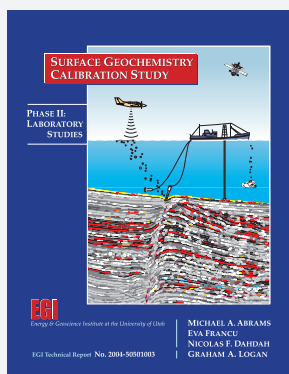


The University of Utah based in Salt Lake City sits at the base of the Wasatch Mountains on the eastern edge of the Great Basin. It has approximately 29,000 students from more than 111 countries.

# Storming the Ivory Tower

The oil shock of 1973 transformed the global energy picture. As lines of automobiles snaked down the street awaiting their turn at the pumps, the realization dawned that plentiful, cheap energy was not something to be taken for granted. Many governments and leaders in the petroleum industry began asking scientific questions about fossil energy and alternative energy sources. And it is to this environment that the Energy & Geoscience Institute (EGI) at the University of Utah traces its roots.

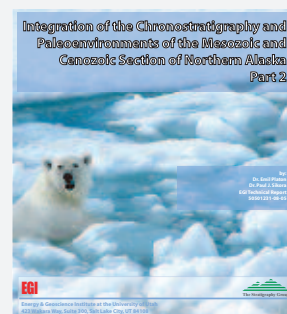




Multi-phased study to improve surface geochemistry calibration. Phase 1 evaluated and identified current best practices. Phase 2 developed innovative new methods to sample and analyze surface geochemical samples, and the on-going Phase 3 is testing these new approaches in the field.



This study continues EGI's 15-year record of working the Caspian region from north to south. This phased study collected, analyzed, and interpreted new geochemical and chronostratigraphic data for the Central Caspian region.



An integrated high-resolution chronostratigraphic and paleoenvironmental framework for the Mesozoic and Cenozoic of northern Alaska.



*Raymond Levey, Energy & Geoscience Institute (EGI) at the University of Utah*

The Energy & Geoscience Institute (EGI) at the University of Utah has now for a decade served as center for dedicated research in the energy sector. Located in Salt Lake City in the University of Utah Research Park, EGI is a not-for-profit research organization that has conducted multi-disciplinary projects on behalf of industry and government for more than 30 years.

EGI was created in 1996 through the merger of the University of Utah Research Institute, an organization focused on geothermal energy, and the fossil energy group from the University of South Carolina's Earth Sciences and Resources Institute.

The merger of these two internationally known research organizations propelled the University of Utah to the forefront of applied geological and engineering research focused on the energy sector. The Institute serves as a cost-shared research laboratory to the petroleum industry and governments, and has conducted more than \$200 million of energy research.

A university-based institute like EGI is the ideal place to conduct such research, since today's complex scientific and technological problems are often too broad to be solved by a single researcher working in isolation. Instead EGI creates an environment where multi-disciplinary research can flourish. Involving students in this dynamic environment exposes them to a team-based problem-solving process that closely reflects the approaches used in today's corporations.

## Building relationships with industry

Traditionally there has been skepticism within the petroleum industry of the value of university research. Too often the image was of academics sitting in their ivory towers unwilling to tackle the problems facing industry. This is a caricature, of course, that does not accurately reflect reality. But, like most caricatures, it contains a kernel of truth.

The foremost requirement for success in meeting industry's research needs is delivering information, approaches, knowledge, and technologies that are directly applicable to their problems. The foundation for doing so is communication and relationships developed between the institute



EGI has conducted more than 480 projects in 62 countries over the past 3 decades.

and industry. This strategy has enabled EGI to develop the largest upstream energy industry supported research program at any university in the world—its Corporate Associate program.

Currently 50 companies from 19 countries support EGI research through an annual membership. Together these companies represent the most active international exploration companies in the world, with a combined market capitalization of more than \$1 trillion. As a Corporate Associate they have direct access to EGI's research, information and data, and scientific expertise.

By building personal relationships with petroleum explorationists, EGI's scientific staff learns what industry's challenges are. As a result, both the Director and the senior scientific staff work hard to develop extensive personal networks within each

## Changing scope

The history of research has been varied. During the 1960s and 1970s research was synonymous with large, well-respected corporate laboratories, including Bell Labs, General Electric, Dow, DuPont, and Esso/Exxon. These labs were multi-disciplinary with broad research portfolios. They fostered innovation and made significant contributions to scientific knowledge, both fundamental and applied. In addition, they provided lucrative, secure employment for class after class of science graduates.

In the 1980s and 1990s the situation changed. For better or worse, corporate emphasis shifted to near-term performance, preferring to outsource everything that didn't contribute to short-term profitability. The result was corporate downsizing and cutbacks that led many companies to dismantle their large research organizations.

In order to centralize decision-making and performance responsibility, many corporations adopted a business unit model. This reinforced the trend away from scientific research, as business units instead sought specific solutions to their immediate problems. In fact, in some cases corporations completely lost the ability to fund research that could not be directly tied to a business unit.

But while corporations were reluctant to devote the necessary resources, the need for such research remained strong. This need created opportunity for the university research community, and resulted in the formation of numerous centers and institutes dedicated to advancing the scientific and technological state of the art.

### EGI CORPORATE ASSOCIATE PROGRAM

Amerada Hess	Norsk Hydro
Anadarko	Occidental
Apache	Oil India
BHP Billiton	Oil Search
BP	OMV
BPC Ltd.	Paladin Resources
CEPSA	Petrobras
Chevron	PetroCanada
ConocoPhillips	Petronas-Carigali
Devon	Pioneer
El Paso	Premier Oil
EnCana	Reliance Energy
ENI-AGIP	RepsolYPF
Frontera	ROC Oil
Gaz de France	RWE Dea
Hardman Resources	Samson
Kerr McGee	Shell
LUKOIL	Sipetrol
Lundin Group	Spinnaker
Maersk Oil	Statoil
Marathon	Talisman
Nation's Energy	Total
Newfield	Vintage
Nexen	Wintershall
Noble Energy	Woodside



EGL is within a half-day drive of 5 national parks, which provide an excellent natural laboratory for geological research and field trips.

company at both the managerial and technical levels. They then develop approaches to solve these problems. Having established relationships with the explorationist on the front-line of his or her company's activities in a particular region or discipline creates a feed-back loop that involves them in the design of a solution, and incre-

ases the likelihood of a breakthrough.

The Institute also receives strategic advice from their Advisory Board, comprised of senior executives from the international energy industry and the University of Utah. The current Chairman of the **Advisory Board** is Steven Bell, President of BHP Billiton's global petroleum exploration and

new business development. He is flanked by Vice Chairman Robert Ryan, General Manager of worldwide exploration at Chevron, and Executive Secretary Kenneth Crouch, Executive Vice President at Kerr-McGee. The Advisory Board meets twice annually to advise EGL on strategic developments in the global energy scene. The resulting dialog is unique and valuable, and enables EGL to remain at the forefront of worldwide energy issues and tackling the challenges faced by industry.

### The need for global reach

The energy industry in general and the petroleum industry in particular are international in scope. EGL's Corporate Associates are from 19 countries with exploration interests across the globe. As a result, over the past 6 years I have personally visited and negotiated cooperative research relationships with industry and government in Europe, South America, Africa, and Asia. Developing and maintaining the contacts with the research sponsors and partners that are essential to EGL's success have led them to develop a strategic alliance with Imperial College London, and maintain offices in Houston, Calgary, and Sydney.

The foundation for much of EGL's global research is alliances and partnerships with local organizations in countries where they are active. These groups range from governmental research organizations, such as the Geological Institute of Azerbaijan and Geoscience Australia, to academia like Universidade Federal Fluminense in Brazil or Moscow State University. They have a wealth of knowledge and experience beneficial to industry, and involving them in EGL projects provides opportunity to demonstrate this expertise.

The international and cross-cultural aspect of EGL's research activities requires scientific staff with similar diversity. EGL's personnel are from 14 countries and col-

## Best in class

An example of developing best-in-class research programs is EGL's Surface Geochemical Calibration study. Michael Abrams, a 19-year Exxon veteran, joined EGL in 2000 as manager of the petroleum geochemistry group. Based on his global experience evaluating geochemical surveys he had always wanted to evaluate the successes and failures of surveys after drilling a prospect. The idea was to evaluate current methodo-

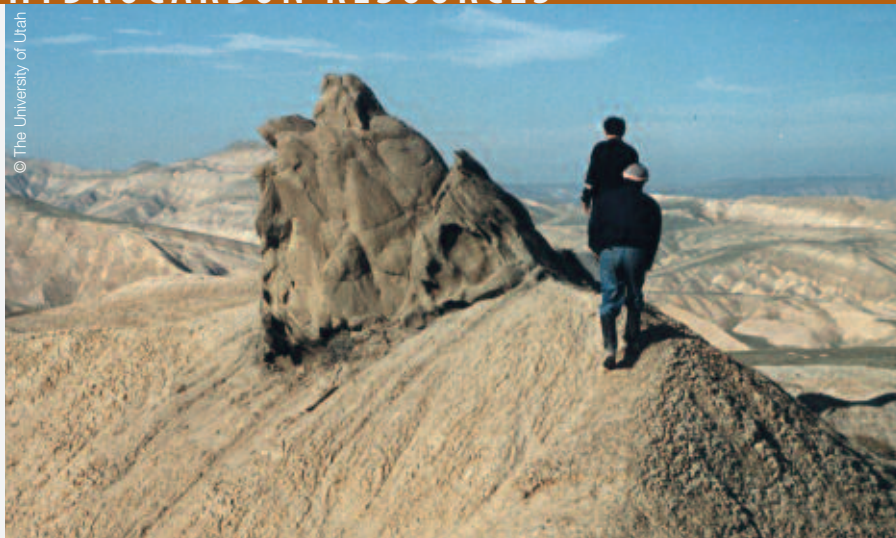
logies and determine their efficacy for finding hydrocarbons.

With the support of 15 companies, he designed a multi-year research project to do such an evaluation. Involving many of the supporting companies' experienced and top-notch geochemists in the analysis and interpretation, EGL evaluated 20 basins around the world.

The basins represented a cross-section of

basin types and tectonic styles, including those with active and passive seeps, as well as onshore and offshore measurements. The results were a series of calibrations and methods to reduce the risk of misinterpretation. Subsequent phases of the project designed new methods to improve the results of surface geochemical surveys and test them in the field.





EGI scientists have been working cooperatively with colleagues from the Geology Institute of Azerbaijan since 1991. Here they are inspecting a mud volcano.

lectively speak more than 18 languages. They have worked on all seven continents and in more than 60 countries. Many EGI scientists also have significant industry experience, having worked for Exxon, Shell, Amoco, Unocal, and JNOC.

## The business of applied research

Notwithstanding the success that EGI has enjoyed, getting industry funds to support applied research remains a highly competitive venture. The way to compete successfully is by choosing several disciplines as core areas, and then working diligently to create broad and deep expertise in these areas. This requires a constant search for the best and brightest scientists and technical staff, and not everyone who was successful in either academia or industry has what it takes to succeed in this environment. It requires entrepreneurial flair to see and communicate the application of scientific knowledge to industry problems.

In looking for new trends, strategies, or areas where EGI can expand its expertise, much time is spent benchmarking other institutes and for-profit research corporations. My objective is to find ways to enhance EGI's existing core strengths, add new value to EGI's Corporate Associates, and identify the problems that individual companies cannot tackle alone.

Sometimes developing or expanding core strengths does not happen through organic growth, but rather by acquisition. An excellent example occurred in 1999 when BP donated to EGI the Global Composite Standard Database, which had been

developed by Amoco over nearly 40 years. The database consists of detailed micropaleontologic and other time-scale data to provide detailed chronostratigraphic control, spanning Cambrian to present, in over 100 basins. It provides EGI with a tool to develop high-resolution chronostratigraphic frameworks in important oil-bearing provinces, such as the Gulf of Mexico, West Africa, and the North Sea. It also builds EGI's ability to conduct paleo-climatic and paleo-oceanographic studies.

EGI continues to expand and improve this global database. It has great potential to improve understanding of the world's petroleum basins, as well as earth's history. In fact, it has potential to improve understanding of global temperature fluctuations through time as defined by changes in global biota. As such it could contribute positively to the ongoing debate on global climate change.

## Science for energy

The common theme in our projects is taking cutting-edge science and applying it to industry problems. The world has changed since EGI got its start in 1973 in a high-energy price environment, but those high prices have returned. Then as now EGI is unafraid to storm the ivory tower and

## From Utah to Landmark

Bridging academia and industry to lead such an organization requires a blend of academic rigor and entrepreneurial savvy. Director Raymond Levey possesses those qualities. He was appointed Director in 1999, after serving as Deputy Director since 1997. His background includes a decade at Shell Oil where he was involved in petroleum exploration, development, and research. He also spent 7 years at the University of Texas at Austin where he served as Associate Director for Fossil Energy at the Bureau of Economic Geology before coming to the University of Utah. He earned his Ph.D. in geology at the University of South Carolina.

A university-based institute needs not only visionary leadership in the director's chair, but also within the university administration. The University of Utah excels here. There is both a societal and University expectation that its intellectual capital

will be an economic engine that benefits the State and the world through innovation and scientific advances. Their record doing so is impressive, ranging from the first human implant of an artificial heart and advances in genetic research to computer technology and visualization techniques. Many world-renowned high-tech corporations were either founded or are presently led by University of Utah faculty and alumni, including Landmark Graphics Corporation, Silicon Graphics,

Netscape, Adobe, Novell, TerraTek, and Pixar.



Raymond Levey, Director of EGI, exhibiting at a recent conference, showing EGI's global research efforts.

tackle real-world problems with real-world impact. From the Arctic to Borneo, from petroleum to geothermal, from basic to applied research, they do it by building personal relationships and forging alliances.

And as a result, EGI is the place where the international petroleum and geothermal industries come for the science to find energy.