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SEG EVOLVE: Developing the fearless explorers of the future

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SEG EVOLVE: Developing the fearless explorers of the future

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Addressing industry challenges

The exploration and production (E&P) industry currently faces major personnel challenges resulting from "the great crew change." With this departure of considerable knowledge from organizations, new hires and graduates do not have the large network of experienced professionals and mentors to support them as they transition from academia to the real world.

Universities have rightly focused on theoretical foundations and principles, but this results in a gap relative to the business settings where decisions are based on state-of-the-art approaches and workflows. Students may not have exposure to these approaches nor the opportunity to interact with industry professionals. Additionally, the business criteria for these decisions are infrequently discussed in universities.

What is EVOLVE?

A strategic collaboration between Halliburton and the SEG Foundation was formed to start the SEG EVOLVE program with Halliburton donating funds for SEG to manage the program and providing the Landmark iEnergy Cloud and the Halliburton Landmark DecisionSpace platform. The program's goal is to facilitate the passing of practical knowledge to the next generation using experiential learning. The program links experienced mentors to student teams, empowering the students to solve the types of challenges they will encounter when they start working.

The EVOLVE program offers students direct experience in conducting multidisciplinary subsurface integration projects using real-world seismic, wireline, core, 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.

EVOLVE consists of open-ended exercises that have no prepared answers. The emphasis for students is not on the "right answers" but on using available data to think carefully and ask the right questions. Students, regardless of their level at the start, can expect to be continuously challenged and to see significant improvement in their:

[1]SEG EVOLVE Program Manager.
[2]SEG EVOLVE Technical Coordinator.
[3]SEG EVOLVE Technical Advisor.

What they're saying about EVOLVE

"The SEG EVOLVE program, very early on, has broken all stereotypes of what well-rounded explorationist training should look like. This is a multidisciplinary collaboration tool for future oil and gas professionals. It is a first of its kind in the degree of professionalism, technical challenge, real-life situations, noncompetitive learning environment, and peer and mentor support that it offers. I joined the EVOLVE Committee in 2017 and watched it grow from a vision to real-time presentations by 10 highly talented international teams working with offshore data. I believe that EVOLVE is a rising star among diverse SEG programs. It brings value to both students and employers alike. By offering unique skill-building and recruitment opportunities, EVOLVE has helped give back to the oil and gas community. Sponsorship opportunities are coming up to help SEG grow the program to accept more teams. Simply put, EVOLVE is yet another reason to be involved with SEG."

– Olga Nedorub
Geophysicist at Apache Corporation
SEG EVOLVE Technical Committee Chair

- Technical insight
- Understanding of modern workflows
- Skills in applying modern workflows

The goal of EVOLVE

EVOLVE prepares participants to launch and advance their careers in the rapidly developing and multidisciplinary geophysics profession by building their confidence and bringing them closer to the goal of becoming fearless explorers. The program incorporates the industry's long-established values by encouraging thoroughness, thoughtfulness, and stewardship of investors' funds while maintaining a high level of professionalism and integrity.

EVOLVE establishes a noncompetitive team environment that fosters collaboration and global participation. Following a pilot in 2015, the program has adapted and grown based on learnings and feedback from both students and mentors. In 2018, SEG EVOLVE expanded to 10 international university teams.

SEG EVOLVE 2018 program

Management of the EVOLVE 2018 program was divided between SEG and Halliburton. The program was led by Technical Coordinator Allen Bertagne, based at the SEG EVOLVE office in Houston, and Advisor Mike Forrest who were supported by a group of experienced industry mentors. Some mentors acted as local area experts, some as advisors on

SEG EVOLVE 2018 teams

- University of Alberta (Edmonton, Canada)
- Texas A&M University (College Station, Texas, USA)
- Universidad Autónoma del Carmen (Ciudad de Carmen, Mexico)
- Universidad Simón Bolívar (Caracas, Venezuela)
- University of Bucharest (Bucharest, Romania)
- University of Sciences and Technology (Algiers, Algeria)
- State University of Rio de Janeiro (Rio de Janeiro, Brazil)
- Instituto Superior Técnico-Universidade de Lisboa (Lisbon, Portugal)
- RWTH Aachen University (Aachen, Germany), TU Delft (Delft, Netherlands), and University Pierre and Marie Curie (Paris, France)
- Norwegian University of Science and Technology (Trondheim, Norway)
- University of Edinburgh (Edinburgh, UK)
- AGH University of Science and Technology (Krakow, Poland)

> The value of EVOLVE to participating students is immense. They gain exposure to real-world data, top-class mentors, industry-leading software, and critique and direction that no other industry/academia consortium can provide. There is no pressure or competition between teams to worry about, just learning and collaboration with team members and experienced industry consultants just a phone call or e-mail away. This phenomenal learning experience is unmatched in any earth sciences industry program."
>
> – Dean Mento, P.G.
> Senior Petroleum Geophysicist, IHRDC

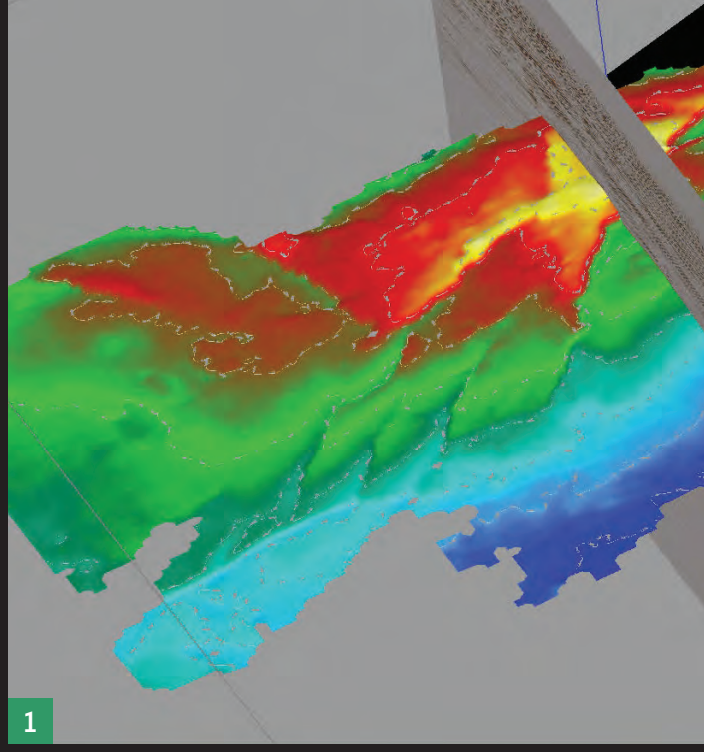

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Photo credit: Patsy Alexander

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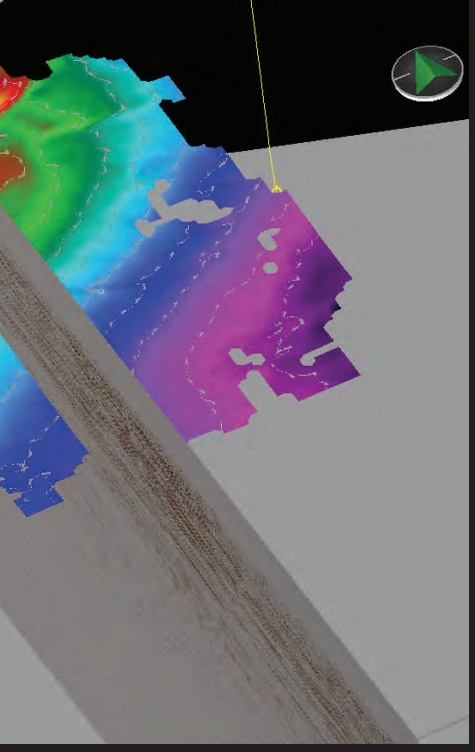

1 Visualization of Gulf of Mexico prospect in DecisionSpace. 2 Allen Bertagne and the POSOIL team in an active work session. 3 2018 EVOLVE team locations. 4 Mike Forrest visiting EVOLVE teams in Lisbon. 5 The PeTROLLers team with Allen Bertagne and Jesus Nevarez at SEG 2018. 6 SEG EVOLVE participants and mentors at SEG 2018. 7 The Oilers team standing in front of their poster at SEG 2018. 8 The Aggies team presenting at SEG 2018.

EVOLVE Sponsors

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All about EVOLVE

The vision:

- Deliver an experiential real-world learning environment to students and early-career professionals across the globe
- Facilitate and support multidisciplinary teams working on integrated evaluations of real-world projects with real seismic, geology, and wellbore data
- Global delivery of project-based training, data, and software with guidance and mentoring drawn from a cross section of recognized professional association industry experts

The future:

- 30–50 teams worldwide with 180–300 students per year
- Increase number of integrated data sets from conventional and unconventional play areas
- Increase technology application learning for the teams

Program characteristics – Tools:

- Real seismic, geologic, and wellbore data
- State-of-the-art industry software remotely and globally available on a cloud platform
- Instruction and guidance from industry experts

Program characteristics – Benefits:

- Work with industry leaders to create and execute modern E&P workflows
- Project-based, integrated training with real data to improve capabilities to succeed in today's industry jobs
- Recognition by industry and SEG

SEG EVOLVE

software workflows, and others as experts in the use of DecisionSpace. The iEnergy Cloud infrastructure and support, as well as software, were managed by the Halliburton Landmark EVOLVE team, and additional Houston-based data loading and data management were provided by Jesus Nevarez, a 2017 University of Houston graduate.

The 2018 program kicked off in mid-February and included 60 students from around the world who collaborated and conducted multidisciplinary analyses using real-world seismic, wireline, core, production, and other data. Each multidisciplinary team had four to six members including geologists, geophysicists, petrophysicists, and reservoir engineers. The participants' progress was supported by their local professors as they were being coached by mentors in the development of skills such as project management, presentation, teamwork, and business analysis.

All teams were assigned one of three data sets and received the same data, software, and educational materials. The data sets used in 2018 were public domain and located in the Gulf of Mexico Shelf, the Dutch North Sea Shelf, and offshore northwestern New Zealand.

The majority of the technical activities took place within the DecisionSpace platform, which has a suite of digital E&P software as a service (SaaS) applications deployed on Landmark's iEnergy Cloud platform. Several tutorials were donated by the International Human Resources Development Corporation (IHRDC), and these were also made available in the cloud.

The overarching goals were (1) to find the best exploration or production investment opportunity within the team's asset (data set) and (2) to make business recommendations to management on the best way(s) to create value from the asset.

Following an individual project kickoff meeting, each team went through an initial phase of literature review, data gathering, and analysis with the goal of understanding the petroleum geology of their areas and preparing a detailed plan to allow them to identify the best investment opportunity within the data set they had been provided. The teams also had access to

> The EVOLVE program, as I envision it, is a collaborative real-world interpretation project enabled by Halliburton cloud technology (and grants) with the objective to (interpret and collaborate in the cloud) evaluate the resource potential of an area using geophysical data integrated with available geologic, well, and economic data. I am encouraged by the level of collaboration on the project by a team with members at three different universities presenting to a team in Houston across the Internet. EVOLVE exhibits the essence of how the geophysics profession will be practiced in the future and exemplifies 'experiential learning' that will help transition recent graduates to qualified contributing professional interpreters."
>
> – Nancy House
> SEG Past President

eight IHRDC training modules that covered topics such as basin analysis and petroleum geology, prospect generation, and developing an exploration program, as well as a Rose & Associates risk analysis course.

Bertagne and Nevarez met weekly with the teams to provide guidance and support and to bring in additional mentoring and other resources as necessary. Among the most active mentors were Jennifer Thompson, Migdalys Salazar, and Walter Gonzalez. In addition to the SEG EVOLVE Technical Committee, many volunteers and mentors offered their skills and support to the participants.

In April, each team made a one-hour presentation to the committee members, mentors, and other key stakeholders. An additional hour of one-on-one discussion and support followed. This presentation helped provide a testing ground for the two key presentations that were to be made later in the year.

The next phase consisted of in-depth analysis and interpretation conducted in the DecisionSpace platform. Some teams comprised a single university, while other teams had individuals based at several geographic locations. Regardless of location, the cloud allowed everyone to see each other's work and facilitated effective integration and collaboration across disciplines.

Mentorship and real-life experience

A key element of EVOLVE is that mentors aim to visit teams on their own turf at least once during the project. This year, mentors visited eight of the 10 teams. Bertagne also provided career talks and other presentations to local SEG student chapters. Discussions included "How do we form a new oil company in Bucharest?" to "How do we form a consulting company in Lisbon?"

These personal meetings allowed for customized exchanges and helped the mentors gain an understanding of student competencies and remaining gaps. Adjustments made both by the teams and the project managers resulted from the information gained in these face-to-face meetings.

Presenting to management

After considerable work over an eight-month period, in September, the students presented their best-investment opportunities to a panel that simulated an oil company boardroom. Once again, the panel and mentors provided additional guidance and suggestions to help the students improve their understanding of the opportunities and to allow them to communicate their results more effectively.

EVOLVE at the Annual Meeting

At the 2018 SEG Annual Meeting in Anaheim, participants from every team showcased their learnings from the year by:

- Making a 15-minute overview presentation during the oral sessions
- Hosting a poster session to discuss their work and conclusions in detail
- Presenting their investment opportunity to an international audience
- Participating in a panel discussion in which they answered questions about their learnings and gave industry leaders recommendations for the future

The event displayed the ability of the students to communicate with senior industry professionals using technical and business language that they understand. Industry personnel who participated were impressed by the breadth of knowledge and practical recommendations that the students provided.

Developing soft skills

As can be gathered from this article, EVOLVE is about more than technical activities and learning. It also strives to develop the human traits required to be a successful explorer while having fun along the way. As the teams and mentors collaborated in Anaheim for the final presentations, lifelong bonds were formed. While it was only a beginning for the students, EVOLVE 2018 helped set the participants on the right career path.

Plans for 2019 and how to apply

In 2019, EVOLVE will expand to 20 teams with a total of 120 students. Ten of these teams will use the Halliburton Landmark DecisionSpace platform, and the remaining 10 will act as noncloud teams.

The team application and selection process will be in December 2018, and teams will be assigned a data set and start their regional and technical activities in January 2019. The program's technical work will occur during the standard

university semester and conclude with the EVOLVE sessions at the SEG Annual Meeting.

Closing thoughts

SEG developed EVOLVE with the vision of training students and early-career professionals to become the fearless explorers of the future. SEG EVOLVE is set to yield an increasing number of graduates who are recognized as champions for integrated subsurface evaluation. This type of training and practical experience will be essential if the industry is to meet the major energy challenges that lie ahead. These young professionals will be well prepared for a successful career involving complex subsurface, economic, and human elements, and they will indeed be ready to become fearless explorers of the future.

Call to action for sponsors and mentors

As we look to the future and work on plans to expand the reach of EVOLVE, we welcome additional partners and mentors. The SEG Foundation is seeking additional industry partners to financially support EVOLVE, guide it, and ensure the program continues to succeed. For more information and to join others in making an impact with EVOLVE through a gift to the SEG Foundation, please contact Katie Burk, development and stewardship officer, at foundation@seg.org.

SEG looks forward to taking the next steps on the EVOLVE journey as we work with the next generation of students to provide the best trained and highest qualified future employees in the E&P industry.

The SEG Foundation and SEG thank Halliburton for their vision in starting the EVOLVE program and continuing to support the program in 2019. Special thanks to Rekha Patel, Helen Smyth, and Colette Lyle with Halliburton who helped make the EVOLVE program successful in 2018. TLE

The application process for EVOLVE 2019 will begin in December 2018. Those considering being a part of EVOLVE 2019 should visit https://seg.org/evolve or contact Andrew Geary at ageary@seg.org.

EVOLVE's benefits to industry

- A unique and modernized model for early asset-based learning
- Modernized software, data platforms, and work practices
- New and agile approaches to improve and enhance workflows
- Accelerated contribution from early-career professionals and new hires
- Focused, persistent collaboration between academia, associations, and industry
- Access to a pool of trained individuals familiar with E&P practices

Andrew Geary is the Publications Outreach and EVOLVE Program Manager at the Society of Exploration Geophysicists. In addition to his work with EVOLVE, he manages the SEG Wiki, the world's first online geophysics encyclopedia. He is also the co-founder and producer of SEG's podcast, Seismic Soundoff. He received an economics degree from Christopher Newport University and a master's degree in nonprofit management from Indiana University.

Jesus Ortiz Nevarez graduated from the University of Houston-Downtown in December 2017 with a Bachelor of Science degree in geology. He is currently working as a Geoscientist at BRT Energy Advisors and has been providing Geoscience Support to the SEG EVOLVE teams for 2018. His activities have included data loading, basic seismic interpretation, and prospect generation in DecisionSpace Geosciences.

Allen Bertagne is Technical Coordinator of SEG EVOLVE and Principal of BRT Energy Advisors. He has more than 30 years' experience in the industry and has worked at Exxon, CGG, PGS and Shell. He holds a degree from the Royal School of Mines at Imperial College and a master's from the University of Texas at Austin. He has published many papers, has served as Chair of The Leading Edge Editorial Board and First Vice President of SEG. Over his career, he has used a wide range of software including Kingdom, 123di/ndi, Paradigm, SeisWorks, OpenWorks, and more recently, DSG.

Mike Forrest has 60 years' experience in oil and gas exploration and development as a geophysicist and an executive. His career includes 37 years with Shell Oil, five years with Maxus Energy, and an Exploration Consultant during the past 20 years. Mike was part of the Shell team that made significant discoveries in the Gulf of Mexico Shelf and Deep Water plus he has experience in the Lower 48, Alaska and international. Mike led the Rose & Associates DHI Risk Analysis Consortium during the past 18 years. He is a member of the SEG Foundation board, was Chair during 2014 to 2017, and is currently focused on fund raising for the SEG Geoscientists Without Borders humanitarian program and an advisor and mentor with the SEG EVOLVE student program.