenges”

Qiuzi Li, Harry W. Deckman, and Deniz Ertas

### HONORABLE MENTION, BEST POSTER PAPER

“Flexible high-performance multiphysics waveform modeling on unstructured spectral-element meshes”

Michael Afanasiev, Christian Boehm, Martin van Driel, Lion Krischer, and Andreas Fichtner

### BEST PAPER PRESENTED BY A STUDENT

“Q-interface imaging based on data-domain attenuation estimation”

Bei Li

### AWARD OF MERIT, BEST PAPER PRESENTED BY A STUDENT

“Accurate estimates of simultaneous seismic velocity changes and interfracture-source distances from coda wave interferometry”

Jonathan Singh

### BEST POSTER PAPER PRESENTED BY A STUDENT

“Amplitude variation with offset (AVO) inversion modeling with a local elastic solver”

Elena Jaimes

### AWARD OF MERIT, BEST STUDENT POSTER PAPER

“Jump-starting neural network training for seismic problems”

Fantine Huot

## REPORTS OF COMMITTEES

### **Interpretation Editorial Board** Balazs Nemeth, editor-in-chief

This is the seventh *Interpretation* annual report since its launch in October 2012. The Editorial Board members for 2019 included Balazs Nemeth (editor-in-chief), Kurt Marfurt (deputy editor-in-chief), William L. Abriel, Sunday Amoyedo, Huyen Thi Thanh Bui, Oswaldo Davogustto, Dallas B. Dunlap, Vsevolod Egorov, Shu Jiang, Robert K. Merrill, Lisa Stright, Oskar Vidal Royo, Bradley Wallet, Chicheng Xu, Bo Zhang, and Hongtao Zhu.

*Interpretation* is built on special sections, with standing sections on “Tools, Techniques, and Tutorials” and “Pitfalls,” as well as a general technical section. There are three motivations for the special sections. First, the readers of *Interpretation* can find multiple articles addressing a given technical topic or geologic basin, thereby identifying unifying themes and alternative perspectives. Second, the special sections are organized by guest editors, thereby broadening not only the intellectual scope but also the geographic and demographic diversity of the journal. Third, in addition to the published calls for papers requesting submissions from the geotechnical community at large, the special section

editors directly enlist contributions from potential authors who are either authorities on a specific technical topic or seasoned interpreters in a specific basin. Such invitations from the special-section editors on behalf of the American Association of Petroleum Geologists (AAPG) and SEG to publish in *Interpretation* greatly facilitate the release of proprietary data, workflows, and best practices from company management. Indeed, such requests are correctly viewed as outside recognition of company expertise and therefore align with business goals of being a preferred partner, operator, or technology provider.

The expectation is that each board member will initiate at least two special sections each year. Not all special sections receive the minimum of three papers; in this case, accepted papers appear in the general technical section. Papers that miss the special section due to delays in data release or additional revisions also appear in the next technical section. Papers accepted for publication prior to the target special-section publication date are placed online as accelerated articles immediately after they have been edited, composed, and approved.

Table 13 summarizes the origin of papers by country for 2019. The origin

roughly represents the membership of SEG and AAPG. As in 2018, the focus of the special sections can influence the origin of the papers. In 2018, special sections on Brazil broadened diversification beyond the United States and China.

Table 14 groups the contributions by type of institution. With the desire of university faculty and students to document their capabilities through peer-reviewed publications, it should be no surprise that universities contribute 60% of the papers, unchanged from previous years. However, note that the simple classification in these tables has a North American bias — with many of the Chinese university authors working in institutions that are more accurately categorized as university-industry-government technology labs based at university sites.

The success of the journal led to a continued increase in the number of unsolicited papers to the general technical section (Table 15). To aid in this effort, we have enlisted a suite of high-energy deputy associate editors, including Gaurav Dutta, Nabanita Gupta, Bruno Cesar Zanardo Honorio, Yunsong Huang, Murari Khatiwada, Chaoli Lan, Felipe Alberto Lozano, Marcilio Castro de Matos, Andrea Miceli Romero, Osareni Christopher Ogiesoba, Depapriya Paul,

**TABLE 13**

ORIGIN OF PAPERS SUBMITTED FOR PUBLICATION IN *INTERPRETATION* BY COUNTRY 1 JANUARY 2019–31 DECEMBER 2019

|                                                      |     |               |            |
|------------------------------------------------------|-----|---------------|------------|
| China                                                | 140 | France        | 2          |
| USA                                                  | 87  | Ireland       | 1          |
| Canada                                               | 12  | Israel        | 1          |
| India                                                | 10  | Italy         | 1          |
| Brazil                                               | 5   | Japan         | 1          |
| Colombia                                             | 3   | Norway        | 1          |
| Egypt                                                | 3   | Pakistan      | 1          |
| Malaysia                                             | 3   | Portugal      | 1          |
| Nigeria                                              | 3   | Saudi Arabia  | 1          |
| Netherlands                                          | 3   | Ukraine       | 1          |
|                                                      |     | <b>Total.</b> | <b>287</b> |
| United Kingdom of Great Britain and Northern Ireland | 3   |               |            |
| Australia                                            | 2   |               |            |
| Denmark                                              | 2   |               |            |

Xuan Tang, Sumit Verma, Xinming Wu, Rui Zhang, Shuo Zhang, and Tao Zhao. These deputy associate editors have been proficient in conducting efficient, timely, and objective reviews of papers in a wide range of topics.

The manuscript-handling statistics are listed in Tables 16 and 17. There is no significant change in the number of days required for the first review (Table 16) and in the average number of days spent between acceptance and online publication (Table 17). Of papers receiving a final decision in 2019, 61.3% were accepted.

**TABLE 14**

ORIGIN OF PAPERS SUBMITTED FOR PUBLICATION IN *INTERPRETATION* BY EMPLOYER 1 JANUARY 2019–31 DECEMBER 2019

|                                     |            |
|-------------------------------------|------------|
| Universities                        | 168        |
| Oil companies                       | 45         |
| Research institutes                 | 34         |
| Governments                         | 17         |
| Consultants                         | 12         |
| Service companies and manufacturers | 11         |
| <b>Total</b>                        | <b>287</b> |

REPORTS OF COMMITTEES

During its seventh year in 2019, the reputation of *Interpretation* has grown. Equally importantly, *Interpretation* has risen in the Clarivate Analytics Science Citation Index Expanded (SCIE) from 0.52 in 2015 to 1.172 in 2018 (Table 18). Although originally intended as a tool for libraries, many government research institutions and international universities use the score as a component in employee evaluation and promotion decisions. Interestingly, because most *Interpretation* articles cite papers previously published in the AAPG *Bulletin* and *GEOPHYSICS*, the rise of *Interpretation* also has had a positive impact on these two well-established journals.

In summary, through the efforts of the Tulsa-based editorial staff, the work of the special-section editors, the board of editors, and most importantly, the contribution of the authors and reviewers, *Interpretation* is running smoothly, addressing the needs of our readership, and further building its reputation as a peer-reviewed journal.

TABLE 15  
SPECIAL SECTION AND PAPER COUNT

| Year                                | 2013 |    | 2014 |    |    |    | 2015 |    |    |    | 2016 |    |    |    | 2017 |    |    |    | 2018 |    |    |    | 2019 |    |    |    |
|-------------------------------------|------|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| Issue                               | A    | N  | F    | M  | A  | N  | F    | M  | A  | N  | F    | M  | A  | N  | F    | M  | A  | N  | F    | M  | A  | N  | F    | M  | A  | N  |
| Planned special sections            | 1    | 1  | 2    | 2  | 4  | 8  | 8    | 8  | 6  | 7  | 3    | 5  | 6  | 6  | 4    | 4  | 7  | 5  | 4    | 3  | 4  | 4  | 1    | 3  | 5  | 5  |
| Special sections published          | 1    | 1  | 2    | 3  | 3  | 4  | 6    | 6  | 8  | 4  | 3    | 5  | 6  | 6  | 4    | 2  | 6  | 4  | 3    | 2  | 2  | 4  | 1    | 2  | 3  | 4  |
| Papers in special sections          | 8    | 10 | 23   | 21 | 19 | 26 | 35   | 32 | 50 | 30 | 27   | 22 | 28 | 13 | 19   | 23 | 39 | 20 | 18   | 14 | 16 | 27 | 3    | 10 | 29 | 21 |
| Papers in general technical section | 9    | 7  | 4    | 6  | 2  | 9  | 4    | 7  | 4  | 6  | 7    | 11 | 13 | 18 | 11   | 12 | 14 | 14 | 16   | 19 | 20 | 21 | 18   | 20 | 12 | 15 |
| Total papers published              | 21   | 19 | 28   | 26 | 21 | 35 | 40   | 41 | 55 | 38 | 35   | 34 | 42 | 33 | 30   | 38 | 53 | 35 | 34   | 36 | 37 | 49 | 23   | 30 | 42 | 36 |

TABLE 16  
MANUSCRIPT-HANDLING  
STATISTICS

| Year submitted<br>1 July–<br>30 June | Average number<br>of days required<br>for first review |
|--------------------------------------|--------------------------------------------------------|
| 2013–2014                            | 64                                                     |
| 2014–2015                            | 69                                                     |
| 2015–2016                            | 59                                                     |

| Year submitted<br>1 January–<br>31 December | Average number<br>of days required<br>for first review |
|---------------------------------------------|--------------------------------------------------------|
| 2016                                        | 61                                                     |
| 2017                                        | 66                                                     |
| 2018                                        | 63                                                     |
| 2019*                                       | 64                                                     |

\*First reviews have not been returned for all papers.

TABLE 17  
MANUSCRIPT-HANDLING  
STATISTICS

| Year published<br>1 July–<br>30 June | Average number<br>of days between<br>acceptance and<br>online publication |
|--------------------------------------|---------------------------------------------------------------------------|
| 2013–2014                            | 82                                                                        |
| 2014–2015                            | 70                                                                        |
| 2015–2016                            | 58                                                                        |

| Year published<br>1 January–<br>31 December | Average number<br>of days between<br>acceptance and<br>online publication |
|---------------------------------------------|---------------------------------------------------------------------------|
| 2016                                        | 68                                                                        |
| 2017                                        | 56                                                                        |
| 2018                                        | 73                                                                        |
| 2019                                        | 71                                                                        |

TABLE 18  
IMPACT FACTOR

| Year | Impact factor |
|------|---------------|
| 2015 | 0.510         |
| 2016 | 0.690         |
| 2017 | 0.937         |
| 2018 | 1.172         |

## REPORTS OF COMMITTEES

### Meetings Review and Planning Carmen Dumitrescu, chair

The Meetings Review and Planning Committee (MRPC) for most of the year had 20 members, including the SEG Board liaison and staff liaisons. MRPC membership includes representatives from SEG's regional advisory committees (RACs), SEG standing committees (Development and Production, Gravity and Magnetism, Oil and Gas Reserves, and Technical Standards), and intersocietal/cooperative committees (Global Inc. and Offshore Technology Conference).

MRPC provides the SEG Board of Directors and SEG staff with member-driven advice for all proposed meetings that request in-kind or financial support of SEG. A secondary role of MRPC is to ensure that all segments of the Society have visibility, voice, and representation in the content, approval/rejection, and scheduling of proposed meetings.

#### 2019 ACCOMPLISHMENTS

- A clear approval process for submitted proposals was used.
- The number of reviewed and approved meetings reflects the

changing face of SEG Membership and healthy oil prices. The number of submitted and approved meeting proposals continued to increase. There were 45 submissions in 2019, 25 in 2018, and 13 in 2017. In 2019, 38% of the proposals came from North America; the SEG Middle East office produced 24%; and SEG China office, India, and Singapore produced 20%. The remaining 18% of requests came from South America and Europe.

- Approximately 36% of the approved proposals are promoted meetings, 56% are operated meetings, and 8% are partnered.
- Some of the promoted meetings include the Virtual Student Conference, Congreso Mexicano del Petróleo, 16<sup>th</sup> International Congress of the Brazilian Geophysical Society, General Assembly of the European Geosciences Union, 10<sup>th</sup> Congress of the Balkan Geophysical Society, and 9<sup>th</sup> International Geosciences Student Conference.
- Updated MRPC policies and procedures are available on Basecamp.

### 2020 GOALS AND OBJECTIVES

- The meeting proposal submittal form is available on Basecamp. More feedback (number of participants, number of presentations, and financial) is needed to better estimate the meeting costs and finances and to clarify the expected benefits from the requested meetings.
- MRPC will work with SEG staff to create a complete calendar by region to include the American Association of Petroleum Geologists, European Association of Geoscientists and Engineers, Society of Petroleum Engineers, American Geophysical Union, Developing Unconventionals, and other pertinent geoscience/engineering meetings, workshops, etc.
- The committee will continue to provide informed recommendations to the SEG staff and Board on event approvals, ensuring that the events are consistent with the SEG mission; appropriately separated in time, geography, and subject matter; and are fiscally effective for the Society.
- MRPC will encourage closer communication between RACs and the Global Advisory Committee

to identify particular needs for proposed SEG meetings. Specifically, RACs should act as advisors for their regions and countries to highlight meeting needs from SEG.

### Membership

Aldo Vesnaver, chair

The period from October 2018 to October 2019 saw relevant changes in the SEG Membership rules.

In spring 2018, the SEG Board of Directors and Council approved a Bylaws change in voting rights, allowing Associate Members to vote but not be elected to Society leadership positions. This decision was later approved by a ballot among the entire SEG Membership. This change is a positive conclusion after a decade of discussion about engaging a larger share of members in the Society, without directly involving less-experienced members in critical decisions.

Another change was approved by the Board of Directors and Council for linking the start (and end) of individual memberships to the date they first joined SEG in an anniversary date membership cycle (i.e., one year from the day that the individual

membership started). Previously, membership was related to the solar year, running 1 January to 31 December. Under this rule, a member joining SEG mid-year received only a few months of benefits, new members were discouraged from joining in the second half of the year, and members were not allowed to join in the fourth quarter of the year. With the anniversary date membership cycle, all new members will immediately enjoy a full year of SEG benefits, without reason to delay his/her membership. This rule will also simplify the related administration processes, potentially producing an income increase and a cost decrease.

The committee held online meetings, discussing new initiatives to expand the reach and size of SEG. One meeting was devoted to discussing concerns raised by President-elect Rick Miller in *The Leading Edge*. In which, he raised the question of why there are more professionals attending the Annual Meeting than Active Members. One of the reasons considered was the networking opportunity for both for business and scientific idea exchange. For this reason, the committee agreed to contribute to such networking growth by expanding its reach, in a similar way adopted in the past by the

## REPORTS OF COMMITTEES

Global Affairs Committee, although with a different goal. A revision of the procedures manual for the committee was proposed and shortly discussed by the Board of Directors. This revision is still being fine-tuned to link it to an ongoing general reorganization of many other SEG committees.

Several other accomplishments to improve membership satisfaction and size include the following.

- For the second year, the Community Engagement Department held a calling campaign to notify past-due members. The campaign resulted in the renewal of 952 suspended memberships.
- A reenvisioned Corporate Membership benefits package was approved to increase group-payment options for companies who sponsor employee membership and to better educate employers on the privileges of SEG Membership.
- Sunday Funday members-only events were held at four meetings during 2019. They included the American Association of Petroleum Geologists' Annual Meeting, Unconventional Resources Technology Conference, and SEG Honorary Lecturer tour in Oklahoma and Kansas.

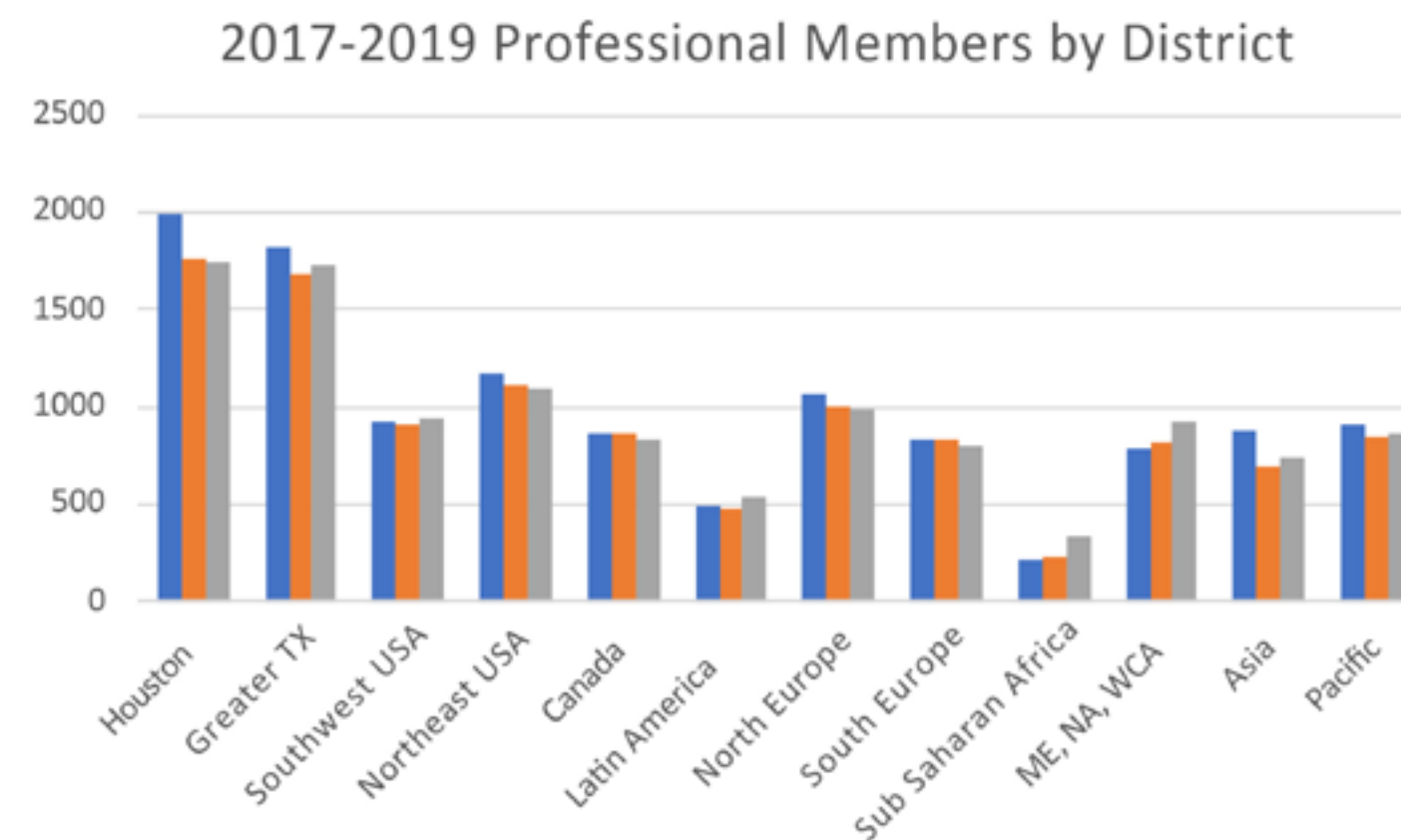
- The Meet, Eat, and Greet members-only breakfast was successfully held for the second year at the 2019 Annual Meeting.
- The Bring a Member competition also was held in 2019. Members who successfully invited nonmembers to join SEG between May and September were entered to win a prize.
- In the SEGratis program, participants paying a nonmember rate now are rewarded with a free membership. The program will be expanded in 2020 to include the SEG

Annual Meeting, workshops, and continuing-education courses.

### TOTAL PAID MEMBERS

- Total paid members were 13,365. This number includes Active (8498), Associate (3088), and Student (1779) memberships. Active Members include Honorary, Life-awarded, and Emeritus members.

The distribution of SEG Membership worldwide confirms that its core is still in the United States, although it is not a majority and is slightly declining. However, adding Canada, we see that North America

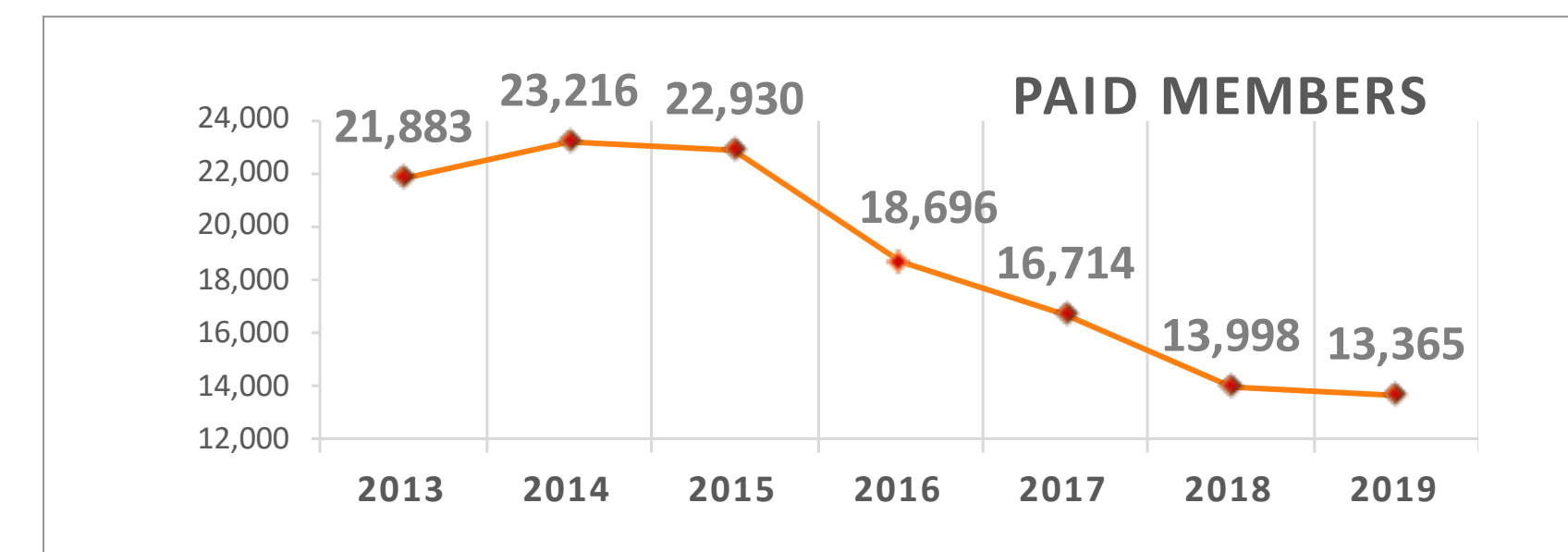


Member population in various districts.

**TABLE 19**

DISTRIBUTION OF SEG MEMBERSHIP

| SEG district                                     | Count | Percent (all members) |
|--------------------------------------------------|-------|-----------------------|
| Houston                                          | 1820  | 13.62%                |
| Greater Texas                                    | 1864  | 13.95%                |
| Southwestern United States                       | 1072  | 8.02%                 |
| Northeastern United States                       | 1290  | 9.65%                 |
| Canada                                           | 946   | 7.08%                 |
| Latin America and Caribbean                      | 712   | 5.33%                 |
| North Europe                                     | 1115  | 8.34%                 |
| South and Central Europe                         | 1001  | 7.49%                 |
| Sub-Saharan Africa                               | 431   | 3.22%                 |
| Middle East, North Africa, and West Central Asia | 1045  | 7.82%                 |
| Asia                                             | 1031  | 7.71%                 |
| Pacific                                          | 981   | 7.34%                 |
| Unknown                                          | 57    | 0.43%                 |
| United States                                    | 6046  | 45.24%                |
| All other regions                                | 7262  | 54.34%                |



Membership count over the last few years. \*Student memberships paid by the SEG Foundation result in higher numbers for 2013–2017. Beginning in 2018, the SEG Foundation no longer had funding to sponsor Student Members.

## REPORTS OF COMMITTEES

accounts for more than half of the total membership. At the same time, it suggests that potential growth may be envisioned in Asia, Africa, and Latin America, while taking into account their population size and extension.

Student memberships paid by the SEG Foundation result in higher numbers for 2013–2017. Beginning in 2018, the SEG Foundation no longer had funding to sponsor Student Members.

### Mining

Jean Legault, chair

The end of 2019 marks the midpoint for me as chair of the Mining Committee, during which I have been ably assisted by Glenn Chubak (vice chair) and Sarah Devriese (technical program chair).

The primary function of the Mining Committee continues to be the organization of mining-related activities at the SEG Annual Meeting. For the 2019 Annual Meeting in San Antonio, the committee organized one full oral session, one poster session, and a committee meeting. The committee also co-organized a postconvention workshop with the Gravity and Magnetism Committee honoring the late Misac Nabighian.

The committee held four meetings during 2019. These took place at the Association for Mineral Exploration Roundup Conference in Vancouver, Canada; the Australian Society of Exploration Geophysicists Conference in Perth, Australia; the Prospectors and Developers Association of Canada International Convention in Toronto; and the SEG Annual Meeting in San Antonio, United States.

Attendance was varied with a minimum of three and a maximum of 16. Topics discussed during the meetings included planning for the SEG Annual Meeting; closer cooperation with the Near-Surface Geophysics Technical Section, Gravity and Magnetism Committee, and SEG; the SEGMIN list server; and archiving the mining and geothermal workshop presentations.

### Near-Surface Geophysics Technical Section

José Arce, chair

The SEG Near-Surface Geophysics Technical Section has continued sustained growth. Our participation at the 2019 Annual Meeting included five oral, three poster, and three special sessions. We also held one panel discussion, one postconvention workshop, a full-day postconvention

summit, and a traditional reception. In addition, we presented the Harold Mooney Award to Jonathan Ajo-Franklin. Work is currently under way for the 2020 technical program.

Our annual elections concluded 1 July, and we had an excellent candidate pool.

A significant step for the section was the new definition of roles and responsibilities, allowing for better collaboration between leadership and duplicated functions to compensate for cases when our members are in the field. These modifications will allow us to improve actions and services for our membership.

We appointed leaders for various areas, including *TLE*, GEOPHYSICS, membership communication, newsletters, student programs, continuing education, and social media. We also defined new elected positions for global chair and global cochair in accordance with the SEG expansion to better serve all regions in the world.

The 2019 leadership included Chester Weiss (chair), Catherine Truffert (chair-elect), José Arce (past chair), John Goff (vice chair), Lia Martinez (secretary), Sarah Morton Rupert (vice chair of

committees), and Kennedy Doro (global chair).

### Nominations

Ruben Martinez, chair

The Committee on Nominations is charged with assembling a list of candidates for the Board of Directors and the district representatives and overseeing all membership votes. The committee is made up of three immediate prior SEG past presidents; four representatives from sections, associated societies, technical sections, or geographic districts; the chair of the Council; and two SEG directors at large. This year's committee members were John Bradford, Bill Abriel, Nancy House, Abdulaziz Muhaidib, Mike Wilt, Stuart Wright, Tim Dean, Gustavo Carstens, and Ken Tubman.

Filling a slate of candidates is not an easy task. The Board and the Council need to represent and give voice to our diverse membership of different geophysical disciplines, geographic areas, and personal backgrounds. The committee looks for candidates who not only help balance this representation but also care about SEG, have shown that they are willing to make an effort and commit time, have the best interests of the

organization and its members in mind, and are willing to work hard to achieve the goals of the Society. Therefore, it is not surprising that nominees often are people who have served on SEG committees, have been involved in the organization of the Annual Meeting, have served on the board of an SEG subsidiary, have been Council members, or have otherwise made a mark.

### 2019 SEG ELECTION

President-elect:

- Maurice Nessim
- James Rector

Second vice president:

- David Bartel
- Scott Singleton

Vice president, publications:

- Baishali Roy
- Mauricio Sacchi

Director at large:

- Mohammed Badri
- Tad Smith

Director at large:

- Kurt Marfurt
- Amy Rhodes

District 1:

- Allen Bertagne
- Karen Carlson

## REPORTS OF COMMITTEES

District 2:

- Kathy Hardy
- Frank Brown

District 3:

- Tiziana Vanorio

District 4:

- Ray Earley

District 5:

- Jennifer Leslie-Panek
- David Mosher

District 6:

- Hector Alfonso
- José Arce

District 7:

- Isabelle Lecomte
- Sjoerd de Ridder

District 8:

- Dirk Gajewski

District 9:

- Obi Ifeanyichukwu
- George Smith

District 10:

- Sherif Hanafy
- Jackie Zhang

District 11:

- How-Wei Chen

District 12:

- Kim Frankcombe
- Ahmad Riza Ghazali

Survey & Ballot Systems Inc. (SBS)

was contracted to conduct the SEG election for the Board of Directors. SBS designed ballots and distributed an electronic ballot and a paper ballot to each voting member. SBS received, tabulated, and verified the votes, and submitted the results to the SEG business office. The Committee on Nominations verified the count provided by SBS.

Official ballots were sent out 4 June 2019 to 10,498 voting members eligible to vote in this year's election. The annual election had a participation rate of 20.48%.

## ELECTION RESULTS

- President-elect: Maurice Nessim
- Second vice president: Scott Singleton
- Vice president, publications: Baishali Roy
- Directors at large: Tad Smith and Kurt Marfurt
- District 1: Allen Bertagne
- District 2: Kathy Hardy
- District 3: Tiziana Vanorio
- District 4: Ray Earley
- District 5: Jennifer Leslie-Panek

- District 6: Hector Alfonso
- District 7: Isabelle Lecomte
- District 8: Dirk Gajewski
- District 9: Obi Ifeanyichukwu
- District 10: Sherif Hanafy
- District 11: How-Wei Chen
- District 12: Kim Frankcombe

## Passive Seismology

Ulrich Zimmer, vice chair

In 2019, the main activity of the Committee for Passive Seismology was developing a workshop on recent developments in the interpretation and application of microseismic technologies. The workshop was planned for June in Santa Fe, New Mexico. Unfortunately, the workshop was canceled due to a lack of participation, although quality speakers from many operators had accepted the invitation.

The committee recognizes that there are numerous induced seismicity efforts. Looking forward, the question arises of where the committee should focus. One thought is that it should focus on the practical integration and application of passive seismology techniques. The primary topic during the first-quarter 2020 committee meeting will be defining the committee's direction.

## Publications

Kris Innanen, chair

During 2018–2019, the Publications Committee trained its focus on one question — whether SEG should join with other societies as a participant in a new open-access journal operated by GeoScienceWorld (GSW).

Committee discussions on the matter began in November 2018 as the concept for the new publication was in early stages of development. Less than two months prior, a group of European governmental research-funding agencies organized under the name cOAlition S had issued an open-access mandate that raised potential demand for the journal GSW was developing. Under Plan S, as the mandate is called, authors whose research is funded by cOAlition S agencies will have their article processing fees covered only if the articles in which their research results are reported appear in fully open-access journals. GEOPHYSICS, *Interpretation*, and *The Leading Edge* all are hybrid open-access journals, meaning they include a mixture of articles available for free under an open license and content available only by member or institutional subscription, and are, thus, not Plan S compliant.

In early April 2019, the Publications Committee voted to recommend to the SEG Board of Directors that SEG become a participant in the new journal. The Board approved the proposal later in the month, and SEG formally contracted with GSW as a participant at midyear. There are six other professional geoscience organizations participating — the American Association of Petroleum Geologists (AAPG), Geological Society of America (GSA), Geological Society of London, Mineralogical Society of America, Society of Economic Geologists, and Society for Sedimentary Geology.

GSW has operated primarily as a geoscience journals aggregation program since its founding in 2004 and online launch in 2005. SEG, a founding society, has its three journals in the aggregation. Journal publishing is a new enterprise for GSW. Rather than start from scratch, GSW purchased an existing journal, *Lithosphere*, from GSA, and it will open for submissions in January 2020.

Through its participation, SEG can provide a publishing channel for applied-geophysics researchers subject to open-access mandates such as Plan S. Authors may submit directly to *Lithosphere* or gain the

## REPORTS OF COMMITTEES

benefit of SEG peer review by submitting to one of the journals operated by the Society. Authors submitting articles to Society-operated journals also can indicate if they are willing to have the SEG editors (SEG/ AAPG in the case of *Interpretation*) transfer articles to *Lithosphere* that they reject for their own journals because they are lean on novelty or otherwise deemed out of scope yet that are well written, reflect adherence to sound scientific principles, and have value in the marketplace.

It has been my pleasure to serve as chair of this committee, comprised of leaders of all SEG publications teams. Members were Valentina Socco (GEOPHYSICS editor), Balazs Nemeth (*Interpretation* editor), Mauricio Sacchi (Books Editorial Board chair), Baishali Roy (*The Leading Edge* Editorial Board chair), Raul Cova (Translations Committee chair), Karl Schleicher (Wiki Committee chair), Amit Padhi (Reviews Committee chair), Dimitri Bevc (Technical Program Committee chair), James Rector (member at large), and Sergey Fomel (vice president, publications). Fomel has assumed the role of chair for 2019–2020.

### Research

Sergio Chávez-Pérez, chair

The Research Committee currently includes 79 members from a variety of industry segments and academia, including student members and young professionals. Due to travel restrictions and the downturn in oil and gas, committee attendance and participation has been lower than expected. However, the committee meeting during the 2019 Annual Meeting was well attended and active.

### UPDATES AND DISCUSSIONS

- Azra Tutuncu was chair of the Research Committee for the 2018–2020 term. She unexpectedly passed away before the 2019 Annual Meeting. Her memorial is in the January 2020 issue of *The Leading Edge*.
- Sergio Chávez-Pérez assumed the position of chair during the 2019 Annual Meeting.
- New committee members include Miguel Bosch, Aaron J. Girard, Niels Grobbe, and Sjoerd A. L. de Ridder.
- Partha Routh will provide meeting space for the 2020 winter meeting

in Houston (30–31 January) at the ExxonMobil campus.

- Matthew Brzostowski was selected as vice chair for the committee. He will assume the position of chair in 2021.
- There is a lack of international opportunities (i.e., workshops) in Latin America.
- There also is a need for an increased footprint in Asia.
- A broader proposal of workshops will be presented to the SEG Board.
- Real workshop interaction is needed.
- Further participation is required to help select the Best Paper in GEOPHYSICS.
- Members would like to include a monthly committee column in *The Leading Edge*.

### 2019 AND 2020 SUMMER RESEARCH WORKSHOPS

- Summer research workshops were not scheduled during 2019 to avoid topic conflicts with the Energy in Data conference.

- There are two workshops scheduled for 2020. The first, “Maintaining true seismic amplitudes from sensor to image,” will be held 20–24 July in Park City, Utah. The second, “Data analytics and machine learning for exploration and production,” will take place 10–13 August in Denver, Colorado.

### 2019 ANNUAL MEETING SPECIAL SESSIONS AND POSTCONVENTION WORKSHOPS

The Recent Advances and the Road Ahead special session was sponsored by the Research Committee. Presentations included overview perspectives and examples of cutting-edge research in unconventional, full-waveform inversion/imaging, machine learning, and seismic acquisition. The average attendance was 112.

The Research Committee sponsored 14 of the 18 postconvention workshops at the 2019 Annual Meeting. Titles and topics included:

- Advances with land seismic for characterizing reservoirs — Part 1
- Advances with land seismic for characterizing reservoirs — Part 2

- Artificial intelligence frontiers in geosciences
- DAS part 1: Recent advances in subsurface characterization using distributed acoustic sensing and the road ahead
- DAS part 2: What is next for DAS? Operator needs versus technology suppliers’ vision
- Frontiers in seismic reservoir characterization
- Joint imaging/inversion of S-waves with P-waves: Advances in characterizing overburden, elastic models, and petrophysical properties related to conventional and unconventional reservoir development
- Least-squares migration: The way forward
- Long-term monitoring of CO<sub>2</sub> geosequestration: Continuous surveillance and quantitative interpretation
- Machine learning and data analytics algorithms and workflows for geoscience applications

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- New technologies in marine acquisition
- Real-time processing for large-scale streaming seismic data
- Seismic attributes in the age of machine learning
- Value of high-frequency FWI models

The average attendance ranged from 30 to 300.

### Reviews

Amit Padhi, chair

In 2019, we published 29 book reviews. This is the same number of reviews that were published in 2018.

Committee membership decreased after the chair requested less-active members to step down. Several new members were added from different regions and age groups. And, in an unfortunate turn of events, two members passed away. The current membership stands at 32.

Scientific publishers are increasingly offering e-books rather than printed books for review. Within the committee, there is hesitation to accept e-books

for review, despite multiple discussions on the matter.

A final word of warm thanks for her invaluable assistance in handling the affairs of this committee goes to Callie Lee-Petricek. She is organized, diligent, and ensures that the committee is never off track.

### Scholarships

Camelia Knapp, chair

Since its inception in 1956, the SEG Scholarships program has helped advance the field of applied geophysics by encouraging students who excel in geoscience. Gifts from SEG Members, their employers, corporate sponsors, SEG Sections and Associated Societies, and memorial funds given in honor of colleagues, friends, and family members provide substantial merit-based financial awards for deserving students. Approximately US\$9 million in scholarship money has been awarded to date to the top geoscience students in the world. From freshmen just beginning their education to graduate students doing research to advance the field, SEG scholarship awardees are recipients of the most prestigious geoscience scholarships in the world.

During 2019, the SEG Scholarships Committee managed the application process for the 2019–2020 academic year. The committee evaluated 428 applications and granted 124 students scholarships, totaling US\$578,463.

During the evaluation process, each committee member ranked applicants for merit based on information provided in their applications. Individual rankings were compiled, and a composite forced ranking was created to determine the highest-qualified applicants in each of six categories (freshman, undergraduate, and graduate, each divided into North American and international).

The committee considered the specific selection criteria for each of the individual scholarships and carefully matched qualified applicants, in some cases with the assistance of advisory boards that provided feedback and recommendations on applicants. All scholarships are merit based, ensuring that the top geoscience students in the world are honored and awarded.

Committee members also served as advisors to each of the 122 recipients for the 2018–2019 academic year, helping them learn more about career opportunities in geophysics and connecting them with valuable

resources to enhance their education and prepare for their careers.

The 2019 Scholarships Committee included Camelia Knapp (chair), Esther Babcock, Lorie Bear, Lorelee Dickson, Yong Ma, Adam Mangel, Karl Schleicher, and Kai Zhang.

### SEG–AAPG Cooperation

Brandy Hawkins, chair

During the 2018–2019 period, the SEG–AAPG Cooperation Committee endeavored to make headway on several fronts for new collaboration and reinvigoration. Because there are no committee members at this time, most discussions developed among myself, SEG, and AAPG leadership and staff. It is our recommendation to decommission this standing committee to a task force or special interest group that may function to coordinate specific objectives.

There is interest by both organizations to see potential collaboration for:

- Concurrent or consecutive conferences every 2–5 years
- Early-career and student programs

- Joint events focusing on women, diversity, and inclusion that would be held in regions and during annual meetings
- Facilitating joint publications such as *Interpretation*
- Contributing to “Geophysical Corner” in *AAPG Explorer*
- Listing dual memberships in publications

### SEG Bylaws

Joseph Reilly, chair

During 2019, the Bylaws Committee consulted with the Board and various other committees on a number of items including Council processes, voting member definition, the membership application process, and an anniversary dues cycle. Subsequently, formal reviews were requested by the Board of all proposals. This eventually resulted in motions on all items to the Council. With the exception of the membership application process, all proposed amendments were approved by the Council. In addition, the committee advised the Board on various topics including the European Union privacy law and the need to retain legal advice.

## SEG–NGWA Collaboration

John Lane, cochair

The SEG–NGWA Collaboration Committee (SNCC) was established as part of the SEG–NGWA affiliation MOU signed 23 May 2016. In the MOU, the National Groundwater Association was “charged with considering and making recommendations to the respective organizations regarding areas of cooperation, such as joint workshops or programs and continuing education courses.”

NGWA and SEG provide complementary support for geophysical sciences, with SEG focusing on methodology development in applied geophysics and NGWA primarily supporting geophysics as applied to hydrologic scientific questions.

SNCC identified the following areas of overlap between the two communities: water resource management, ground and surface water measuring and monitoring, and remediation of water resources.

SNCC meets four times a year, of which two meetings are in person at the major annual meetings of each organization.

## COMMITTEE MEMBERS

- John Lane  
USGS  
SEG cochair
- Bill Ally  
NGWA  
NGWA cochair
- John Jansen  
Collier Consulting
- John Sciacca  
AECOM
- Jonathan Ajo-Franklin  
Lawrence Berkeley National Laboratory
- Kristina Keating  
Rutgers University
- Gordon Osterman  
Aarhus University
- Stephen Moysey  
East Carolina University
- Niels Grobbe  
University of Hawaii at Manoa
- John Bradford  
Colorado School of Mines
- Kathy Butcher  
NGWA

SEG and NGWA agreed to sponsor joint technical sessions, and the organizations are open to the development of joint meetings.

## SEG–SPE Collaboration

James Rector, cochair

The SEG–SPE Collaboration Committee’s work has fostered a series of workshops on injection-induced seismicity. Per agreement, the societies take turns being the primary operator. The initial SPE-operated workshop occurred September 2012 in Broomfield, Colorado. Subsequent workshops in the series occurred in Banff, Alberta, Canada (2014); Fort Worth, Texas (2016); and Dallas, Texas (2017). All workshops, including the fifth and latest SEG-operated workshop (Dallas, Texas, November 2019), have essentially been sellouts and, with tight budgetary control, profitable for both SEG and SPE. Workshop participants strongly advocate continuing with a sixth workshop in the series, possibly in 2021, which would be back to SEG to operate.

Technical content in the workshop series has mirrored evolving technical understanding. The inaugural workshop in Broomfield can best be summarized as a starting point, targeting industry education and awareness of the issue of induced seismicity. The second workshop in Banff showcased, with expanding examples of induced seismicity, the establishment of reactionary operational protocols tailored to local

conditions. The third workshop in Fort Worth was timed with the release of the USGS one-year hazard map, updated to include induced seismicity for the first time. The workshop identified the need for proactive mitigation strategies including improved predictive modeling capabilities. The fourth workshop in Dallas highlighted continuous improvements in understanding and operational risk management and stressed the need for improved public engagement.

The most recent workshop in 2019 drew 108 participants, by far the majority being from the United States and Canada, but there also were participants from Japan and China. Themes covered within the workshop included geomechanics and fracture mechanics; reservoir-engineering perspectives; ground motion and seismic hazard; integrated case studies of injection-induced seismicity from disposal; hydraulic fracturing; regulatory and operational protocols; risk assessment, management, and mitigation; stakeholder engagement, communication, and public education; and the intersection of evolving science, regulations, and public viewpoint. The workshop concluded with topical sessions highlighting effective industry approaches to risk management and public engagement.

A look back at the workshop series brings into focus the key enabling concepts for the rapid progress that has occurred — collaboration, integration, communication, transparency, and trust. The workshops have served as an important framework for ongoing discussions between researchers, industry, and academics.

## SEG Women’s Network

Hendratta Ali, chair

The SEG Women’s Network Committee (WNC) was created in 2011 to raise awareness and find solutions for the challenges women encounter in applied geophysics.

## STRATEGIES

- Empower women’s participation and leadership in applied geophysics worldwide
- Enhance opportunities for participation, representation, self-empowerment, leadership, networking, technical offerings, and sharing of best practices for women in SEG, connected societies, and the profession

- Create a community of mutual support among female SEG Members
- Elevate awareness of the value of a diverse workforce in the profession and implement solutions for women's challenges in geophysics

## OBJECTIVES

- Promote SEG Membership among women globally by creating beneficial activities that increase awareness of diversity issues and offer a sense of community
  - Create opportunities for networking following an incremental approach
  - Provide self-empowerment and self-training opportunities in technical and soft skills via webinars and other means
  - Maintain a sustained effort in nominating women for SEG governance roles, participation in committees and programs, and in awards and recognitions
- Enhance the effectiveness of WNC activities by improving communication and by working with WNC key stakeholders in SEG committees, programs, activities, and governance

- Mentor students and early-career professionals
- Maintain visibility on women's challenges in geophysics by identifying changing opportunities and needs by communicating these challenges in a constructive and grounded way that is aimed to identify and implement solutions
- Expand outreach to members in order to raise collective awareness on gender diversity and inclusion
  - Publish a series of articles in the Full Spectrum column of *The Leading Edge*
  - Advertise WNC on the SEG website and in other societies' publications
  - Create and maintain a strong, informative, and inspirational presence of WNC on social media
  - Establish and enrich SEG resources on diversity in the SEG Wiki and BaseCamp
  - Host SEG webinars to widely share women role models in geophysics as well as gender-diversity statistics, issues, solutions, trends, and inclusion-related articles

- Enrich the Annual Meeting program with specific activities created to raise awareness about diversity and inclusion in geophysics and to support the empowerment of women, specifically focusing on young professional and student segments of SEG

WNC has made significant contributions toward increasing the effective participation of women in SEG by raising awareness of diversity and inclusion issues for women in geophysics and by boosting the nomination of women for SEG governance roles and awards over the last eight years.

WNC also has been instrumental in raising the collective awareness of women's challenges and contributions to geophysics through a series of communicative, informative, and educational strategies such as the Full Spectrum column in *TLE*, presence on social media (LinkedIn, Facebook, Twitter, and Instagram), workshops, courses, and networking events.

Additionally, WNC has conducted several surveys to gather demographic and experiential information on the current state of diversity within SEG Membership.

## WNC IN 2018–2019

The committee made significant advances in 2018 and 2019.

- A WNC webinar series was launched in 2019, with five successful webinars held throughout the year.
- A book contest was held on 8 March to celebrate International Women's Day. Four winners were chosen.
- Several exciting WNC events were held at the 2019 Annual Meeting.
- The 9th Annual Women's Networking Event brought members and students together to network and discuss current events. Allyson Anderson Book, executive director of the American Geosciences Institute, was the keynote speaker.
- A full-day postconvention workshop titled "Near-surface geophysics for archaeological and forensic applications" was held. Workshop leaders were Blair Schneider from the University of Kansas and Recep "Ray" Cakir from the Washington Geology Survey. This workshop focused on how geophysicists can be valuable collaborators and aid in identifying unknown site and future excavation or preservation plans.

- WNC hosted a half-day postconvention workshop titled "Rock physics implications of CO<sub>2</sub> injection in the subsurface." It was organized by Hendratta Ali from Fort Hays State University, Nazmul Haque Mondol from the University of Oslo, and Manika Prasad from Colorado School of Mines. This workshop brought together a panel of experts and practitioners to share insights about the challenges and opportunities of applying rock physics to image CO<sub>2</sub> and fluid interactions in the subsurface.
- Mentoring365 was held during the Annual Meeting in collaboration with the American Geophysical Union and the Association for Women Geoscientists. WNC provided several mentors for this activity and contributed with the advertising.
- A WNC fund was established through the SEG Foundation to encourage individuals to donate and support activities of the committee.

## PLANS FOR 2020

- Launch a WNC newsletter to be distributed quarterly
- Revise the WNC web page to better facilitate engagement of all SEG Members

- Develop a WNC-sponsored award, the SEG IDEAL Award, that will honor an individual for leadership in inclusion, diversity, and equality
- Submit a proposal for a new technical award named after a woman to be presented at the Honors and Awards Ceremony at the Annual Meeting
- Continue efforts to globalize WNC, with regional committees, initiatives, and activities led by young professionals and students
- Increase the publication frequency of the Full Spectrum column
- Augment joint activities with connected societies and organizations that work for women empowerment
- Offer dedicated mentoring for students

## COMMITTEE LEADERSHIP

- Hendratta Ali, chair
- Blair Schneider, vice chair
- Ellie Ardakani, publications lead
- Ogochukwu Ozotta, communications lead

## ADVISORY COUNCIL

- Eve Sprunt
- Nancy House
- Maria Angela Capello
- Maitri Erwin

## The Leading Edge Editorial Board

Baishali Roy, chair

*The Leading Edge (TLE)* Editorial Board members for the 2018–2019 term were Baishali Roy (chair), Yongyi Li, Steve Sloan, Kyle Spikes, Ulrich Zimmer, Margarita Corzo, and Michel Kemper. Roy completed her term of service during the 2019 Annual Meeting and was replaced by Chengbo Li. Kyle Spikes took over the role of chair for 2019–2020 at the conclusion of the Annual Meeting.

In 2019, the SEG Board of Directors approved the addition of two *TLE* Editorial Board members to assist with the growing number of submissions. Current Editorial Board members will identify and recruit additional members in 2020.

In calendar year 2019, 83 technical articles were published in *TLE* with 68 of those being assigned to specific special sections and the other 15 appearing as “standalone” technical papers. Numerous nontechnical articles related to Society events and activities also were published.

Through a change in the *TLE* Policies and Procedures, recommended by the *TLE* Editorial Board and approved

by the SEG Board of Directors, the Editorial Board delegated review and editing of nontechnical material to SEG staff, with the caveat that any material judged to be sensitive or controversial would be elevated to the Editorial Board for review. This change was intended to allow Editorial Board members to focus on technical articles.

## SPECIAL SECTION TOPICS COVERED IN CALENDAR YEAR 2019

- January: Case studies: Conventionals
- February: Case studies: Unconventionals
- March: Full-waveform inversion
- April: India
- May: Rock physics
- June: Near-surface geophysics
- July: Machine learning applications
- August: Exploration geophysics in China
- September: Acquisition and sensing
- October: AVO inversion
- November: Borehole geophysics
- December: General submissions

The 2018 *TLE* Best Paper Award was presented to Jens-Erik Lund Snee and Mark D. Zoback for their paper titled “State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity.”

Additionally, an Honorable Mention was awarded to Grant Byerley, Dave Monk, Peter Aaron, and Mike Yates for their paper titled “Time-lapse seismic monitoring of individual hydraulic frac stages using a downhole DAS array.”

## Translations

Raul Cova, chair

The Translations Committee reviews applied geophysics books and articles published globally and recommends to the vice president, publications and/or chair of the Books Editorial Board published materials deemed to be of sufficient interest to the general membership to warrant translation and publication either in SEG journals or as an SEG special publication. Historically, the committee focused on translations into English but has expanded its role to consider translations of works into other languages as well.

In addition to fulfilling its charter, the Translations Committee advises the Board on policy matters related to publications translations. It also collaborates with the Wiki Committee in the translation of content published through the SEG Wiki.

In 2019, the Translations Committee continued its collaboration with the Wiki Committee on the Spanish translation of the *Encyclopedic Dictionary of Applied Geophysics, fourth edition*. Volunteers were recruited during March to participate in a Marathon Week of translation in April. A total of 70 volunteers participated in the event, which was extended for a second week. Volunteers reached the goal of translating 100% of the Dictionary’s 6777 terms. When the last term was translated by Sven Treitel on 16 May, phase 1 of the project was complete.

Phase 2 began immediately after, with a review of all of the translated terms to ensure quality and consistency. Figure labels and tables will continue to be translated during this phase, and completion is expected year end 2020.

Notably, since its inception in 2017, the SEG Wiki Spanish translation project has involved more than 75 volunteers from six different countries, making it SEG’s first crowdsourced book translation effort.

In December 2018, the Translations Committee received a proposal for publishing the English version of the Russian book *Numerical Modeling of Seismic Responses from Fractured Reservoirs by the Grid-characteristic*

*Method* by Vladimir Leviant, Igor Kvasov, and Igor Petrov. The proposal was distributed to technical experts and reviewers who approved its publication. The translation was done by the authors. Thanks to an impressive copyediting effort led by Susan Stamm, the final version of the book was presented at the SEG Annual Meeting in San Antonio in September 2019.

In September 2019, the committee also received a recommendation for translation of a book originally published in Portuguese: *Geophysics State of Bahia: Geological Studies and Mineral Exploration*. A formal submission and its distribution to reviewers are in progress.

## Travel Grants

J. Tyler Schwenk, chair

The primary purpose of the Travel Grants Committee is to evaluate student and recent graduate applications for grants that offset costs associated with attending the Annual Meeting. The majority of the grants go to attendees of SEG-sponsored student programs, such as the SEG/ExxonMobil Student Education Program and the SEG/Chevron Student Leadership Symposium. The committee also evaluates awards of the SEG Technical Program Travel Grant for those planning to present their research at the Annual Meeting. Lastly, the committee evaluates applications for the SEG Near-Surface Research Award, which offsets costs associated with a near-surface geophysics project.

## 2019 AWARDS

Near-Surface Research Award:

- Four applicants
- Presented to Patrick Duff of the University of South Carolina for the project, “Understanding shallow marine classic reservoir heterogeneity from modern analogues resolved by GPR and drone imagery”

Student Education Program:

- 112 applicants
- 30 award recipients
- 18 countries of citizenship

Student Leadership Symposium:

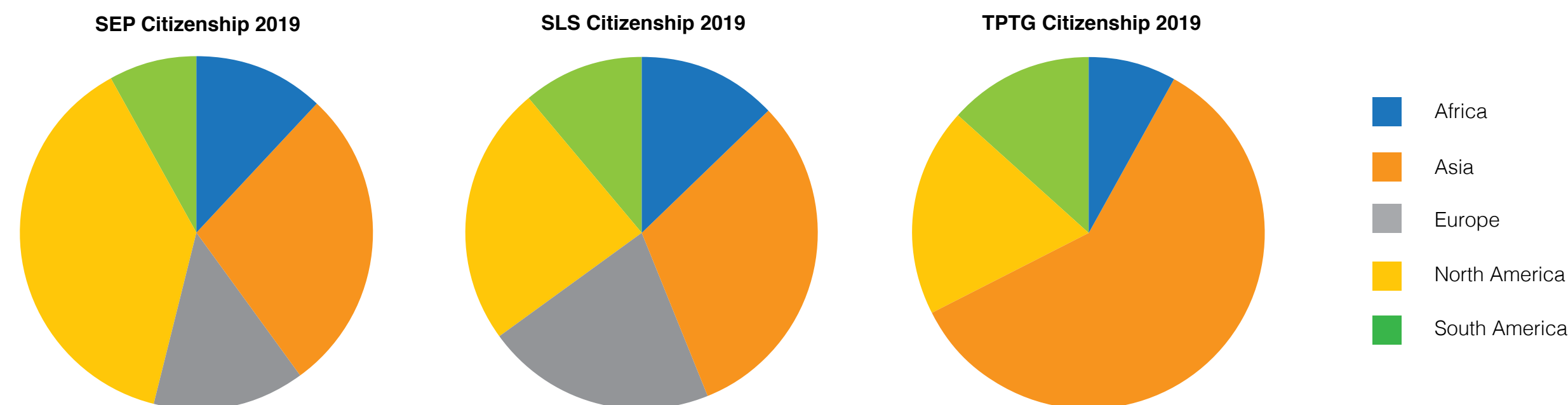
- 83 applicants
- 50 award recipients
- 21 countries of citizenship

Technical Program Travel Grant:

- 40 applicants
- 23 award recipients
- 12 countries of citizenship

## 2019 ACTIONS

Committee members, SEG staff, the SEG Women’s Network Committee, and SEG Members at large worked to diversify new committee membership: geographically, technically, with young professionals, and by gender. Year-on-year updates of the Student Education Program and Student Leadership Symposium essay questions continued. Committee members also worked to make the grading guidelines of grants and best practices clear and uniform. This practice will continue in 2020.



Participants in the Student Education Program, Student Leadership Symposium, and Technical Program Travel Grants are from a variety of continents.

## PLANS FOR 2020

In 2019, the committee voted to change the grant-review process. Applications will be randomly sorted and reviewed by three members of the committee. This decision was prompted by the difficulty of finding volunteers that could commit to reviewing 100 or more grant applications. The committee hopes this will expand the possible volunteer pool of future committee members and allow for a more thorough examination of each grant application. In addition to this change, goals for 2020 include increasing membership of the committee from 13 to 16 and continuing to promote diversity.

The members of the committee dedicate a great deal of time and effort to the thoughtful evaluation of each of the grant applications. I'd like to acknowledge and thank them for their service to SEG and its members:

- Emma Butler
- Chandra Dubey
- Seth Haines
- Dalton Hawkins
- Sajad Jazayeri
- Leslie Marasco
- John Onayemi
- Cecilia Ramirez
- Justin Simmons
- Chelsea Squires

- Zhiguo Wang
- Zoe Zhang

## Wiki

Karl Schleicher, chair

In 2019, the Wiki Committee proposed and the SEG Board approved an expanded charter. In addition to organizing member contributions to the SEG Wiki, the committee will help organize contributions to social media (LinkedIn, Twitter, and other online outlets). The committee also will provide avenues for SEG Members to recommend topics for the SEG podcast, Seismic Soundoff.

In February 2017, a group of volunteers started translating Robert Sheriff's *Encyclopedic Dictionary of Applied Geophysics* into Spanish. On 16 May 2019, the entire dictionary was translated. From the team leaders that helped start the project to the ones that stayed with us through the years, it was an amazing team effort from all volunteers. The top contributors each made over 1000 contributions, and more than 70 volunteers participated in the project. Currently, the Spanish project team leaders, with a selected group of volunteers, are reviewing the translations and updating the SEG Wiki with the translated figures and tables to create an e-book and/or print book of the final translation.

Top contributors were: Brenda Monsalve, Jorge Luis Ñustes Andrade, Maria Brandt, Andrés Felipe Salamanca, Raul Cova, Juan Márquez Cruz, Reinaldo Michelena, César Darío Cantú Bendeck, Lucía Torrado, Carlos Finlay, and Lara Blazevic.

The Mandarin translation project for the dictionary continues from 2018, now led by Yang Zhang with support from Jianxiong Chen, Tao Li, Ching Wen, Alfred Liaw, and additional volunteers. As of 15 December 2019, 3650 entries had been translated in their entirety by 41 volunteers. Close to 55% of this translation is complete.

The SEG Wiki university partnerships continue to grow, as Heather Bedle from the University of Oklahoma led four classes to write and submit new articles to the SEG Wiki in 2019. This partnership to date has produced more than 125 new high-quality articles to the wiki.

The third book to be added to the wiki, *Problems in Exploration Seismology and their Solutions* by Lloyd P. Geldart and Robert E. Sheriff, was completed in 2019. Conversations are ongoing about translating this book.

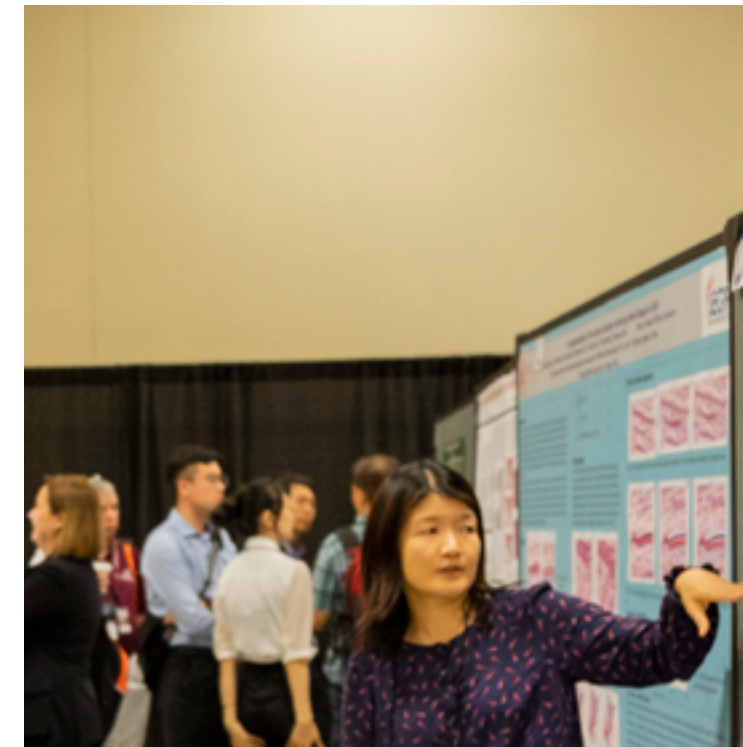
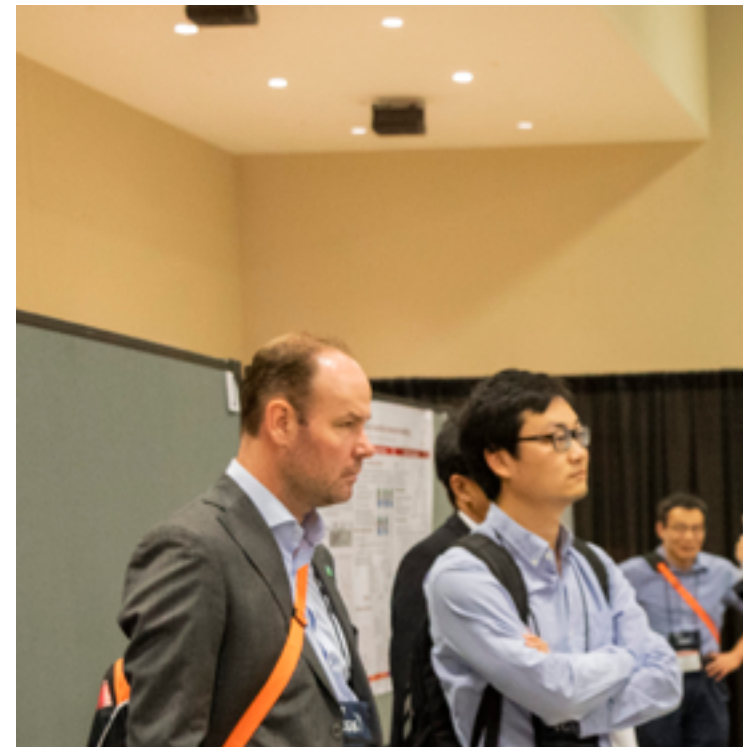
The SEG Wiki and chair also worked closely with the Geophysical Society of Houston to add its geoscience

museum online. Through this partnership and additional support from Les Denham, Bill Gafford, and Ed Lengel, the wiki added more than 1400 items from the geoscience museum to the SEG Wiki. Each item published is searchable and linked by multiple categories, including location, donor, manufacturer, and description. Most items have images, and the public will be able to add their knowledge and information to each item to highlight the history and future of applied geophysics.

The SEG Wiki continues to be sustained by sponsors. Sustaining investors are Apache (founding sponsor), Shell, IHS Markit, and In-Depth Geophysical. We appreciate these companies' commitment to knowledge sharing through the SEG Wiki.

“In 2019, on the recommendation  
of the Publications Committee  
and endorsement by the Board of  
Directors, SEG decided to join six  
other societies as participants in  
the new GSW journal.”

— Ted Bakamjian  
GeoScienceWorld representative



**REPORTS OF REPRESENTATIVES**

## REPORTS OF REPRESENTATIVES

### GeoScienceWorld

Ted Bakamjian, representative

GeoScienceWorld (GSW) is a nonprofit collaborative and comprehensive Internet resource for research and communications in the earth sciences that is built on a core database of peer-reviewed journals and is integrated with the GeoRef index. SEG is one of GSW's seven founding organizations, along with the American Association of Petroleum Geologists (AAPG), the Geological Society of America (GSA), the Geological Society of London (GSL), the American Geosciences Institute, the Mineralogical Society of America (MSA), and the Society for Sedimentary Geology (SEPM).

The journals aggregation launched in February 2005 and today includes 46 journals from 28 publishers. SEG has three journals available through GSW: *GEOPHYSICS*, *The Leading Edge* (*TLE*), and *Interpretation* (copublished with AAPG). SEG also is one of 11 publishers participating in GSW eBooks, which launched in 2014 and includes more than 1200 titles, including more than 140 from SEG.

GSW is supported by institutional journal and book subscriptions and perpetual-access sales of books to institutions. Institutions subscribing

to the journals are required to purchase access to the entire journals aggregation. Compensation to the publishers is based on a combination of the amount of content the publisher contributes and how much it is used. By participating in GSW, SEG extends the usage of its publications beyond the SEG Library while also earning royalties.

Approximately 20% of usage of *GEOPHYSICS*, *TLE*, and *Interpretation* occurs through GSW, with nearly all of the rest enabled by the SEG Library. Usage of SEG publications on GSW declined significantly during 2018 as usage on the SEG Library increased. A primary reason appears to be that search algorithms have been adjusted for versions of record, and for SEG the versions of record are in the SEG Library. Some adjustments were made to the GSW platform in 2019 that appear to have boosted usage, yet not to the level of years past when approximately a third of all usage was through GSW.

GSW spent much of 2019 developing a new business line — a multisociety open-access journal that would be compliant with Plan S, the mandate initiated by European Union government research funding agencies known as cOAlition S. The mandate requires that reports of research

financed by cOAlition S and other organizations that have signed on to Plan S be published only in fully open-access journals. SEG's journals are hybrid open-access journals, meaning that authors can pay a fee to make their articles free under an open license.

In 2019, on the recommendation of the Publications Committee and endorsement by the Board of Directors, SEG decided to join six other societies as participants in the new GSW journal. The other six are AAPG, GSA, GSL, MSA, SEPM, and the Society of Economic Geologists.

Rather than start from scratch, GSW purchased an existing journal, *Lithosphere*, from GSA. The journal opened for submissions in January 2020.

Through its participation, SEG can provide a publishing channel for applied-geophysics researchers subject to open-access mandates such as Plan S. Authors may submit directly to *Lithosphere* or gain the benefit of SEG peer review by submitting to one of the journals operated by the Society. Authors submitting articles to Society-operated journals also can indicate if they are willing to have the SEG editors (SEG/AAPG in the case of *Interpretation*)

transfer articles to *Lithosphere* that they reject for their own journals because they are lean on novelty or otherwise deemed out of scope yet that are well written, adhere to sound scientific principles, and have value in the marketplace.

### IPTC Management

Joseph Reilly and Mohammed Badri, Board members

The International Petroleum Technology Conference (IPTC) rotates between Asia Pacific and Middle East locations. IPTC is organized to advance technology related to exploration, drilling, and production as well as transportation and processing covering upstream and midstream technologies. IPTC partners are the American Association of Petroleum Geologists (AAPG), the European Association of Geoscientists and Engineers (EAGE), the Society of Petroleum Engineers (SPE), and SEG. SPE operates IPTC on behalf of the partnership.

Key factors responsible for IPTC's success are the host national oil company, an international oil company cohost, and service-sector support. Structurally, IPTC is incorporated with the four societies as owners (20% interest to SEG). The board of

directors consists of eight members, two appointed from each society. Joseph Reilly, chief geoscientist for ExxonMobil, and Mohammed Badri, managing director for Schlumberger Research Dhahran, are SEG's IPTC board of directors representatives.

### IPTC 2019 IN BEIJING (26–28 MARCH 2019)

The theme of IPTC 2019 was "Partnership and Innovation: The Silk Road towards a Sustainable Energy Future." The China National Petroleum Corporation (CNPC) was the host organization, and Saudi Aramco was the cohost. More than 2400 abstracts were submitted and 447 were presented (oral and e-poster combined) in 70 technical sessions. This was a record for IPTC conferences.

Attendance was more than 3000. Overall, content was well balanced between petroleum engineering and geoscience. Including special and panel sessions and opening and closing ceremonies, there were a total of 89 sessions. To further enhance an already strong technical program, additional elements included top papers from sponsoring societies, an oil and gas project case study session,

## REPORTS OF REPRESENTATIVES

ask the expert sessions, and the society president's panel session.

A special CEO plenary session was moderated by Tor Fjaeran, president of the World Petroleum Council, with CEOs from CNPC (Wang Yilin), Saudi Aramco (Amin Al Nasser), Total (Patrick Pouyanne), and Woodside Energy Ltd. (Peter Coleman). In addition, there were eight topically focused panel sessions.

Education Week, a week-long program running concurrently with the regular technical program, provided third- and fourth-year international university students a chance to work in groups in selected project areas. Selection was very competitive. A total of 277 applications were received representing 83 universities and 28 countries. Through sponsorship, IPTC provided for students' travel and accommodations.

For young professionals 35 years or younger or with less than 10 years of experience, IPTC offered a one-day Emerging Leaders Workshop. The program is a mix of talks and activities prepared and presented by emerging leaders, industry leaders, and experts.

A staple of every IPTC conference is the Award for Excellence in Project Integration. There were 16 projects from 12 organizations representing four

countries nominated. Review led to a short list of six project nominations from six organizations representing four countries. Finalists were Manifa from Saudi Aramco (winner), Malikai from Shell, and Moho Nord from Total.

### **IPTC 2020 IN DHAHRAN (13–15 JANUARY 2020)**

A first since being founded in 2005, IPTC will be held in the Kingdom of Saudi Arabia, with Saudi Aramco serving as the exclusive host. The conference is honored to receive the patronage of his royal highness Crown Prince Mohammed Bin Salman Bin Abdulaziz.

IPTC 2020 will be the first international multidisciplinary multisociety oil and gas conference and exposition to be held in Saudi Arabia. The conference is especially welcomed since the last IPTC conference in the Middle East was in December 2017. The Executive Committee of the conference includes more than 45 top company executives and managers, positioning the event for remarkable success. The Kingdom of Saudi Arabia has seen significant changes in recent years, making it a perfect place for this oil and gas conference that will attract many professionals to learn

about its oil industry. The conference is expected to attract top executives from national and international oil companies from around the world.

The conference theme is "Vision to Prosperity: A New Energy Era Emerges." Industry response set a new record with more than 3500 abstracts submitted. The abstracts were submitted from 336 organizations and 56 countries. A total of 762 abstracts were selected (oral and e-poster combined) and worked into 100 technical sessions. The conference will take place at the Dhahran Conference and Exhibition Complex. The conference venue has been upgraded and enlarged to accommodate delegates and visitors, including exhibition space and technical session rooms.

The technical program includes 14 geoscience-specific, six integrated geoscience and engineering, and 10 unconventional sessions. The conference also will feature four technical program enhancements including top papers from sponsoring societies, ask the expert sessions, project case study sessions, and seminars. Several workshops also are planned including one titled, "Emerging leaders, diversity, and inclusion in the oil and gas programme."

SEG representatives on the IPTC board participated in the IPTC Excellence in Project Integration Award Committee, where three finalists were selected out of 17 candidate projects submitted from 11 organizations.

### **IPTC 2021 IN KUALA LUMPUR (23–25 MARCH 2021)**

Early planning for IPTC 2021 is under way. The host for the event is Petronas, and Mubadala Petroleum is the cohost. The current plan is to have more than 400 papers presented in more than 50 technical sessions, plus all of the additional components that are a part of the overall IPTC program.

### **IPTC FINANCIALS**

While planning for IPTC 2019, the IPTC board of directors was informed that achieving a financial surplus would be a challenge in China. IPTC staff provided regular financial updates to the IPTC board to keep them informed of the anticipated financial performance of the event. The IPTC board approved delivering the event despite the projected poor financial performance, as they were comfortable with the company's cash flow and reserves. Furthermore, they agreed that delivering a quality event in China was important to IPTC's long-term strategy

to continue its presence in China. As a result, a loss of US\$272,000 was recorded for the 2019 Annual Report. However, the current projected budget surplus for IPTC 2020 in Dhahran of more than US\$2 million will restore IPTC to a positive cash flow. We recognize Saudi Aramco for their support of IPTC.

### **NAPE Advisory**

Patrick Rutty, representative

Partners in the North American Prospect Expo (NAPE) are the American Association of Petroleum Landmen (AAPL), the Independent Petroleum Association of America (IPAA), the American Association of Petroleum Geologists (AAPG), and SEG. NAPE, which celebrated its 25<sup>th</sup> anniversary in 2019, was founded by AAPL in 1993. IPAA joined as a partner in 1995. In 2004, AAPG and SEG came aboard, each taking a 10% interest. This left IPAA with 29% and AAPL with a majority-ownership 50.5% position. NAPE Management LLC retains 0.5% and serves as NAPE's general partner. Partners participate through the NAPE Advisory Board, on which I began serving as SEG's representative in spring 2019.

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NAPE is an environment where prospect developers interact with potential buyers with the expectation of doing business. This environment naturally draws engineers, geoscientists, landmen, lenders, capital providers, etc. Because there is the expectation of making deals, many attendees are decision makers.

NAPE began in Houston with Winter NAPE (now called NAPE Summit) and expanded to include Summer NAPE. Later, two regional conferences were added in Pittsburgh and Denver, but since they proved unprofitable, NAPE now only consists of the winter and summer conferences located in Houston.

**NAPE SUMMIT 2019**  
(11–15 FEBRUARY, HOUSTON, TEXAS)

NAPE Summit 2018 attendance and financial returns improved over prior years, as the industry started to emerge from the downturn. The 2019 results were equally strong, with exposition attendance and the number of exhibitors (and the net surplus) identical to 2018 (Table 20).

Net surplus distributed to SEG's 10% interest in June 2019 from NAPE Summit 2019 was US\$500,093.

**SUMMER NAPE 2019**  
(21–22 AUGUST, HOUSTON, TEXAS)

In contrast to NAPE Summit, exposition attendance and the number of exhibitors of Summer NAPE 2019 struggled to maintain the levels seen during 2018, and financial results decreased measurably. Realizing that NAPE Summit competes with Summer NAPE, NAPE is starting a season pass package in 2019 that will include attendance of both events (Table 21).

Net surplus to SEG's 10% interest from Summer NAPE 2019 was US\$54,004.

**SEG PARTNER EVENTS AT NAPE SUMMIT**

NAPE encourages its partners to develop training and events to foster a NAPE week experience. These are partner events, not official NAPE events. NAPE encourages these events

by offering space and audio/visual at no cost, but there are two caveats: (1) events cannot conflict with NAPE events, and (2) sponsorships cannot be solicited. SEG's initial ROI Forum at NAPE Summit 2018 lost money. For 2019, SEG developed a more focused program with four distinct geoscience subthemes. Still, preregistrations remained low, and the forum was canceled. For NAPE Summit 2020, SEG planned a popular two-day machine learning short course, but due to low registration, the course was canceled. Striving to be a responsive partner, SEG will continue looking for a model for a profitable partner event.

**NEW INITIATIVES WITHIN NAPE**

NAPE has initiated a quarterly hardcopy publication, the intent being to maintain regular contact with its audience. Other new components

include job fairs and young professional events. NAPE has a strong track

record of adding something new to the events each year.



Visitors engage at the SEG booth during NAPE 2019.

**TABLE 20**  
ATTENDANCE AND FINANCIAL DATA FOR NAPE SUMMIT 2019

|             | Attendance |                        |                       |                         | Net surplus<br>(8/8 <sup>ths</sup> \$) |
|-------------|------------|------------------------|-----------------------|-------------------------|----------------------------------------|
|             | Expo       | Business<br>Conference | Charities<br>luncheon | Number of<br>exhibitors |                                        |
| Summit 2018 | 12,298     | 902                    | 1083                  | 701                     | US\$4,610,140                          |
| Summit 2019 | 12,328     | 920                    | 1597                  | 694                     | US\$5,000,933                          |

**TABLE 21**  
ATTENDANCE AND FINANCIAL DATA FOR SUMMER NAPE 2019

|                  | Attendance |                        |                         | Net surplus<br>(8/8 <sup>ths</sup> \$) |
|------------------|------------|------------------------|-------------------------|----------------------------------------|
|                  | Expo       | Business<br>Conference | Number of<br>exhibitors |                                        |
| Summer NAPE 2018 | 2866       | 265                    | 225                     | US\$893,876                            |
| Summer NAPE 2019 | 2487       | 318                    | 185                     | US\$540,038                            |

## REPORTS OF REPRESENTATIVES

### Offshore Technology Conference

Alex Martinez, chair

The Offshore Technology Conference (OTC) organization is an excellent collaboration between multiple professional societies, including SEG. The conferences OTC sponsors bring people together to discuss and learn about the latest advances in offshore technology and new business opportunities. OTC has been going successfully for more than 50 years, adapting and evolving over that time to meet the needs of attendees and exhibitors. In addition, it brings needed revenue to the organizing societies. For the 2019 fiscal year, the net distribution to SEG from all OTC events was US\$1,143,123.04.

A brief summary of each OTC event follows.

#### OTC HOUSTON 2019 (5–9 MAY 2019, HOUSTON, TEXAS, UNITED STATES)

Held annually since 1969, OTC is the largest global offshore-focused conference in the world, drawing more than 100,000 attendees in the peak years of 2013 and 2014. Attendance during the current downturn has dropped approximately 40% to the 60,000 range. However, from a

percentage standpoint, the exposition footage (the primary driver for net surplus) only fell in the 10% to 12% range because companies want to maintain their priority space. The general perception is that the offshore market is rebounding, but sustainment requires further efficiency gains.

OTC 2019 (5–9 May) drew 59,200 attendees, a decrease of about 5000 from OTC 2018. Exposition footage fell approximately 6% from OTC 2018. Financially, net surplus increased modestly despite the decrease in attendance and exposition space.

OTC offers a plethora of learning and networking opportunities through an extensive program of regular and special technical sessions, panel sessions, breakfast and luncheon presentations, and other activities. Program development is a collaborative effort of the professional societies forming the OTC partnership. SEG primarily contributes through its Technical Program Subcommittee.

OTC Week started with a Golden Anniversary Gala, where SEG and AAPG jointly sponsored a table. During the dinner, the OTC Achievement Awards for Individuals and Organizations were recognized. Carlos Mastrangelo was recognized

for Individual Achievement. The Institutional Achievement awardee was the ExxonMobil-operated Hebron Offshore Project. David Baldwin was honored with the Hoover Medal. Net proceeds from the dinner were donated to the 2019 charity beneficiary, Spindletop Charities.

In the opening general session, “The next 50 years of offshore developments,” company executives shared how they are preparing for the brave new world of digitalization, automation, and machine learning. Other special events during the week included:

- Rice Alliance Startup Roundup @ OTC
- Spotlight on New Technology Awards
- OTC Energy Challenge (high school competition)

New to OTC in 2019 was the Around the World Series. These special sessions focused on specific countries. Countries featured this year were Canada, Ghana, Guyana, Israel, Mexico, Norway, and the United Kingdom. In these sessions, global industry leaders discussed new licensing and business opportunities

as well as recently introduced technologies.

Advancements in marine renewables have impacted the offshore sector on a global scale. In response, OTC has expanded its program content to include technical sessions dedicated to wind, hydrokinetic, and gas hydrate advancements. This expansion is expected to continue in future years.

Technical and panel sessions featuring SEG collaboration with other societies included:

- “Offshore drilling, reservoirs, and foundations: Solutions for today and tomorrow” organized by the American Association of Petroleum Geologists (AAPG), Marine Technology Society (MTS), and SEG
- “Coming to Americas” organized by MTS and SEG
- “State of the seismic industry: Preparing for the upturn” organized by AAPG and SEG

SEG also played a role in two breakfast/luncheon presentations:

- “BOEM: An update on the U.S. offshore regulatory environment” by Walter Cruickshank, deputy director

and acting director, Bureau of Ocean Energy Management (BOEM)

- “DOE oil and gas: Addressing technology and market challenges” by Shawn Bennett, deputy assistant secretary for the Office of Oil and Natural Gas, U.S. Department of Energy

OTC’s Technical Program Subcommittee would not be possible without the dedicated efforts of volunteers. Alex Martinez was the chair for OTC 2019, and Stephan Gelinsky served as vice chair. Other volunteers included Nathan Bangs, Brian Brookshire, Lance Cole, Ashwani Dev, Elive Menyoli, and Larry Scott. Immediately following OTC 2019, Alex Martinez moved upward to fill SEG’s OTC board of directors position. It was vacated by Wafik Beydoun of IOGP after eight years of faithful service, the last two as chair of the OTC board. Gelinsky stepped forward to become SEG’s subcommittee chair for OTC 2020, and Martin Terrell became the new vice chair.

Looking forward to OTC 2020, now SEG Technical Program Subcommittee Chair Stephan Gelinsky notes that SEG will be sponsoring two invited technical sessions jointly with AAPG. One focuses on contrasting deepwater

## REPORTS OF REPRESENTATIVES

and onshore shale opportunities, the other is on geohazards. There also will be one or more general technical sessions on reservoir characterization and monitoring. SEG will host one luncheon (or breakfast) on energy solutions across the Atlantic margin with speakers from Brazil and South Africa. SEG also is cohosting a panel on “Investing in uncertainty: Rewarding the upside,” for which an impressive list of senior managers from operators and service providers have been recruited.

### OTC BRASIL 2019 (29–31 OCTOBER 2019, RIO DE JANEIRO, BRAZIL)

The 5<sup>th</sup> OTC Brasil was held at SulAmerica, switching locations from Riocentro, where previous OTC Brasil conferences were held. Unlike OTC Brasil 2017, it was not colocated with Rio Pipeline. The conference theme was “Strengthening Deepwater for the Future.” An attendance of 15,291 from 48 countries exceeded expectations, reflecting both the strong technical program and high interest in Brazil’s upcoming bid rounds.

The technical program featured four plenary sessions, 22 special sessions, and 40 technical sessions. Focus areas were changing conditions of the Brazilian gas market, exploration and production in ultra-deep waters of the

presalt province, and the impact of the digital revolution on the offshore sector. SEG’s Technical Program Subcommittee delivered a panel session titled, “Geophysical advanced technologies applied to the Brazilian pre-salt reservoirs.” It was moderated by Paulo Johann (Petrobras). Past OTC Board Chair Wafik Beydoun moderated a breakfast presentation by Alex Dal Pont (Petrobras) covering “The new paradigm of innovation in Brazil.” Prior to OTC Brasil, in a meeting arranged by Paulo Johann, SEG leadership met privately with Petrobras’s geophysical group.

From a volunteer standpoint, Paulo Johann represented SEG on the Oversight Committee. Cochairs for SEG’s Technical Program Subcommittee were Marcilio Matos and Manuel Peiro. Other volunteers were Eduardo Lopes de Faria, William Meyer, Gonzalo Flores, Terrel Dhanpaul, and Pedro Mario Cruz E. Silva.

### OTC ASIA 2020 (24–27 MARCH 2020, KUALA LUMPUR, MALAYSIA)

The biennial OTC Asia 2020 will have more than 150 exhibitors and anticipates more than 20,000 attendees. With its theme “Excellence in Asia: Creating a Sustainable Energy Equation — The Next 50 Years,”

OTC Asia 2020 will highlight how Asia continues to thrive as a center of excellence to drive efficiency through vigilance in cost management, application of robust strategies, and development of emerging technologies to proof the industry as it transitions into a lower carbon world.

Elements of the technical program that are likely of interest to SEG Members follow.

- Panel session titled, “Talent capability development: Closing the gap.” Panelists include Cindy Yielding (senior vice president, strategic initiatives, BP America Inc.), Emeliana Rice-Oley (vice president, exploration upstream, Petronas), and Salam Salamy (administrator, Upstream Professional Development Center, Saudi Aramco).
- Technical sessions titled, “Geoscience/geology,” “Geophysical technology and solutions — What’s new?,” “Novel approaches and emerging technologies in geoscience,” “Advanced reservoir characterization,” “Reservoir characterization,” and “Cost management by hazard mitigation”
- Country sessions about Australia, Brazil, Brunei, Canada, China,

Indonesia, Japan, Malaysia, Myanmar, and Thailand

Charles Knobloch (partner in Knobloch & Tripp) represents SEG on the Oversight Committee. Chrissie Sylvester Lojikim (Shell) is serving as chair of SEG’s OTC Asia Technical Program Subcommittee, while Mohd Firdaus Abdul Halim (Petronas) is serving as vice chair. Other volunteers include Xie Yi, Guillaume Cambois, Hitoshi Mikada, Elita Yunyuye Li, Alessandro Mannini, Wanida Sritongthae, Stephan Gelinsky, and Michelle Tham.

It is with great sadness to announce the passing of Professor Deva Ghosh, our long-serving SEG Member who also served as Honorary Lecturer for SEG (2010–2012). He was an excellent contributor for OTC Asia since its inception. He unexpectedly passed away on 6 December 2019 in the company of his beloved family. He will be deeply missed by the geophysical community around the world.

### ARCTIC TECHNOLOGY CONFERENCE

The last Arctic Technology Conference (ATC) occurred in November 2018. Attendance was low. Only 280 registered and only 259 picked up their badges. Financially, it suffered

a loss. OTC wants to continue supporting development and capture of Arctic technology, but until a profitable business model can be developed, there are no definitive plans for the next ATC.

### Unconventional Resources Technology Conference Management

Frank Brown, representative

The Unconventional Resources Technology Conference (URTeC) is a science-based annual conference developed as a collaboration of the American Association of Petroleum Geologists (AAPG), the Society of Petroleum Engineers (SPE), and SEG. URTeC focuses on unconventional reservoir development with a specific emphasis on integrated workflow. URTeC operates through the Management Committee outlined in a Sponsoring Organizations Agreement. Leadership of the Management Committee rotates among the societies. The Technical Program Committee operates with cochairs from the three societies. Shawn Maxwell served as SEG’s cochair for URTeC 2017 and 2018. Scott Singleton is SEG’s cochair for URTeC 2019 and 2020.

Although the original intent was for URTeC to have a home base in Denver, Colorado, the location has moved through the years due to venue unavailability during the desired time frame. After two years in San Antonio, URTeC 2017 moved to Austin and then to Houston for URTeC 2018 where attendance set a record of more than 6400. Although dropping from record levels, URTeC 2019 attendance in Denver was strong at around 5200. This reflects strong unconventional resources activity and URTeC's solid reputation as the go-to conference for unconventional. URTeC 2020 moves back to Austin and to Houston for 2021.

## URTEC 2019 TECHNICAL FOCUS

Fears concerning participation were quickly allayed when the opening plenary session drew more than 2000 people. High-profile speakers included Mike Henderson (senior vice president, Marathon Oil), Clay Gaspar (president, WPX Energy), Jeremy Sweek (advisor, Darcy Partners), Pete Hagist (senior vice president engineering, Whiting Petroleum), and Shawn Bennett (deputy assistant secretary for oil and natural gas, Department of Energy). A panel session on "Unconventional play development — A view from the front lines" also was packed with more than

400 attendees. The opening morning was topped off with two well-attended topical luncheons. The first, "The shale revolution — Is the party over?," was presented by Mike Wichterich (CEO) and Leanne Churchward (vice president of business development) from Three Rivers Operating Company IV. The second, "Targets, training, and technology in the 2020s: Where is geoscience headed?," was presented by Rob Stewart (SEG president and University of Houston professor). Topics of great interest included:

- Geomechanics and formation evaluation
- Economics of unconventional plays
- Operator's Forum sessions
- Enhanced oil recovery
- Hydraulic Fracturing Test Site II
- Depositional processes in unconventional reservoirs, including geologic characterization of unconventional reservoirs and deriving rock properties from seismic

## EXPANDING THE UMBRELLA IN 2019

This was a year of expansion for URTeC. Expansion took three forms:

- **URTeC one-day workshops.** URTeC conducted three one-day workshops in 2019. They were held in Midland, Texas (SEG operated); Oklahoma City, Oklahoma (SPE operated); and Pittsburgh, Pennsylvania (AAPG operated). All were well attended and financially profitable. Importantly, feedback indicated that by attending the one-day workshops, attendees were more likely to attend URTeC. Going forward, three one-day workshops are planned for 2020 with SEG again operating the workshop in Midland. Longer term, there is potential for expansion to additional domestic locations and possibly to global locations.
- **Global URTeC conferences.** SPE operated URTeC's first global conference in Brisbane, Australia (18–19 November). The event drew 565 attendees from 20 countries and had positive financial results. It provided insight into a potential model for smaller global URTeC conferences.
- **Global URTeC conferences in 2020.** After monitoring unconventional activity in Argentina, the Management Committee authorized conducting a URTeC Argentina conference to be held 16–18 November 2020

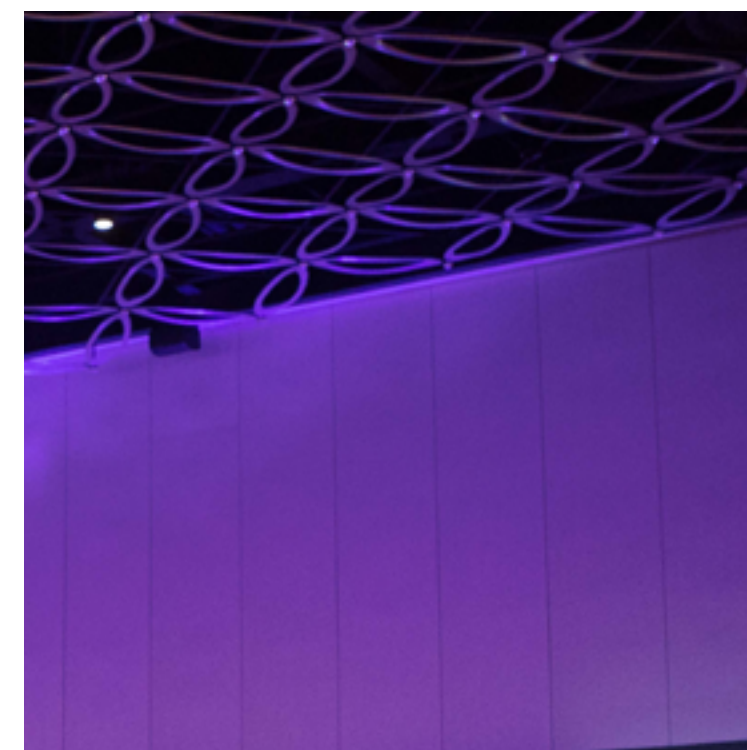
in Buenos Aires. SEG's China office also is working to propose a URTeC China conference.

## FINANCIALS

Although not yet finalized as of year-end 2019, the net-surplus forecast for URTeC 2019 exceeds US\$1.4 million (or more than US\$420,000 to SEG's 30% ownership). Financial results were on par with those experienced in 2018, even with the expected drop in attendance. As has been since inception, there is a note of caution in the financial arena, as SEG Member attendance at URTeC significantly lags its ownership interest. Should the conditions for an ownership adjustment be met, SEG's interest could be reduced, but the maximum allowable reduction would be to 25%.

“The SEG Foundation aspires  
to help geophysicists adapt and  
respond to humanity’s increasingly  
diverse and urgent needs.”

— Michael G. Loudin  
Foundation Board of Directors chair



## FOUNDATION REPORT



## FOUNDATION REPORT

### Foundation Board of Directors Michael G. Loudin, chair

For nearly a century, exploration geophysicists have enabled global economic growth by finding and managing the oil and gas energy sources that power civilization. In parallel with this contribution, we have over the last few decades developed the knowledge and tools to provide solutions to additional societal challenges that have emerged, e.g., managing scarce freshwater resources and mapping areas prone to natural disasters. Since its founding in 1930, SEG has helped guide the profession with clear long-term strategies, and will continue this leadership in a changing future. Since 1987, the SEG Foundation has worked with individual and corporate donors to provide tens of millions of philanthropic dollars to support programs that meet the needs of students and professionals and to support global growth.

The SEG Foundation, a wholly owned subsidiary of SEG, is the fundraising arm of the parent organization. The Foundation is an IRS 501(c)(3) charitable organization, which means donations to the Foundation are tax

deductible in the United States. The Foundation financially supported 16 programs that benefited thousands of SEG Members in 2019 by contributing more than \$2 million to SEG from the combination of endowment spending and numerous pass-through donations from corporations and individuals. At the end of 2019, the Foundation's endowment was approximately \$15.5 million, of which about half supports scholarships, and our annual spending rate for endowed programs was 4%.

Thank you to the many corporations and hundreds of individuals who contribute their time, talent, and treasure to the SEG Foundation each year. You enable the education and continued development of thousands of members globally, as well as the application of geophysics in the service of humanity.

### 2019 FUNDRAISING RESULTS

- \$1,665,615 (unaudited numbers)

CORPORATE GIVING: \$1,228,219

- Chevron — Student Leadership Symposium: \$800,000

- PGS — Distinguished Lecture program: \$50,000
- Schlumberger — Geoscientists Without Borders® (GWB): \$250,000
- TGS — Field Camps: \$70,000
- W&T Offshore Inc. — Scholarships: \$50,000

SOCIETY/SECTION GIVING: \$67,250

- AAPG Foundation — GWB: \$60,000
- AIPG Foundation — GWB: \$2000
- Dallas Geophysical Society — Scholarships: \$3500

- Pacific Coast Section of SEG — Field Camps: \$1750

INDIVIDUAL GIVING: \$368,744

- Donations with SEG Membership dues: \$31,102
- Employer Matching Gifts: \$30,450
- Major Gift Donors — Cumulative total: \$183,000

- 28 Sustaining Trustee Associates (\$2000/year)

### 2019 FOUNDATION BOARD OF DIRECTORS

The Board included Michael G. Loudin (chair), Anna C. Shaughnessy (vice chair), Pete W. Cramer (treasurer), David C. Bartel, Craig J. Beasley, Arthur Cheng, Maitri Erwin, Raymond C. Farrell, Michael C. Forrest, Gretchen M. Gillis, Julie K. Hardie, John A. Lambuth, Zhaobo “Joe” Meng, and David J. Monk. Mid-term resignations were accepted for Glenn W. Bear (relocated by employer) and Maurice M. Nessim (voted as SEG president-elect).

### FUNDRAISING IN 2020 AND BEYOND

The ongoing expansion of exploration geophysics from its roots in oil and gas into additional key arenas holds many implications for our profession. We must act now to attract passionate and talented new scientists to our changing field. We must provide our new professionals with the practical learning experiences and resources that will speed their contributions. We must advance the professional

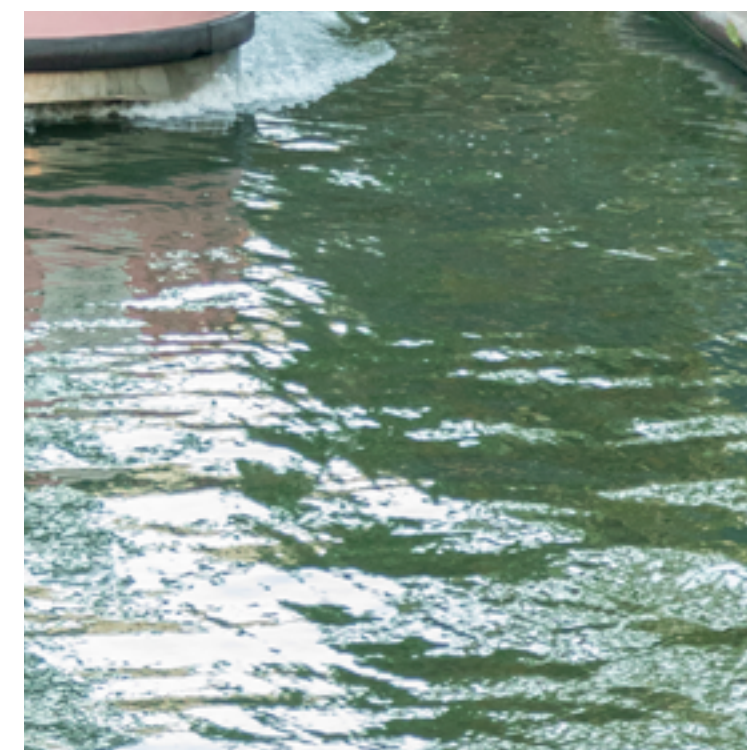
development of existing professionals, enriching their careers by helping them prepare for the exciting new opportunities of tomorrow. And we must support geophysicists' hands-on humanitarian efforts around the world, as they pursue projects that apply our unique science to improve quality of life for communities in need.

The SEG Foundation aspires to help geophysicists adapt and respond to humanity's increasingly diverse and urgent needs. Carefully stewarded and strategically applied by the Foundation, philanthropic investment will be vital to our profession's dynamic future, yielding exceptional educational, scientific, economic, and humanitarian benefits as applied geophysics continues to evolve.

*Note: All monetary values are in U.S. dollars.*

“We organize collaborations among industry, government, and academia to build realistic subsurface models based on geophysical data simulations.”

— Josef Paffenholz  
SEAM Board of Directors chair



## SUBSIDIARIES REPORTS

## SUBSIDIARIES REPORTS

### SEAM Board of Directors

Josef Paffenholz, chair  
Shelly Oakley, director of operations

SEAM is the research arm of SEG. Our mission statement asserts: “SEG Advanced Modeling Corporation (SEAM) is a not-for-profit research entity that hosts collaborative projects between sponsoring stakeholders to further geophysical research by industry and academia.”

To this end, we organize collaborations among industry, government, and academia to build realistic subsurface models based on geophysical data simulations. In so doing, we stimulate research and development and provide a basis for industry leaders to discuss and learn about specific geophysical problems of common interest.

The 2019 SEAM Board of Directors included Josef Paffenholz (chair), John Eastwood (vice chair), Edith Miller (treasurer), Paul Williamson, Adriana Ramirez, Ali Tura, Eric Verschuur, Aria Abubakar, Peter Haffinger, and Ken Tubman (SEG Board liaison).

The Executive Committee meets every two weeks to discuss current issues or concerns.

Working committees are utilized on an as-needed basis. The Board continues to ensure that the operations of SEAM are conducted in a fiscally and legally responsible manner.

### SEAM PROJECTS ACTIVE IN 2019

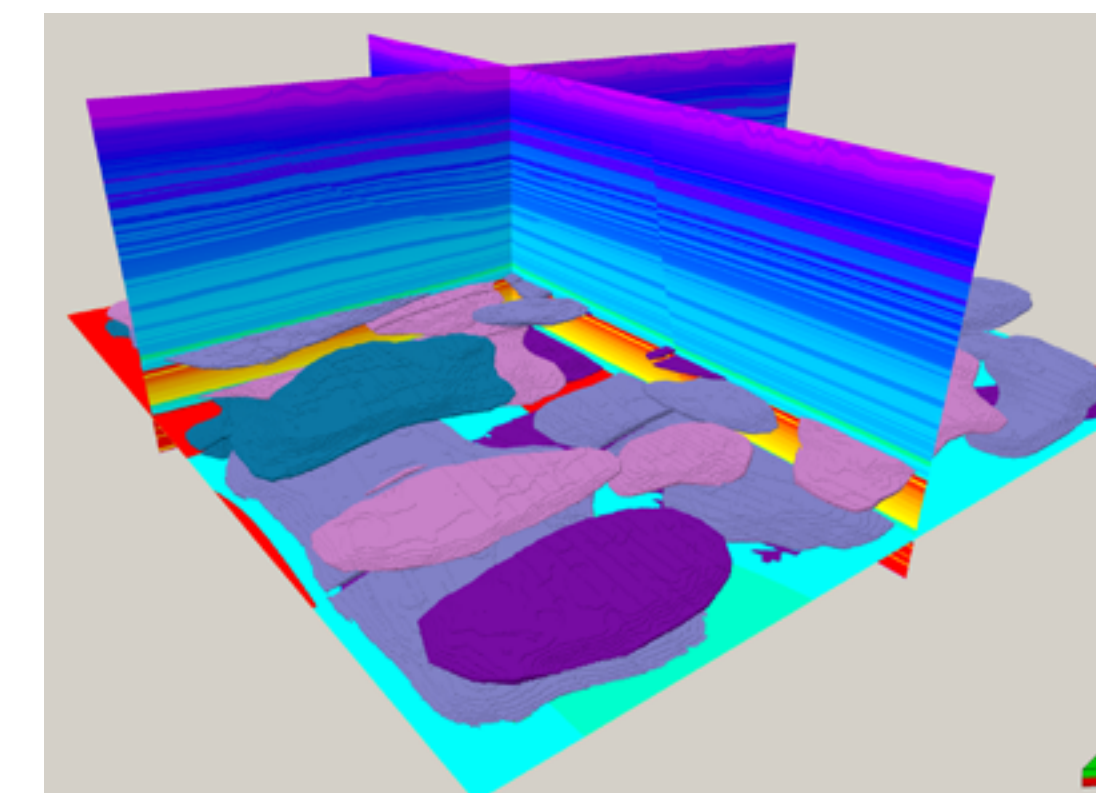
- Pore Pressure Prediction and Hazard Avoidance. With adequate funds remaining in the Pressure Prediction budget, the Management Committee issued a Request for Bids in June 2018 to build an acoustic velocity model. Work was completed in December 2018, and the deliverables along with a final report were sent to all participants in early 2019. The chair of the Management Committee is Cengiz Esmersoy (Schlumberger), and the project manager is Mike Fehler (Massachusetts Institute of Technology).
- Life of Field (2016–2019). This project began active development in 2017, following the learnings of the 2016 Time Lapse Pilot (or Pore Pressure Extension) project. The project began with six participants and has grown to nine participants. An ambitious clastic model was decided on, and a Request for Bids was issued. Tasks to be completed include reservoir simulations, petrophysical modeling and cross scaling, and geophysical simulations.
- With the addition of more participants, a carbonate model is being constructed. SEAM has contracted with Chevron to complete this model. Work has begun and will be completed by March 2020. The project manager is Mike Oristaglio (Yale University), and the Management Committee is chaired by Shauna Oppert (Chevron).
- Artificial Intelligence (2019–2021). The Artificial Intelligence project was launched in September 2019 with six participants. Several Management Committee and Technical Committee meetings have taken place. The Management Committee included Konstantin Osypov (Aramco), Adam Halpert (Chevron), Jicai Ding (China National Offshore Oil Corporation), Cengiz Esmersoy (chair), Pandu Devarakota (Shell), and Rami Nammour (Total). Three working committees have been formed, which include the Standards and Formats Committee, Benchmark Committee, and the Cloud Collaboration Committee.

Collaboration with the Open Subsurface Data Universe is being explored.

### PROJECT DEVELOPMENT

Three projects are beginning to take shape and gain momentum.

- 1) Non-Impulsive Moving Source project. Non-impulsive moving sources present several new challenges to data processing, from the earliest data quality control and preprocessing to final imaging. This project will strive to understand and build industry-wide confidence in seismic processing tools. A prospectus and a work plan have been developed and distributed. Additionally, Letters of Intent and Membership Agreements were sent out during October and November 2019. The project will be conducted in five phases. Based on industry input, we expect to launch the project in late 2020 or early 2021.
- 2) CO<sub>2</sub> Sequestration Monitoring/Microseismic project. The purpose of the project is to improve fracture



The SEAM Barrett Model

detection (CO<sub>2</sub> sequestration reservoirs), monitor CO<sub>2</sub> plume in the subsurface, and CO<sub>2</sub> containment. Several planning meetings with interested parties from industry, academia, and government labs have been held. The plan is to use small-scale models for microseismic event detection validation and reservoir-scale 4D seismic, gravimetric, and electric simulations. Preparations for a DOE grant application are under way.

- 3) Near surface/ground water. A new SEAM Director, Adam Mangel has volunteered to take the lead in developing a near-surface project.

## SUBSIDIARIES REPORTS

He plans to attend upcoming conferences to gauge interest in possible collaboration.

### SEAM FINANCES

SEAM is currently financially self sufficient. Control of cost structures has been achieved. Data storage costs of approximately US\$50,000/year have been eliminated by contracting with Polaris E&E Services Inc. to share a portion of the data license fees as opposed to a fixed annual cost. Additionally, the SEAM treasurer tracks monthly income and expenses.

The contract with SEG for provision of services has been renewed through February 2024.

### SEAM DATA STORAGE AND DISTRIBUTION

- Oxy has processed the Phase II Barret data set and agreed for SEAM to license the data to the public.
- A review of the data license and other documents is complete, and inconsistencies have been eliminated.

- Numerous steps were taken over the last year to improve use and accessibility of SEAM data.

- All Phase I and Phase II data are now available at cost to academia.
- Phase I data prices were reduced by 50% for corporations.
- Phase II data are now available on a line-by-line basis.
- Phase I, Phase II, and Pore Pressure Prediction data will be available as small affordable 3D subsets. Phase II is available now. These subsets are distributed at cost to academia and at reduced rates to commercial entities.
- The Phase I and Phase II reports are available for free download.

- The SEAM website is undergoing major reconstruction to improve access to data and to inform consumers. The new website will serve as a starting point for developing a comprehensive marketing plan.

### SEG Global Inc. Board of Directors

Bruce Shang, chair

SEG Global Inc. (SGI) is the SEG subsidiary established to promote and expand the global impact of applied geophysics around the world. It was originally tasked with operating all of SEG's regional offices. The scope of SGI's business interest has been concentrated in China, with oversight of the China office. The operating model has been evolving and maturing thanks to the great effort of staff at the SEG headquarters and China office to optimize the impact and efficiency of SGI.

The SGI board of directors continues to be populated with leaders in the global community and serves to complement the SEG China Advisory Committee.

### SGI BOARD OF DIRECTORS

- Bruce Shang (chair)
- Huasheng Zheng (vice chair)
- Alfred Liaw (executive director)
- Said Sadykhov
- Tien-When Lo
- Turki M. Al-Ghamdi
- Jie Zhang
- Xuri Huang
- Richard Xu

In 2019, the SGI board conducted quarterly reviews and provided guidance on SEG China technical programs and financial activities. With four employees, the SEG China office successfully conducted 14 events:

- 11<sup>th</sup> International Petroleum Technology Conference, 22–26 March, Society of Petroleum Engineers/American Association of Petroleum Geologists/European Association of Geoscientists and Engineers/SEG, Beijing, China
- 2<sup>nd</sup> Foothill Exploration Workshop, 12–14 April, SEG/China National Petroleum Corporation, Chengdu, China
- International Workshop on Gravity, Electrical & Magnetic Methods and their Applications, 19–22 May, SEG/CGS, Xi'an, China
- BGP-contracted in-house short course by Mohammad Reza Saberi, 25–27 June, Zhuozhou, China
- Geophysics for Smart City Development Technical Workshop, 29–31 July, SEG, Beijing, China
- UAV-based Geophysics Special Seminar, 29 July, Beijing, China
- Honorary Lecture tour in China by Koya Suto, 27 July–7 August, SEG, included five tour stops in Beijing, Nanjing, Jinan, Qingdao, and Xi'an
- Distinguished Lecture tour in China by John Etgen, 20–25 August, SEG, included two tour stops in Beijing and Nanjing
- 7<sup>th</sup> Oriental Cup National Exploration Geophysics Competition for College Students, 27 August, Beijing, China
- Fractured Reservoirs and Unconventional Resources Technology Workshop, 1–3 September, SEG, Lanzhou, China
- 2<sup>nd</sup> Rock Physics Technology Workshop, 25–27 October, SEG, Qingdao, China
- Business Application Seminar of Artificial Intelligence in Oil and Gas Fields, 5 November, Beijing, China
- 3<sup>rd</sup> International Workshop on Mathematics Geophysics: Traditional vs. Learning, 5–7 November, SEG, Beijing, China
- Distinguished Instructor Short Course by Manika Prasad, 10 December, SEG, Beijing, China

## SUBSIDIARIES REPORTS

In addition, the SEG China office initiated trials for monthly meetings. Format and operation details will be decided after the trials.

- SEG China's 1<sup>st</sup> Monthly Meeting, 21 August, SEG/Aramco/IHS, Beijing, China
- SEG China's 2<sup>nd</sup> Monthly Meeting, 5 November, SEG/Aramco/Peking University, Beijing, China

The board developed and presented future strategies and initiatives to further increase SEG technical programs, membership, and other services while maintaining a more or less balanced budget. Among the proposed initiatives, the SEG Board of Directors approved the following resolutions:

- The acceptance of SEG membership dues in Chinese currency. This will help increase membership in China by removing the difficulty of currency conversion.

- The 2019 SEG China incentive bonus program structure that is designed to be competitive and to retain talent in the SEG China office.

The SEG China office engaged Maimang Technology of Beijing to develop an official SEG China website in both Mandarin Chinese and English in the fourth quarter of 2019. We expect to have the product deliverable in January 2020. Phase 1 of the website development focused on SEG membership registration and event management, including abstract submission, abstract review, and event registration.

With these new initiatives, we are looking forward to expanding the impact of SEG in China and globally.

### SEG Real Estate Corporation Board of Directors

Keith Willson, chair

The SEG Real Estate Corporation is a subsidiary of SEG that was formed in 2011. The Board is charged with oversight of all activities associated with the Geophysical Resource Center in Tulsa, Oklahoma. The property consists of two Class A buildings with a combined office space for rent of almost 180,000 square feet situated on 11 acres at 8801 South Yale Avenue and 8811 South Yale Avenue. The original building was completed in 1986, and the second building was completed in 2015. SEG staff is located on the fifth floor of the original building.

During 2019, the campus was offered for sale. There were a number of bids, including one that came in at the top end of the range that was established by the late 2018 valuation studies. In conjunction with the SEG Board, a decision to sell was made in March. Negotiations and due diligence led to an 31 October closing. Since the Real Estate Corporation exists only to manage SEG real estate, and with the sale of the campus, the wholly owned Real Estate Corporation subsidiary was dissolved in December per Bylaws procedure and rolled back into the parent SEG.



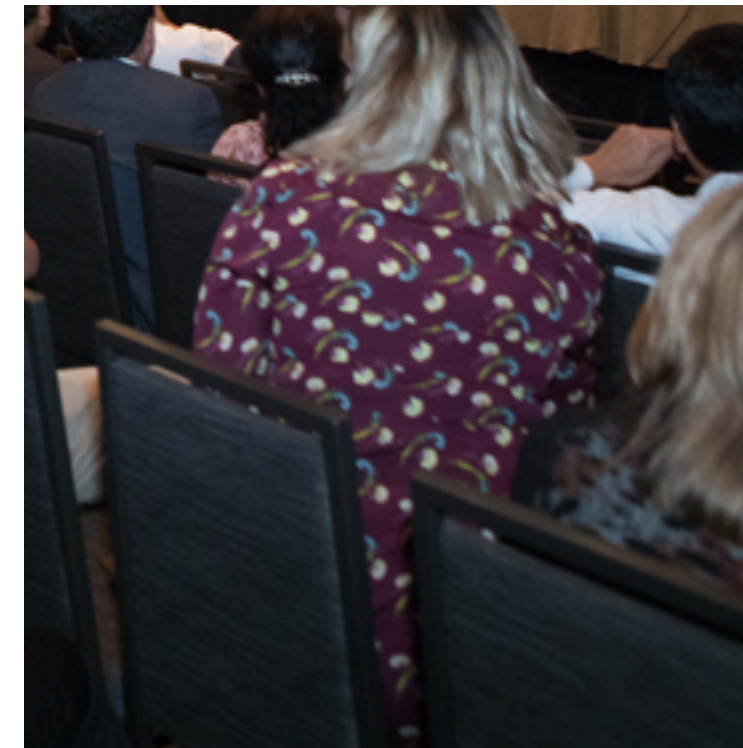
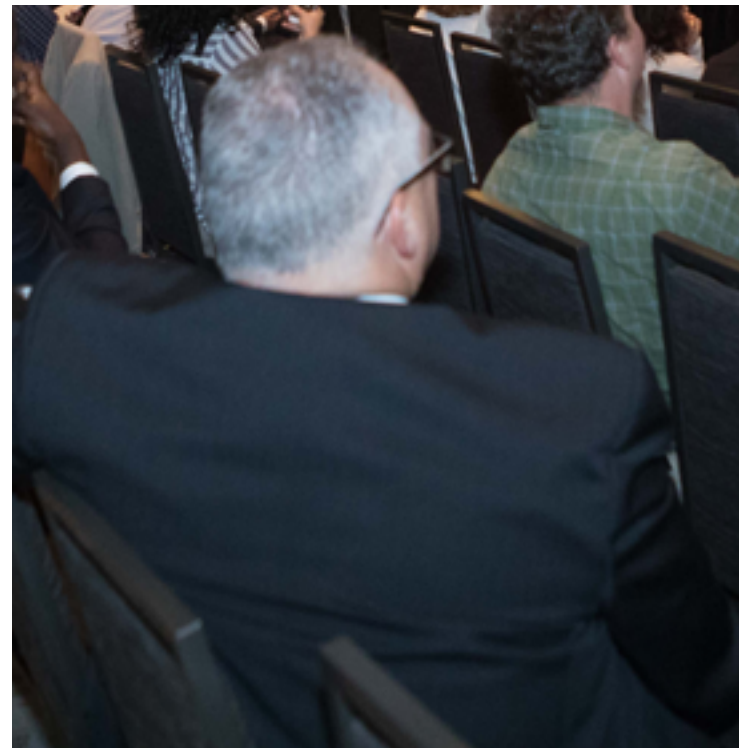
The two buildings that comprise the Geophysical Resource Center campus in Tulsa, Oklahoma, were sold in 2019.

In 2020, the only business will be some final accounting and IRS filing, which will be handled by SEG staff and the Real Estate Board chair.

In 2019, the Real Estate Board of Directors were: Keith Willson (chair), Steve Simmons (vice chair), Dorsey Morrow/Anna Shaughnessy/John Koehr (secretary), Bill Underwood (Finance Committee chair), Kim Guyer (Buildings and Grounds Committee chair), Ray Earley (Audit Committee chair), and Dan Piazzola (Board member).



## FINANCIAL REPORTS





**CONSOLIDATED FINANCIAL STATEMENTS**

**DECEMBER 31, 2019 and 2018**

**WITH**

**INDEPENDENT AUDITOR'S REPORT**



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## INDEPENDENT AUDITOR'S REPORT

To the Board of Directors  
Society of Exploration Geophysicists

We have audited the accompanying consolidated financial statements of the Society of Exploration Geophysicists and its affiliates (the Society), which comprise the consolidated statements of financial position as of December 31, 2019 and 2018, and the related consolidated statements of activities, functional expenses and cash flows for the years then ended, and the related notes to the consolidated financial statements (collectively, the financial statements).

### Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

### Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

### Basis for Qualified Opinion

The Society is the sole corporate member of SEG Foundation (the Foundation) and as a result has a controlling financial interest in the Foundation. The Society does not include the accounts of the Foundation in these financial statements. Accounting principles generally accepted in the United States of America requires consolidation of an entity when the reporting entity has a controlling financial interest in that entity. If SEG Foundation were consolidated in these financial statements and intercompany accounts and transactions had been eliminated, assets, liabilities and net assets would increase by \$22,203,321, \$6,452 and \$22,196,869, respectively as of December 31, 2019, and \$20,030,287, \$9,720 and \$20,020,567,

See notes to consolidated financial statements on page 75

respectively, as of December 31, 2018. Also, revenues, expenses and change in net assets would increase by \$2,594,695, \$418,395 and \$2,176,300, respectively, for the year ended December 31, 2019. Expenses would increase by \$309,821 and revenues and change in net assets would decrease by \$2,179,612 and \$2,489,433, respectively, for the year ended December 31, 2018.

### **Qualified Opinion**

In our opinion, except for the effects on the financial statements of not consolidating the SEG Foundation as described in the Basis for Qualified Opinion paragraph, the financial statements referred to above present fairly, in all material respects, the financial position of the Society of Exploration Geophysicists and affiliates as of December 31, 2019 and 2018, and the changes in their net assets and their cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

### **Emphasis-of-Matter**

As discussed in Note 1 to the financial statements, the Society adopted Financial Accounting Standards Board Accounting Standards Update No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* effective January 1, 2019. Our opinion is not modified with respect to this matter.

A handwritten signature in black ink that reads "Hogan Taylor LLP". The signature is written in a cursive, flowing style.

Tulsa, Oklahoma  
May 28, 2020

**SOCIETY OF EXPLORATION GEOPHYSICISTS**  
**CONSOLIDATED STATEMENTS OF FINANCIAL POSITION**

**December 31, 2019 and 2018**

|                                                | 2019                 | 2018                 |
|------------------------------------------------|----------------------|----------------------|
| <b>Assets</b>                                  |                      |                      |
| Current assets:                                |                      |                      |
| Cash and cash equivalents                      | \$ 9,300,608         | \$ 3,510,149         |
| Accounts receivable, net                       | 2,300,293            | 2,038,616            |
| Accounts receivable, SEG Foundation            | 1,005,097            | 921,566              |
| Inventories                                    | 280,044              | 317,506              |
| Prepaid expenses                               | 1,467,628            | 605,200              |
| Assets held for sale                           | -                    | 24,135,496           |
|                                                | <hr/>                | <hr/>                |
| Total current assets                           | 14,353,670           | 31,528,533           |
| Investments                                    | 11,302,145           | 8,489,679            |
| Property and equipment, net                    | 682,069              | 359,550              |
| Other long-term assets                         | 250,000              | 250,000              |
|                                                | <hr/>                | <hr/>                |
| Total assets                                   | <u>\$ 26,587,884</u> | <u>\$ 40,627,762</u> |
| <b>Liabilities and Net Assets</b>              |                      |                      |
| Current liabilities:                           |                      |                      |
| Accounts payable and accrued liabilities       | \$ 969,280           | \$ 1,938,148         |
| Current portion of capital lease obligation    | 170,653              | 55,811               |
| Current portion of deferred revenue            | 2,769,826            | 3,513,927            |
| Liabilities held for sale                      | -                    | 18,416,831           |
|                                                | <hr/>                | <hr/>                |
| Total current liabilities                      | 3,909,759            | 23,924,717           |
| Capital lease obligation, less current portion | 380,030              | 220,896              |
| Deferred revenue, less current portion         | 2,459,531            | 94,903               |
|                                                | <hr/>                | <hr/>                |
| Total liabilities                              | 6,749,320            | 24,240,516           |
| Net assets without donor restrictions          | 19,838,564           | 16,387,246           |
|                                                | <hr/>                | <hr/>                |
| Total liabilities and net assets               | <u>\$ 26,587,884</u> | <u>\$ 40,627,762</u> |

See notes to consolidated financial statements on page 75

**SOCIETY OF EXPLORATION GEOPHYSICISTS**  
**CONSOLIDATED STATEMENTS OF ACTIVITIES**

**Years ended December 31, 2019 and 2018**

|                                                   | 2019                 | 2018                 |
|---------------------------------------------------|----------------------|----------------------|
| Revenues:                                         |                      |                      |
| Membership dues                                   | \$ 1,116,735         | \$ 958,310           |
| Conferences and meetings                          | 9,088,140            | 7,969,463            |
| Publication sales and advertising                 | 2,757,255            | 3,058,625            |
| Professional development                          | 344,686              | 433,498              |
| Research and data                                 | 4,150                | 1,077,874            |
| Foundation support for programs                   | 2,010,533            | 2,318,791            |
| Investment income (loss)                          | 1,775,360            | (676,848)            |
| Total revenues                                    | 17,096,859           | 15,139,713           |
| Expenses:                                         |                      |                      |
| Program expenses:                                 |                      |                      |
| Constituent engagement                            | 394,464              | 305,613              |
| Meetings                                          | 3,735,000            | 3,674,364            |
| Knowledge management                              | 2,560,044            | 2,674,580            |
| Professional development                          | 1,285,568            | 1,009,340            |
| Students                                          | 1,204,103            | 1,378,478            |
| Regional offices                                  | 1,416,967            | 674,818              |
| Business development                              | 999,902              | 707,994              |
| Research and data                                 | 42,101               | 779,955              |
| Total program expenses                            | 11,638,149           | 11,205,142           |
| Supporting services                               | 3,524,796            | 3,294,914            |
| Total expenses                                    | 15,162,945           | 14,500,056           |
| Increase in net assets from continuing operations | 1,933,914            | 639,657              |
| Gain (loss) from discontinued operations          | 1,383,725            | (496,464)            |
| Change in net assets                              | 3,317,639            | 143,193              |
| Net assets, beginning of period                   | 16,387,246           | 16,244,053           |
| Cumulative adjustment for the adoption of ASC 606 | 133,679              | -                    |
| Net assets, end of period                         | <u>\$ 19,838,564</u> | <u>\$ 16,387,246</u> |

See notes to consolidated financial statements on page 75

**SOCIETY OF EXPLORATION GEOPHYSICISTS**  
**CONSOLIDATED STATEMENT OF FUNCTIONAL EXPENSES**

**Year ended December 31, 2019**

|                                     | Program Expenses          |              |                         |                             |              |                     |                         |                      |                        |               |
|-------------------------------------|---------------------------|--------------|-------------------------|-----------------------------|--------------|---------------------|-------------------------|----------------------|------------------------|---------------|
|                                     | Constituent<br>Engagement | Meetings     | Knowledge<br>Management | Professional<br>Development | Students     | Regional<br>Offices | Business<br>Development | Research<br>and Data | Supporting<br>Services | Total         |
| Staffing                            | \$ 246,042                | \$ 1,301,603 | \$ 1,332,605            | \$ 452,303                  | \$ 172,830   | \$ 754,863          | \$ 541,453              | \$ -                 | \$ 2,708,876           | \$ 7,510,575  |
| Travel                              | 13,164                    | 224,821      | 42,974                  | 244,947                     | 15,369       | 138,473             | 38,661                  | 11,179               | 191,992                | 921,580       |
| Office                              | 34,556                    | 255,747      | 213,380                 | 93,915                      | 20,952       | 93,725              | 44,735                  | 7,983                | 191,905                | 956,898       |
| Program awards                      | -                         | 3,911        | -                       | 47,457                      | 882,390      | -                   | 167,744                 | -                    | 4,096                  | 1,105,598     |
| Production                          | -                         | -            | 582,597                 | -                           | 33           | 1,581               | -                       | -                    | -                      | 584,211       |
| Postage                             | 12,952                    | 16,731       | 143,048                 | 1,831                       | 11,762       | 2,332               | 863                     | 335                  | 6,912                  | 196,766       |
| Commissions, honor<br>and royalties | -                         | -            | 48,731                  | 119,262                     | -            | 6,098               | 2,000                   | -                    | -                      | 176,091       |
| Cost of sales                       | 93                        | -            | 55,151                  | 946                         | -            | -                   | -                       | -                    | 56                     | 56,246        |
| Events                              | 18,072                    | 1,682,566    | 29,792                  | 83,311                      | 61,858       | 271,527             | 24,924                  | 2,101                | 70,408                 | 2,244,559     |
| Promotion costs<br>and other        | 16,419                    | 65,744       | 27,347                  | 1,678                       | 246          | 19,973              | 6,889                   | 201                  | 7,942                  | 146,439       |
| Outside services                    | 44,042                    | 129,569      | 66,130                  | 201,401                     | 1,187        | 108,671             | 41,628                  | 16,652               | 342,673                | 951,953       |
| Other                               | -                         | (7,995)      | (20,265)                | 4,459                       | -            | 3,103               | 116,406                 | -                    | (90,707)               | 5,001         |
| Taxes                               | -                         | 25,805       | 232                     | 17,634                      | 32,001       | 12,971              | -                       | -                    | 14,095                 | 102,738       |
| Depreciation and<br>amortization    | 9,124                     | 36,498       | 38,322                  | 16,424                      | 5,475        | 3,650               | 14,599                  | 3,650                | 49,274                 | 177,016       |
| Foundation support<br>costs         | -                         | -            | -                       | -                           | -            | -                   | -                       | -                    | 27,274                 | 27,274        |
| Total                               | \$ 394,464                | \$ 3,735,000 | \$ 2,560,044            | \$ 1,285,568                | \$ 1,204,103 | \$ 1,416,967        | \$ 999,902              | \$ 42,101            | \$ 3,524,796           | \$ 15,162,945 |

**SOCIETY OF EXPLORATION GEOPHYSICISTS**  
**CONSOLIDATED STATEMENT OF FUNCTIONAL EXPENSES**

**Year ended December 31, 2018**

|                                     | Program Expenses          |                     |                         |                             |                     |                     |                         |                      | Supporting<br>Services | Total                |
|-------------------------------------|---------------------------|---------------------|-------------------------|-----------------------------|---------------------|---------------------|-------------------------|----------------------|------------------------|----------------------|
|                                     | Constituent<br>Engagement | Meetings            | Knowledge<br>Management | Professional<br>Development | Students            | Regional<br>Offices | Business<br>Development | Research<br>and Data |                        |                      |
| Staffing                            | \$ 194,449                | \$ 1,141,993        | \$ 1,192,029            | \$ 323,661                  | \$ 205,811          | \$ 425,762          | \$ 251,431              | \$ 93,220            | \$ 2,454,651           | \$ 6,283,007         |
| Travel                              | 5,670                     | 236,101             | 35,497                  | 271,092                     | 13,453              | 73,957              | 15,820                  | 2,419                | 156,101                | 810,110              |
| Office                              | 33,223                    | 301,836             | 307,708                 | 87,862                      | 46,751              | 81,536              | 18,678                  | 277                  | 322,191                | 1,200,062            |
| Program awards                      | -                         | -                   | -                       | -                           | 803,694             | -                   | 373,973                 | -                    | 5,716                  | 1,183,383            |
| Production                          | -                         | -                   | 686,448                 | -                           | -                   | -                   | -                       | -                    | -                      | 686,448              |
| Postage                             | 9,100                     | 25,172              | 151,685                 | 14,771                      | 7,481               | 1,060               | 1,037                   | 35                   | 9,279                  | 219,620              |
| Commissions, honor<br>and royalties | -                         | -                   | 100,393                 | 155,396                     | -                   | -                   | -                       | -                    | -                      | 255,789              |
| Cost of sales                       | -                         | -                   | 68,255                  | 28,431                      | -                   | -                   | 354                     | 683,395              | 28                     | 780,463              |
| Events                              | 7,879                     | 1,760,134           | 19,387                  | 93,116                      | 103,509             | 48,079              | 11,591                  | -                    | 59,227                 | 2,102,922            |
| Promotion costs<br>and other        | 13,789                    | 47,770              | 25,823                  | 2,217                       | 191                 | 1,922               | 8,540                   | 622                  | 2,145                  | 103,019              |
| Outside services                    | 38,473                    | 137,373             | 63,431                  | 24,803                      | 162,914             | 12,890              | 23,266                  | (13)                 | 158,664                | 621,801              |
| Other                               | -                         | 8,516               | 444                     | -                           | -                   | 15,296              | -                       | -                    | 10,383                 | 34,639               |
| Taxes                               | 359                       | 2,112               | 2,109                   | 1,758                       | 32,003              | 14,316              | 632                     | -                    | 30,895                 | 84,184               |
| Depreciation and<br>amortization    | 2,671                     | 13,357              | 21,371                  | 6,233                       | 2,671               | -                   | 2,672                   | -                    | 39,180                 | 88,155               |
| Foundation support<br>costs         | -                         | -                   | -                       | -                           | -                   | -                   | -                       | -                    | 46,454                 | 46,454               |
| <b>Total</b>                        | <b>\$ 305,613</b>         | <b>\$ 3,674,364</b> | <b>\$ 2,674,580</b>     | <b>\$ 1,009,340</b>         | <b>\$ 1,378,478</b> | <b>\$ 674,818</b>   | <b>\$ 707,994</b>       | <b>\$ 779,955</b>    | <b>\$ 3,294,914</b>    | <b>\$ 14,500,056</b> |

## CONSOLIDATED STATEMENTS OF CASH FLOWS

Years ended December 31, 2019 and 2018

|                                                                                             | 2019         | 2018         |
|---------------------------------------------------------------------------------------------|--------------|--------------|
| <b>Cash Flows from Operating Activities</b>                                                 |              |              |
| Increase in net assets from continuing operations                                           | \$ 1,933,914 | \$ 639,657   |
| Adjustments to reconcile change in net assets to net cash provided by operating activities: |              |              |
| Depreciation and amortization                                                               | 177,016      | 88,155       |
| Gain on disposal of assets                                                                  | -            | (1,750)      |
| Net realized/unrealized (gain) loss on investments                                          | (1,545,551)  | 795,802      |
| Change in operating assets and liabilities:                                                 |              |              |
| Accounts receivable, net                                                                    | 94,212       | (722,937)    |
| Accounts receivable, SEG Foundation                                                         | (83,531)     | (403,272)    |
| Inventories                                                                                 | 37,462       | 2,988        |
| Prepaid expenses                                                                            | (862,428)    | (109,872)    |
| Accounts payable and accrued liabilities                                                    | (968,868)    | 257,056      |
| Deferred revenue                                                                            | 1,398,317    | 59,262       |
| Net operating cash flows from continuing operations                                         | 180,543      | 605,089      |
| Net operating cash flows from discontinued operations                                       | 617,027      | 669,320      |
| Net cash provided by operating activities                                                   | 797,570      | 1,274,409    |
| <b>Cash Flows from Investing Activities</b>                                                 |              |              |
| Purchases of property and equipment                                                         | (85,076)     | (21,632)     |
| Purchases of investments                                                                    | (9,510,918)  | (14,407,656) |
| Proceeds from sale of investments                                                           | 8,244,003    | 14,354,307   |
| Net investing cash flows from continuing operations                                         | (1,351,991)  | (74,981)     |
| Net investing cash flows from discontinued operations                                       | 24,611,368   | (92,636)     |
| Net cash provided by (used in) investing activities                                         | 23,259,377   | (167,617)    |
| <b>Cash Flow from Financing Activities</b>                                                  |              |              |
| Payments on capital lease obligations                                                       | (140,483)    | (42,962)     |
| Payments on long-term debt from discontinued operations                                     | -            | (632,505)    |
| Net financing cash flows from continuing operations                                         | (140,483)    | (675,467)    |
| Net financing cash flows from discontinued operations                                       | (18,126,005) | -            |
| Net cash used in financing activities                                                       | (18,266,488) | (675,467)    |
| Net increase in cash                                                                        | 5,790,459    | 431,325      |
| Cash, beginning of period                                                                   | 3,510,149    | 3,078,824    |
| Cash, end of period                                                                         | \$ 9,300,608 | \$ 3,510,149 |
| <b>Supplemental Cash Flow Disclosures</b>                                                   |              |              |
| Interest paid                                                                               | \$ 578,569   | \$ 717,211   |
| <b>Noncash Investing and Financing Activities</b>                                           |              |              |
| Pending trades to purchase investments                                                      | \$ -         | \$ 769,729   |
| Acquisition of equipment with capital lease                                                 | \$ 414,459   | \$ 307,608   |

See notes to consolidated financial statements on page 75

**SOCIETY OF EXPLORATION GEOPHYSICISTS**  
**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**December 31, 2019 and 2018**

**Note 1 – Summary of Significant Accounting Policies**

Nature of organization

The Society of Exploration of Geophysicists (the Society or SEG), was organized in 1930 as a not-for-profit organization. The objectives of the Society are to promote the science and common scientific interests of geophysicists, and to maintain a high professional standing among its members. The Society accomplishes these objectives by publishing scientific literature, conducting professional development and student programs, hosting technical meeting and conferences, and providing other informational services.

The Society maintains offices in the United States, United Arab Emirates, and China. The corporate headquarters are in Tulsa, Oklahoma.

Basis of presentation

The consolidated financial statements include the accounts of the Society and its subsidiaries, SEG Advanced Modeling Corporation (SEAM), SEG Real Estate Corp (REC), and SEG Global, Inc. All intercompany balances and transactions have been eliminated in consolidation. As discussed further in Note 2, all of the land and buildings held within REC were sold in 2019 and there are no longer operations within this entity.

These consolidated financial statements do not include the SEG Foundation (the Foundation), an affiliated not-for-profit organization governed by a separate board of directors. The Foundation receives contributions to support scientific, educational, and charitable activities to benefit geophysicists and their professional community. The Society is the sole corporate member of the Foundation.

Cash and cash equivalents

Cash and cash equivalents include cash in banks and all highly liquid investments with an original maturity of three months or less. Accounts at each institution are insured by the Federal Deposit Insurance Corporation up to \$250,000. At times, cash exceeds federally insured limits, but management believes any possible risk of loss is minimal. At December 31, 2019 and 2018, the Society and SEAM had deposits in excess of the federally insured limit.

Accounts receivable

Accounts receivable largely consists of uncollateralized billings for exhibit space, research completed and in progress, the Society's share of revenues related to collaborative conferences, advertising and page charges. Accounts receivable are stated at the amount billed, less an allowance for uncollectible accounts.

The Society provides for losses on receivables using the allowance method. The allowance is based on experience, terms of agreements, and other circumstances affecting the ability of customers to meet their obligations. Outstanding balances are written off when management determines that the receivables will not be collected. The Society provides for probable uncollectible amounts through a provision to bad debts

expense and a corresponding amount to the allowance based on management's assessment of the current status of individual accounts. Unpaid amounts that remain after management has pursued reasonable collection efforts are written off through a charge to the allowance for uncollectible accounts and a credit to accounts receivable. Interest is not charged on outstanding balances. At December 31, 2019 and 2018, management estimates that the allowance for uncollectible accounts of \$17,307 and \$61,051, respectively, is adequate to absorb losses arising from nonpayment.

### Inventories

Inventories of publications for resale are valued at the lower of cost, determined by the average method, or net realizable value.

### Investments

Investments in marketable securities are carried at estimated fair value as reported by the asset custodians. See Note 4 for description of the fair value inputs and methodologies utilized. Unrealized gains and losses are included in the statement of activities.

### Property and equipment

The Society capitalizes all expenditures for property and equipment in excess of \$1,000. Property and equipment are carried at cost. Depreciation is computed using the straight-line method based on the estimated useful lives of the assets. When assets are retired or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts, and any resulting gain or loss is included in the statement of activities. Expenditure for maintenance and repairs are charged to expense as incurred. Major improvements are capitalized. The lives used in computing depreciation are as follows: buildings range from 40 to 50 years; software, tenant improvements, furniture and equipment range from three to ten years.

The Society reviews the carrying value of property and equipment for impairment whenever events and circumstances indicate that the carrying values of long-lived assets may not be recoverable from the future cash flows expected to result from their use and ultimate disposition. In cases where the undiscounted expected future cash flows are less than the carrying values, an impairment loss is recognized equal to the amount by which the carrying value exceeds the fair value of each asset. The factors considered by the Society in performing an impairment assessment include current operating results, trends, and prospects, and the effects of obsolescence, demand, competition, and other economic factors. Based on these criteria, there was no impairment for the years ended December 31, 2019 and 2018.

### Net assets

Net assets and income, expenses, gains and losses are classified based on the existence or absence of donor-imposed restrictions. Accordingly, the Society's net assets and changes therein are classified and reported as follows:

*Without donor restrictions* – Net assets without donor restrictions represent those resources that are not restricted by donors.

*With donor restrictions* – Net assets with donor restrictions reflect donor-imposed restrictions that require the Society to utilize or expend the related assets as specified. The Society does not have any net assets with donor restrictions at December 31, 2019 or 2018.

The Society adopted Accounting Standards Codification (ASC), *Revenue from Contracts with Customers* (ASC 606) effective January 1, 2019, for all revenue forms other than contributions, leasing or investment income, utilizing the modified retrospective approach. In determining the appropriate amount of revenue to recognize, the Society applies the following five-step model: (1) identify contracts with customers, (2) identify the performance obligations in the contract, (3) determine the transaction price, (4) allocate the transaction price to the performance obligations, and (5) recognize revenue as each performance obligation is completed. The Society accounts for a contract with a customer when it has approval, the contract is committed, the rights of the parties, including payment terms, are identified, the contract has commercial substance and consideration is probable of collection.

In accordance with ASC 606, the modified retrospective method was applied to those contracts which were not completed as of January 1, 2019.

Previously revenues were recorded as follows:

- For membership dues, revenue was recognized ratably over the membership term;
- For conferences and meetings, revenue was recognized when the event is held;
- For publication, sales and advertising revenue was recognized when the publication was issued and services were rendered to the customer; and
- For research and data, revenue was recognized as the related services were performed in accordance with the contracts.

Under the modified retrospective method, the cumulative effect of applying the standard is recognized at the date of initial application. The Society was required to recalculate the revenue earned on any contract-in-process at the implementation date and to restate the revenue and costs of services as if ASC 606 had been followed from the inception of the contract. In recalculating costs and revenue under ASC 606 guidelines, a cumulative effect adjustment of \$133,679, was recorded as an adjustment to opening net assets as of January 1, 2019. In addition, increases to accounts receivable of \$355,889, prepaid expenses of \$483,679 and deferred revenue of \$705,889 were recorded as of January 1, 2019. Results beginning after January 1, 2019, are presented under ASC 606.

The impact of adoption of ASC 606 on the consolidated statement of financial position as of December 31, 2019, includes an increase in prepaid expenses of \$508,556, accounts receivable of \$377,185 and deferred revenue of \$608,647.

The impact of adoption of ASC 606 on the accompanying consolidated statement of activities for the year ended December 31, 2019, is as follows:

|                                    | Recognition<br>under previous<br>guidance | Recognition<br>ASC 606 (as shown<br>on 2019 Statement<br>of Activities) | Impact of<br>adoption of<br>ASC 606 |
|------------------------------------|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------|
| Publication sales and advertising  | \$ 355,889                                | \$ 377,165                                                              | \$ 21,276                           |
| Research and data revenue          | 612,797                                   | 4,150                                                                   | (608,647)                           |
| Research and data program expenses | (550,657)                                 | (42,101)                                                                | 508,556                             |
|                                    | <u>\$ 418,029</u>                         | <u>\$ 339,214</u>                                                       | <u>\$ (78,815)</u>                  |

These adjustments were made based on the identification of the fulfillment of performance obligations for research and data contracts at a point in time rather recognition as the services were performed and the timing of recognition for certain publication royalty income.

*Contracts with customers* – A contract exists when services to be performed and products ordered are specified in a submitted and accepted membership application, written contract, purchase order or similar instrument.

*Performance obligations* – The Society's contracts may have a single or multiple performance obligations. For contracts with multiple performance obligations, the Society allocates the contract transaction price to each performance obligation using the estimated standalone selling price of each distinct good or service in the contract, generally equal to the prices specified in the contract. Membership terms include many benefits and discounts available to the member. The Society treats these as a single performance obligation, the availability of the benefits, resources and discounts, as the customer may not utilize all benefits and value is created to the member for the integration of these benefits. There is not a contribution component of the membership dues.

For membership dues and online publications, revenue is recognized ratably over the membership or subscription term as the customer receives and consumes the benefits. Revenue from each print publication is recognized in the month they are mailed to subscribers. Revenue from conferences, meetings and other events is recognized when the event is held, and services are rendered. Generally advertising revenue is recognized when the advertisement is delivered, either in publication or its display at an event. Research and data revenue is recognized upon completion of the project and the beginning of the customer's exclusivity period.

Payment terms for memberships and subscriptions are due when the contract is initiated. Payment terms for conferences, meetings and other events vary based on stated contract terms, but typically require an upfront deposit upon registration for the event and the remainder due shortly before the event occurs. Payment terms for research and data projects require payments according to contract milestones. These payment terms do not approximate timing of revenue recognition. Contracts typically do not contain variable-consideration, any consideration payable to the customer or any significant financing components.

*Contract modifications* – The Society considers contract modifications to exist when the modifications either create new or changes the existing enforceable rights and obligations. Most contract modifications are for goods or services that are not distinct from the existing performance obligation(s). The effect of a contract modification on the transaction price is recognized as an adjustment to revenue on a cumulative catchup basis.

The Society has adopted the following practical expedients and accounting policy elections:

*Incremental costs of obtaining a contract* – These costs are included in selling, general and administrative expenses as incurred when the amortization period is generally one year or less.

*Shipping activities* – The Society has elected to treat shipping and fulfillment activities as fulfillment costs rather than a separate performance obligation. As a result, any consideration received related to these activities will be included as a component of the overall transaction consideration and allocated to the performance obligations of the contract.

*Sales tax and other related taxes* – Sales and other tax amounts collected from customers for remittance to governmental authorities are excluded from revenue.

### Foundation support for programs

The Society recognizes foundation support revenue from the Foundation as it incurs expenses that the Foundation has agreed to reimburse.

### Building lease operations

Office space that is not used by the Society was leased to other organizations. Income from these operations was recognized ratably over the lease term.

Deferred leasing costs consist of costs incurred to obtain new tenants, including leasing commissions and incentives, that are paid in advance and due upon occupancy. These costs were recognized over the life of the lease.

The building and all lease operations were sold in 2019 and all related revenue and expenses were included in discontinued operations. See Note 2 for further details.

### Functional expenses

The costs of providing various programs and supporting activities have been summarized on a functional basis in the consolidated statement of activities. The consolidated statement of functional expenses present expenses by function and natural classification. Expenses directly attributable to a specific functional area of the Society are reported as expenses of those functional areas while indirect costs, include salaries and benefits, that benefit multiple functional areas have been allocated among the various functions based on estimated cost attributable to each function.

### Income taxes

The Society is exempt from federal income tax under Section 501(c)(6) of the Internal Revenue Code. Income from its consolidated for-profit subsidiary is subject to income tax. Advertising income not directly related to the Society's tax-exempt purpose and income from debt-financed real estate are subject to taxation as unrelated business income. The Society did not incur any tax expenses associated with unrelated business income or its subsidiary for the years ended December 31, 2019 or 2018.

### Use of estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reported period. Actual results could differ from those estimates.

### Accounting pronouncements not yet adopted

In February 2016, the Financial Accounting Standards Board issued Accounting Standards Update (ASU) No. 2016-02, *Leases (Topic 842)*, which amends the existing accounting standards for lease accounting, including requiring lessees to recognize most leases on their statement of financial position. ASU 2016-12 is effective for the Society for annual periods beginning January 1, 2020. The standard requires a modified retrospective transition approach for all leases existing at, or entered into after, the date of initial application, with an option to use certain transition relief. The primary impact of the adoption is that the Society will recognize right-of-use assets and offsetting lease liabilities for the present value of the future operating

lease payments. Management is evaluating the impact the ASU will have on its financial statements and related disclosures.

### Subsequent events

Management has evaluated subsequent events through May 28, 2020, the date the consolidated financial statements were available to be issued. See additional information in Note 13.

## **Note 2 – Discontinued Operations**

During 2018, the Board of Directors made the decision to market the office buildings held by REC. The buildings were sold in October 2019. The Society sold these buildings to focus its operations on its core mission to advance the science of geophysics and the profession. The Society incurred intercompany lease expense for this office space of \$294,143 and \$358,094, which was included in continuing operations, for the years ended December 31, 2019 and 2018, respectively. Established lease terms between the Society and REC were continued with the new owners. This lease requires monthly payments of approximately \$31,000 and expires in December 2022. As of December 31, 2018, all the assets and liabilities for REC are classified as held for sale on the statement of financial position. All of the operations of REC have been reported as discontinued operations for the years ended December 31, 2019 and 2018.

Assets and liabilities held for sale for the year ended December 31, 2018, are as follows:

Carrying amounts of major classes of assets included as part of discontinued operations:

|                        |                   |
|------------------------|-------------------|
| Accounts receivable    | \$ 85,184         |
| Prepaid expenses       | 31,654            |
| Deferred leasing costs | 821,228           |
| Property and equipment | <u>23,197,430</u> |

|                                                                |                             |
|----------------------------------------------------------------|-----------------------------|
| Total assets of the disposal group classified as held for sale | <u><u>\$ 24,135,496</u></u> |
|----------------------------------------------------------------|-----------------------------|

Carrying amounts of major classes of liabilities included as part of discontinued operations:

|                                          |                   |
|------------------------------------------|-------------------|
| Accounts payable and accrued liabilities | \$ 270,342        |
| Current portion of long-term debt        | 657,108           |
| Deferred revenue                         | 20,484            |
| Long-term debt                           | <u>17,468,897</u> |

|                                                                     |                             |
|---------------------------------------------------------------------|-----------------------------|
| Total liabilities of the disposal group classified as held for sale | <u><u>\$ 18,416,831</u></u> |
|---------------------------------------------------------------------|-----------------------------|

Discontinued operations were comprised of the following for the years ended December 31:

|                                        | 2019                       | 2018                       |
|----------------------------------------|----------------------------|----------------------------|
| Building lease revenue                 | \$ 2,150,970               | \$ 2,957,872               |
| Gain on sale of real estate            | 2,731,927                  | -                          |
| Building lease operation expenses      | (1,954,903)                | (1,553,483)                |
| Depreciation                           | (965,700)                  | (1,183,642)                |
| Interest                               | <u>(578,569)</u>           | <u>(717,211)</u>           |
| Gain (loss) on discontinued operations | <u><u>\$ 1,383,725</u></u> | <u><u>\$ (496,464)</u></u> |

Operating cash flows from discontinued operations for the years ended December 31, are as follows:

|                                                                                                          | 2019              | 2018              |
|----------------------------------------------------------------------------------------------------------|-------------------|-------------------|
| Gain (loss) from discontinued operations                                                                 | \$ 1,383,725      | \$ (496,464)      |
| Adjustments to reconcile loss from discontinued operations to net cash provided by operating activities: |                   |                   |
| Depreciation                                                                                             | 965,700           | 1,183,642         |
| Gain on sale of discontinued operations                                                                  | (2,731,927)       | -                 |
| Change in operating assets and liabilities:                                                              |                   |                   |
| Accounts receivable                                                                                      | 80,503            | (57,565)          |
| Prepaid expenses                                                                                         | 31,654            | 2,314             |
| Deferred leasing costs                                                                                   | 821,228           | 88,408            |
| Accounts payable and accrued liabilities                                                                 | 66,144            | (51,015)          |
| Net cash provided by operating activities of discontinued operations                                     | <u>\$ 617,027</u> | <u>\$ 669,320</u> |

### Note 3 – Financial Assets and Liquidity Resources

The Society's financial assets available for general expenditures within one year of the December 31, consolidated statement of financial position are as follows:

|                                                                                         | 2019                 | 2018                 |
|-----------------------------------------------------------------------------------------|----------------------|----------------------|
| Assets:                                                                                 |                      |                      |
| Cash and cash equivalents                                                               | \$ 9,300,608         | \$ 3,510,149         |
| Accounts receivable, net                                                                | 2,300,293            | 2,038,616            |
| Accounts receivable, SEG Foundation                                                     | 1,005,097            | 921,566              |
| Investments                                                                             | 11,302,145           | 8,489,679            |
| Total financial assets available to management for general expenditures within one year | <u>\$ 23,908,143</u> | <u>\$ 14,960,010</u> |

The Society maintains a policy of structuring its financial assets to be available as its general expenditures, liabilities and other obligations come due. The Society follows the practice of maintaining six months of operating expenses in reserve.

### Note 4 – Investments

#### Fair value measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Accounting Standards provide a consistent framework for measuring fair value and a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted

quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to measurements involving significant unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are as follows:

- Level 1 – Quoted prices in active markets for identical securities
- Level 2 – Other significant observable inputs (including quoted prices for similar securities)
- Level 3 – Significant unobservable inputs

The level in the fair value hierarchy within which a fair measurement in its entirety is based on the lowest level input that is significant to the fair value measurement in its entirety. There were no investment transfers due to changes in the observability of significant inputs between Level 1, Level 2 and Level 3 assets during the year ended December 31, 2019 or 2018.

Investments measured at fair value on a recurring basis consisted of the following:

|                                 | Fair Value of Measurements as of December 31, 2019 |              |         |               |
|---------------------------------|----------------------------------------------------|--------------|---------|---------------|
|                                 | Level 1                                            | Level 2      | Level 3 | Total         |
| Mutual funds                    | \$ 2,461,409                                       | \$ -         | \$ -    | \$ 2,461,409  |
| Equity securities               | 7,373,164                                          | -            | -       | 7,373,164     |
| Fixed income and preferred      | -                                                  | 511,583      | -       | 511,583       |
| Government securities           | 349,224                                            | 606,765      | -       | 955,989       |
| Total investments at fair value | \$ 10,183,797                                      | \$ 1,118,348 | \$ -    | \$ 11,302,145 |

|                                 | Fair Value of Measurements as of December 31, 2018 |            |         |              |
|---------------------------------|----------------------------------------------------|------------|---------|--------------|
|                                 | Level 1                                            | Level 2    | Level 3 | Total        |
| Mutual funds                    | \$ 3,347,443                                       | \$ -       | \$ -    | \$ 3,347,443 |
| Equity securities               | 4,657,813                                          | -          | -       | 4,657,813    |
| Fixed income and preferred      | -                                                  | 175,194    | -       | 175,194      |
| Government securities           | 119,183                                            | 190,046    | -       | 309,229      |
| Total investments at fair value | \$ 8,124,439                                       | \$ 365,240 | \$ -    | \$ 8,489,679 |

Investment income (loss) consists of the following at December 31:

|                                                | 2019                | 2018                |
|------------------------------------------------|---------------------|---------------------|
| Interest and dividend income                   | \$ 312,088          | \$ 179,523          |
| Realized/unrealized gain (loss) on investments | 1,545,551           | (795,802)           |
| Investment fees                                | (82,279)            | (60,569)            |
|                                                | <u>\$ 1,775,360</u> | <u>\$ (676,848)</u> |

## Note 5 – Property and Equipment

Property and equipment consist of the following at December 31, 2019 and 2018:

|                                                | 2019                              | 2018                              |                                  |
|------------------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
|                                                | Held for<br>Long-Term<br>Purposes | Held for<br>Long-Term<br>Purposes | Held for<br>Sale<br>(see Note 2) |
| Land                                           | \$ -                              | \$ -                              | \$ 489,605                       |
| Building and leasehold improvements            | 83,768                            | 23,219                            | 31,282,525                       |
| Application development                        | 594,362                           | 594,362                           | -                                |
| Furniture, fixtures, and equipment             | 591,474                           | 654,314                           | 27,564                           |
| Capital lease equipment                        | 722,069                           | 307,609                           | -                                |
|                                                | 1,991,673                         | 1,579,504                         | 31,799,694                       |
| Less accumulated depreciation and amortization | (1,309,604)                       | (1,219,954)                       | (8,602,264)                      |
| Property and equipment, net                    | <u>\$ 682,069</u>                 | <u>\$ 359,550</u>                 | <u>\$ 23,197,430</u>             |

Depreciation and amortization expense (including \$965,700 and \$1,183,460 classified as part of the loss from discontinued operations for the years ended December 31, 2019 and 2018, respectively) totaled \$1,142,716 and \$1,271,797 for the years ended December 31, 2019 and 2018, respectively.

## Note 6 – Related Party Transactions

The Society and Foundation support each other with contributions, and the Society provides services to the Foundation, some of which are reimbursed by the Foundation. During the year ended December 31, 2018, the Society implemented a requirement for related parties to reimburse a portion of the costs of shared services (indirect costs).

Transactions for the years ended December 31, are as follows:

|                                                                                      | 2019                | 2018                |
|--------------------------------------------------------------------------------------|---------------------|---------------------|
| Foundation support for the program activities                                        | \$ 2,010,533        | \$ 2,318,791        |
| Reimbursement from the Foundation for direct fundraising and administrative services | 146,586             | 139,379             |
| Reimbursement from the Foundation for indirect administrative services               | 92,972              | 69,692              |
|                                                                                      | <u>\$ 2,250,091</u> | <u>\$ 2,527,862</u> |

In-kind contributions to the Foundation consist of the portion of allocation of indirect costs not required to be reimbursed totaling \$27,274 and \$46,461 for the years ended December 31, 2019 and 2018, respectively.

## Note 7 – Retirement Plan

The Society sponsors a defined contribution plan. The plan is nondiscriminatory and covers all SEG employees who are foreign nationals or legal residents of the United States and have attained the age of 21. The Society's contributions to this plan are computed based on a safe-harbor nonelective 3% of salaries and a one-for-one safe-harbor matching contribution of employees' contributions, up to a maximum of 3% of salaries. In addition, a discretionary profit-sharing contribution can be made after reaching the end of the plan year. The discretionary contribution, if any, will be determined from year-to-year.

For the years ended December 31, 2019 and 2018, the Society's expense for the safe-harbor match and safe-harbor nonelective contributions was \$403,979 and \$247,836, respectively. During the year ended December 31, 2018, the Society made discretionary contributions to the plan of \$43,552.

## Note 8 – Deferred Revenue

Deferred revenue consists of the following:

|                            | 2019                | 2018                |
|----------------------------|---------------------|---------------------|
| Dues                       | \$ 637,796          | \$ 585,379          |
| Subscriptions              | 432,160             | 451,900             |
| Meetings                   | 1,771,847           | 1,681,886           |
| Research and data projects | 2,387,554           | 889,665             |
|                            | <u>\$ 5,229,357</u> | <u>\$ 3,608,830</u> |

## Note 9 – Long-Term Debt

REC had financing arrangements incurred for construction of a building. The financing was divided among three tranches and was collateralized by all assets of REC and was guaranteed by the Society. REC and the Society had semi-annual financial reporting requirements and affirmative covenants including: 1) a requirement for the Society to maintain liquid assets of at least \$5 million, 2) a requirement for the Society and REC to maintain a combined tangible net worth of at least \$10 million, and 3) a requirement for debt service ratio of a minimum of 1.30 to 1.00. All of these liabilities were repaid in full in 2019 upon the sale of the REC buildings, see Note 2.

Long-term debt under the agreement is as follows:

|                                                                                                                                                                                                               | 2019 | 2018         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------|
| Note payable to a bank with monthly payments of \$14,198. The note bore interest at 3.40% and matures October 2020, with a balloon payment due at maturity. This was repaid in full during 2019 (see Note 2). | \$ - | \$ 1,667,585 |
| Note payable to a bank with monthly payments of \$29,549. The note bore interest at 3.70% and matures October 2022, with a balloon payment due at maturity. This was repaid in full during 2019 (see Note 2). | -    | 4,448,999    |

Note payable to a bank with monthly payments of \$68,818. The note bore interest at 4.00% and matures October 2025, with a balloon payment due at maturity. This was repaid in full during 2019 (see Note 2).

|    |       |               |
|----|-------|---------------|
|    | -     | 12,009,421    |
|    | <hr/> |               |
| \$ | -     | \$ 18,126,005 |
|    | <hr/> |               |

Interest expense (all included in the loss from discontinued operations) totaled \$578,569 and \$717,211 for the years ended December 31, 2019 and 2018, respectively.

## Note 10 – Capital Leases

The Society leases certain equipment under a capital lease and has recorded an outstanding obligation and related lease assets. Capital lease assets of \$535,232 and \$271,721 (amount net accumulated amortization of \$186,837 and \$35,888) as of December 31, 2019 and 2018, respectively, is included in property and equipment. Amortization of the leased property is included in depreciation and amortization expense.

The following is a schedule of future minimum lease payments under capital leases as of December 31, 2019:

|                                       |                   |
|---------------------------------------|-------------------|
| 2020                                  | \$ 190,005        |
| 2021                                  | 187,894           |
| 2022                                  | 130,335           |
| 2023                                  | 66,424            |
| 2024                                  | 15,766            |
|                                       | <hr/>             |
| Total minimum lease payment           | 590,424           |
| Less interest                         | (39,741)          |
|                                       | <hr/>             |
| Total present value                   | 550,683           |
| Less current portion                  | (170,653)         |
|                                       | <hr/>             |
| Capital lease, net of current portion | <u>\$ 380,030</u> |

Interest expense on the capital lease obligation was \$23,424 and \$11,405 for the years ended December 31, 2019 and 2018, respectively.

## Note 11 – Operating Leases

The Society leases certain equipment under noncancelable operating leases. Rental expense for the years ended December 31, 2019 and 2018, totaled \$107,441 and \$59,410, respectively.

Future minimum rental payments are as follows at December 31, 2019:

|       |                     |
|-------|---------------------|
| 2020  | \$ 388,905          |
| 2021  | 379,412             |
| 2022  | 383,118             |
|       | <hr/>               |
| Total | <u>\$ 1,151,435</u> |

## **Note 12 – Concentrations**

All of the Society's customers are companies and professionals in the oil and gas industry both within the United States and internationally.

The Society has significant investments in equity and debt securities and is therefore subject to concentrations of credit risk. Investment advisors who are supervised by the Finance Committee manage investments. Market value of investments is subject to fluctuations on a year-to-year basis, however the Executive Committee believes the investment policy is prudent for the long-term welfare of the Society.

## **Note 13 – Subsequent Events**

On March 11, 2020, the World Health Organization declared a global pandemic over the novel coronavirus known as COVID-19, which continues to spread throughout the United States and around the world. Due to quarantine and travel restrictions from COVID-19 some of the Society's events scheduled for fiscal year 2020 have been postponed or cancelled.

Additionally, in March 2020, crude oil prices in both the spot market and futures market experienced significant declines. As described in Note 12, the Society has a concentration of customers in the oil and gas production and distribution industry which will be significantly adversely impacted by the decline in oil prices. Significant estimates, including the allowance for doubtful accounts, may be materially adversely impacted by these events. The effect of lower oil prices and the global pandemic on the Society's future financial position or results of operations is not currently determinable due to broader economic and industry uncertainties. Accordingly, while management cannot quantify the financial and other impact to the Society as of May 28, 2020, management believes that a material impact on the Society's financial position and results of future operations is possible.



**FINANCIAL STATEMENTS**  
**DECEMBER 31, 2019 and 2018**  
**WITH**  
**INDEPENDENT AUDITOR'S REPORT**



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## INDEPENDENT AUDITOR'S REPORT

To the Board of Directors  
SEG Foundation

### Report on the Financial Statements

We have audited the accompanying financial statements of SEG Foundation (a not-for-profit corporation), which comprise the statements of financial position as of December 31, 2019 and 2018, and the related statements of activities and cash flows for the years then ended and the related notes to the financial statements.

### Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

### Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

### Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of SEG Foundation as of December 31, 2019 and 2018, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

A handwritten signature in black ink that reads "Hogan Taylor" followed by the letters "LLP".

Tulsa, Oklahoma  
May 28, 2020

**SEG FOUNDATION**

**STATEMENTS OF FINANCIAL POSITION**

**December 31, 2019 and 2018**

|                                          | 2019          | 2018          |
|------------------------------------------|---------------|---------------|
| <b>Assets</b>                            |               |               |
| Cash                                     | \$ 665,946    | \$ 1,502,211  |
| Pledges receivable, net                  | 1,510,259     | 1,355,808     |
| Investments                              | 20,842,476    | 17,948,942    |
| Exhibits                                 | 131,736       | 131,736       |
| Other assets                             | 58,001        | 13,156        |
|                                          | <hr/>         | <hr/>         |
| Total assets                             | \$ 23,208,418 | \$ 20,951,853 |
|                                          | <hr/>         | <hr/>         |
| <b>Liabilities and Net Assets</b>        |               |               |
| Liabilities:                             |               |               |
| Due to affiliate                         | \$ 1,005,097  | \$ 921,566    |
| Accounts payable and accrued liabilities | 6,452         | 9,720         |
|                                          | <hr/>         | <hr/>         |
| Total liabilities                        | 1,011,549     | 931,286       |
| Net assets:                              |               |               |
| Without donor restrictions               | 4,673,285     | 4,226,786     |
| With donor restrictions                  | 17,523,584    | 15,793,781    |
|                                          | <hr/>         | <hr/>         |
| Total net assets                         | 22,196,869    | 20,020,567    |
|                                          | <hr/>         | <hr/>         |
| Total liabilities and net assets         | \$ 23,208,418 | \$ 20,951,853 |
|                                          | <hr/>         | <hr/>         |

See notes to consolidated financial statements on page 94

**SEG FOUNDATION**

**STATEMENT OF ACTIVITIES**

**Year ended December 31, 2019**

|                                            | Without<br>Donor<br>Restrictions | With<br>Donor<br>Restrictions | Total         |
|--------------------------------------------|----------------------------------|-------------------------------|---------------|
| Revenues, gains and other support:         |                                  |                               |               |
| Contributions                              | \$ 133,107                       | \$ 1,515,172                  | \$ 1,648,279  |
| In-kind support from affiliate             | 16,279                           | -                             | 16,279        |
| Investment income, net                     | 542,098                          | 2,638,130                     | 3,180,228     |
| Loss on bad debts                          | -                                | (250,000)                     | (250,000)     |
| Net assets released from<br>restriction    | 2,173,499                        | (2,173,499)                   | -             |
| Total revenues, gains and other<br>support | 2,864,983                        | 1,729,803                     | 4,594,786     |
| Expenses:                                  |                                  |                               |               |
| Program services:                          |                                  |                               |               |
| Grant awards to affiliate                  | 2,010,533                        | -                             | 2,010,533     |
| Supporting services:                       |                                  |                               |               |
| Management and general                     | 214,616                          | -                             | 214,616       |
| Fundraising                                | 193,335                          | -                             | 193,335       |
| Total supporting services                  | 407,951                          | -                             | 407,951       |
| Total expenses                             | 2,418,484                        | -                             | 2,418,484     |
| Change in net assets                       | 446,499                          | 1,729,803                     | 2,176,302     |
| Net assets, beginning of year              | 4,226,786                        | 15,793,781                    | 20,020,567    |
| Net assets, end of year                    | \$ 4,673,285                     | \$ 17,523,584                 | \$ 22,196,869 |

See notes to consolidated financial statements on page 94

**SEG FOUNDATION**

**STATEMENT OF ACTIVITIES**

**Year ended December 31, 2018**

|                                            | Without<br>Donor<br>Restrictions | With<br>Donor<br>Restrictions | Total         |
|--------------------------------------------|----------------------------------|-------------------------------|---------------|
| Revenues, gains and other support:         |                                  |                               |               |
| Contributions                              | \$ 108,830                       | \$ 1,592,778                  | \$ 1,701,608  |
| In-kind support from affiliate             | 46,461                           | -                             | 46,461        |
| Investment income, net                     | (269,122)                        | (1,283,302)                   | (1,552,424)   |
| Loss on bad debts                          | (2,000)                          | (8,000)                       | (10,000)      |
| Net assets released from<br>restriction    | 2,537,609                        | (2,537,609)                   | -             |
| Total revenues, gains and other<br>support | 2,421,778                        | (2,236,133)                   | 185,645       |
| Expenses:                                  |                                  |                               |               |
| Program services:                          |                                  |                               |               |
| Grant awards to affiliate                  | 2,318,796                        | -                             | 2,318,796     |
| Supporting services:                       |                                  |                               |               |
| Management and general                     | 220,427                          | -                             | 220,427       |
| Fundraising                                | 135,855                          | -                             | 135,855       |
| Total supporting services                  | 356,282                          | -                             | 356,282       |
| Total expenses                             | 2,675,078                        | -                             | 2,675,078     |
| Change in net assets                       | (253,300)                        | (2,236,133)                   | (2,489,433)   |
| Net assets, beginning of year              | 4,480,086                        | 18,029,914                    | 22,510,000    |
| Net assets, end of year                    | \$ 4,226,786                     | \$ 15,793,781                 | \$ 20,020,567 |

See notes to consolidated financial statements on page 94

# SEG FOUNDATION

## STATEMENTS OF CASH FLOWS

Years ended December 31, 2019 and 2018

|                                                                                                       | 2019         | 2018           |
|-------------------------------------------------------------------------------------------------------|--------------|----------------|
| <b>Cash Flows from Operating Activities</b>                                                           |              |                |
| Change in net assets                                                                                  | \$ 2,176,302 | \$ (2,489,433) |
| Adjustments to reconcile change in net assets to net cash provided by (used in) operating activities: |              |                |
| Contributions with donor restrictions in perpetuity                                                   | (124,478)    | (177,701)      |
| Donated stock                                                                                         | -            | (78,867)       |
| Net (gain) loss on investments                                                                        | (2,366,856)  | 2,049,642      |
| Loss on bad debt                                                                                      | 250,000      | 10,000         |
| Change in operating assets and liabilities:                                                           |              |                |
| Pledges receivable, net                                                                               | (387,826)    | 578,877        |
| Other assets                                                                                          | (44,845)     | 8,613          |
| Due to affiliate                                                                                      | 83,531       | 403,272        |
| Accounts payable and accrued liabilities                                                              | (3,268)      | 9,720          |
| Net cash provided by (used in) operating activities                                                   | (417,440)    | 314,123        |
| <b>Cash Flows from Investing Activities</b>                                                           |              |                |
| Proceeds from sales of investments                                                                    | 12,191,685   | 5,740,298      |
| Purchases of investments                                                                              | (12,718,363) | (6,010,682)    |
| Net cash used in investing activities                                                                 | (526,678)    | (270,384)      |
| <b>Cash Flows from Financing Activities</b>                                                           |              |                |
| Proceeds from contributions with donor restrictions in perpetuity                                     | 107,853      | 79,318         |
| Net increase (decrease) in cash                                                                       | (836,265)    | 123,057        |
| Cash, beginning of year                                                                               | 1,502,211    | 1,379,154      |
| Cash, end of year                                                                                     | \$ 665,946   | \$ 1,502,211   |

See notes to consolidated financial statements on page 94

## NOTES TO FINANCIAL STATEMENTS

December 31, 2019 and 2018

### Note 1 – Nature of Operations and Summary of Significant Accounting Policies

#### Nature of operations

SEG Foundation (the Foundation), is a not-for-profit corporation affiliated with the Society of Exploration Geophysicists (the Society) (see Note 8). The Foundation encourages and supports scientific, educational and charitable activities of benefit to geophysicists. The Foundation provides funding to the Society, who in turn provides funding directly to students and others. Awards to the Society support major programs including student programs, professional development and digital knowledge support. Awards to students include scholarships and travel grants. The Foundation also provides funding through the Society for grants to other organizations for summer field camps and the Geoscientists *Without Borders* program. Contributions are received primarily from members of the Society and corporations.

#### Basis of presentation

The Foundation's information regarding its financial position and changes in net assets according to two classes of net assets based on the existence or absence of donor-imposed restrictions, is as follows:

*Without donor restrictions* – Net assets without donor restrictions are available for use at the discretion of the Board of Directors (the Board) and/or management for general operating purposes. From time to time the Board may designate a portion of these net assets for specific purposes which makes them unavailable for use at management's discretion. See Note 6 for more information on the composition of net assets without donor restrictions.

*With donor restrictions* – Net assets with donor restrictions consist of assets whose use is limited by donor-imposed time and/or purpose restrictions. The Foundation reports gifts of cash and other assets as revenue with donor restrictions if they are received with donor stipulations that limit the use of the donated assets. When a donor restriction expires, that is, when a stipulated time restriction ends or purpose restriction is accomplished, the net assets are reclassified as net assets without donor restriction and reported in the statements of activities as net assets released from restrictions. Some net assets with donor restrictions include a stipulation that assets provided be maintained permanently (perpetual in nature) while permitting SEG Foundation to expend the income generated by the assets in accordance with the provisions of additional donor-imposed stipulations or a Board approved spending policy. See Note 6 for more information on the composition of net assets with donor restrictions.

The Foundation maintains a pool of investment funds for net assets without donor restrictions and net assets with donor restrictions. Investment returns are allocated to net asset classifications based upon the percentage of the balance of net assets held in each classification. Investment returns on net assets with donor restrictions and board-designated matching funds are restricted for the purposes stipulated by donors. Investment returns on board-designated funds that are not associated or matched with a restricted gift are unrestricted. Investment losses on net assets with donor restrictions in excess of accumulated nonexpended returns are allocated to net assets without donor restrictions. Recoveries of such losses are first allocated to net assets without donor restrictions.

### Use of estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

### Cash

Cash consists of deposit balances maintained at high quality financial institutions. Typically, cash exceeds federally insured limits, but management believes any possible risk of loss is minimal.

### Contributions and pledges receivable

Unconditional promises to give that are expected to be collected within one year are recorded at estimated net realizable value. Unconditional promises to give that are expected to be collected in future years are recorded at the estimated present value of their estimated future cash flows. The discounts on those amounts are computed using risk-free interest rates applicable to the years in which the promises are received.

Management determines the allowance for doubtful accounts based on periodic assessment of outstanding pledges, particularly those pledges which are past due, as well as consideration of historical experience on collection of pledges. Pledge receivables are written off when deemed uncollectible.

### Investments

Investments are carried at estimated fair value as reported by the asset custodians. See Note 4 for a description of the fair value inputs and methodologies utilized.

### Income tax status

The Foundation is a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code and is considered an organization that is not a private foundation.

### Reclassifications

Certain reclassifications have been made to the 2018 financial statements to conform to the 2019 financial statement presentation. Change in net assets and total net assets are not modified.

### Subsequent events

Management has evaluated subsequent events through May 28, 2020, the date the financial statements were available to be issued. See additional information in Note 11.

## Note 2 – Financial Assets and Liquidity Resources

The Foundation's financial assets available within one year of the statement of financial position date for general expenditures as of December 31, are as follows:

|                                                                                         | 2019         | 2018         |
|-----------------------------------------------------------------------------------------|--------------|--------------|
| Assets:                                                                                 |              |              |
| Cash                                                                                    | \$ 665,946   | \$ 1,502,211 |
| Pledge receivables due within one year                                                  | 473,600      | 651,700      |
| Investments                                                                             | 20,842,476   | 17,948,942   |
| Interest receivable                                                                     | 58,001       | 13,156       |
| Total financial assets available within one year                                        | 22,040,023   | 20,116,009   |
| Less:                                                                                   |              |              |
| Amounts unavailable for general expenditures within one year, due to:                   |              |              |
| Restricted by donors with purpose restrictions                                          | (3,709,405)  | (2,454,346)  |
| Restricted by donors in perpetuity                                                      | (12,766,019) | (12,621,278) |
| Amounts unavailable to management without Board's approval                              | (2,771,587)  | (2,771,587)  |
| Total financial assets available to management for general expenditures within one year | \$ 2,793,012 | \$ 2,268,798 |

The Foundation maintains a policy of structuring its financial assets to be available as its general expenditures, liabilities and other obligations come due. The Foundation follows the practice of maintaining a cash reserve of 90% of its current year operating budget, pass thru donations and the annual spending rate and annual management fee. In addition, the Foundation has approximately \$2.8 million of Board Designated assets without donor restrictions, while the Foundation does not intend to spend these for purposes other than as identified, the amounts could be made available for current operations if necessary and upon Board approval. Additionally, the Foundation expects to collect pledges of \$473,600 during 2020.

## Note 3 – Pledges Receivable

Pledges receivable consist of the following unconditional promises to give at December 31:

|                                 | 2019         | 2018         |
|---------------------------------|--------------|--------------|
| Due in less than one year       | \$ 473,600   | \$ 651,700   |
| Due in one to five years        | 1,097,500    | 755,500      |
|                                 | 1,571,100    | 1,407,200    |
| Allowance for doubtful accounts | (11,500)     | (12,700)     |
| Unamortized discount            | (49,341)     | (38,692)     |
|                                 | (60,841)     | (51,392)     |
|                                 | \$ 1,510,259 | \$ 1,355,808 |

## Note 4 – Investments

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The quality and reliability of the information used to determine fair values is prioritized into three broad categories, with the highest priority given to Level 1 inputs and the lowest to Level 3 inputs. These inputs are summarized in three broad levels:

- Level 1 Quoted prices in active markets for identical assets or liabilities.
- Level 2 Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
- Level 3 Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

There were no investment transfers due to changes in the observability of significant inputs between Level 1, Level 2 and Level 3 assets during the years ended December 31, 2019 or 2018.

Investments measured at fair value on a recurring basis consisted of the following:

|                                 | Fair Value Measurements as of December 31, 2019 |              |         |               |
|---------------------------------|-------------------------------------------------|--------------|---------|---------------|
|                                 | Level 1                                         | Level 2      | Level 3 | Total         |
| Equity securities               | \$ 8,568,108                                    | \$ -         | \$ -    | \$ 8,568,108  |
| Corporate bonds                 | -                                               | 1,055,814    | -       | 1,055,814     |
| Government securities           | -                                               | 1,908,106    | -       | 1,908,106     |
| Bond mutual funds               | 3,036,984                                       | -            | -       | 3,036,984     |
| Equity mutual funds             | 6,273,464                                       | -            | -       | 6,273,464     |
| Total investments at fair value | \$ 17,878,556                                   | \$ 2,963,920 | \$ -    | \$ 20,842,476 |

|                                 | Fair Value Measurements as of December 31, 2018 |              |         |               |
|---------------------------------|-------------------------------------------------|--------------|---------|---------------|
|                                 | Level 1                                         | Level 2      | Level 3 | Total         |
| Equity securities               | \$ 5,692,910                                    | \$ -         | \$ -    | \$ 5,692,910  |
| Corporate bonds                 | -                                               | 923,198      | -       | 923,198       |
| Government securities           | -                                               | 1,765,504    | -       | 1,765,504     |
| Bond mutual funds               | 4,736,075                                       | -            | -       | 4,736,075     |
| Equity mutual funds             | 4,831,255                                       | -            | -       | 4,831,255     |
| Total investments at fair value | \$ 15,260,240                                   | \$ 2,688,702 | \$ -    | \$ 17,948,942 |

Investment income (losses) consists of the following for the year ended December 31:

|                                        | 2019                | 2018                  |
|----------------------------------------|---------------------|-----------------------|
| Interest and dividends                 | \$ 959,522          | \$ 644,129            |
| Realized and unrealized gains (losses) | 2,366,856           | (2,049,642)           |
| Investment expenses                    | (146,150)           | (146,911)             |
|                                        | <u>\$ 3,180,228</u> | <u>\$ (1,552,424)</u> |

## Note 5 – Exhibits

Exhibits consist of historical geophysical equipment and a "Doodlebugger" statue commemorating the geophysical tradition.

## Note 6 – Net Assets

### Without donor restrictions

Net assets without donor restrictions are comprised of the following at December 31:

|                        | 2019                | 2018                |
|------------------------|---------------------|---------------------|
| General operating fund | \$ 1,901,698        | \$ 1,455,199        |
| Board-designated funds | 2,771,587           | 2,771,587           |
|                        | <u>\$ 4,673,285</u> | <u>\$ 4,226,786</u> |

In previous years, contributions of \$2,771,587 were designated by the Board to match permanently restricted contributions received from donors. The Board has designated these funds for investment and is obligated to use the returns in compliance with donor restrictions for the matched gift. No contributions were designated by the Board for the year ended 2019.

### With donor restrictions

Net assets with donor restrictions net assets are available for the following purposes at December 31, 2019:

| Program                              | For a Specific Purpose/Time | Held in Perpetuity   | Total                |
|--------------------------------------|-----------------------------|----------------------|----------------------|
| General                              | \$ 359,456                  | \$ 1,495,000         | \$ 1,854,456         |
| Geoscientists <i>Without</i> Borders | 898,376                     | 1,715,287            | 2,613,663            |
| Professional development             | 743,650                     | 541,495              | 1,285,145            |
| Student support                      | 1,277,467                   | 1,968,421            | 3,245,888            |
| Scholarships                         | 1,213,302                   | 6,333,210            | 7,546,512            |
| Field Camps and Travel Grants        | 188,185                     | 679,145              | 867,330              |
| Near surface                         | 3,749                       | 33,461               | 37,210               |
| Other                                | 73,380                      | -                    | 73,380               |
|                                      | <u>\$ 4,757,565</u>         | <u>\$ 12,766,019</u> | <u>\$ 17,523,584</u> |

Net assets with donor restrictions net assets are available for the following purposes at December 31, 2018:

| Program                              | For a Specific Purpose/Time | Held in Perpetuity   | Total                |
|--------------------------------------|-----------------------------|----------------------|----------------------|
| General                              | \$ 46,101                   | \$ 1,494,101         | \$ 1,540,202         |
| Geoscientists <i>Without</i> Borders | 783,109                     | 1,707,457            | 2,490,566            |
| Professional development             | 833,624                     | 541,092              | 1,374,716            |
| Student support                      | 504,011                     | 1,940,219            | 2,444,230            |
| Scholarships                         | 732,334                     | 6,242,380            | 6,974,714            |
| Field Camps and Travel Grants        | 208,175                     | 662,769              | 870,944              |
| Near surface                         | (844)                       | 33,260               | 32,416               |
| Other                                | 65,993                      | -                    | 65,993               |
|                                      | <u>\$ 3,172,503</u>         | <u>\$ 12,621,278</u> | <u>\$ 15,793,781</u> |

## Note 7 – Endowment Funds

The Foundation's endowment consists of 14 individual programs established for a variety of purposes. Its endowment includes both donor restricted funds and funds designated by the Board to function as endowments.

The Board has interpreted the Uniform Prudent Management of Institutional Funds Act (UPMIFA) for Oklahoma as requiring the preservation of the fair value of the original gift as of the gift date of the donor-restricted endowment funds absent explicit donor stipulations to the contrary. As a result of this interpretation, the Foundation classifies as permanently restricted net assets: (a) the original value of gifts donated to the permanent endowment, (b) the original value of subsequent gifts to the permanent endowment, and (c) excess accumulated investment earnings in accordance with the applicable donor gift instruments and policy.

Accumulated earnings on the endowment is held as net assets with donor restrictions until those amounts are appropriated for expenditures by the Foundation in a manner consistent with the standard of prudence prescribed by UPMIFA.

### Investment return objectives, risk parameters and strategies

The Foundation has adopted investment and spending policies, approved by the Board, for endowment assets that attempt to provide a predictable stream of funding to programs supported by its endowment funds while also maintaining the purchasing power of those investment earnings over the long-term. Accordingly, the investment process seeks to achieve an after-cost total real rate of return, including investment income as well as capital appreciation, which exceeds the annual distribution with acceptable levels of risk. Endowment assets are invested in a diversified asset mix that is intended to produce a target return, net of fees, of at least 5% per annum. Actual returns in any given year may vary from this amount.

### Spending policy

The Foundation's spending policy is consistent with its investment objective of achieving long-term real growth in its assets. In establishing this policy, the Foundation considered the long-term expected return on its investment assets, the nature and duration of the individual endowment funds, many of which must be maintained in perpetuity because of donor-restrictions, and the possible effects of inflation. The

Foundation expects the current spending policy to allow its endowment funds to grow at a nominal average rate, which is consistent with the Foundation's objective to maintain the purchasing power as well as to provide additional real growth through new gifts and investment returns. The annual spending rate is approved annually by the board. The spending rate was set at 3.2% and 3.0% for the years ended December 31, 2019 and 2018, respectively.

These annual fees cannot exceed 25% of the designated spending rate set by the Board of Directors. Annual management fee for the years ended December 31, 2019 and 2018, was 0.80% and 0.75%, respectively. Total amount of these fees was \$122,797 and \$112,512 for the years ended December 31, 2019 and 2018, respectively.

In addition to approved spending policy amounts and the annual management fees, the Foundation also appropriates funds for investment fees and other expenses directly related to the endowment assets. Total amounts appropriated for these purposes were \$139,697 and \$146,913 for the years ended December 31, 2019 and 2018, respectively.

Donor agreements allow for a portion of the donor restricted contributions to be used for management, administration and development expenses. The development fee is 5% of the restricted contribution.

Endowment net asset composition by type of fund as of December 31, is as follows:

| 2019                                       | Without<br>Donor<br>Restrictions | With<br>Donor<br>Restrictions | Total                |
|--------------------------------------------|----------------------------------|-------------------------------|----------------------|
| Donor restricted - in perpetuity           | \$ -                             | \$ 12,766,019                 | \$ 12,766,019        |
| Donor restricted - unappropriated earnings | -                                | 2,232,047                     | 2,232,047            |
| Board restricted                           | 2,771,587                        | -                             | 2,771,587            |
|                                            | <u>\$ 2,771,587</u>              | <u>\$ 14,998,066</u>          | <u>\$ 17,769,653</u> |
| 2018                                       | Without<br>Donor<br>Restrictions | With<br>Donor<br>Restrictions | Total                |
| Donor restricted - in perpetuity           | \$ -                             | \$ 12,621,278                 | \$ 12,621,278        |
| Donor restricted - unappropriated earnings | -                                | 285,125                       | 285,125              |
| Board restricted                           | 2,771,587                        | -                             | 2,771,587            |
|                                            | <u>\$ 2,771,587</u>              | <u>\$ 12,906,403</u>          | <u>\$ 15,677,990</u> |

Changes in endowment net assets for the years ended December 31, is as follows:

| 2019                                                          | Without<br>Donor<br>Restriction | With<br>Donor<br>Restriction | Total         |
|---------------------------------------------------------------|---------------------------------|------------------------------|---------------|
| Endowment net assets,<br>beginning of year                    | \$ 2,771,587                    | \$ 12,906,403                | \$ 15,677,990 |
| Investment return:                                            |                                 |                              |               |
| Interest and dividends                                        | -                               | 621,132                      | 621,132       |
| Net realized and unrealized gains<br>on long-term investments | -                               | 2,017,012                    | 2,017,012     |
| Total investment return                                       | -                               | 2,638,144                    | 2,638,144     |
| Contributions                                                 | -                               | 124,476                      | 124,476       |
| Appropriation of endowment assets<br>for expenditure          | -                               | (670,957)                    | (670,957)     |
| Endowment net assets, end of year                             | \$ 2,771,587                    | \$ 14,998,066                | \$ 17,769,653 |
| 2018                                                          | Without<br>Donor<br>Restriction | With<br>Donor<br>Restriction | Total         |
| Endowment net assets,<br>beginning of year                    | \$ 2,771,587                    | \$ 14,490,193                | \$ 17,261,780 |
| Investment return:                                            |                                 |                              |               |
| Interest and dividends                                        | -                               | 527,074                      | 527,074       |
| Net realized and unrealized loss<br>on long-term investments  | -                               | (1,662,486)                  | (1,662,486)   |
| Total investment return                                       | -                               | (1,135,412)                  | (1,135,412)   |
| Contributions                                                 | -                               | 177,701                      | 177,701       |
| Appropriation of endowment assets<br>for expenditure          | -                               | (564,671)                    | (564,671)     |
| Fund adjustments and transfers                                | -                               | (61,408)                     | (61,408)      |
| Endowment net assets, end of year                             | \$ 2,771,587                    | \$ 12,906,403                | \$ 15,677,990 |

## Note 8 – Society of Exploration Geophysicists

The Society is the sole corporate member of the Foundation and appoints the Board. The Foundation supports the Society with contributions and the Society provides services for which it is partially reimbursed by the Foundation. Those transactions for the years ended December 31, are as follows:

|                                                          | 2019                | 2018                |
|----------------------------------------------------------|---------------------|---------------------|
| Cash contributions from the Society                      | \$ -                | \$ -                |
| In-kind support from the Society                         | 16,279              | 46,461              |
| Total support from the Society                           | <u>\$ 16,279</u>    | <u>\$ 46,461</u>    |
| Grant awards to the Society                              | <u>\$ 2,010,533</u> | <u>\$ 2,318,796</u> |
| Reimbursement to the Society for fundraising expenses    | \$ 138,043          | \$ 140,357          |
| Reimbursement to the Society for administration expenses | 101,515             | 68,713              |
| Total reimbursements to the Society                      | <u>\$ 239,558</u>   | <u>\$ 209,070</u>   |

In-kind support from the Society consists of indirect cost allocation (IDC) and is reflected in the Foundation's financial statements as both revenue and expense, with no net overall financial impact to the statements of activities.

The Foundation began reimbursing the Society on January 1, 2016, for 20% of allocated indirect costs. An additional 20% requirement will be added each year until the Foundation is fully reimbursing the Society.

## Note 9 – Grant Awards and Functional Expenses

As disclosed in Note 1, the Foundation generally carries out its purpose by providing financial support solely to the Society for specific programs. Expenses directly attributable to a specific functional area of SEG Foundation are reported as expenses of those functional areas. Costs that benefit multiple functional areas (indirect costs) have been allocated across programs based on the proportion of revenue relative to the entire entity.

Expenses by function and natural classification for the year ended December 31, are as follows:

| 2019                        | Management<br>and General | Fundraising       | Total             |
|-----------------------------|---------------------------|-------------------|-------------------|
| Expense category:           |                           |                   |                   |
| Professional development    | \$ 58,277                 | \$ 81,612         | \$ 139,889        |
| Meeting expense             | 421                       | 33,409            | 33,830            |
| Supplies                    | 2,162                     | 14                | 2,176             |
| Facilities rental           | -                         | 4,320             | 4,320             |
| Travel                      | 4,303                     | 3,619             | 7,922             |
| Professional fees           | 31,931                    | 62,887            | 94,818            |
| IDC Allocation (see Note 8) | 109,251                   | -                 | 109,251           |
| Depreciation                | 5,475                     | -                 | 5,475             |
| Other                       | 2,796                     | 7,474             | 10,270            |
|                             | <u>\$ 214,616</u>         | <u>\$ 193,335</u> | <u>\$ 407,951</u> |

| 2018                        | Management<br>and General | Fundraising       | Total             |
|-----------------------------|---------------------------|-------------------|-------------------|
| Expense category:           |                           |                   |                   |
| Professional development    | \$ 50,034                 | \$ 86,194         | \$ 136,228        |
| Meeting expense             | 8,219                     | 14,568            | 22,787            |
| Supplies                    | 2,416                     | 8,375             | 10,791            |
| Facilities rental           | -                         | 5,379             | 5,379             |
| Travel                      | 5,571                     | 3,097             | 8,668             |
| IDC allocation (See Note 8) | 116,153                   | -                 | 116,153           |
| Depreciation                | 890                       | -                 | 890               |
| Other                       | 37,144                    | 18,242            | 55,386            |
|                             | <u>\$ 220,427</u>         | <u>\$ 135,855</u> | <u>\$ 356,282</u> |

#### Note 10 – Commitments

The Foundation has committed approximately \$471,000 to the Society for Geoscientists *Without Borders* awards and grants to various universities as of December 31, 2019. The ultimate amount funded for each award and grant is based on the respective project's performance and actual expenditures. No amounts have been accrued in the accompanying financial statements for these commitments.

#### Note 11 – Subsequent Events

During 2020, a strain of coronavirus (COVID-19) was reported worldwide, resulting in decreased economic activity and concerns about the pandemic, which would adversely affect the broader global economy. As a result of the pandemic, the Foundation could also experience losses in its investment portfolio as a result of volatile markets and operating results including obtaining future donations. Significant estimates, including the allowance for doubtful accounts, may be materially adversely impacted by these events. Accordingly, while management cannot quantify the financial and other impact to the Foundation as of May 28, 2020, management believes that a material impact on the Foundation's financial position and results of future operations is possible.