Geophysics—Breaking with Tradition

A true innovator in the field of geophysics, the 2007-2008 president of the Society of Exploration Geophysicists, Dr. Fred Aminzadeh sees the advances in geophysics going far beyond the current applications of finding and exploiting hydrocarbons.

With your broad range of experience and diverse technical contributions, what direction do you hope to steer SEG as their new president?

More than 60% of our members are from outside the US providing us many new opportunities and new challenges. We have new initiatives for SEG online and our ongoing efforts to establish SEG regional offices in key locations. With the fast moving demographics of our membership, we will also put some emphasis on what I call Geo-Mentoring, providing educational opportunities to attract more people to our profession and increase public awareness on what geophysics have to offer.

By public awareness, do you mean outside the oil and gas industry?

Yes. The importance and value of geophysics to society must be publicized. This also includes communicating to the public at large, the youth, government entities, and the financial community. Applications for geophysical technologies should include those outside the oil and gas industry, such as exploring for fresh water, underground construction, archeological work, detecting land mines, locating leaks, hazardous waste, earthquake prediction, and many other environmental issues. The role of geophysics to assist in these areas and reduce the finding cost of energy should be highlighted at every opportunity we have.

What is your long-term strategy for the Society?

We need to identify future technical and professional needs for both current and future geophysicists and increase basic and applied research funding from both government and industry sources that have experienced major cutbacks during last decade. SEG has recently launched the Seismic Elastic Advanced Modeling (SEAM) project as an extension to its earlier successful, SEG/EAG Modeling project. We hope to play a role in many other innovative projects to advance the science of geophysics.

Photo: Private

Dr. Fred Aminzadeh is president and chief executive officer of dGB-USA in Houston. Fred received a Ph.D. from the University of Southern California. He worked for Unocal both in technical and management capacities. He holds 3 patents and has authored 11 books on subjects that include modeling, seismic attributes, reservoir characterization and neural networks. He recently was appointed to Department of Energy's (DOE) unconventional resource technology advisory committee.

Which of the recent developments in geophysical technology do you consider more important to the oil and gas industry?

There are a number of recent developments that aim at using new types of data such as passive seismic, full-wave seismic land surveys, controlled source electro-magnetic, and wide azimuth illumination. Also there are many exciting interpretation and data analysis techniques that are making better use of the conventional data. They include 3-D seismic stratigraphy, advanced pre-stack depth migration/model building techniques, and gas chimney analysis.

Over the years you have contributed a lot to the advancement of your field. Both in 2005 and 2006 you were the only geoscientist finalist for the World Oil Innovative Thinkers Award. What do you consider your most important contribution?

I did introduce the elastic impedance concept when I was working on my Ph.D. dissertation back in the late 70's. I also was first to introduce combining (clustering) different seismic attributes to detect hydrocarbons and characterize reservoirs. Breaking discipline boundaries and helping wider use of pattern recognition, neural networks, and fuzzy logic in our industry has probably been my most rewarding contribution.

Exploration is now into extreme conditions (depth, temperatures, tight formations, thin reservoirs). Is there a limit where geophysics can take us?

I am not going to make the same mistake as the head of US Patent Commissioner Charles H. Duell said back in 1899: "Everything that can be invented has been invented." I am convinced that with massive computer power and many other advances many of the seemingly intractable problems will be solved.

What is your advice to young geoscientists entering the field?

Work hard, think big and get involved in the professional societies.

Tom Smith
Associate Editor