

# PRACTICALLY SPEAKING



## Research Profile

### *Reservoirs, Petroleum Systems, CO2 Storage, and Education are Priorities for Researcher.*

Dr. Grant Wach of Dalhousie University has focused his research on the Scotian Basin and characterization of outcrop analogues in the Bay of Fundy and Trinidad. A number of his students, in collaboration with co-supervisors from the Geological Survey of Canada, are currently examining factors that impact stratigraphy and reservoir distribution along the Atlantic Margin.

Wach's research on reservoir characterization is "From the basin to the grain," he explains. "You must understand the basin scale architecture to understand the effects and controls of the petroleum system on the reservoir.

"We need to understanding the stratigraphy of and depositional environments within a basin before exploration begins. This provides the framework for future development work. To maximize resource recovery, we must

*Above: Wach (right) and his Petroleum Field Methods Class (students from Dalhousie, Acadia, St. Mary's and St. FX) have just finished studying the Pliocene outcrops of deltaic sediments along Cedros Bay in Trinidad.*

model reservoirs with greater accuracy. This can only be achieved through multi-disciplinary, collaborative research particularly with our colleagues in engineering."

Coming from industry, Wach realized the value of collaborative research and developing multi-disciplinary teams. He continues to develop research partnerships with colleagues at other universities, industry and government labs. These collaborations include salt and stratigraphic studies with Juergen Adam and Csaba Krezsek, seismic studies with Mike Enachescu (formerly at Memorial), Keith Louden and Mladen Nedimovic (both at Dal); geoscience studies with Dave Brown (C-NSOPB) and seismic stratigraphic studies with David Mosher (GSC).

Together they have all co-supervised a number of Honours and Graduate student projects focused on

the offshore basins of Nova Scotia, many of which have benefited from considerable PRAC support.

The Scotian Slope demonstrates a history of canyon and channel cut and fill, and sediment mass transport. Research has led to further investigation of shelf and slope processes along the continental margin and the role of salt tectonic control on reservoir distribution in deep and ultra-deep water funded by OETR and Imperial Oil.

Where do you go to study the inherent complexities of the Sable Delta? Wach noted reservoirs were missing in the region, but from his experience at Texaco he believed the outcrops of Trinidad could provide some of the clues to understanding the deltaic and shelf margin deltaic processes offshore. He explains, "There are similar issues in Trinidad -- reservoir compartmentalization, over pressure, and so on -- that we can see impacting the producing fields offshore Nova Scotia."

Understanding the stratigraphic framework was just the first step. "When I was making the transition from Chevron Texaco to Dalhousie I began to investigate potential research areas offshore Nova Scotia," Wach said. "I was surprised to learn that the entire Tertiary succession through to the uppermost Cretaceous was characterized as the Banquereau.

"In basins around the world -- Colombia, GOM, Trinidad, North Sea, Nigeria -- the Tertiary succession can comprise twenty separate divisions. My initial research funded by PRAC was directed to defining the stratigraphy recognizing that much of the data that is normally available to industry is proprietary to an academic."

Wach's initial research was on the stratigraphic framework of the Scotian Margin. This included paleontological studies (with Dave Scott, Flavia Fiorini, Vic-

## Researcher Profile



**Dr. Grant Wach** was appointed Professor of Petroleum Geoscience at Dalhousie University in 2002, and Director of Energy Dalhousie in 2003.

A specialist in Reservoir Characterization and Stratigraphy, his interest in complex oil reservoirs began at

Syncrude, in the oil sands of Alberta. Prior to his recruitment to Dalhousie he was Geoscience Research Associate at Chevron Texaco, involved with exploration and commercialization with business units in numerous basins around the globe.

He has been Visiting Professor at both the University of West Indies (Petroleum Geoscience programme) the University of Adelaide's Australia School of Petroleum (Co-operative Research Centre for Greenhouse Gas Technologies).

Dr. Wach has an Honours B.A. (Geography/Geology) from the University of Western Ontario, a M.Sc. (Geology) from South Carolina, and a D.Phil. (Geology) from Oxford. To contact him, call (902) 494-2358 or e-mail gwach@dal.ca.

toria Arbour, Samantha Jones, Sara Mason and Chloe Younger), and clay minerals and heavy minerals (with Yawooz Kettanah and Marcos Zentilli). The research was expanded to include the Grand Banks (Deborah Skilliter) to include the less eroded Tertiary succession.

In the past six years considerable effort has been directed at understanding the biostratigraphic complexity in collaboration with colleagues at St. Mary's (Andrew MacRae) and the Geological Survey of Canada-Atlantic (Graham Williams and Rob Fensome).

### CO<sub>2</sub> SEQUESTRATION AND STORAGE

Energy and the environment are inexorably linked. New and existing developments must design for minimal carbon emissions. "This is a real challenge for a resource based economy in Canada. The same principles and techniques of reservoir characterization for the oil and gas sector apply to CO<sub>2</sub> storage particularly injection

**LEFT:** Petroleum geoscience students measuring outcrops of shelf margin deltaic sediments on the southeast coast of Trinidad. These outcrops are analogous to fields offshore Nova Scotia.



## President's Message

One of PRAC's ongoing strategic objectives is to deliver more value for our funding members from their R&D investments. While the answer to "What is value?" will always vary from member to member (and change over time), one ringing answer we consistently hear from industry members is the need to increase the near term commercial impact of PRAC-funded projects. We need projects that will not just create knowledge, but will transform that knowledge into new products, processes and services.

Innovation occurs in two phases: (1) R&D and early invention that produces patents, product licenses or university spin-off companies, i.e. product/service opportunities; (2) commercialization of opportunities in the form of new companies, revenues, jobs and profits that produce wealth. Our active project list is currently weighted towards Phase 1—we need more projects in Phase 2.

One way to rebalance PRAC's portfolio of funded projects is to increase the participation of suppliers (including consultants and engineering firms) in regional R&D activities. But a major issue in Atlantic Canada is the capacity of our suppliers to play this role: university R&D accounts for almost 3 times as much as private sector R&D, the reverse of what is found in the most innovative economies. Without strong private sector partners, it's no surprise that Atlantic Canadian institutions lag nationally in the commercialization of research results (StatsCan, Survey of Intellectual Property Commercialization in the Higher Education Sector, 2003).

This imbalance will not be easily or quickly fixed, but needs to become a regional priority. We hope to do our part by soliciting more direct supplier participation in PRAC projects, and otherwise working with our industry association partners NOIA and OTANS and other stakeholders to encourage growth in regional private sector R&D capacity.



### CONTINUED FROM PAGE 2

rates, reservoir capacity and seal integrity."

Says Wach, "The first step will be to assess the geosequestration potential of Atlantic Canada (particularly onshore and offshore Nova Scotia) and then develop the economic models for the most promising basins and field to determine the feasibility of injection into these formation."

While he was Visiting Professor at the University of Adelaide CRC for Greenhouse Gas Technologies (CO2CRC), he developed key relationships and observed firsthand the Australian technology in this field that can be applied in Nova Scotia.

### EDUCATING YOUNG GEOLOGISTS IS KEY

Dr. Wach believes in applying the asset team approach used in Industry to his senior Petroleum courses in Engineering and Earth Sciences, integrating engineering and geoscience students in a team atmosphere.

"The days of discrete engineering, geophysics and geology teams have disappeared. Today exploration and commercialization is undertaken by asset teams

with a business model that includes exploration through refining and marketing so let's bring that to the classroom." He adds, "Competition for students entering Geology is very tough in these times of declining enrollments. In the booming job market, it's also challenging for students pursuing a career in Petroleum Geosciences to replace the 'lost generation.'"

In his teaching, the focus is on understanding the Petroleum System. The Petroleum Methods Field course is the finishing school where students apply the concepts and principles learned in the classroom to practical field problems.

Exercises and concepts such as sequence stratigraphy are applied to problems of reservoir architecture and distribution, examining fields and reservoirs analogous to those of offshore Nova Scotia.

The course brings together students from universities across Nova Scotia and has received significant support from industry, including Shell, BP, Imperial Oil, EnCana, Petrotrin, and particularly the Nova Scotia Department of Energy.

## ***PRAC Annual General Meeting*** **April 22; Halifax**

PRAC will hold its AGM on April 22nd at The Westin Nova Scotia (Harbour Suite B). Join us as we review 2007, elect our new Board and reveal plans for the year ahead! Lunch will be held from 12:30-1:45 p.m. The AGM will begin at 2 p.m. and will be followed by an All Members Meeting. Afterward, join us for a Reception in Commonwealth Suite B from 4-6:30 p.m. For more details, call Joy MacPherson at (902)494-3726 or visit [www.pr-ac.ca](http://www.pr-ac.ca).

## ***Atlantic BIOEnergy Conference***

**April 9-11; Saint John**

The Atlantic BIOEnergy Conference 2008 is a follow up to the successful inaugural conference held last year. Atlantic Canadian bioenergy stakeholders will gain an appreciation and knowledge as to how to advance this industry in Atlantic Canada. The Conference is focused on the growth and sustainability of bioenergy and renewable energy opportunities in Atlantic Canada with guest speakers and participation from private industry, government, and academia. For more information or to register, visit [www.atlanticbioenergy.ca](http://www.atlanticbioenergy.ca).

## ***Special OTC East Coast Session & Luncheon***

**May 5th; Houston**

Atlantic Canada continues to establish itself as an emerging leader in offshore petroleum activities. Leading-edge technology and research are changing the way the industry operates. Find out what it means to your business. Eight presenters, including keynote address by EnCana, will round out the East Coast OTC session. To view the event flyer and program online, visit [www.pr-ac.ca](http://www.pr-ac.ca).

## **Upcoming Events**

### ***Nova Scotia Energy R&D Forum 2008*** **May 21-22; Antigonish**

Hosted in association with OEER, OETR and PRAC, the Nova Scotia Department of Energy invites you to take part in the Province's 3rd Energy R&D Forum. For registration details, visit [www.offshoreenergyresearch.ca](http://www.offshoreenergyresearch.ca).



### ***Offshore Safety Workshop*** **June 13; St. John's**

For more details, read the following article on page 5, call P. Carey Ryan at (902) 494-6633 or visit our Events Calendar at [www.pr-ac.ca](http://www.pr-ac.ca).

### ***Conjugate Margins Conference***

**August 13-15; Halifax**

The Conjugate Margins Conference offers an opportunity to incorporate the results of hydrocarbon exploration throughout the Central Atlantic conjugate margin basins using the latest concepts and interpretations of divergent margin basin evolution, petroleum systems, productive fields and analogues. The conference will highlight research from the producing field-to-margin scale with participants from around the globe. Visit [www.conjugatemargins.com](http://www.conjugatemargins.com).



## Offshore Safety Workshop

PRAC will host a one-day Offshore Safety Workshop on June 13, 2008 at the National Research Council's Institute of Ocean Technology in St. John's, NL.

The workshop will focus on process and personal safety issues relevant to both regional and international offshore petroleum exploration and production activities in harsh, cold water environments.

In addition to providing participants with an understanding of the UK's STEP Change Program, the workshop will include sessions that address three themes – lifeboat evacuation and retrieval, process safety and alarm management, and metrics for measuring safety performance.

This Offshore Safety workshop is intended to: provide participants with details on the UK's STEP Change Program; improve understanding of the region's safety research capacity and what has been learned from research activities to date; develop an understanding of the safety issues that continue to be faced by the offshore industry in Atlantic Canada; identify potential changes in regulatory requirements that relate to offshore safety and their implications; and contribute to a constructive dialogue between researchers and petroleum industry representatives to identify future research priorities for the region.

The workshop will be of considerable value for current operators, infrastructure owners, supply and service companies, EPC contractors, government officials and regulators as well as selected researchers, technology providers and consultants with recognized experience in issues related to offshore safety.

For registration details, contact P. Carey Ryan at (902) 494-6633 or visit [www.pr-ac.ca](http://www.pr-ac.ca).

## R&D Focus

### CALL 9 to Focus on Asset Integrity

Coming up in the next few weeks will be the formal announcement for Call 9 in the subject area of Asset Integrity. Project themes will include: corrosion under insulation; coatings; composites; other corrosion/fatigue issues; and inspection technologies relating to all of the above.

PRAC's future Calls will be conducted in a slightly different way, inviting Expressions of Interest from universities, colleges and the established petroleum R&D community -- and also from engineering firms, consultants and suppliers as we seek to attract projects with more near term commercial applicability. We will be open to proposals for larger Joint Industry Projects (JIPs). Stay tuned for the official announcement!



### PRAC to Manage Minimal Platform Study

PRAC has approved an application by Martec Ltd. for a JIP to conduct a study on Minimal Platforms for Marginal Fields Offshore Nova Scotia.

A \$150,000 grant has been issued on behalf of the Nova Scotia Department of Energy, with PRAC managing the JIP funding and administering the project. The Martec study aims to reduce the size of a natural gas or oil discovery that is required to produce an economically viable offshore field in Nova Scotia. More specifically, the project will provide a database/tool that will allow smaller operators to perform an assessment of cost associated with development of a small offshore field.

In achieving these objectives, it is important to look at local capabilities in comparison to what the study suggests may be required for marginal field development.

## The Canadian Association of Petroleum Producers (CAPP)

represents 140 companies that explore for, develop and produce natural gas, natural gas liquids, crude oil, oil sands, and elemental sulphur throughout Canada. CAPP member companies produce more than 95 per cent of Canada's natural gas and crude oil.



With offices in Calgary, AB and St. John's, NL CAPP has an additional 135 associate members that provide a wide range of services that support the upstream crude oil and natural gas industry. Together, these members and associate members are an important part of a \$100-billion-a-year national industry that affects the livelihoods of more than half a million Canadians.

### CAPP's Research & Innovation Task Group

Nationally, CAPP's Research and Innovation (R&I) Task Group provides strategic direction to members and various research organizations to help set research priority areas and coordinate research funding.

The priority areas focus around R&D to help increase recovery of conventional resources in mature basins and in frontier areas and new basins, increase recovery of unconventional gas and oil resources and improve environmental and social performance to address stakeholder expectations. The task group is comprised of senior representatives from CAPP member companies and reports directly to CAPP's Board of Governors.

### CAPP's Role in Atlantic Canada

In Atlantic Canada, CAPP participates on R&D advisory committees to both PRAC and PERD and in R&D administration and management through the ESRF. A description of the ESRF and PERD (from the organizations' respective websites) is included below. Paul Barnes, CAPP's Atlantic Canada manager is the Vice-Chair of the Management Board for

## Member Feature

the ESRF. Paul also sits on PERD's Strategic Advisory Committee for Frontier Oil and Gas research.

### Environmental Studies Research Funds

The Environmental Studies Research Funds (ESRF) is a research program which sponsors environmental and social studies. It is designed to assist in the decision-making process related to oil and gas exploration and development on Canada's frontier lands.

The funding for the ESRF is provided through levies on frontier lands paid by interested holders such as the oil and gas companies. The ESRF is directed by a joint government/industry/public Management Board and is administered by a small secretariat which resides in the National Energy Board office in Calgary, Alberta.

Recent published ESRF studies include: acoustic monitoring and marine mammal surveys before and during marine seismic programs, drilling waste management recommended best practices and recommended seabird and marine mammal observation protocols for Atlantic Canada.

### Program of Energy R&D

The Program of Energy Research and Development (PERD) is a federal, interdepartmental program operated by Natural Resources Canada. PERD funds research and development designed to ensure a sustainable energy future for Canada in the best interests of both our economy and our environment. It directly supports energy R&D conducted in Canada by the federal and provincial governments, and is concerned with all aspects of energy supply and use.

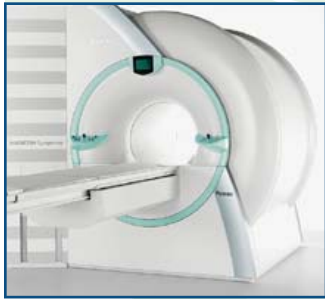
One of PERD's current research priority areas is frontier oil and gas. Specific research programs within this priority area include: Offshore Environmental Factors for Regulatory, Design, Safety and Economic Purposes; Regulatory Requirements for Offshore Drilling and Production Wastes Assessment of Cumulative Effects, and Remediation of Offshore Discharges and Spills; and, Marine Transportation and Safety.

For more information, visit [www.capp.ca](http://www.capp.ca).



CANADIAN ASSOCIATION  
OF PETROLEUM PRODUCERS

## GIT Values PRAC as Partner in Innovation



Magnetic resonance imaging (MRI) may be best known for its use in health care, ongoing research shows that this powerful technology can also be applied to the ever-advancing petroleum industry.

### Green Imaging Technologies Inc (GIT), a systems integrator of MRI technology for industrial solutions, recently teamed up with PRAC to develop research capacity in Atlantic Canada.

As part of an Idea to Innovation grant from the Natural Sciences and Engineering Research Council, the project would allow the University of New Brunswick's MRI Research Centre to further develop MRI-based capillary pressure measurement ability.

The MRI-GIT technology will satisfy demand from the petroleum industry for new methods of testing rock samples to determine where, when and how to exploit oil and gas reserves.

An instrument prototype was soon developed and tested with funding from a PRAC research grant and equipment provided by Bruker Canada.

Green Imaging Technologies CEO Jill Green noted,

"Without the support of PRAC, I don't think that this valuable research could have been undertaken."

## Interest

She continued, "Our company was founded based on this technology and I'm unsure if we could have started this endeavour without the additional research funded."

Green went on to talk about what her company saw as true value in their PRAC membership. "Although Atlantic Canada may not be considered an oil and gas mecca, valuable research and development is taking place right here. PRAC is a key motivator of much of this research and is a valuable resource."

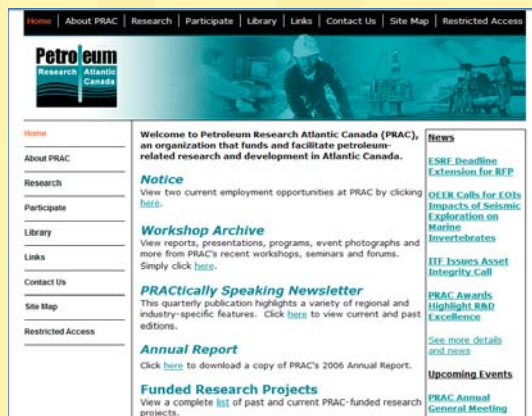
She added, "I cannot stress how important R&D funding like this is for our region. We have extremely talented people that can benefit from programs like this. Our company was formed as a direct result of some of this talent."

For more details visit [www.greenimaging.com](http://www.greenimaging.com).



## PRAC Website Gets a Face-lift!

PRAC is pleased to announce the launch of its brand new website, which will take place during the AGM on April 22nd, 2008. To serve our members better, this redesigned and comprehensive site will answer all your questions about PRAC, the programs and funding we have available, as well as the innovative R&D we have funded! Take a quick look at the "before" and "after" home page screen shots below:



# OUR MEMBERS

## INDUSTRY OPERATORS

Chevron Canada Resources, ConocoPhillips Canada, Corridor Resources Inc., EnCana Corporation, ExxonMobil Canada Ltd., Husky Energy, Imperial Oil Ltd. (ESSO), StatoilHydro Canada Ltd., Petro-Canada, Shell Canada Ltd.

## INDUSTRY ASSOCIATIONS

Canadian Association of Petroleum Producers (CAPP), Newfoundland Ocean Industries Association (NOIA), Offshore/Onshore Technologies Association of Nova Scotia (OTANS)

## GOVERNMENT

Atlantic Canada Opportunities Agency (ACOA), Environment Canada, Fisheries and Oceans Canada, Industry Canada, National Research Council, Natural Resources Canada (NRCan), New Brunswick Natural Resources, Newfoundland Labrador Department of Natural Resources, Nova Scotia Department of Energy, PEI Energy Corporation

## ASSOCIATE MEMBERS

Survival Systems Training Ltd.,  
Newfoundland and Labrador Hydro

## ACADEMIA

Acadia University, Cape Breton University, C-CORE, College of the North Atlantic, Dalhousie University, Holland College, Memorial University of Newfoundland, Nova Scotia Community College, Saint Mary's University, St. Francis Xavier University, Université de Moncton, University of New Brunswick

**PRACTically Speaking** is PRAC's quarterly newsletter. To submit an article, announcement or event, contact Jennifer Barnable, Manager of Communications, at (709) 726-0690 or e-mail [communications@pr-ac.ca](mailto:communications@pr-ac.ca).

# Program Spotlight

## Eminent Speaker Program: 2008 Funding Available

PRAC provides grants to Atlantic Canadian universities, colleges and not-for-profit organizations to off set travel costs and honoraria for hosting eminent speakers in subject areas of relevance Atlantic Canada's petroleum industry. Grants of up to \$2,000 per speaker are available on a first come, first served basis, not to exceed 50% of eligible costs.

In 2007, PRAC funded speakers at Dalhousie and Memorial Universities' Departments of Earth Sciences. In addition, we supported speakers sponsored by OTANS in Halifax, Nova Scotia and the Centre for Marine CNG in St. John's, Newfoundland.

**Selection criteria include:** (1) the international reputation of the speaker; (2) the subject matter and relevance to the region/industry; (3) the target audience (numbers/expected composition); (4) the expected value for the audience; (5) amount of funding requested and other sources of support; (6) collaboration with other institutes or venues; and (7) the number of applications and funding already provided to the institute during the year.

For grant application forms, deadline dates and more information about the selection process, please visit our website: [www.pr-ac.ca](http://www.pr-ac.ca).

