

# The Rock Record – October 2007

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Please contribute to the SGS  
Newsletter

The SGS Newsletter is produced by the SGS executive. Letters, announcements, notices, comments, photos, news and information about SGS members, etc. are always welcome. Call an executive member or write to us at:

**Saskatchewan  
Geological Society**  
P.O. Box 234  
Regina, SK S4P 2Z6

**SGS e-mail address:**  
[info@sgshome.ca](mailto:info@sgshome.ca)

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[www.sgshome.ca](http://www.sgshome.ca)

All advertising inquiries should be directed to Nadene Hagen

## In This Issue

- First lunch talk of the season
- Other Events and Notices - U of R student Career Night
  - Open House Public Lecture
  - Open House Student – Industry Social

**Wednesday Oct 10<sup>th</sup>**

**“Tectonic and Magmatic Precursors for Porphyry and Epithermal Deposits “**

Dr. Jeremy Richards  
University of Alberta

9:30 \* 10:20 a.m.

University of Regina

CL 435 (CLASSROOM BUILDING)

**Friday Oct 12<sup>th</sup>**

**“What else can the seismic waveform tell us?”**

Dr. Gerhard Pratt  
Queen's University  
2008 CSEG Distinguished Lecturer

12:15 – 13:00

University of Regina

College West rm 237.1

**Student Career Night  
University of Regina**

Thursday Nov. 1<sup>st</sup>  
5:30 to 9:00pm  
The University Club  
Rm 215 College West

**Speakers:**

**Steve Halabura, President and Founder  
North Rim Exploration Ltd.**

**Rebecca Hunter, Project Geologist  
Cameco Corp.**

**Beer and Pizza will be served!!!**

**Tuesday Dec. 4<sup>th</sup>,  
5:30-7:00 pm  
Delta Bessborough Hotel  
Saskatoon**

**Students:** come out and meet potential employers  
bring your resume

**Exploration Company Reps:** come out and meet students  
interested in a career in mineral exploration

Refreshments will be served!

Sponsored by SGS and APEGS

**SGS-CIM Fall Public Lecture**  
In conjunction with the SIR Open House

**Ancient Climates, Future Challenges:  
Lessons from the geologic record**

**Dr. Ellen Morris Bishop  
Oregon Paleo Lands Institute  
Fossil, Oregon**

**Tuesday Dec. 4<sup>th</sup>  
7:30-9:00 pm  
Battlefords rm  
Delta Bessborough Hotel  
Saskatoon, SK.**

**2007 SGS Golf Tournament and BBQ:**

The 21st Annual Golf Tournament and BBQ was held on Sept. 7 at the Murray Golf Club with 50 golfers participating. The BBQ was attended by approx. 100 and, for the tenth year in a row, was hosted by Alice and Dave Macdougall - we thank them for their hospitality. I should also thank

Bill Slimmon and his able sidekick Horst Stolz for acting as our brewery and vineyard reps. A great time was had by all !!!!

The event was "won" by Nicole Schwartz, Thomas Love, Dustin Zmetana and Ted Morris. For various reasons (conferences, field trips, family events, other golf tournaments) the numbers to both the golf and BBQ were down. Hopefully, we will see everyone out again next year.

This year, the golf gods were good to us again. While the sun showed up every now and then, the weather was cloudy and slightly cool – but, hey, it didn't rain. To those members who have never participated in either the golf or the BBQ, you are missing a great event. Please note that you do not have to be a golfer to play and if you do not wish to play you may still participate in the good food, drink and company at the BBQ. Keep this in mind and maybe we'll SEE YOU NEXT YEAR

The organizers of the tournament, Bob Troyer and Pam Schwann (who lobbied the mining community for prizes) would like to extend their appreciation to the following sponsors of the tournament without whose support they could not organize the event and provide all of the prizes, food and refreshments:

Prairie Mine and Royalty  
Mollard and Assoc.  
PCS - Lanigan  
Mozaic - Belle Plaine  
Moose Jaw Refinery  
Cameco  
Don Kent Consulting  
TransGas/SaskEnergy  
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Caprice Resources  
PCS – Head Office  
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Divestco  
JNR  
MC3 Resources  
IHS Energy  
Villanova Energy  
Sask. Mining Assoc.  
Canetic Trust  
Sask. Geological Society

## TALKS:

### **Tectonic and Magmatic Precursors for Porphyry and Epithermal Deposits**

Dr. Jeremy Richards  
University of Alberta  
Hutchison Lecture Tour

**Abstract:** Porphyry Cu-Mo-(Au) and epithermal Cu-Au deposits in convergent margin settings are late-stage, near-surface products of subduction zone magmatism. Contributory steps in their formation can be related back to the overall tectonic framework of the convergent margin, and include the rate and locus of magma generation and the state of stress in the upper plate. Processes that favour voluminous emplacement of evolved calc-alkaline magma in upper crustal magma chambers (i.e., batholiths) will enhance the probability that large volumes of metalliferous magmatic hydrothermal fluid will be exsolved. Details of the upper crustal magma chamber setting, including magma recharge frequency (affecting thermal longevity of the system), structure, and volcanic venting, will control the flow path and evolution of exsolved fluids, which will in turn control the amount and location of deposition of economic minerals.

**Biography:** Jeremy Richards is a Professor of economic geology at the University of Alberta, Canada, and is a registered professional geologist in Alberta. He received B.A. (1983) and M.A. (1986) degrees from Cambridge University, UK, an M.Sc. from the University of Toronto, Canada, and a Ph.D. (1990) from the Australian National University. After holding a post-doctorate fellowship at the University of Saskatchewan from 1990 to 1992, he was appointed Lecturer at the University of Leicester, UK, in 1992. He joined the University of Alberta as Associate Professor in 1997, and was appointed Professor in 2002.

Research interests and activity have focused on the genesis of hydrothermal mineral deposits. Within this field his interests cover aspects as diverse as regional tectonic and magmatic controls on mineralization, volcanology, and detailed ore depositional mechanisms. His current research involves the study of regional controls on porphyry copper and polymetallic epithermal mineralization in northern Chile, Argentina, Iran, and Turkey. These projects aim to characterize events that lead to the development and emplacement of ore-forming magmas. In particular, focus has been brought to bear on deep crustal structural controls on magma emplacement.

In parallel with these studies, Richards is pursuing research in sustainable development as applied to the minerals industry, and, with his students, has conducted case studies in Alberta, Vietnam, Romania, and Nunavut.

In 1986, Richards was a recipient of the Canadian Institute of Mining and Metallurgy President's Gold Medal for Graduate Student Essays, M.Sc. thesis category. In 1995 he received the Society of Economic Geologists' Lindgren Award, and in 2001 he received the Geological Association of Canada's William Harvey Gross Award in the Mineral Deposits Division. He was selected as the Society of Economic Geologists' International Exchange Lecturer for 2003, and as the Canadian Institute of Mining and Metallurgy's University Visiting Lecturer

in 2005. He received the Geological Association of Canada's W.W. Hutchison Medal in 2007.

He is a member of several professional societies, and has served on committees and councils for the Society of Economic Geologists, the Geological Association of Canada, the Geological Society of the Canadian Institute of Mining and Metallurgy, the Geological Society of America, and the Mineral Deposits Studies Group (UK).

He is editor of the journal *Exploration & Mining Geology*, and was recently associate editor of the journals *Economic Geology* and *Mineralium Deposita*, as well as of the *Economic Geology 100<sup>th</sup> Anniversary Volume*.

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OCT 12<sup>TH</sup>, 2007

## **“What else can the seismic waveform tell us?”**

Dr. Gerhard Pratt  
2008 CSEG Distinguished Lecturer  
Queen’s University

**Abstract:** Traditional seismic imaging as widely practiced in the oil and gas industry, conceptually treats the seismic velocity model as if it were a separate entity from the seismic reflectivity image. A whole industry has been constructed around this separation, and for good cause: the velocity model is a very smooth, low resolution representation required for successful imaging, while the final reflectivity image contains the detailed, structural images that interpreters need most. However, for the naïve geophysicist learning about imaging for the first time, this separation seems strange – aren’t the velocity model and the reflectivity just two different ways of looking at the same earth? In order to answer the question posed in the title, it is helpful abandon the distinction between the model, and the image (perhaps, our naïve geophysicist will be happier too). Instead, at any given point we only have the model, which we progressively try to improve until it finally it completely accounts for our seismic data; in an ideal world we would be able to use the model to predict every minor wiggle on every trace from every shot gather in the survey. Generally speaking, the goal of seismic waveform inverse methods is to obtain and study the class of models that fully explain the data. If we could arrive at such a state, the seismic waveforms would be able to tell us little else, and the model would combine aspects of both the velocity model and the reflectivity image. Crucially, this approach includes parts of the seismic waveform that are not used in conventional processing, such as wide angle reflections and refractions (which carry very useful information). Of course, it is one thing to imagine we could find a model that completely accounts for all our seismic waveforms, but quite another thing to accomplish this in practice. First and foremost, we need an accurate, reliable and reasonably fast forward method to predict the waveforms for all the trial models along the way. Simulating the wave equation by numerical finite differences is a well known method for doing this, but tricks are needed to overcome the major computational expenses involved. Next on our list of needs

is a suitable inverse method for updating the model, in order to iteratively improve the data fit. There are many mathematical possibilities, all of them fraught with other difficulties. Finally, we need to bring to the problem our experience in methods of preprocessing the data, and post processing the images. This talk will deal with several aspects of the waveform inversion problem: the philosophical goals, the mathematical techniques, the engineering of the methods to allow them to provide useful results, and most importantly, a suite of examples demonstrating the potential of using waveform inversion to solve geological imaging problems in a wide range of applications. Ultimately, surveys should be specifically designed for this waveform approach, and it is one of the goals of this lecture to encourage an awareness of the survey design principles that may lead to further successes.

**Biography:** Dr. Gerhard Pratt joined the Department of Geological Sciences and Geological Engineering at Queen's University in 1998, where he is currently a Professor of Geophysics. His interests are in the fields of seismic waveform modelling, seismic imaging and in the combination of these two techniques in "seismic waveform inversion". Following a B.Sc. in Engineering Physics (1980) from Queen's University, he joined Schlumberger International as a Wireline Engineer, working in Germany, and the Dutch and Norwegian sectors of the North Sea in the early 1980's. After this initial exposure in the industry to the power of non-conventional seismic imaging with walkaway VSP surveys, Gerhard returned to University to obtain his M.Sc. and PhD degrees from Imperial College London (1986, 1989), under the supervision of Professor Michael Worthington, where he became interested in the powerful mathematical inverse methods of Albert Tarantola. He followed his PhD with a two year postdoctoral fellowship at the University of Toronto, working with Professors Chris Chapman, and Gordon West, developing methods for traveltome tomography in anisotropic media. From 1992-1997 Gerhard was the Elf Aquitaine Lecturer in Geophysics, in the Department of Geology at Imperial College, London. Gerhard has been actively researching methods in seismic wave modelling and imaging throughout his academic career. A key development was the implementation of frequency-domain techniques that makes possible large scale forward and inverse modelling of exploration seismic data, through numerical simulation of the full wave equation. Together with his students, he has been able to use these methods in imaging structures in a wide range of applications, from large scale wide-angle deep crustal profiling, to exploration scale imaging, to small scale site investigations. Most recently he has begun using these techniques for imaging breast cancers in medical ultrasound tomography. His work has been published in over 40 peer-reviewed articles in Geophysics, Geophysical Journal International, Geophysical Prospecting and other leading journals. He has coauthored over 100 conference presentations at the CSEG, the SEG, the EAGE and many other meetings. From 1996 to 2000 Gerhard was an associate editor of Geophysics; he is currently an editor of the Geophysical Journal International. His 2004 paper with Laurent Sirgue, "Efficient waveform inversion and imaging: a strategy for selecting temporal frequencies"

received an honourable mention for best paper in Geophysics. He has been active as a geophysical consultant in a number of different fields.

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DEC 4<sup>TH</sup>, 2007

## Ancient Climates, Future Challenges: Lessons from the geologic record

**Dr. Ellen Morris Bishop**

Oregon Paleo Lands Institute  
Fossil, Oregon

**Abstract:** The accelerating recognition of climate change marks the rise of a new paradigm and new priorities for the 21<sup>st</sup> century. Despite its critical import and impact, many people are unsure of climate change's mechanisms, effects, past history, and may even doubt its reality. But the record is now unequivocal.

Mechanisms that have driven past global climate shifts are diverse. They arguably include changes in solar influx, orbital cycles, and meteorite impact. Throughout geologic time, greenhouse gas has also undeniably served as instigator or accomplice in abrupt climate shifts. Compelling evidence for the role of carbon dioxide and methane in past warming and cooling is provided by stable oxygen isotopes as well as atmospheric carbon measured with the dual parameters of stable carbon isotopes (carbon 12 and carbon 13) and leaf stomata. We are also aware of the timing, amount and types of gas emitted by past major volcanic eruptions.

Four well known, large geologic climatic shifts serve as guideposts for today. Each was accompanied by major extinctions, or major shifts in planetary life: The causes and effects of each of the following events will be discussed: 1) The Devonian extinction, 370 million years ago; 2) The Permian extinction, 250 million years ago; 3) The Triassic extinction event, 210 million years ago; and 4) The Paleocene – Eocene extinction, 55 million years ago. The geologic record may seem remote; however, it offers compelling lessons for today's climate crisis. First, greenhouse gases DO affect climate--and life on Earth--dramatically and lethally. Second: Greenhouse gas is being added to the atmosphere at geologically unprecedented rates. Third, whereas volcanoes were common villains in the past; today, WE are the sole major source of greenhouse gas. Oregon State University's Jane Lubchenco said, a year ago: "If society wishes to avoid catastrophic disruption of our lives, the time for action is now." The past global geologic record seems strong motivation to heed these words.

**Biography:** An accomplished geologist, writer, photographer, environmental advocate, and teacher, Ellen Morris Bishop presently serves as the Executive Director of the Oregon Paleo Lands Institute in Fossil, Oregon. This new non-profit is dedicated to connecting residents and visitors with the causes and effects of global climate change through time. With more than two decades of

experience in geological research in the northwest and abroad, Dr. Bishop is well qualified to put climate change in the perspective of geologic time. She has earned degrees in geology from Dickinson College (B.S.) and Oregon State University (M.S. and Ph.D.) and completed postgraduate studies with the geological research division of the Scripps Institution of Oceanography. Her research helped define Oregon's exotic terranes, including the Baker Terrane, and the terranes of the Blue Mountains. An avid educator, Ellen has held both research and teaching positions at Marylhurst University, the University of Arkansas, and Oregon State University. In these roles she has authored multiple technical publications and inspired future geologic researchers. She has lived and worked in communities throughout Oregon and regularly hikes the diverse backcountry of the Pacific Northwest. She specializes in field-based education. Ellen also has substantial training and experience as a professional photographer and science photojournalist. Her landscape photos have been used and displayed by the Sierra Club, Oregon Natural Resources Council, and the Nature Conservancy, and also grace earth science exhibits in many museums and visitors centers. While geologists have a mantra that the present is the key to the past, Ellen strongly believes that the past is also a key to the future. This has led her to use her expertise about geology, climates, and past ecosystems to inform the public about our critical role in influencing climate—and its potential severe consequences. As a science writer, Ellen has regularly informed the public about scientific, environmental, and technological issues. Her most recent book, *In Search of Ancient Oregon: A Geologic and Natural History*, won the Oregon Literary Arts award for best nonfiction work in 2004. As Director of the Oregon PaleoLands Institute, Ellen has developed a variety of classes and experiences that reveal the landscape's history, its past ecosystems, and ancient climates to visitors. Her experience, insight, and passion have helped people understand their intimate connections to the past, the lessons of ancient climate changes, and the critical importance of today's challenges.

## Job Opportunities

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### Geoscientist (Geological Operations), Fort Hills - # 1271

Location :  
CALGARY

#### DESCRIPTION

Petro-Canada holds a 12% interest in Syncrude oil sands mining and upgrading company is the operator and 60% interest holder in the Fort Hills oil sands mining and upgrading project, and holds 100% interest in the MacKay River in situ project.

The Fort Hills Geoscience Project team's current strategy is to evaluate and develop the large bitumen resource at Fort Hills, 90 km. northeast of Fort McMurray. Project activity involves mapping of the bitumen resource and overburden as well as bottom water and water disposal mapping in prospective areas. A development program for this resource will incorporate and integrate the results and learnings from our annual drilling programs. Integration of geological information with reservoir modeling and mine planning is a key component in this project.

## ACCOUNTABILITIES

Working with the Mine Technical Team with the objective of supporting geological field operations, the candidate will:

- Work closely with Production and Overburden Geologists
- Responsible for coordinating, supporting and implementing Geological components of the drilling programs
- Provide input and training to geological consultants in the field
- Ensure the standards of the technical team are met through ongoing quality assurance validation
- Recognize and advance opportunities to optimize field activities
- Work with the Petro-Canada Drilling Completions and Logistics group to ensure synergy of field operations and geological data collection
- Coordinate on-site geological and geotechnical consultants
- Provide training and ongoing feedback to on-site consultant work
- Provide ongoing quality assurance of consultant products
- Provide ongoing quality assurance of wireline logging products
- Interface with other groups to ensure synergy of activities
- Interface with the technical team to understand field requirements and sensitivities

## CAPABILITY REQUIREMENTS

### Specific Functional/Technical Skills

- Minimum of 5 years recent experience in oil sands projects
- Experience with oil sands core drilling programs and oil sands mine operations will be preferred
- Candidate will have experience describing oil sand core, interpreting and ensuring quality control of wireline geophysics, as well as a familiarity with the suite of oil sand core assay data and experience with geotechnical and hydrogeological instrumentation
- Must possess a working knowledge of coring rigs, sonic rigs, and auger rigs and how the different drilling methodologies effect sample collection and integrity
- Solid well log analysis skills

### General Skills / Knowledge / Attributes

- Strong communication, negotiation and presentation skills
- Self starter who demonstrates the organizational and prioritization abilities required to work between an operational role and a planning role
- Demonstrable creativity and innovative thinking
- Flexible and open minded
- Mature, enthusiastic and participative work outlook in achievement of team goals and objectives

## **Additional Information**

- This position will initially be located in Calgary
- Starting in 2009, this position will be located at the Fort Hills site north of Fort McMurray
- Flexible options for living arrangements will be available, such as commuting or relocation assistance

Petro-Canada offers a very attractive total compensation and benefit package.

Please apply on or before **October 31, 2007** either via fax to 403-296-6677 or by visiting [www.petro-canada.com](http://www.petro-canada.com) and applying to job #1271.

We thank all applicants for their interest in Petro-Canada; however, only those considered for an interview will be contacted.

Your application to this posting is deemed to be consent to the collection, use and necessary disclosure of personal information for the purposes of recruitment. Petro-Canada respects the privacy of all applicants and the confidentiality of personal information and we will retain this information for a period of 1 year.

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## **Geoscience Team Lead - Fort Hills #1270**

**Western (Calgary)**

**Organizational Unit Name:** OIL SNDS FH PROGRAM MINING OPERATIONS

### **Description**

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### **Accountabilities**

Working with the Fort Hills Mine Technical Team and supervising the Fort Hills Geoscience team the candidate will steward toward the 2009 mine start-up and 2011 first bitumen.

- Identify, evaluate and create geological assessments
- Provide recommendations for delineation drilling and laboratory studies of both the ore and overburden intervals
- Will work with the mine engineering team leader to co-ordinate ore and overburden requirements for construction, pit wall and bench planning
- Support Mine Operations to ensure ore quality to the Plant
- OBIP, Resource & Reserve quantification and validation
- Geological model validation and risk identification
- Determine in-place volumes of construction and waste materials
- Identify and quantify geological risk
- Potential impact of surface geophysics, surfical water related to production schedule, basal water mitigation options
- Evaluate and quantify Phase 2 opening cut options

- Direct the evaluation of potential acquisition, and development opportunities to compliment the team's development focus
- Take a lead role in recruitment and direct supervision of up to 20 staff and the mentoring of more junior members of the Fort Hills Geoscience team

### Capability Requirements:

### Specific Functional/Technical Skills

- Candidate will be a Professional Geologist with a minimum of ten years of geology supervisory experience in an oil sands mine project
- The ideal candidate will be recognized for their advanced knowledge in daily oil sands mine operations as well as clastic sedimentology and stratigraphy
- The incumbent will have direct recent experience with oil sands mining operations and start up
- Experience in geotechnical aspects and mine modeling
- The successful candidate will be comfortable with integrating geology with engineering issues associated with a mine project development

### General Skills / Knowledge / Attributes

- Strong communication, negotiation and presentation skills
- Self starter who demonstrates organizational and prioritization abilities required to work between an operational role to a coordinating or planning role
- Demonstrates creativity and innovative thinking
- Flexible and open minded
- Mature, enthusiastic and participative work outlook in achievement of team goals and objectives
- Natural leadership abilities

### Additional Information

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***'Shaping the Future: Worldwide. Responsibly. For the long term.'***

**Excellent Professional Opportunities**

**Corporate Profile**

Our client is one of the world's most respected engineering services and project management companies with office networks across the Americas, Europe and Asia. On behalf of the company, we are seeking leadership candidates who can undertake the following professional opportunities within the company's highly recognised Earth & Environmental Division & within the E&E / Mining Group. Compensation for all roles is excellent & matches candidate experience & capabilities.

**SENIOR ROCK MECHANICS ENGINEER/GEOLOGICAL ENGINEER**

To be located in Burnaby, BC, or within a successful candidate's preferred location, the role will be seen as a leader within the company or region. A track record in consulting, including some mine operations experience is essential. A geological engineering degree or mining engineering degree with strong rock mechanics background is required.

**SENIOR TAILINGS ENGINEER/GEOTECHNICAL ENGINEER**

To be located in Burnaby, BC, or within a successful candidate's preferred location, the role will be seen as a leader within the company or region. An international consulting background is essential. One of, or all of the following preferred: tropical, permafrost &/or oil sands experience.

**TWO BUSINESS MANAGERS/GEOTECHNICAL ENGINEERS**

**Abbotsford & Fort St. John, BC**

The Business Manager's role is an important & integral part of the company's organization structure. Successful candidates will have the challenge & responsibility to: grow & sustain business & marketing goals; to oversee consistent delivery of superior client services; to provide leadership & project management direction to staff; to build, maintain & lead staff to a high level of team performance &, to personally perform & lead professional/technical services.

**Abbotsford** has become "The Raspberry Capital of Canada". It is known to have some of the finest recreational facilities in Canada & to have outstanding transportation facilities.

**Fort St. John** is in the heart of the majestic Peace River country & is known as "The City of Energy" & as a powerhouse of opportunity. FSJ is a 19,000 person city & is the oil & gas Business Centre of BC. Agriculture & forestry add to the powerful economy with secondary businesses being tourism, retail & hydroelectricity. Access is year round.

**Please Contact Soon:**



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