

2020
**ANNUAL
REPORT**

OUR MISSION

“The SEG Foundation advances geophysics today and inspires geoscientists for tomorrow through funding innovative activities and grant programs that benefit geophysicists, their professional community, the Society of Exploration Geophysicists (SEG), and the general public.”

OUR HISTORY

The SEG Foundation is the fundraising arm of SEG. The Foundation was incorporated by the State of Oklahoma in 1987 as a 501(c)(3) not-for-profit organization, which means donations to the Foundation are tax deductible in the United States. Since inception, the Foundation has worked with thousands of individual, society/section, and corporate donors to provide tens of millions of philanthropic dollars to support geoscience programs that meet the needs of students and professionals in the geophysics community worldwide.

MESSAGE FROM THE CHAIR

I think pretty much everyone is happy to see 2020 in the rearview mirror. Many of us lost friends and family to a terrible virus, and thousands of our professional colleagues were caught up in layoffs brought about by the pandemic's savage economic impact. SEG was not insulated from the economic damage inflicted on our partners, and was deeply impacted by staff reductions, program cancellations, and postponements.

The SEG Foundation's plans for new fundraising initiatives in 2020 were delayed by the pandemic, and our inaugural Black Tie Gala fundraiser for Geoscientists *without* Borders® (GWB) was canceled in light of the health risks it posed. Thankfully, the dedication and brilliance of our colleagues in the life sciences resulted in safe, highly effective vaccines that are beginning to enable the resumption of normality, in some countries much earlier than many of us had dared hope.

Despite such an *annus horribilis*, I am quite optimistic as we look forward into 2021 and beyond. The SEG Foundation spent much of the past year building a strong framework for success in partnership with a strong SEG leadership team, along with a GWB-focused partnership with the American Geosciences Institute. David Bartel, our gifted Development Committee chair, reorganized the committee into six focused sub-committees, with every director playing a vital role. The SEG Foundation's Executive Committee hired new and dynamic fundraising consultants and also selected Mark Leonard as our new major gifts officer. Despite seven of our directors leaving the SEG Foundation

Board at the end of 2020 (three of whom were elected to leadership roles in SEG and the American Association of Petroleum Geologists), our six new directors bring an exciting diversity of background and talent to the team. The stars are aligning for great things to come soon.



Finally, I wish to thank the many corporate supporters and hundreds of individuals who contribute their time, talent, and treasure to the SEG Foundation each year. Even in a year in which a pandemic struck, your generosity resulted in more than US\$1 million spent in support of SEG programs. You enable the education and continued development of thousands of members globally, as well as the promotion and application of geophysics in the service of our fellow human beings. We wouldn't be able to continue this great work without your support. Thank you!

Michael G. Loudin
2020 SEG Foundation board chair

LEADERSHIP

BOARD OF DIRECTORS

The SEG Foundation Board of Directors has overall responsibility for all aspects of the Foundation’s functions, including fundraising and oversight of investments. Directors are appointed to three-year terms by the SEG president, and the SEG’s executive director serves as Foundation secretary.

The 2020 15-member Board was comprised of dedicated industry leaders and volunteers who are passionate about geophysics and our professional community. Mid-term resignations were accepted for Pete W. Cramer (elected as 2020–2021 SEG treasurer) and Anna C. Shaughnessy (elected as 2020–2021 SEG

president-elect) on 15 October 2020. As a result, Arthur Cheng served as interim vice chair and Mark Leonard served as interim treasurer for the Foundation Board through year end.

Five leadership Board committees provide business guidance and ensure the Foundation’s financial well-being. These committees include the Executive Committee, Audit Committee, Development Committee, Finance/Investment Committee, and Nominating Committee. In addition, Board liaisons are assigned to particular Foundation-funded SEG program committees to ensure that donor intentions are being honored and to enable open pathways of communication between SEG programs and the Foundation.

2020 OFFICERS



Michael G. Loudin
chair



Anna C. Shaughnessy
vice chair



Pete W. Cramer
treasurer



John Koehr/James White
secretary

2020 DIRECTORS



David C. Bartel



Craig J. Beasley



Alex Biholar



Arthur Cheng



Maitri Erwin



Raymond C. Farrell



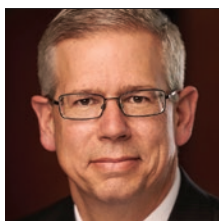
Michael C. Forrest



Gretchen M. Gillis



Julie K. Hardie



John A. Lambuth



Mark S. Leonard



Zhaobo “Joe” Meng

VOLUNTEER AWARD



DICK BAILE EXEMPLARY SERVICE AWARD PRESENTED TO MICHAEL C. FORREST IN 2020

The SEG Foundation Board of Directors is proud to recognize the outstanding achievements that Michael “Mike” C. Forrest has made as a philanthropist, volunteer, and Board director. Therefore, he was awarded the Dick Baile Exemplary Service Award in 2020. The Baile Award was not conceived as an annual award, and to date it has been received by only three other individuals (Dick Baile himself, Elwyn Peacock, and Gary Servos). This award recognizes individuals who have made exemplary contributions to the SEG Foundation via service, fundraising, and/or monetary donations.

Mike meets all the criteria for this service award. He has been recognized as an SEG Foundation Trustee Associate since 1994 and annually as a Sustaining Trustee Associate since that program’s inception in 2015. He has been an avid and active fundraiser for many Foundation-supported programs, including Geoscientists *without* Borders® and most recently the SEG EVOLVE program. His own cumulative donations to the Foundation and for these causes have been quite generous. In addition, he helped raise more than US\$500,000 through individual fundraising efforts in recent years.

Mike’s contributions to the SEG Foundation have also included service as a Board director for 12 years, including four years as my predecessor as Foundation

chair. Among his many other volunteer roles with SEG and the Foundation, he is most passionate as a hands-on mentor for the student teams participating in the EVOLVE program. Although he stepped down from the Foundation Board at the end of 2020, Mike continues his productive engagement as an Emeritus Board Member, and he has cheerfully remained an active volunteer, fundraiser, and mentor.

I can’t think of a more deserving person to be recognized with the Baile Award. You can watch the presentation of Mike’s award during the virtual 2020 Donor Luncheon at the link below.

Congratulations, Mike, and thank you for all you do!

— Michael G. Loudin



SEG YouTube – 2020 Donor Event link: youtu.be/fyo5fex1Jhs

20-21 SCHOLARSHIP RECIPIENTS

See Scholarships article on Page 26.



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GIVING BACK

2020 FINANCIALS

The following charts display the sources of revenue and program and support expenses for 2020 and 2019:

REVENUES

	2020	2019
Contributions	\$772,000	\$1,648,000
In-kind support from SEG	0	16,000
Investment results	4,319,000	3,180,000
Loss on bad debt	(8000)	(250,000)
	\$5,083,000	\$4,594,000

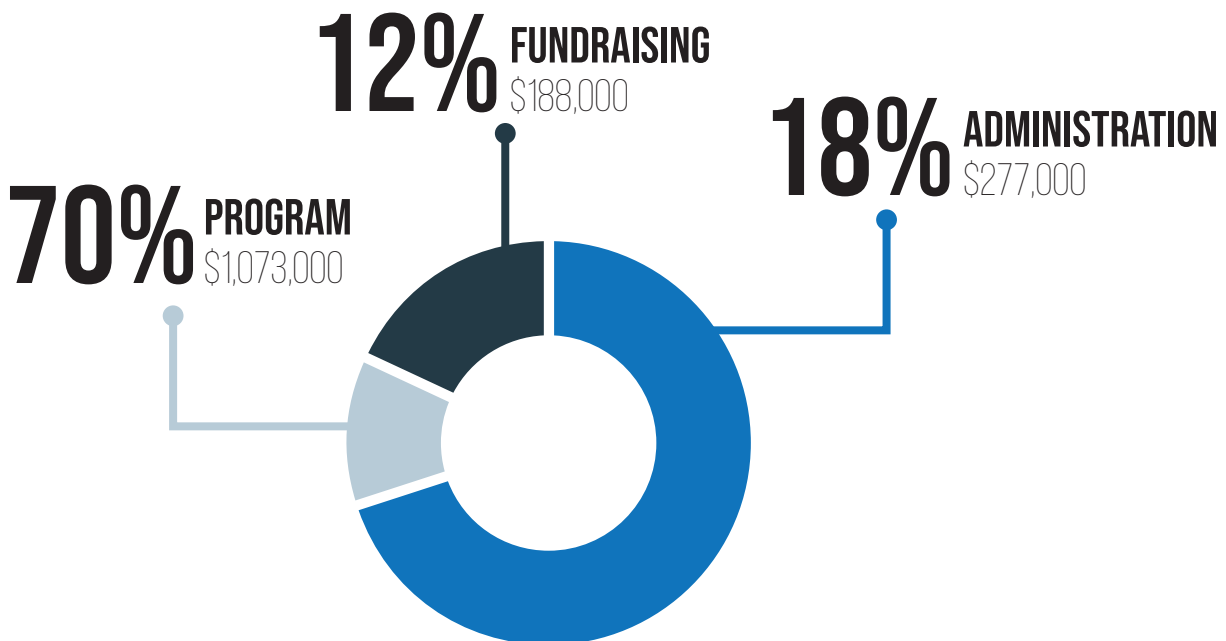
EXPENSES

	2020	2019
SEG program support	\$1,073,000	\$2,011,000
Management and general	277,000	215,000
Fundraising	188,000	193,000
	\$1,538,000	\$2,419,000

NET ASSETS

	2020	2019
Beginning of year	\$22,197,000	\$20,021,000
End of year	25,692,000	22,197,000
	\$3,495,000	\$2,176,000

FINANCIAL PERFORMANCE



All monetary values are in U.S. dollars. Complete audited financial statements available at seg.org/foundation.

FINANCIAL SUMMARY

SEG program support is funded by contributions from corporate and individual donors. SEG Foundation management and fundraising expenses are funded by donor contributions, the Foundation’s Development Reinvestment Fee, and the Annual Fund. The Foundation gained a full-time administrative support position in 2020, in addition to hiring a part-time major gifts officer and a consulting firm to continue with campaign strategy and planning efforts.

At the end of 2020, the Foundation’s endowment balance was \$16.1 million, of which half supports scholarships. For the third year in a row, the total annual spending rate for endowed programs was set by the Foundation Board at 4%. Overall, the Foundation’s net assets were greater than \$25.6 million at year end.

FOUNDATION-FUNDED SEG PROGRAMS

During 2020, Foundation donors supported 16 SEG programs with more than \$1 million. These programs included: professional development (Distinguished Lecture, Honorary Lecture, Distinguished Instructor Short Course, SEG Wiki, SEG Online, SEG on Demand; \$242,000), experiential learning (EVOLVE, Field Camps; \$109,500), social impact (Geoscientists *without* Borders®; \$290,000), student programs (Student Chapters, Scholarships, Student Leadership Symposium, Challenge Bowls, Near Surface Geophysical Research Award, Travel Grants; \$424,000), and others (Historical Preservation; \$6700).

REVENUES: CONTRIBUTIONS

The Foundation received three renewed annual commitments from sustaining investors in 2020: Schlumberger (Geoscientists *without* Borders®), TGS-NOPEC (Field Camps), and Petroleum Geo-Services (Distinguished Lecture). Notably, individual giving contributed to 66% of the total funds raised in 2020, with much thanks to seven major gift donors who gave more than \$200,000 in support of the Annual Fund and other designated SEG programs. Revenue reported by the Foundation includes new pledges and contributions made in the current year and does not reflect additional cash received against pledges made in prior years.

EXPENSES: SUPPORTING SERVICES

The Foundation’s expenses include SEG program support, management and general, and fundraising costs. Program support is reimbursements made to SEG for program development, grants/awards, and

program administration. Management and general are related to the general administration and operation of the Foundation. Fundraising is directly related to the development and stewardship of Foundation donors.

FUNDRAISING EFFICIENCY

A commonly used metric for monitoring fundraising efficiency is the “fundraising cost ratio.” To calculate the cost per dollar raised, divide the fundraising expenses by total contributions. Calculating fundraising expenses and revenues using rolling averages over a period of three to five years reduces the impact on any one large gift, bequest, grant, or a low-revenue year on the fundraising cost ratio in any given year. The Foundation has chosen to use this three-year rolling average, and feels that in order to be most prudent of donor intent, this ratio should be less than 20%.

FUNDRAISING COST RATIO FORMULA

$$\frac{\text{fundraising expenses}}{\text{contributions}} \times \$100 = \text{dollars spent per } \$100 \text{ raised}$$

DOLLARS SPENT PER \$100 RAISED



All monetary values are in U.S. dollars.

GEOSCIENTISTS WITHOUT BORDERS BONANZA EN LOS ANDES - PERU

BY JASPER OSHUN

Bonanza en los Andes” was a collaborative Geoscientists *without* Borders® (GWB)-funded, two-year water-development project involving faculty at Humboldt State University (HSU), Rutgers University-Newark, and the rural Andean community of Zurite, Peru.

Zurite is an agriculturally dependent community located approximately 30 km northwest of Cusco.

GWB provided the resources to design our project around three interconnected themes: (1) the humanitarian benefit to the society of Zurite, (2) the hydrogeologic science of the Andean puna, and (3) the training and education of students.

1) Society: The need for irrigation canals to provide water to the fields of approximately 100 families in the rural Andean community of Zurite.



2) Science: Zurite-derived irrigation and drinking water from the local Ramuschaka, a watershed originating in the seasonally dry grasslands of the Andean puna. Although puna-derived water resources are critical to small communities and large cities throughout southern Peru, the hydrology of the puna is poorly understood.

3) Education: Solutions to environmental problems, such as water-resource development, require a workforce trained in interdisciplinary and community-minded approaches.

Specifically, our goals were to collaborate with the community of Zurite to build irrigation canals, quantify water resources in the Andean puna, and train and empower students to seek careers in community-minded water-resource development.

We designed an educational program, in which four weeks of mid-year field work were embedded within a year of course work and independent research. Over two years, 20 students from HSU participated in the program, and nine students from other institutions across the United States and Peru contributed to the field work. We introduced students to the goals of the project and facilitated communication across disciplines. Students honed research questions and began researching topics that would contribute to the overall project goals. We led in-class workshops to build communication skills,



empathy, and understanding of different points of view that students were likely to encounter in Zurite.

We traveled to Zurite in June 2018 and 2019 for one month of field work. Students stayed with host families and worked alongside Peruvian geology students as well as volunteers from the community. Field work was concentrated in the Upper Ramuschaka Watershed (URW), a 2.12 km² catchment with a mean elevation of 4332 m.a.s.l., which drains to an interbasin transfer canal used for agriculture and across the site of the proposed canal network adjacent to Zurite.

Students mapped the geology of the URW; installed hydrologic monitoring equipment and took stream discharge measurements; flew a drone to collect topographic data; conducted seismic refraction, electrical resistivity tomography, and nuclear magnetic resonance surveys; and mapped the extent of existing and proposed irrigation canals while discussing water-resource needs with irrigators.

Post field work, students completed individual research projects under the guidance of faculty. Students presented their research in written reports and in class presentations, including capacity building statements that detailed how their results could be used to benefit the local community. One student presented the results of the seismic refraction surveys at the 2018 American Geophysical Union (AGU) Fall Meeting, and three students presented geophysical and hydrologic results at the 2019 AGU Fall Meeting.

HSU students cite the life-changing impact that the GWB project had on their professional and personal outlook:

- “This trip made me rethink what approach I want to take for grad school (location,

concentration) and made me think more about pursuing a career in water resources.”

- “It was so valuable to get to work with multiple disciplines and gain new perspectives. It was definitely life changing.”
- “This trip broadened my horizons immensely. It made me realize that I can do meaningful work in almost any part of the world while still doing something I enjoy.”
- A Peruvian student concurred: “To be a part of this research team was a great honor for me due to the learning that took place. I learned a great deal about geologic mapping, hydrogeology, hydrology, and geophysics.”





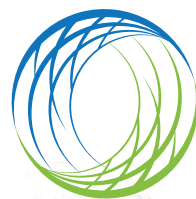
COMMUNITY IMPACT

Our project has left lasting positive impacts on the community of Zurite. In early 2020, construction was completed on 1.3 km of irrigation canals. A portion of the grant funding from GWB directly contributed to the completion of the canal project, extending the irrigation system to provide a secure source of irrigation water to croplands owned and operated by more than 100 families in Zurite. The community is extremely grateful for our support in expanding the canal network. They say that we should have a “great sense of satisfaction for having helped a small village.”

Additionally, the project supported the construction of a prototype sprinkler system that increases local irrigation efficiency. There are ample opportunities to aid in the

construction of relatively low-cost sprinkler systems that could connect to the existing canal network and serve the community to decrease downstream water demand.

Zurite and neighboring communities are eager to learn more about our scientific results, which have focused on the importance of peat-forming wetlands, known locally as “bofedales,” in sustaining perennial flow in the Ramuschaka. We have been invited by the community of San Jeronimo (a suburb of Cusco) to explore water resources emanating from deep, fractured bedrock and faults.



**GEOSCIENTISTS
without BORDERS®**

SOCIETY OF EXPLORATION GEOPHYSICISTS

Founding Supporter Schlumberger

THANK YOU

The organizers of this project are grateful for GWB’s support and hope to continue our high-impact work focused on science, society, and students in the future. There is much more work to be done!

GEOSCIENTISTS WITHOUT BORDERS® PROGRAM

Geoscientists *without* Borders® (GWB) serves as a catalyst bringing capable scientists together with communities to solve their problems. Many places around the globe facing severe water shortages, earthquakes, tsunamis, and other hazards are benefiting from the humanitarian efforts of geoscientists who are offering their specialized knowledge and technical skills to those in need. GWB provides funding and assists geoscientists and their teams in collaborating with multidisciplinary and community-based partners. Data is collected, processed, and interpreted to provide resources that result in a more accurate, efficient, sustainable humanitarian benefit to the communities. In total, GWB has supported more than 50 projects in 31 countries since inception. For more information about GWB, please visit seg.org/gwb.

2020 PROJECT LOCATIONS/GRANT RECIPIENTS

BRAZIL (SOUTH AMERICA)

Geophysics applied to geotechnical study in Ouro Preto, Minas Gerais, eastern Brazil (2 years); SGA – Sociedade de Geofísica Aplicada de Ouro Preto

EGYPT (NORTHEAST AFRICA)

Development of sustainable groundwater resources in Saint Catherine area, Sinai, northern Egypt (2 years); Texas A&M University – Corpus Christi

INDIA (SOUTH ASIA)

Enhancing community resilience: Integrated approaches for monitoring and early warning of landslides, western India (2 years); Amrita Vishwa Vidyapeetham University

PERU (SOUTH AMERICA)

Hydrogeophysics for community monitoring of groundwater in degraded dry forest quebradas, northern Peru (1 year); EcoSwell

UGANDA (EAST AFRICA)

Capacity building of Acholi people in Uganda to develop and manage village water supplies, northern Uganda (2 years); IsraAID

CORPORATE AND INDIVIDUAL INVESTORS

Schlumberger

founding supporter



ConocoPhillips

Endowment Funds: US\$1,789,500
Debra and Mark Gregg/KiwiEnergy Ltd.
(founding supporter)
Michael C. Forrest Honorary Endowed Fund

2020 STATS: APPLICATIONS 65 SUBMISSIONS 30 COUNTRIES

AWARDS/GRANTS 5 RECIPIENTS 5 COUNTRIES (PROJECT LOCATIONS)

4 TWO-YEAR PROJECTS 1 ONE-YEAR PROJECT **US\$328,087** TOTAL AWARDS VALUES FROM US\$28,200–\$100,000



seg.org/gwb

PROFESSIONAL DEVELOPMENT

SEG DISTINGUISHED LECTURE

BY ARIA ABUBAKAR

Abubakar is known for his passion, dedication, and expertise throughout SEG and the geoscience community. In addition to the vast number of patents, publications, and paper/abstract submissions, he has also presented more than 300 invited and contributed talks in international conferences, institutes, and universities.

Abubakar earned a doctorate degree in computational physics with cum-laude distinction from Delft University of Technology, The Netherlands. His thesis focused on numerical modeling and inversion of electromagnetic fields for biomedical and oil and gas applications. He started his industrial career at Schlumberger-Doll Research in Ridgefield, Connecticut. He has been working on a variety of topics where rigorous numerical optimization expertise is required. He is currently the head of data science and the scientific advisor for Digital Subsurface Solutions with Schlumberger.

Abubakar is active in various SEG activities. He currently serves as vice chair of the SEG Research Committee, Board director of the SEG Advanced Modeling Corporation, associate editor of *GEOPHYSICS*, and Technical Program co-chair for *IMAGE '21*. In 2014, he served as SEG Honorary Lecture for North America talking about one of his favorite topics: joint inversion of multiphysics data for petrophysical and engineering properties. During the lecture tour, he delivered more than 20 presentations for universities and professional societies.



In early 2020, Abubakar was preparing for his SEG-AAPG 3Q/4Q Distinguished Lecture tour focused on potential and challenges of applying artificial intelligence and machine learning methods for geoscience. This topic has become very popular in the geoscience community due to rapid advancement and ease availability of cloud computing technology.

The 2020 tour was to include 12 lecture stops. Unfortunately, the COVID-19 pandemic hit, and nearly all cities around the world went into lockdown. As a result of the consideration of safety, SEG decided to cancel all in-person lectures through the end of the year.

Therefore, Abubakar's lecture tour was switched to two global virtual lectures. While SEG continued to manage the marketing of the lectures, Knowledgeette organized the landing and registration pages for the presentations. Lectures were provided at no cost to attendees and the materials presented in virtual lectures was used as raw material to produce a professional recording. This video

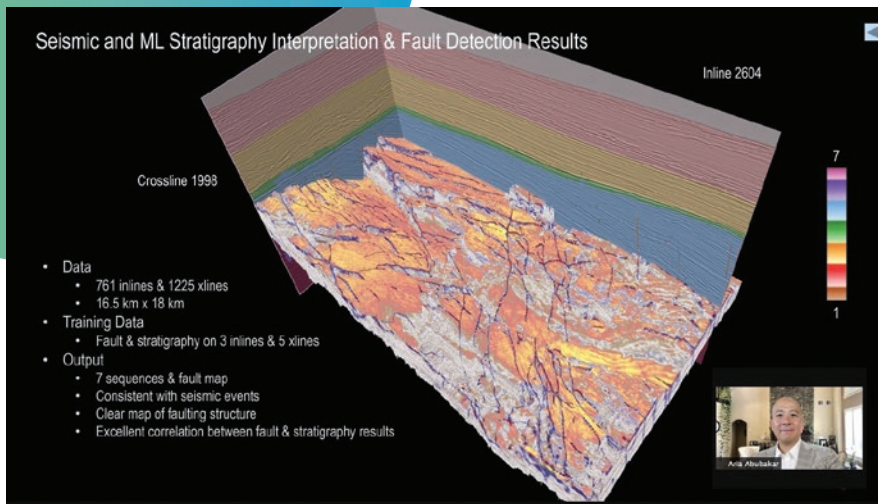
Potential and Challenges of Applying Artificial Intelligence and Machine Learning Methods for Geoscience

Aria Abubakar

2020 SEG-AAPG Distinguish Lecturer



Connecting the World of Applied Geophysics



DISTINGUISHED LECTURE PROGRAM

The Distinguished Lecture (DL) Program honors and recognizes outstanding individuals for their contributions and advancements to the fields of geophysics and geology. In addition to recognizing an individual's contributions to the science, the role of a Distinguished Lecturer is to promote geophysics, stimulate general scientific and professional interest, expand technical horizons, and provide a connection to SEG activities and practices.

recording is available at no cost to SEG members and available for a small fee to nonmembers on the SEG education/lectures webpages.

The first global virtual lecture, which was planned to accommodate North America and European attendees, took place on Tuesday 22 September and was attended by approximately 532 individuals. There were more than 60 questions submitted by the audience, but due to time limitations, only about a dozen questions were able to be answered during the time available.

The second global virtual lecture was planned to accommodate Far East attendees. It took place on Tuesday 27 October 2020. A large and active audience of 578 attendees participated, with more than 40 questions submitted.

Overall, Abubakar felt that the lectures were a success despite all of the challenges introduced by the pandemic and the virtual format not allowing for more interactive question-and-answer sessions. Additionally, in comparison to his 2014 Honorary Lecture tour, he missed the in-person interactions with students and colleagues before, during, and after the presentation. However, he gives kudos to SEG staff for arranging such smooth events and recognizes that virtual lectures allow SEG to reach a larger audience around the world. He hopes that when things get back to normal, SEG will once again offer in-person lectures (perhaps a reduced amount), augmented with a few virtual lectures.

Each year, two Distinguished Lecturers are selected to present topics of global interest. While these lectures are typically conducted in-person, they are also recorded for online viewing. For more information regarding the lecture programs, please visit seg.org/education/lectures or view lectures online at seg.org/ondemand.

2020 DL LECTURERS

DR. SERGY FOMEL: 1Q/2Q

Professor at the University of Texas in Austin (United States)
Title: "Automating seismic data analysis and interpretation"
Schedule: 23 presentations (21 in-person; two virtual), 2313 attendees

DR. ARIA ABUBAKAR: 3Q/4Q

Head of Data Science and Scientific Advisor for Schlumberger (United States)
Title: "Potential and challenges of applying artificial intelligence and machine-learning methods for geoscience"
Schedule: two presentations (two virtual), 873 attendees

CORPORATE AND INDIVIDUAL INVESTORS



Shivaji and Rumki Dasgupta

2020 STATS

25 PRESENTATIONS
(21 IN-PERSON, 4 VIRTUAL)

3186 RECORDED ATTENDEES

90+ COUNTRIES

seg.org/education/lectures

PROFESSIONAL DEVELOPMENT

SEG HONORARY LECTURE

BY PATRICIA DE LUGÃO

Patricia de Lugão received a BS in environmental engineering and water resources from the University of South Carolina, an MS in geophysics from the Observatório Nacional in Rio de Janeiro, and a PhD in geophysics from the University of Utah. After earning her PhD, she worked in the research department at Western Atlas in Houston, where she applied her knowledge in modeling and inversion to the development of algorithms for array borehole tools. de Lugão later moved to Brazil and in 2003 founded Strataimage Consultoria Ltda., foreseeing an interest in the new marine electromagnetic techniques that were being developed. In 2008, she participated in the first marine magnetotelluric survey offshore Brazil on the Santos Basin. Lugão was instrumental in helping establish electromagnetic methods onshore and offshore in Brazil, leading most of the recent commercial onshore surveys in the country.

de Lugão was invited to be the SEG Honorary Lecturer (HL) Latin America in 2020. Her lecture focused on environment-friendly exploration using magnetotellurics. The magnetotelluric method, due to its natural signal source, small crews, and relatively low cost, has proven to be an alternative to answering questions around the growing concerns regarding oil exploration and its environmental impact on new frontiers and in highly



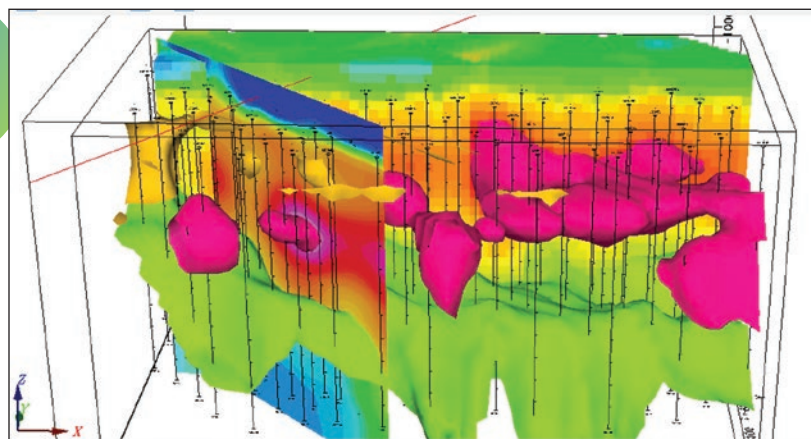
populated areas. Also, the low price of oil has pushed operators to search for methods that provide geologically meaningful information while using fewer resources.

“It was an honor to be invited to be the HL for Latin America. It was a great chance to further promote the magnetotelluric method, a little-known geophysical technique among oil and gas exploration that is within the idea of environment-friendly exploration. Also, I am always involved in educational

efforts, either at our technical societies or by giving lectures at universities, and the HL gave me the chance to reach a broader audience,” states de Lugão.

Although her work is in the industry, she is involved in teaching, advising students, and participating in thesis committees. In her company, she accepts students for internships along with new graduates, coaching and training them.

Due to the COVID-19 pandemic and SEG’s decision to cancel all in-person lectures in consideration of safety, de Lugão was unable to travel to the different cities in Latin America and interact with the audience. But, she felt the online format using Webinar Zoom and recordings hosted by the professional virtual lecture company, Knowledgette, had a good side — it reached audiences in other continents.



“I was pleasantly surprised to see that a large amount of people from all over the world were interested in the subject of magnetotellurics and attended the talk” she reflected. The virtual lectures took place on 17 September and 20 October and were attended by approximately 356 individuals.

de Lugão’s lecture was the first to use the “office hours” format, an informal meeting with the speaker after the talk for extra questions. She felt the office hours allowed interaction between the speaker and the audience,



almost like being in person, which was very important to give a live flavor to the talk.

Overall, de Lugão expressed that being an HL was a great experience. And after that, she was invited to participate in the SEG Distinguished Lecture Committee where “I hope to continue contributing to the community.”

HONORARY LECTURE PROGRAM

Each year, Honorary Lecturers transfer knowledge to six major regions of the globe with a mixture of live tours and virtual lectures. In addition, a Near Surface Global Lecturer delivers two virtual presentations attended by a global audience and recorded for online viewing. The regional focus of the lecture programs helps strengthen the services SEG provides to an expanding global membership. Lectures may be given in English or a language appropriate to the region, and all are recorded for online viewing. For more information regarding the lecture programs, please visit seg.org/education/lectures or view lectures online at seg.org/ondemand

2020 HL LECTURERS

SALEH AL-DOSSARY: MIDDLE EAST AND AFRICA

Consultant for Saudi Aramco (Saudi Arabia)
 Title: “Improving reservoir characterization using four innovative seismic technologies”
 Schedule: two virtual presentations, 159 attendees

PATRICIA DE LUGÃO: LATIN AMERICA

Founder of Strataimage Consultoria Ltda. (Brazil)
 Title: “Environment-friendly exploration using magnetotellurics”
 Schedule: two virtual presentations, 356 attendees

ANNA SHAUGHNESSY: NORTH AMERICA

Consultant (United States)
 Title: “Developing a successful career in geophysics today”
 Schedule: two virtual presentations, 352 attendees

JOHAN ROBERTSSON: EUROPE

Professor at ETH-Zürich (Switzerland)
 Title: “Generalized sampling and gradiometry: Changing the rules of the information game”
 Schedule: 11 presentations (eight in person, three virtual), 881 attendees

LISA GAVIN: PACIFIC SOUTH

Geophysicist for Woodside Energy (Australia)
 Title: “Regional to reservoir stress-induced seismic azimuthal anisotropy”
 Schedule: nine presentations (seven in person, two virtual), 258 attendees

XINMING WU: SOUTH AND EAST ASIA

Professor at the University of Science and Technology of China (China)
 Title: “Deep learning for seismic processing and interpretation”
 Schedule: five virtual presentations, 2475 attendees

2020 NEAR SURFACE LECTURER ESTELLA A. ATEKWANA

Dean of the College of Earth, Ocean, and Environment, University of Delaware (United States)
 Title: “Biogeophysics: Exploring earth’s subsurface biosphere using geophysical approaches”
 Schedule: two virtual presentations, 417 attendees

CORPORATE AND INDIVIDUAL INVESTORS



Shivaji and Rumki Dasgupta

2020 STATS

33 PRESENTATIONS
 (15 IN-PERSON, 18 VIRTUAL)

4898 RECORDED
 ATTENDEES

90+ COUNTRIES

seg.org/education/lectures

PROFESSIONAL DEVELOPMENT

SEG DISC

BY DAVE MONK

When SEG asked if I would be willing to be their Distinguished Instructor Short Course (DISC) instructor for 2020, I couldn't possibly turn the opportunity down. Not only was this a great honor, but I thought I could put something together that would have real value for the audiences that I anticipated lecturing. It would also bring the opportunity to tour the world and reconnect with many of the people I had worked with over the years. This was at the beginning of 2019.

SEG sets a rigid timetable for DISC instructors, and development of the accompanying book is perhaps the biggest task that the instructor faces. It's daunting, and writing and editing the book *Survey Design and Seismic Acquisition for Land, Marine, and In-Between in Light of New Technology and Techniques* took six months. SEG requests an early draft of the book so they can arrange publication and printing well before the first lecture. Once written, edited, and published, the actual lectures are far less of a problem for the instructor. The biggest work is done!

The course was designed to help those involved in designing and acquiring seismic surveys better understand how some traditional ideas have changed as technology has evolved. Traditionally, surveys would never have involved many sources being recorded at the same time. Typically, the seismic data would come from regularly sampled shots and receivers and be examined as the data were recorded.

Today, many of these aspects of seismic acquisition have been turned on their head. Data can be recorded in randomly located receivers, with tens of sources all working at the same time and no chance to examine the data until they reach a processing center. Conventional rules and "rules of thumb" need to be understood, but it also needs to be understood when they can be ignored and what new rules exist.

So, when the book was delivered (on time) in 2019, SEG started to prepare a tour schedule around the world for 2020. Visits would include many stops in the Middle East, Europe, South America, Australasia, and Africa. It looked as though I would spend much of 2020 out of the United States, delivering the DISC lecture, with travel dates starting in January... and then the world changed.



We all know now that 2020 was not a normal year. As a result of COVID-19, early DISC lectures were slowly canceled, and by the middle of the year, it looked as though there would be no opportunity to present a conventional DISC lecture in 2020. So, SEG adapted to a new world.

SEG's first request was for production of a set of videos that could be presented at any time and watched at will by members of the Society. A traditional DISC lecture is a day (an eight-hour lecture), but during the lecture I would have the opportunity to dwell on subject matter most relevant to a particular audience. But, for a video series, I needed to cover everything. The videos are broken into the various chapters of the book, but if watched together, they run far longer than a traditional DISC lecture.

At the 2020 SEG Annual Meeting, two things changed the DISC course for the year. The first was that the DISC Committee decided they would delay and reset the period for DISC lectures so they would run between Annual Meetings. My year was about to start; and to prove it, the first-ever virtual DISC was delivered as part of the 2020 SEG Annual Meeting.

“THE SEG DISC OFFERS AN ENVIRONMENT FOR PARTICIPANTS TO LEARN AND INTERACT WITH SOME OF THE MOST ACCOMPLISHED INDIVIDUALS IN THE INDUSTRY.”

The lecture was broken into two four-hour sessions on consecutive days. The course was well attended, and virtual DISCs looked as though they would be the way forward. But, the committee agreed to hold off until Q1 2021 to see whether travel might be possible in the later half of the new year.

In the interim, some of the issues with virtual courses have become apparent. Interaction with a live audience is always easier than a remote audience, and when it comes to questions it's always difficult to limit discussion in a way that doesn't delay the schedule. I've been told by one participant in a virtual presentation that "It's a great way to do things as it's so convenient." But, when lecturing around the globe, "convenience" may often only be true for one end of the discussion if there is a 12-hour time difference.

Over this period, the course has evolved. It's unusual for lectures to be presented so long after the book was written (it's now nearly two years old), and even in this short period, technology has changed. But, the lecture material has evolved as well, and future lectures will capture some of the changes in the recent past, which cannot be in the book.

More virtual courses are being planned, and I still hold out hope (perhaps forlorn) that some real live DISC courses might be possible in 2021. I'm vaccinated and can be tested and ready to roll to your part of the world. But of course, your part of the world might not yet be ready for tourists and lecturers.

DISTINGUISHED INSTRUCTOR SHORT COURSE

The SEG DISC offers an environment for participants to learn and interact with some of the most accomplished individuals in the industry. This popular eight-hour one-day short course focuses on a topic of current and widespread interest. DISC instructors are nominated, prestigious, world-class individuals who tour globally, as well as, are recorded for online viewing. The DISC program continues to be a long-standing high-level SEG resource. For more information regarding DISC, please visit seg.org/disc.

2020 DISC INSTRUCTOR

DAVE MONK

Retired Director of Geophysics for Apache Corporation (United States)

Course title: "Survey design and seismic acquisition for land, marine, and in-between in light of new technology and techniques"

Schedule: two virtual presentations, 89 attendees

CORPORATE AND INDIVIDUAL INVESTORS

Endowment funds: US\$418,000

Richard and Fran Baile and others

2020 STATS

2 PRESENTATIONS
(VIRTUAL)

89 ATTENDEES

10 COUNTRIES

PROFESSIONAL DEVELOPMENT SEG WIKI

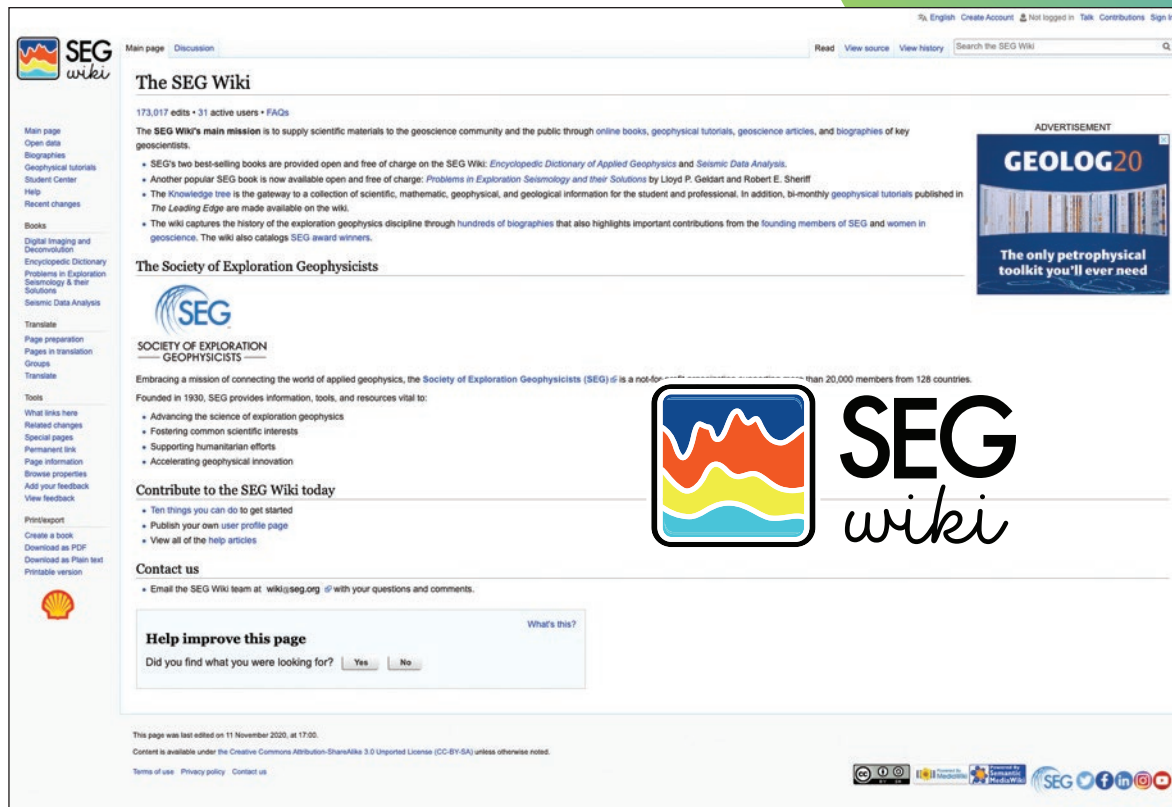
An encyclopedia of applied geophysics, the SEG Wiki is a publicly accessible and editable website, open to all users registered with SEG. The SEG Wiki's main mission is to supply scientific material to the geoscience community and general public through online books, geophysical tutorials, geoscience articles, and biographies of key geoscientists, and to engage emerging and established professionals.

The wiki is maintained by volunteers, strategic university partnerships, the SEG Community Content Committee, and readers throughout the world. SEG encourages its members to create a profile and make additional edits to the content as needed. For more information regarding the SEG Wiki, please visit wiki.seg.org.

2020 ACCOMPLISHMENTS

Work continued by the Geophysical Society of Houston in making geophysical artifacts images searchable for the virtual museum. The virtual museum currently has more than 1440 pages with images.

The Latin America Regional Affairs Advisory Committee is working on a Spanish translation of *Digital Imaging*



and Deconvolution: The ABCs of Seismic Exploration and Processing by Enders Robinson and Sven Treitel.

Contributions to the SEG Wiki also continue to be received from the partnership with Heather Bedle of the University of Oklahoma. Her students wrote and submitted new articles to the SEG Wiki for the third consecutive year.

CORPORATE INVESTORS



2020 STATS

15,713 EDITS
MADE TO THE WIKI IN 2020

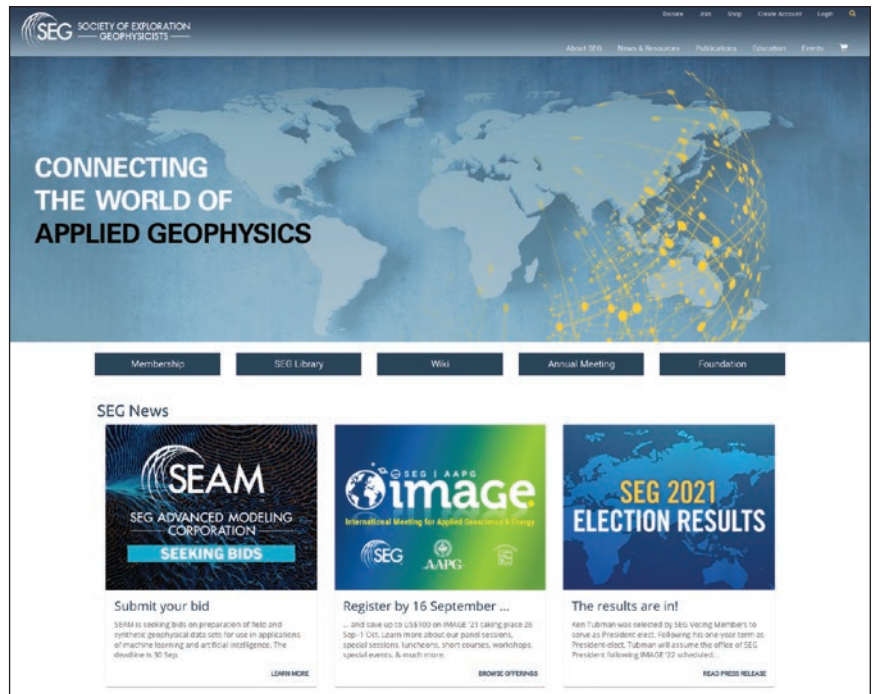
159,618 TOTAL CHANGES
TO THE WIKI AND COUNTING

wiki.seg.org

SEG ONLINE

Members benefit from SEG's leading online services and value-added content concerning all things geophysics. SEG works diligently to add value for its members and other visitors by producing and maintaining online information that is useful and timely.

Ongoing efforts are made to leverage information and technology in an efficient, productive, and secure manner. Improved security features of the website help visitors feel secure when navigating content and when providing personal and payment information to SEG for transactional purposes. Improving search features and functionality, updating promotional items, allowing visitors to opt-in to targeted e-mail campaigns, and enhancing the dues renewal process for members



are just some of the ways that SEG enriches its website experience. SEG also manages the appropriate hardware, software, networking, and communications infrastructure for automation.

SEG ON DEMAND

Offering industry expert-led programs on big ideas, SEG on Demand allows access to geophysical resources for thousands of geosciences students and professionals around the globe. The SEG on Demand platform offers a learner-friendly environment, giving users access to recordings of SEG's Distinguished Instructor Short Courses, virtual courses, Distinguished and Honorary Lectures, and Annual Meeting Technical Programs. In addition, learners have access to a full library of International Human Resources Development Corporation e-learning courses. With BGP's added support, SEG has been able to translate many of its virtual resources into Mandarin for further global reach.

CORPORATE AND INDIVIDUAL INVESTORS

SEG on Demand



SEG Online

Endowment funds: US\$221,500
Rutt Bridges and others

2020 STATS

US\$56,085 SUPPORT TO SEG

seg.org



EXPERIENTIAL LEARNING

SEG EVOLVE

BY QAZI SOHAIL IMRAN
2020 TEAM LEAD, UTP EXPLORERS

Qazi Sohail Imran is a PhD research scholar at the Universiti Teknologi PETRONAS (UTP) in Malaysia. He has extensive experience in 2D/3D seismic data interpretation, along with emphasis in 2D/3D seismic data acquisition (planning, designing, monitoring, and quality control). Imran led the UTP EXPLORERS team during the 2020 EVOLVE student program.



EVOLVE reminds me of a wonderful and memorable learning experience in my life. It not only groomed me as an individual, but trained me on how to work in a team. I, along with my multidisciplinary team of geologists, geophysicists, a petrophysicist, and a petroleum engineer, embarked in EVOLVE in January 2020.

Steering team members from five different countries was a challenging task for me. In just the third month of EVOLVE, COVID-19 struck the world. The university closed, and we started having difficulties in meeting face to face and accessing the software installed on university machines. It was a tough time when a few of our team members couldn't continue, but the rest of the team stayed the course.

Our EVOLVE mentors and management played a crucial role in steering us through this situation. It was the first

time that most of us were being exposed to the entire process — from prospect generation, to economics, to production. EVOLVE pushed us to overcome the diverse challenges and helped us put theory into practice. The program gave us a better understanding of the oil and gas industry's upstream exploration, economic, and production side. We faced realistic challenges and worked as a team to find viable solutions.

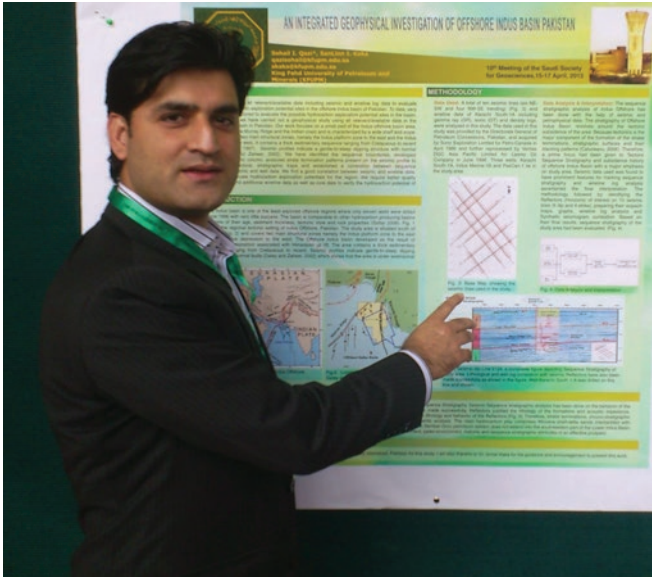
All in all, it was an amazing experience to participate in EVOLVE 2020. We gained an excellent understanding of geologic and geophysical analysis in a multidisciplinary subsurface data integration project. EVOLVE also helped in the development of interpersonal skills. Communicating with and assisting fellow participants was a whole new experience. New acquaintances and lifelong bonds were formed.

I found EVOLVE to be the best collaborative program that industry professionals mentor. I would highly recommend EVOLVE to young and experienced professionals alike who are interested in career and interpersonal development. I would like to thank all mentors and sponsors who make this program possible.

EVOLVE PROGRAM

SEG EVOLVE offers students direct experience in conducting integrated subsurface analyses using real-world seismic, wireline, production, and other data. Project management, teamwork skills, and business values are honed within the context of exploration, reservoir appraisal, field development planning, and production-enhancement scenarios.





Each team of four to six students, with backgrounds in geology, geophysics, petrophysics, and reservoir engineering, work together to review a technical data set. The teams use a range of locally installed Petrel, Kingdom, or DecisionSpace® software for their work.

Teams 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. The program links experienced mentors to student teams, empowering participants to solve the types of realistic challenges they will encounter when they start working. For more information regarding the SEG EVOLVE program, please visit seg.org/evolve.

2020 ACCOMPLISHMENTS

14 teams presented their “Best Investment Presentation” virtually during the 2020 Annual Meeting.

CORPORATE AND INDIVIDUAL INVESTORS

Michael C. Forrest
Rocky and Leisa Roden
Other individual donors

See Page 46 for a complete list of EVOLVE teams.

2020 STATS

114 PARTICIPANTS

223 STUDENTS

HAVE COMPLETED THE EVOLVE PROGRAM SINCE INCEPTION

23 TEAMS

18 COUNTRIES



“EVOLVE PUSHED US TO OVERCOME THE DIVERSE CHALLENGES AND HELPED US PUT THEORY INTO PRACTICE.”

seg.org/evolve

EXPERIENTIAL LEARNING GROUNDWATER EVALUATION FIELD CAMP IN KENYA

BY DOROTHY KANINI MWANZIA

The 2020 geophysical field camp by the Jomo Kenyatta University of Agriculture and Technology (JKUAT) SEG Student Chapter aimed to conduct an integrated geophysical study for groundwater potential evaluation in Kathimani-Ndalani, Kenya. The study area covered the region to the west of a previously explored area (field camps in 2015 and 2016 in Matuu-Kilango), with the intention to delineate the western extents of the inferred faults and low-resistivity zones. These zones are possible water conduits and model the western characteristics of the aquifers.

The main purpose of the 2020 field camp was to carry out an integrated geophysical survey (resistivity and gravity) to investigate the extent of the overall anomalous zone identified in 2016 from gravity, resistivity, and magnetic surveys. Specifically, the purpose was to delineate possible geologic structures (faults and fractures) for groundwater resource existence. The program, other than being an application of science to address water challenges in Yatta, was equally to educate students in conducting basic research in an actual field environment away from the classroom.

We conducted the project within three weeks. The students were trained on safety and precaution measures when carrying out fieldwork before the



study. Two techniques were applied: resistivity and gravity. Following the completion of the data acquisition process, the participants were taken through analysis of the data and interpretation of the results, and findings were presented at a physics departmental seminar.

There were 15 students from JKUAT who took part in this field camp. Three of which were postgraduate students (geothermal, geophysical exploration technology), and the remaining 12 were undergraduates (geophysics). One additional undergraduate student (geophysics) joined the JKUAT group from Kabete National Polytechnic. There were also two faculty members, a technician, and three drivers. All students were involved in every phase of the data collection, analysis, and interpretation.

The results of this study showed that Ndalani-Matuu area has groundwater potential; this is supported by the mapping of faults and fractures and high subsurface resistivity to the north. Gravity results showed a substance of low density along the same region. It was suspected that around this region, there could be fractures in the bedrock that are probably filled with groundwater or sediments. Borehole sites at the northern side of the study area have a high possibility of registering a relatively greater percentage of success, especially along the overall anomalous zone compared to the rest of the regions within the study area.

SEG COMMITTEE REPORT

The 2020 SEG 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. SEG received 36 applications for funding — a 20% increase from 2019.

During this unprecedented time of COVID-19, the SEG committee and staff worked with 2020 awardees over the summer to ensure that Health, Safety, Security and

Environment (HSSE) plans and modifications to field plans due to the pandemic were carried out. Many field camps still happened after modifications to the original HSSE plan; however, a number of field courses did have to reduce the number of participants in order to follow guidelines for physical distancing.

FIELD CAMP PROGRAM

In 1993, a 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. This is often the first hands-on experience many students will have in the pursuit of their geophysical career. Grant funding is intended to support projects that promote professional development, student support, and youth outreach goals, as well as valuable field training that emphasizes safety and high-quality learning. For more information regarding the SEG Field Camp program, please visit seg.org/fieldcamps.

CORPORATE AND INDIVIDUAL INVESTORS



- Endowment funds: US\$795,000
- Rutt Bridges Summer Field Camp Grants
- Richard Degner Field Camp Grants
- Hank Hamilton Field Camp Grants
- O. S. Petty Field Camp Grants
- SAGE Field Camp Grants

See Page 46 for a complete list of recipients.

2020 STATS: APPLICATIONS

36 SUBMISSIONS **11** COUNTRIES **US\$445,375** REQUESTED FUNDING

AWARDS/GRANTS

9 RECIPIENTS* **7** COUNTRIES **200+** STUDENT PARTICIPANTS

US\$72,354 TOTAL AWARDS (AVERAGE \$8039)

*16 field courses were selected for grants; 7 canceled due to COVID-19 restrictions

STUDENT PROGRAMS

BEST STUDENT CHAPTER

BY ALIREZA MALEHMIR, FACULTY ADVISOR, UPPSALA UNIVERSITY



Uppsala University (Sweden) launched its SEG student chapter in 2009, and has been actively involved in various activities since then. The chapter runs its Geochampionship

competition every year, with more than 30 students and senior staff members teaming up for the title. Chapter officers also attend student-related events in conjunction with the SEG Annual Meeting. An approved SEG Geoscientists *without* Borders® (GWB) project on quick-clay landslide studies in Nordic countries, allowed several undergraduate and graduate students to participate from various countries including Indonesia, Germany, Sweden, and Norway.

Uppsala SEG Student Chapter activities peaked during 2018,

with several new initiatives aiming to promote the value of applied geophysics among geoscience students. The chapter held Coffee Stations during various occasions in our department and at public events (e.g., SciFest) and resurrected the 8th International Geoscience

Student Conference (IGSC2019), which was idle for three years. Therefore, it was not surprising that the chapter was awarded as the most improved student chapter of 2018.

Many students from Uppsala worked hard to organize IGSC2019. Through this, the students exercised their management and leadership skills. They practiced proposal writing and boosted their networking skills in order to ensure that IGSC would run smoothly and

with the sufficient resources needed to host more than 80 students and guest speakers from across Europe. This included the SEG Distinguished Instructor Short Course instructor, a mini exhibition, and two networking opportunities for students and industry participants. Thanks to SEG and other sponsors who helped make this event possible.

The student chapter network definitely grew. This helped the chapter join forces with the chapter in Berlin and secured an SEG field camp grant. Despite being conducted during the COVID-19 pandemic and with complications in safety and logistics, we were able to run a fantastic field camp involving 16 students from Germany and Sweden and field teachers. The Uppsala University student chapter was awarded by SEG with a summit-level position and the best student chapter of 2020 shortly after the chapter's 10th anniversary.

Members of the chapter have been creative during the COVID-19 pandemic, introducing the “e-Fika Series with

Geophysics” to keep the network engaged. This has helped bring new faces to the series and has connected older and younger students from Uppsala. In essence, the network has grown again, and new possibilities for students have emerged.



TATIANA- “Being a part of the

chapter is an opportunity that brought me many positive experiences — from meeting incredible people with similar goals to improving my academic and leadership skills. During the time that I have been participating in the chapter, I took an active role in the field camp, which strengthened my knowledge in applied geophysics and allowed me to network with other SEG chapters. I am very grateful that our chapter was awarded the best position because it is the result of the hard work from past chapters and all of the current members. I am

looking forward to seeing more and am excited to see what comes next for us!”

EMMANUEL- “It has been awesome to see how the SEG activities, especially the sponsored field camps, can help bridge the gap between theory and practice while improving one’s organizational and leadership skills. Going forward, I see myself better suited to face life after studies through the skills gained while working within a smart and dynamic multicultural group at UU. Thanks to the SEG sponsors!”

ERINA- “I began to know about SEG from senior students when I was studying for my undergraduate degree in my home country of Indonesia. As young students in geophysics, we were introduced to SEG as an organization for geophysicists around the world to share their activities, news, ideas, and research collaborations without boundaries. When I started to study geophysics for my master’s degree at Uppsala University, I knew that the chapter was there and active. When I joined the chapter as an officer, I realized that I was quickly improving my time-management and communication skills.”

SHELLY- “My experience as the representative of our chapter attending the SEG/Chevron Student Leadership Symposium in San Antonio was great. I met other chapter members and this gave me the courage and motivation to make our chapter innovative and one of the best ones in the world. I am grateful for everything I have learned, for the friendships and networks I have built, and for the chapter officers and faculty advisor. It was a fantastic time worth every second to recall!”

STUDENT SUPPORT/STUDENT CHAPTERS

SEG strives to create a culture of leadership that will take the geophysical community forward for years to come. Because a student’s sense of belonging can be a strong predictor of their eventual success, SEG is committed to providing budding geophysicists with as



many tools and networking opportunities as possible as they grow into their geophysical career.

SEG student chapters are an excellent resource to increase interest among students of geophysics. By providing opportunities for leadership, achievement, and cultivation of ideas, student chapters open the door for students to actively participate in projects and initiatives that promote geophysics. For more information on SEG student chapters, please visit seg.org/studentchapters.

RECIPIENTS/AWARDS

2020 BEST SEG STUDENT CHAPTER

Uppsala University, Sweden
US\$5000 award

2020 MOST IMPROVED STUDENT CHAPTER

Industrial University of Santander, Colombia
US\$1000 award

INDIVIDUAL INVESTORS

Endowment funds: US\$2,031,000
Student Support Fund anonymous donor
SEG/Rutt Bridges Emerging Nations Grants
Brian Sabin Student Support Fund

2020 STATS

17 OUTREACH GRANT
APPLICATIONS RECEIVED

10 RECIPIENTS

US\$8808 OUTREACH
AWARDS

230 CHAPTERS
(9 NEW IN 2020)

54 COUNTRIES

seg.org/studentchapters

STUDENT PROGRAMS

SEG SCHOLARSHIPS

BY JIABIN LIANG

As the recipient of the SEG Michael L. Batzle Scholarship Award for the last two years, I feel deeply honored and motivated. Among so many students studying geophysics, my potential to contribute to the Society is acknowledged by the granting of the scholarship. Now, it is my responsibility to turn this potential into reality.

As a PhD student at Curtin University in Australia, I am enthusiastic about exploring the unknown territory and pushing the limit of our knowledge in geophysics. In my studies, I am responsible for starting a new research area in our group, which is digital rock physics (DRP).

The relationships between reservoir characteristics and observed seismic properties are referred to as rock physics. Analytical models of rock physics rely on idealized microstructures and simplify the physics of rock deformation. For example, rocks are often modelled as solid particles with isolated ellipsoidal. DRP aims to overcome this limitation. In DRP, 3D geometry of the mineral and pore phases of a rock is imaged to digitize the sample into a data set. Micro-tomographic (micro-CT) is the most popular method to acquire such pore-scale information, which is obtained from the local X-ray absorption difference. Then, various physical processes can be simulated on this digital rock sample to quantify the corresponding effective rock properties.

With the recent development of high-resolution 3D imaging techniques and ever-growing computational resources, DRP has the potential to provide a comprehensive analysis of rock properties and to simulate various conditions and processes that would be time and cost demanding if they were to be performed in the laboratory.

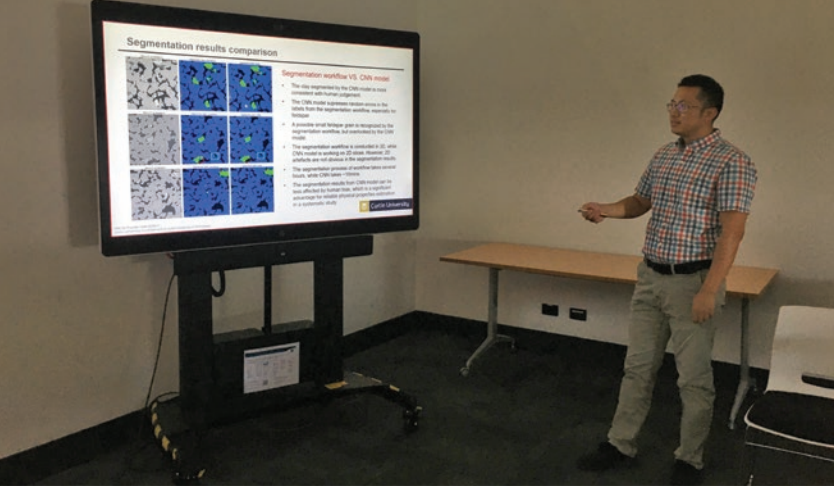
In the field of DRP, there has been a long-standing obstacle, which is segmenting grayscale micro-CT images into multiminerallabels for the following



numerical simulation. For this purpose, I designed an advanced workflow to bring the ability of handling this challenge to a much higher level. Furthermore, I built an artificial neural network to automate this effective but laborious process. My other contributions to the DRP area include understanding the confining pressure effect on the micro-CT images and the grain contact handling in the numerical simulation. My work so far in my PhD studies has been or will be published in four high-level peer-review journal papers.

In my research process, the SEG scholarship is absolutely a boost. It allows me to take advantage of educational resources. For example, I took a machine learning engineering online course, which would have been too expensive for me alone. After the course,

“THE MENTAL ENCOURAGEMENT OF SEG IS EXTREMELY IMPORTANT”



I turned the knowledge into a powerful tool in micro-CT image feature extraction for rock-physics study. I am constantly arming myself with the most recent and advanced scientific tools and applying them in geophysics. The support of the SEG scholarship makes it much more facilitated.

Besides the financial support, the mental encouragement of SEG is also extremely important. I feel that my work is of value and expected to make a difference. Being awarded a scholarship with the name of a scientist who devoted himself to the geophysics world has especially encouraged me to follow his path.

Receiving an SEG scholarship has supported me, and I will pass on the power to others. I served as secretary of an SEG student chapter to promote geophysics with students and help them to be more attracted to the industry. I sincerely hope to contribute more in the future.

Thank you again for granting this scholarship to me!

SCHOLARSHIPS PROGRAM

Since its inception in 1956, the SEG Scholarships Program has been helping advance the field of applied geophysics by encouraging students who excel in the geosciences. Almost US\$11 million in scholarship money has been awarded to date to the top geosciences students based on merit.

From freshmen just beginning their education to PhD students doing research to advance the field, SEG scholarship awardees are recipients of the most prestigious geoscience scholarships in the world. The number scholarships awarded depends chiefly upon the number of donors and the amounts they contribute. For more information about SEG scholarships or to become a donor, please visit seg.org/scholarships

CORPORATE AND INDIVIDUAL INVESTORS



Endowment funds: US\$8,140,000
46 individual, 15 corporate, 10 sections/societies funds

See page 45 for a listing of the 2020-2021 scholarship awards.

2020 STATS: APPLICATIONS

494 EVALUATED **236** UNIVERSITIES **47** COUNTRIES

AWARDS/GRANTS

123 RECIPIENTS **73** UNIVERSITIES **25** COUNTRIES

US\$322,332 TOTAL AWARDS
VALUES FROM US\$500-\$10,000

seg.org/scholarships

STUDENT PROGRAMS

SEG/CHEVRON STUDENT LEADERSHIP SYMPOSIUM

SEG strives to create a culture of leadership that will take the geophysical community forward for years to come. The SEG/Chevron Student Leadership Symposium (SLS) focuses on leadership, teamwork, and community skills building for student participants. Chevron is a vital supporter of the program, both financially and in providing materials, speakers, and representatives to lead team activities.

SLS is typically conducted immediately preceding the SEG Annual Meeting. Therefore, as the conference converted to an online experience as a result of the COVID-19 pandemic, so did the SLS experience. In the end, the virtual 2020 SLS involved 54 SEG student chapter officers representing 28 countries. Awarded students joined Chevron and SEG volunteers online for guest speaker presentations, question and answer sessions, team building activities, and panel discussions throughout the month of October. Topics discussed included personal effectiveness, professional success, leadership skills, diversity and inclusion, importance of Health, Safety, and Environment, and SEG benefits for students and emerging professionals. Students were also awarded registration to attend the Virtual SEG Annual Meeting Experience and provided recorded poster presentations about their chapters in the Student Chapter Spotlight program.

A few words of thanks from 2020 SLS participants are below.

“In this online experience, I had the opportunity to understand that knowledge is not enough to be successful. I have to develop soft skills and look for opportunities. The session about diversity and equity had an exceptionally great impact on me. Since then, I have thought a lot about how I can include more students to be a part of SEG and the positive effects this could have on the Eötvös student chapter members’ everyday lives. I have learned a lot about how I could be a better leader and how I should motivate the members of my chapter.” — Betti Hegyi, Eötvös Loránd University Student Chapter (Budapest, Hungary)

“All the lessons I got from this event are precious and applicable. I believe they will help a lot in pursuing my academic career and my professional career in the future. As I said in my essay application, an achievement for me is when I’m able to learn and grow

better. SLS is another achievement in my life. Meeting international friends with various cultures, accents, and languages shows me the true beauty of this world.” — Hoiriyah Putri Septiani, University of Brawijaya Geophysical Society (East Java, Indonesia)

“Your continued support of this program demonstrates your desire to provide impactful educational experiences and development opportunities for students, and for that, I am very grateful. After participating in this program, I can confidently say that I have significantly developed my leadership skills and look forward to further developing and applying these skills moving forward in a career in geophysics. I have learned ways to improve my communication skills, and my improved awareness of diversity and inclusion will dramatically improve my career and my desire to serve as a leader in society. In a year filled with uncertainty and difficulties because of the COVID-19 pandemic, this was a very positive and exceptional educational experience.” — Michael King, Memorial University of Newfoundland SEG Student Chapter (Newfoundland, Canada)

STUDENT LEADERSHIP SYMPOSIUM

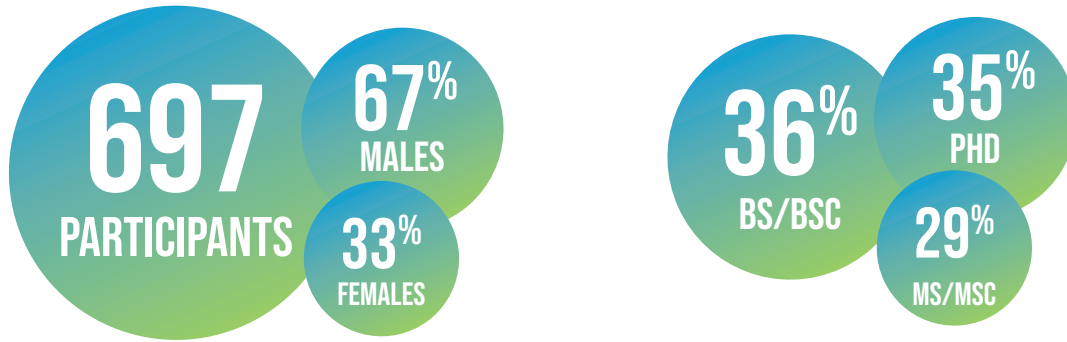
SLS focuses on leadership, teamwork, and community skills building for 50 student participants who are all active officers of their SEG student chapters. This program, immediately preceding the SEG Annual Meeting, includes an address by the SEG president, best-practice presentations from select student chapters, professional leadership coaching, an organized team-building activity, and a strategic problem-solving session with the SEG Board of Directors and other Society leaders.

Chevron additionally supports the program by providing materials, speakers, and representatives to lead team exercises. Traditional student travel grants cover the expenses for travel, lodging, and registration to the SEG Annual Meeting. For more information regarding SLS, please visit seg.org/sls.

CORPORATE INVESTOR



SLS BY THE NUMBERS (2007-2020)*



*2010-2020 classification data (556 participants)

2020 STATS: APPLICATIONS

91 APPLICANTS (APPLICANTS MUST BE ACTIVE SEG STUDENT CHAPTER OFFICERS)

AWARDS/GRANTS

54 RECIPIENTS **51** UNIVERSITIES

22 FEMALES **32** MALES **18** PHD STUDENTS **16** MS/MSC STUDENTS **20** BS/BSC STUDENTS

28 COUNTRIES **US\$4860** TOTAL REGISTRATION AWARDS

SEG-CHEVRON SLS 2020

THANK YOU!

SLS AWARDEES 2020

seg.org/sls

STUDENT PROGRAMS

SEG CHALLENGE BOWL

BY AFEEZ POPOOLA, PHD STUDENT IN THE EARTH SCIENCES
DEPARTMENT AT THE UNIVERSITY OF TORONTO

My affiliation with SEG dates back more than a decade ago to my undergraduate days. I have benefited from various SEG student programs at different stages of my education, and I must say that I enjoyed and learned a lot from the programs. SEG strives to encourage and engage students in geoscience-related disciplines to take an active part in the organization's programs.

My participation in the 2020 Challenge Bowl should have been a different story for several reasons. From the start, I wanted to participate, but I could not find a teammate from my school at the University of Toronto willing to travel to Calgary, where the GeoConvention takes place. It is usually a challenge to get support that covers these travel expenses.

However, due to the COVID-19 pandemic, the GeoConvention had to be conducted online, and the opportunity to participate in the regional Challenge Bowl opened to all students across Canadian universities, as travel to Calgary was no longer required. Therefore, a chance to have fun, test my broad knowledge about our profession, and meet new people, albeit virtually, opened.

Interestingly, according to the emcee, Dr. Peter Duncan, our regional semifinals was used to test the buzzer system that was later used in the online SEG Challenge Bowl World Finals. So, it was a lot of fun and excitement mixed with uncertainties about the new virtual quiz technology using a buzzer several miles away.

The format of the regional finals was somewhat different from the traditional way of team participation. Instead, each person participated as individuals, even though you may be from the same university. I believe the 2020 regional event attracted more participants from different universities across Canada than it had in the past.

The competition took place over a Zoom call, and the buzzer app was used to answer the questions. It was fun! Although there were glitches due to internet issues, the event went on smoothly in general.

At the end of the almost two-hour virtual event, Adam Brudner from the University of Toronto emerged the winner, Paulina Wozniakowska from the University of Calgary was in second place, and I was in third place.



My story continued as SEG ended up approving two teams from Canada, which allowed me, in third place, and another student from the University of Calgary, in fourth place, to participate in the World Finals. The Canadian Society of Exploration Geophysicists Challenge Bowl organizer gave us the opportunity to form the two teams as we wished. The easy and unanimous choice was to form the teams based on our universities, because we had two participants each from the University of Toronto and the University of Calgary.

A month after the regional semifinals, it was time for the SEG Challenge Bowl World Finals. The event is usually hosted in person as part of the SEG Annual Meeting. However, due to the COVID-19 pandemic, the main event had to go virtual. Although there were other student events that could not proceed virtually, I am glad that Dr. Duncan and other SEG program staff were able to adapt the Challenge Bowl to take place online.

Adam and I virtually joined other participants from around the world. We named ourselves "Team Tuzo" after the late Professor J. Tuzo Wilson, a legendary University of Toronto geophysicist and plate tectonics pioneer.

Adam had high hopes for our team stating, "we have a strong team with complementary knowledge of geology and geophysics." Adam was completing his MS in geology, with his research related to tectonics and hard rocks studies. I was starting the second year of my PhD in geophysics, and my research was in experimental rock physics. Adam was also good with general and random knowledge not usually taught in a typical earth sciences curriculum.

In the end, we combined our knowledge to emerge as the winners of the 2020 SEG Challenge Bowl World Finals, despite a slow start at the initial rounds of the



quiz. I think our win reflects the importance of synergy among the various geoscience disciplines, as we tackled some difficult geoscientific questions.

SEG recognizes that the future of the geoscience profession lies in how well trained and engaged the younger generations are, which is also reassuring to many of us who are still going through geoscience education. Therefore, I wish to express my sincere gratitude to SEG for the continued support for student programs.

My personal goal after my studies is to remain in academia, helping to continue to train future generations of geoscientists while contributing to solving some of the challenges facing our planet.

CHALLENGE BOWL WORLD FINALS

The SEG Challenge Bowl competition is a unique event that combines knowledge, competition, and fun. This international contest tests students' breadth and depth of knowledge about the field of geoscience. Contestants try to push the buzzer first to answer challenging geoscience questions on topics including geology, geophysics, geography, and geodesy. Questions about the history of the science and the Society are also featured. Geoscience

questions range in difficulty from second- and third-year undergraduate level to first-year graduate school.

Winners of regional competitions compete in the SEG Challenge Bowl World Finals in conjunction with the SEG Annual Meeting. For more information about the SEG Challenge Bowl, please visit seg.org/education/student/seg-challenge-bowl.

INDIVIDUAL INVESTORS

Numerous individual donors
 Endowment funds: US\$365,144
 Fred and Kathi Hilterman
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RECIPIENTS/AWARDS

FIRST PLACE — Adam Brudner and Afeez Popoola, University of Toronto, Canada

SECOND PLACE — Salvatore Buoninfante and Luigi Bianco, University of Naples Federico II, Italy

THIRD PLACE — José Daniel Rosas Avila and Nelson Alejandro Gil Vargas, University of Texas at Austin, United States

2020 STATS: WORLD FINALS

7 COUNTRIES REPRESENTED

15 TEAMS COMPETED

30 TOTAL STUDENTS

US\$1500 TOTAL AWARDS

seg.org/education/student/seg-challenge-bowl

STUDENT PROGRAMS

NEAR SURFACE GEOPHYSICAL RESEARCH AWARD

BY DANIEL LOCCI LOPEZ

SEG honored Daniel Locci Lopez, a PhD student in geology and geophysics at Louisiana State University (LSU), as the 2020 Near Surface Geophysical Research Award recipient. Lopez was selected for his work in studying seasonal seepage fluid flow and pressure on the landside of artificial levees in the Lower Mississippi River Valley, Louisiana.

Lopez is interested in understanding pressure and permeability using time-lapse near-surface techniques such as shear-wave seismic reflection and electrical resistivity tomography (ERT) during varying river water levels in the Mississippi River. He is focusing on integrating granular contact theory and total stress principles in unconsolidated media to predict pressure along the floodplain using shear-wave velocities. He is also integrating machine learning techniques to predict

soil type and permeability using shear-wave seismic velocity, electrical resistivity, and borings in the area.

Moreover, Lopez has conducted and planned several seismic data and ERT acquisitions on the floodplain area of the Mississippi River as means of quantifying the physical properties of the near-surface point bar sediments. He is continuously looking for motivated geoscience and engineering students to help with the fieldwork and who want to learn about the acquisition techniques. At the same time, these activities help improve the awareness and interest of the SEG student chapter at LSU.

Lopez has always been interested in doing data science integration. "I am interested in applying my expertise in geophysics to problems that require multidisciplinary integration to improve the current knowledge of an area. During my MS, I integrated signal processing techniques such as frequency analysis to work on a new method of spectral decomposition on seismic data to improve layer resolvability and temporal resolution of noisy carbonate reservoirs in oil and gas fields. During my PhD, I am integrating





near-surface geophysics methods, machine learning, and civil engineering fluid flow modeling to understand the pressure regime and sediments heterogeneity on the landside of an artificial levee along the Mississippi River.”

In addition to his research, Lopez has been an active member of SEG. During his MS program at the University of Louisiana at Lafayette, he was selected as vice president of the SEG student chapter for the 2016–2018 period. As a PhD student at LSU, he was selected as president of the SEG student chapter for the 2019–2022 period. In addition to these titles, Lopez was chosen for the SEG/ExxonMobil Student Education Program travel grant award during the SEG Annual Meeting in San Antonio, Texas. He is the first author of three conference papers and presentations at the SEG Annual Meeting (2018 and 2020) and Symposium on the Application of Geophysics to Engineering and Environmental Problems (2019).

“I am grateful for all the support I have received from SEG along with my career in geophysics. Special thanks to the Near-Surface Geophysics Technical Section of

SEG for this award and to the individual donors who support it through contributions to the SEG Foundation.”

ABOUT THE SEG NEAR SURFACE GEOPHYSICAL RESEARCH AWARD

The SEG Near Surface Geophysical Research Award is intended to provide a research grant(s) in support of an undergraduate or graduate student in good standing, enrolled in a relevant academic program at an accredited institution, and engaged in near-surface geophysics research. The award is further intended to offset expenses directly related to the awardee’s near-surface geophysics research, including field data acquisition, laboratory studies, specialized computer software, or other general activities. For more information regarding this award, please visit seg.org/ns.

INDIVIDUAL INVESTORS

Endowment funds: US\$52,500
Near-Surface Geophysics Technical Section of SEG and others

2020 STATS

APPLICATIONS

5 APPLICANTS

AWARDS/GRANTS

1 RECIPIENT

US\$1700 AWARD

STUDENT PROGRAMS

STUDENT TRAVEL GRANTS

Students and recent graduates interested in participating in SEG-sponsored student programs are encouraged to apply for SEG travel and registration grant assistance. Traditional student travel grants are intended to cover the expenses for travel, lodging, and registration to the SEG Annual Meeting and other identified workshops and conferences. Student registration grants are available to cover either a portion or all of the registration cost for specific meetings.

The year, 2020 brought new challenges to our geophysical community. As a result of the restrictions posed by the COVID-19 pandemic, SEG was required to change course to ensure that students were still provided opportunities to further their geophysical learnings. Therefore, traditional student travel grants evolved into student registration awards to cover fees associated with the SEG Annual Meeting, workshops, and other events that were able to continue as virtual experiences.

The bulk of student travel grants are for students planning to present their research at the SEG Annual Meeting. With the 2020 conference being a virtual experience, travel grants were replaced with registration grants, allowing students to participate in online activities and presentations. Although participants were not able to have the same face-to-face interactions throughout 2020, SEG was still able to make awards to a significant number of students.

For more information regarding student travel grant opportunities, please visit seg.org/travelgrants.

INDIVIDUAL INVESTORS

Arthur Cheng
Endowment funds: US\$136,500
Student Support Fund; Rutt Bridges and others

2020 STATS

540+ STUDENTS REGISTERED FOR ANNUAL MEETING

RECIPIENTS/AWARDS

30 TECHNICAL PROGRAM
TRAVEL GRANT RECIPIENTS

16 COUNTRIES

34 ANNUAL MEETING
STUDENT REGISTRATION GRANTS

10 COUNTRIES

10 SEG BOREHOLE GEOPHYSICS WORKSHOP
STUDENT REGISTRATION GRANTS

US\$6520 TOTAL
AWARDS

seg.org/travelgrants

OTHER PROGRAMS

HISTORICAL PRESERVATION

Many of SEG's artifacts (previously part of the SEG Geoscience Center) are hosted by the Geophysical Society of Houston (GSH) at their Geoscience Center and Museum in West Houston, Texas. This facility is used to store, maintain, and refurbish geophysical artifacts in the museum collection that are not presently on display at other locations. Additionally, the center holds workshops for teachers and includes resources to create interactive hands-on activities, educational materials for school career days, classroom presentations, scouting fairs, science fairs, or other opportunities for interaction with students.

The Geoscience Center and Museum includes artifacts and materials from the 1920s forward and accepts donations of materials, instruments, and

documents related to the history of geophysical and geologic exploration as well as periodicals from various companies and organizations. All items are cataloged and preserved. Temporary and permanent displays are prepared and installed at the Geoscience Center and at various educational institutions and company offices in Texas and beyond.

Additionally, since 2019, SEG has teamed up with GSH members to catalog more than 1400 artifacts within the SEG Wiki to create a virtual museum. The virtual museum can be viewed by members at wiki.seg.org/wiki/category:virtual_museum.

INDIVIDUAL INVESTORS

Endowment funds: US\$196,500
Cecil and Ida Green and others

2020 STATS

US\$6705 TOTAL GRANTS
1 RECIPIENT
1444 PAGES OF ARTIFACTS
IN THE VIRTUAL MUSEUM

wiki.seg.org/wiki/category:virtual_museum

DONOR RECOGNITION

CORPORATE INVESTORS

Many industry leaders have partnered with the SEG Foundation to give back to the geophysical community that has supported them over the years. Corporate Sustaining Investors create new opportunities and expand on existing services provided through SEG to its membership and to the general public.

The SEG Foundation and SEG recognize and thank our Corporate Sustaining Investors. The recognition list below is organized by lifetime giving to the SEG Foundation, including major contributions and employer matching programs.

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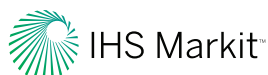
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Note: All monetary values are in U.S. dollars.

SEG Foundation 2020 Annual Report

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Sadly, the SEG Foundation has lost ten Trustee Associates in the past year. Each made a significant difference in the lives of those they knew and will be sincerely missed in our geophysical community and Foundation family.



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Preceded in death by Fran Baile



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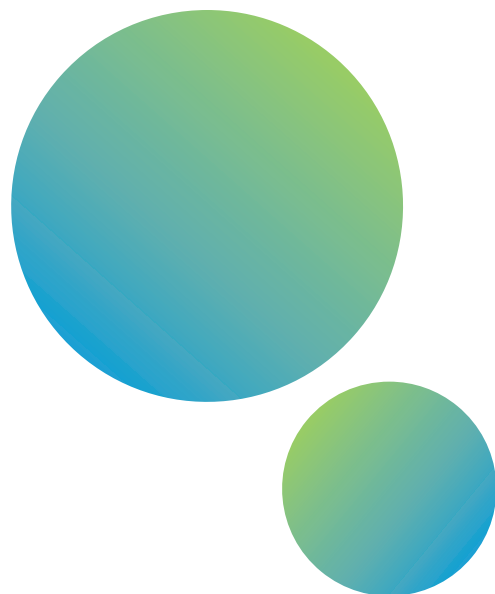
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DONOR CLUB

This is a special club that calls on the colorful history of geophysics for its name. “Doodlebugger” participation marks the beginning of a very special and personal relationship with the SEG Foundation. Members join with a donation between \$100–\$999 in support of the Annual Fund.

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Many companies offer matching gift programs as a way to encourage employees (current and retired) to contribute to charitable organizations. Some companies also provide matching funds to support employee volunteer hours.

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STUDENTS

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Algeria: M'Hamed Bouguerra University of Boumerdes
Austria: Montanuniversität Leoben
Brazil: Federal University of Rio de Janeiro
China: University of Science and Technology of China
Egypt: Ain Shams University
India: Indian Institute of Technology Roorkee
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Ukraine: Taras Shevchenko National University of Kyiv
United Kingdom: University of Birmingham
United States: Boise State University, Oklahoma State University, University of Texas at El Paso, University of Houston, University of Louisiana at Lafayette, University of Oklahoma

2020 FIELD CAMP GRANT RECIPIENTS



EGYPT:

Egypt SEG Field Camp 2020 — Al-Azhar University and SEG Egypt Ain Shams University

GERMANY:

Mitigating landslide hazards: Characterization of quick clay deposits along GÖTA River, Sweden — Student Geoscientific Society Berlin and Potsdam and Uppsala University SEG Student Chapter

ITALY:

SEG Geophysics Field Camp in Southern Italy 2020 — University of Naples Federico II SEG Student Chapter

KENYA:

SEG JKUAT Chapter Field Camp 2020 — Jomo Kenyatta University of Agriculture and Technology

NIGERIA:

Integrated aquifer vulnerability and pollution status investigation of Nnewi industrial zone Nigeria — Nnamdi Azikiwe University Geophysical Society

POLAND:

2020 SEG Field Camp: Geophysical imaging of dissolution phenomena in porous carbonate media — Institute of Geophysics Polish Academy of Sciences SEG Student Chapter

ROMANIA:

Archaeological geophysics for sustainable local community development: Ancient Roman town Romula — University of Bucharest, Faculty of Geology and Geophysics

UNITED STATES:

GeoFORCE Texas 10th Grade Academy — The University of Texas at Austin

Summer of Applied Geophysical Experience — Purdue University



STUDENTS

2020 SEG/CHEVRON STUDENT LEADERSHIP SYMPOSIUM PARTICIPANTS

Participant names and SEG student chapter country locations are noted below.

Aarti Dwivedi — United States
Abdullah Al-haj — United States
Ajithabh Kalari Sudhakaran — India
Alessandro Traversa — Venezuela
Andrea Barone — Italy
Antony Hallam — United Kingdom
Arunima Singh — India
Beatriz Valdés Moreno — Mexico
Betti Hegyi — Hungary
Catherine Panggabean — Indonesia
Chioma Onwumelu — United States
Claudia Rossavik — United States
Daniel Joshua — Nigeria
Darin Rizdianti — Indonesia
Dinda Pramestiningrum — Indonesia
Djurica Surla — Serbia and Montenegro
Elisavet Kollia — Sweden
Erik Urquidi-Delgado — United States
Florencia Balestrini — Netherlands
Frank Thomas — Italy
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Gautam Shekhawat — India
Heinrich Neumeister — Germany
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Hugo de Araújo — Brazil
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