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FRONT & BACK COVER PHOTO:
COURTESY BRENDAN O'BRIEN

Water Finders: (from left) Randy Shinduke, Douglas MacLean, G.I.T., Colin Miazga, G.I.T., Paul Bauman, P.Eng., P.Geoph., Erin Ernst, P.Geo., Landon Woods, P.Geo., and Franklin Koch.

PRINTED IN CANADA

MIX
Paper from responsible sources
FSC® C011825

PEG

VOLUME **7** | NUMBER **3** | **FALL** 2016

(Print) ISSN **1923-0044**

(Online) ISSN **1923-0052**

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US POSTMASTER: PEG (ISSN 1923-0044) is published quarterly in Spring, Summer, Fall and Winter, by the Association of Professional Engineers and Geoscientists of Alberta, c/o US Agent-Transborder Mail 4708 Caldwell Rd E, Edgewood, WA 98372-9221. $15 of the annual membership dues applies to the yearly subscription of The PEG. Periodicals postage paid at Puyallup, WA, and at additional mailing offices. US POSTMASTER, send address changes to PEG c/o Transborder Mail, PO Box 6016, Federal Way, WA 98063-6016, USA.

The publisher has signed an affiliation agreement with the Canadian Copyright Licensing Agency.

Please return Canadian undeliverables to: APEGA, 1500 Scotia One, 10060 Jasper Ave., Edmonton, AB T5J 4A2. Publications Mail Sales Product Agreement No. 40062712

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APEGA

We Must Honour the Privilege of Self-Regulation — or Risk Losing It

BY **DR. STEVE E. HRUDEY,** *P.ENG., FEC, FGC (HON.) FCAE, FSRA*
APEGA President

The year 2016 has been remarkable for many reasons, not least of which is the public's increasing skepticism of expert opinion — a trend that appears to have accelerated. Notably, a majority of British voters apparently did not accept countless warnings from prominent political and economic experts that a vote for Brexit from the European Union was a vote for economic uncertainty.

What does skepticism about expertise have to do with self-regulation and APEGA?

A key argument for regulating professions is that they need to have, maintain, and deliver a unique set of knowledge and skills to ensure that the public interest is served. Trends towards societal rejection of expertise and authority can only make the regulation of professions more challenging.

Self-regulation of a profession — or, in APEGA's case, two professions — is a particularly valuable adaptation of this essential role. Self-regulation can ensure that the people most knowledgeable of best practices provide the standards for measuring competence and professional conduct. The costs of the regulatory process are borne by the regulated professions, not by the taxpayer. In return, regulated professionals are assured that their performance will be judged by practising professional peers, not by bureaucrats inevitably limited in their understanding of details of professional practice.

We have been fortunate to exercise this privilege of ensuring public safety on behalf of our Members since 1920. As we approach APEGA's centennial in 2020, however, we must take heed of authentic threats against retaining this privilege, and we must focus our continuing regulatory improvements with them in mind.

APEGA exists because of the authority granted to us in provincial statute, which means we must honour and understand the obligations required of us by law. Any perception in a specific case — justified or otherwise — that our professions have failed at this could undermine our ability to maintain our privilege to self-regulate. The government must trust us, as must the public it represents. Trust is very challenging to earn, remarkably easy to lose — and, once lost, incredibly difficult to regain. We should be proud that our professions have for the most part earned that trust, but to retain it we must be vigilant and willing to learn from the experience of other self-regulating professional agencies.

On July 6, Quebec's Justice Minister announced that the Ordre des Ingénieurs du Québec (OIQ) was being placed under provincial government trusteeship. An APEGA sister regulator, OIQ, with about 61,000 Members, has been entrusted with the self-regulation of the engineering profession in Quebec since 1920. The Justice Minister's announcement was based on a recommendation from Quebec's Office of Professions, questioning the capacity of OIQ in carrying out its primary mission of protecting the public. *See related story, page 13.*

How did this serious Canadian challenge to self-regulation of our professions come about?

The genesis of this challenge was the four-year Quebec Charbonneau Commission, an inquiry into corruption in the awarding and management of public contracts in the construction industry. Justice France Charbonneau released her report in November 2015, after damning testimony about unethical conduct such as taking bribes.

The unacceptable behaviours in the engineering profession that the commission revealed were not failures of technical competence; they were failures of professional ethics. The commission

recommended mandatory training in ethics and professional conduct, not only for admission to the profession but also as an ongoing requirement of continuing professional development (CPD).

OIQ proposed several specific responses to inquiry recommendations, including increased membership fees to fund improved regulatory capacity. Unfortunately, there was substantial controversy and resistance among OIQ Members to fee increases. The Quebec government concluded that OIQ was not responding adequately to the problems identified by Justice Charbonneau's Commission.

OIQ has not yet lost the privilege of self-regulation, but the government appointment of trustees to its board effectively places OIQ on probation.

Professional Engineers Ontario (PEO) is pursuing compulsory CPD, acting on an October 2014 recommendation of the Elliot Lake Commission of Inquiry into the Algo Centre Mall collapse. The collapse, which caused two deaths, involved questions of both unskilled and unethical practice.

PEO did not meet Commissioner Justice Paul Bélanger's specified deadline of making CPD compulsory within 18 months of this report's release, because PEO has been consulting its membership about implementing a tiered, risk-based approach to CPD. Individual Professional Engineers would have their CPD requirements determined by the degree of public risk that each Member poses.

The Association of Professional Engineers and Geoscientists of B.C. (APEGBC) has voluntary CPD reporting, but it failed in 2009 and 2015 to achieve a required two-thirds majority vote of the membership to adopt a bylaw for compulsory CPD.

Challenges to self-regulation in B.C. have come out of two reports stemming from the massive, August 2014 failure of a tailings dam at the Mount Polley copper mine. The three-member Independent Expert Engineering Investigation and Review Panel, commissioned by the Chief Inspector of Mines for the B.C. Ministry of Energy and Mining, said in its December 2015 report that "the dominant contribution to the failure resides in the design" and that "the engineers of record did not conduct adequate studies and site investigations of the perimeter embankment foundation." Ongoing regulatory investigations are not necessarily bound by these findings and may reach different conclusions.

In its separate report on the failure, in May of this year, B.C.'s Office of the Auditor General said regulation of mining is overly reliant on qualified professionals, including engineers and geoscientists. In its response to this report, the Government of B.C. called this a "criticism of professional bodies' ability to regulate their professions" but found that claim to be unsubstantiated with respect to mining and inconsistent with long-standing industrial and professional regulatory experience in B.C.

Self-regulation of engineering and geoscience was, in this case, supported by the Government of B.C., despite a very pointed challenge. However, the very nature of technological failures that cause major environmental damage, ranging from hydrocarbon spills to groundwater contamination, can be expected to attract criticism and a public search for blame. Such circumstances will inevitably include questions about the performance of Professional Geoscientists and Professional Engineers, a reality that we must be able to responsibly address.

APEGA Members would be extremely unwise to believe that we will be immune from high-profile criticism in cases like these. We must demonstrate meaningful and effective regulatory action within our mandate.

Removal or limitation of professional self-regulation is not without precedent. The medical profession in the U.K. has long been regulated by the General Medical Council, but the professionally funded, self-regulatory body has been subjected to reforms in the last 15 years that reduce its autonomy. These reforms were sparked by extensive public scrutiny that followed some major failures. The most notable and extreme was the notorious Shipman case, in which a licensed physician was discovered by police — not the medical council — to have murdered hundreds of patients over a 27-year period. Medical colleagues failed repeatedly to report Dr. Harold Shipman's openly questionable medical practices.

More than a decade ago, in Queensland, Australia, a growing scandal involving the Queensland Law Society and its inability to regulate excessive fee billing by its members led to the state appointing a Legal Services Commissioner, effectively taking over the society's investigative and disciplinary functions. At the end of June, the B.C. Government removed the privilege of self-regulation from the province's real estate industry, citing its failure to protect the public interest after only 10 years of having this privilege.

What is APEGA doing to ensure that we remain responsive and effective in honouring the privilege of self-regulation?

Our current legislative review has been strongly influenced by these and other challenges to the privilege of self-regulation. The *2017-2019 APEGA Strategic Plan* is structured to better ensure that we are worthy of this privilege. It calls for:

- ensuring organizational excellence
- improving our commitment to continuing professional development, with a focus on ethics
- improving our regulation of ongoing professional practice

A new APEGA Vision, included in the plan, is that APEGA "earn the confidence of the public and instill pride in its Members." This is a call to action to Members, letting us know that individually we must never tolerate unskilled or unprofessional conduct in our ranks.

Effectively policing ourselves to protect the public is the essence of self-regulation. Ultimately, we must continuously recognize that the privilege of professional self-regulation cannot be compromised by self-interest. By ensuring competent and ethical professional activities, we must never lose sight of our duty to protect public safety and honour the public interest.

Questions or comments?
president@apega.ca

How Your Council and Staff Continue Improving APEGA's Game

BY **HEIDI YANG,** *P.ENG., FEC, FGC (HON.)*
Interim CEO

As I write my column for the Success issue of *The PEG*, the 2016 Summer Olympics are officially behind us. Sports do come to mind when many of us try to define success, and it's always tempting to make them a metaphor for the other things that happen in life.

Success in sports is difficult to achieve, taking lots of commitment and effort. But measuring it is, in most cases, fairly straightforward. You beat the time, you win the medal, you stand on the podium. Personal bests, world records, and other measurable achievements lie before you, and you reach for them.

When it comes to the regulation of engineering and geoscience, however, measuring success is a little more difficult. APEGA's goals are not complicated — the most basic, important, and overarching one we have is to serve the public interest by regulating the practices of engineering and geoscience in Alberta. Simple, right?

But achieving that goal relies on our earning and keeping the confidence of the public and instilling pride in Members — pride in their professionalism and practices, pride in their societal role. I don't mean a self-centred type of pride. I mean the kind of pride that comes from doing the right thing in all situations.

The question is this: how do we, as the regulator of engineering and geoscience, earn this public confidence and develop this Member pride?

The privilege of self-regulation is something we must continually work at deserving. These days, our challenges are even greater than usual, in light of:

- growing public expectations of regulators
- recent news events, along with the consequences some self-regulators are facing
- a difficult economic climate
- a need your Council has identified for us to have more robust processes

So, how are we doing? I will do my best to capture the successes we've had in recent months, and there have been many. I'll also provide some context about where we are going, which I'll build upon in my next column.

BETTER PROCESSES

Among our most complex challenges continues to be the timely and effective registration of new Members. Frankly, we are not yet where we need to be. However, several new processes are in place and working well, as we standardize our requirements.

We've put more registration staff in place, including staff dedicated entirely to fielding applicants' phone calls. We have a system for assessing and reporting academic qualifications that saves time and duplication of effort from applicants. Also dramatically improved is the work experience record and its process of gathering references. This system has moved to a mobile-friendly, online platform.

Many of the other processes important to our role as a regulator are also being reviewed and improved. Our *2017-2019 Strategic Plan* calls on us to focus on oversight of the practice of the professions, along with organizational excellence, continuing professional development, and the centennial of APEGA, which occurs in 2020. Two of those priorities are strongly tied to individual ethics, which is worth noting.

Another project that ties directly to our strategic plan is the legislative review. As you may know, the review is preparing us for the first complete revamp of the *Engineering and Geoscience Professions Act (EGP Act)* in more than three decades.

Working with Members, Permit Holders, the Government of Alberta, and other stakeholders, we are delving into all the legislative changes required to improve our regulatory role and make our Act more modern. Proposed recommendations are being forwarded to the government, after Council approval.

The review has been successful in enhancing APEGA's engagement with Members and Permit Holders on regulatory matters. More than 4,000 stakeholders have taken part in the review so far, and further opportunities lie ahead. Right now, we're taking a close look at many of the standards and requirements Members and Permit Holders are held to in the practice of their professions.

OTHER IMPROVEMENTS

Our new website went live in January — the first rebuild of the site in about eight years. Because we rewrote and updated all the material on the site, content is leaner, simpler to read, and less repetitive than it was. A clean, simple look makes finding content much simpler, too. Our data and survey results confirm that Members are more quickly finding what they need on apega.ca.

Interim CEO's Message

Also live since January is our new job board, which operates on an intuitive, user-friendly platform. This is a great tool for employers and Members, helping connect the right people to the right jobs in difficult economic times. More than 400 companies have registered, posting about 550 jobs so far.

The job board amounts to one-stop shopping for Members and employers. Members know their resumes are being perused by legitimate engineering and geoscience employers. And employers know potential applicants who are not professionally qualified are pre-filtered from searches — because only Members have access to postings.

Professional development sessions sold out at APEGA Summit 2016: the Annual General Meeting and Conference, in April in Edmonton. Our professional development offerings are improving all the time, including sessions about APEGA's regulatory roles and requirements. We know how important this regulatory training is, and our Members are responding positively to this focus.

Members honoured their peers with 46 nominations for Summit Awards in 2016, the largest number in years and 20 more than we received in 2015. From my viewpoint, the quality of nominations and recipients was extremely high.

A new and improved APEGA mentoring program is launching this fall. We'll be using online matching software, to make the program more efficient and the pairings of mentee and mentor more successful.

Permit Holder participation in our annual salary survey increased again, to 177 companies from 156 in 2015. This improves our data, and we're sure many of you will put the resulting document, the *Value of Professional Services*, to good use.

We continue to improve our engagement with Branches, which represent our Members at the grassroots level throughout the province. Branches have been directly involved in our legislative review; a champions collaborative of Members from across Alberta have made sure of that.

WHAT'S NEXT

Our business plan approach in 2017 falls under the banner of Strengthening Our Foundation. This speaks to our continuing need, as I said earlier in this column, to meet a deceivingly simple goal: to serve the public interest by regulating the practices of engineering and geoscience in Alberta.

As leaders, directors, and managers at APEGA embarked on the planning process for our next business plan, each department prepared a self-evaluated scorecard. It measured how well we are doing in relation to a performance bar. Are we delivering what we need to deliver, and are we in compliance with the Act?

The exercise helped us determine that there is much to do to strengthen the foundation of APEGA, both from an operational and a regulatory excellence perspective. It will take more resources to be a more effective regulator. By 2020, we may even need to have increased dues by $200 to $300 per Member. This possibility was raised in the winter 2015 CEO's Message — a column that also said we will need to begin that journey with a dues increase in 2017. We continue to dialogue with Council on what the first increase will look like, along with when it and further increases will be implemented. Stay tuned.

The winter edition of *The PEG* will be themed Planning and Preparation. At that time, I'll look at the high-level document that all our business stems from: the *2017-2019 Strategic Plan*, which your elected Council has created. What do you and your regulator need to do to act upon its directions? I hope to answer that question and maybe a few others.

Visit apega.ca to read the plan.

AND FINALLY

APEGA most certainly faces challenges. Olympian challenges, you might even say.

So let me end by thanking our Canadian athletes for a job well done in Brazil. A medal count of 22 is something to be proud of, surpassing the pre-Games goal of 19.

Congratulations. You are an inspiration to us all — APEGA included!

Questions?
ceo@apega.ca

COUNCIL NOMINATIONS

Nominations for 2017 Council close on

Wednesday, October 19, 2016

at

11:59 p.m.

Election Dates February 17 to March 19, 2017

- Nominations are accepted electronically through the Member Self-Service Centre at apega.ca.
- You will have no further opportunity to self-nominate for the 2017 election.
- Based on governance and strategic needs of Council, the Nominating Committee will review all nominations for possible endorsement.
- The names of all qualifying nominees will appear on the ballot, regardless of whether they have the endorsement of the Nominating Committee.
- Information about candidates will be distributed to Members in mid-November.

MORE INFORMATION

Member Self-Service Centre at apega.ca
Summer Edition of *The PEG* (Digital or Hardcopy)

YOUR PATH TO A SEAT ON COUNCIL

You

- Familiarize
- Decide
- Access Member Self-Service Centre
- Complete your submission

Nominating Committee

- Collects
- Interviews
- Meets/Reviews
- Endorses or Doesn't Endorse

APEGA

- Confirms information with you
- Communicates with you
- Creates ballot
- Runs election

Ballot Counting Committee

- Confirms results
- Prepares report to CEO and President

CEO/President

- Calls you to discuss results of election

Deadline Approaches For Council Nominations

Are you ready to take a major step in the life of an APEGA Professional Member? One that could see you playing a key role in shaping the future of your professions and the self-regulatory system that allows you to practise?

If so, consider seeking a seat at the table of the next APEGA Council. Nominations are open for the 2017 APEGA Council election — but not for much longer. They close on October 19, 2016, at 11:59 p.m.

Do you have a professional peer you know would make a great Councillor? If so, please pass along this information.

Strong, thorough preparation will give potential candidates the best chance of being endorsed by the Nominating Committee and elected by their peers.

You must submit your nomination electronically through the Member Self-Service Centre at apega.ca. Full information appears there and in the summer 2016 edition of *The PEG*. If you no longer have your copy of the magazine, read it online at apega.ca.

You'll need to prepare a variety of materials (some mandatory and some not) and gather endorsements from 25 other Professional Members.

The APEGA Nominating Committee is charged with ensuring that recommended candidates represent a strong combination of attributes for Council. Through its own networks, the committee searches for potential candidates to endorse. But it also draws upon self-nominated candidates. Before the election, the committee arrives at its list of candidates — Members who are willing, suitable, and available for Council governance and succession.

Every year, at least four Professional Members are elected to Council. Members also choose a President-Elect and a Vice-President each year, who will lead Council and join the immediate Past-President on the APEGA Executive Committee. Not including the Executive Committee, Council is made up of 12 Professional Members and three public members. The Government of Alberta appoints public members to be the eyes and ears of the public.

Names of all qualified and properly nominated candidates will appear on the 2017 ballot, regardless of whether they receive the Nominating Committee's endorsement.

APEGA runs background checks on all potential nominees, a term you will need to accept before clicking submit in the Member Self-Service Centre.

QUESTIONS?

elections@apega.ca

Improving Professional Practice

APEGA's new strategic plan will, among other things, call for improvements and clarification in our professional practice requirements. We'll meet this strategic priority through better, clearer, and more specific direction for Permit Holders and their Responsible Members

As we heighten our attention to professional practice, APEGA has a great opportunity to strengthen our relationships with Permit Holders and their Responsible Members (RMs) — all serving the cause of working together to be better self-regulators. Launching next year, the *2017-2019 APEGA Strategic Plan* will guide us in connecting with these critical partners in self-regulation to improve and enhance their management and quality systems for professional practice. In fact, one of four priorities in the new strategic plan is entitled Professional Practice.

Changes in this area we're working on are outlined later in this story. But first, here's a refresher on APEGA's permit system.

PERMITS EXPLAINED

In Alberta, companies and many other organizations must have an APEGA Permit to Practice before they can practise engineering or geoscience and use reserved words in their names, in ways and forms that suggest they are legally allowed to practise — words like engineer or geoscientist, for example.

Once issued a permit, a Permit Holder must designate at least one APEGA Professional Member as an RM for each APEGA profession it practises. Permits are renewed annually, just like other APEGA professional memberships.

RMs are employed by the organization, either as regular employees or contractors. The number of RMs needed increases with the size of the company. The rule of thumb is one RM for every 10 Professional Members and Members-in-Training, per profession.

It's the duty of every RM to help regulate the practices of engineering and geoscience within their organization. RMs must ensure their employers have appropriate and properly enforced Professional Practice Management Plans (PPMPs) in place.

What is a PPMP? It's a document that outlines the corporate policies, procedures, and systems used to ensure engineering and geoscience work done by the company is

- carried out responsibly
- meets APEGA's professional, technical, and ethical standards
- meets other legal requirements

APEGA has about 4,600 Permit Holders, and all of them are required to develop, maintain, and deliver PPMPs. Each Permit Holder must assign at least one of its RMs to manage the PPMP.

IN THE NEWS

The public has an increased expectation for engagement, communication, and transparency from companies that practise engineering and geoscience. This desire for an improved social partnership, as it is sometimes called, is often reinforced by current events. News items that come to mind include the Elliot Lake mall collapse in Ontario, the tailings pond failure at Mount Polley Mine in B.C., and pipeline failures in Alberta and elsewhere.

WHAT'S CHANGING?

APEGA is developing clearer guidelines, standards, and bulletins for Permit Holders and RMs to use as they develop this social partnership. These will enhance and clarify their professional obligations and give them better direction on PPMP expectations and oversight. They'll give Permit Holders, RMs, and, indeed, all Members a stronger understanding of their responsibilities, while also improving APEGA's ability to self-regulate on the public's behalf.

We're not just responding to the public in this area. These changes are something Permit Holders themselves have asked for, which underlines their desire to keep improving.

Guidelines, standards, and bulletins will contain more details for Professional Members, RMs, and senior management, outlining specific requirements in such areas as

- document authentication
- outsourcing
- contractor checks
- proper hiring and position titling

Permit Holders will continue to be required to show APEGA, in clear detail through their PPMPs, how they are meeting APEGA's practice standards, guidelines, and bulletins, and how they are ensuring that all engineering and geoscience work is subject to their companies' quality management systems.

PERMIT HOLDER REMINDER

Visit the APEGA Company Self-Service Centre at apega.ca to:

- manage the status of your company's Permit to Practice
- update company information
- pay permit fees

QUICK FACTS

- Not all provincial and territorial regulators of engineering and geoscience require practising companies to have a permit.
- In some provinces, a Permit to Practice is called a Certificate of Authorization.
- APEGA first began licensing consulting firms in the late 1960s. The system expanded in the early 1980s to include all other companies and many organizations practising in Alberta.
- Some organizations, such as governments, are not required to have a Permit to Practice.
- Permit to Practice Seminars began in 2004 to help inform our Responsible Members about how they can entrench professionalism in their corporate cultures.

Currently, APEGA conducts random practice reviews of Permit Holders. In the future, we'll conduct more reviews, and they'll be more focused on areas of public interest.

These reviews allow APEGA to give timely feedback to Permit Holders and work with them to improve their practices.

OTHER IMPROVEMENTS IN THE WORKS

We're also planning improvements to the permitting process and to the tools Permit Holders use. These include enhancements to our online Company Self-Service Centre, through which Permit Holders update their company information and pay their permit fees.

And we're revamping our Permit to Practice seminars. RMs must attend a Permit to Practice seminar (or take an online Permit to Practice course) within six months of a permit for their employer being issued or their becoming a new RM. After that, the seminar or course must be retaken once every five years.

The seminar is open to the public. Also, RMs can request that we deliver the seminar in-house, which we try to accommodate when the number of attendees warrants it. Permit to Practice seminars inform Responsible Members of their duties and provide guidance on creating a PPMP.

We're improving our materials for the seminar and online course, and volunteers who are Responsible Members will soon be joining APEGA staff as presenters.

We expect to start rolling out these changes by the end of 2017.

ENGAGING WITH PERMIT HOLDERS

In the APEGA legislative review, a number of proposed recommendations would, if implemented, affect Permit Holders and Responsible Members. These are being discussed with Members as part of the APEGA legislative review consultations scheduled for this fall. *See story, Page 12.*

We want to continue this heightened level of engagement with Permit Holders and Responsible Members. Indeed, APEGA's ability to uphold the public interest requires an ongoing partnership with our Members and Permit Holders.

We believe the changes we're making will also help Permit Holders become more engaged in self-regulatory matters of professional practice and empower Responsible Members to confidently fulfill their obligations.

QUESTIONS?
permits@apega.ca

The Conversation Continues

Legislative review consultations restart in October, with some significant proposed changes to APEGA's governing legislation on the agenda. Among the topics we'll need your feedback on are Permit Holder criteria, the authentication of professional documents, mandatory professional liability insurance, and professional development obligations

APEGA's legislative review is at a critical stage as we cross the midway mark in the consultation process and prepare for another round of formal consultations with Members and Permit Holders. So far, APEGA Council has endorsed more than 60 recommended changes to the *Engineering and Geoscience Professions Act (EGP Act),* and these have been forwarded to the Government of Alberta for its consideration. The Act hasn't had a major update in over 30 years, so we're working with the province to ensure the Act continues to protect the public interest and reflect business and industry practices.

Stakeholder consultations continue this fall, digging into a number of essential topics. This round of consultation focuses on a list of regulatory areas directly related to how Members and Permit Holders practise their professions and conduct their business. Over the next few months, we'll be seeking your feedback on matters involving:

- authentication practices
- Permit to Practice and Responsible Member responsibilities
- professional liability insurance
- the introduction of creative sanctions
- tools for statutory entities to better manage proceedings
- the introduction of Custodian of Practice
- our Continuing Professional Development (CPD) program
- our Provisional Licensee membership category

Council meets September 30 to review and decide whether to support proposed recommendations set for discussion in fall consultations. Once these details are finalized, they'll be published at apegalegislativereview.ca.

We encourage you to read the full briefing notes, once they're posted, to get a better understanding of the recommendations being proposed. Watch your inbox for an e-PEG announcement when this information goes live.

SHARE YOUR FEEDBACK

Join over 4,000 Members and Permit Holders who have shaped the future of the professions by taking part in the legislative review process. Because Member engagement is critical to the success of self-regulation, your input is important in the review and development of new legislation — legislation that will govern Professional Members and Permit Holders into the future, as they practise their professions in service to the public interest.

Following are several ways you can get involved.

Face-to-Face Consultation Sessions

- Edmonton — October 18 and 19, and November 8
- Calgary — November 17 and 23
- Sherwood Park — November 8

All Members and Permit Holders are invited to attend one of these free, two-hour sessions. For participating, Members can claim credit under the APEGA CPD program. Register online at apegalegislativereview.ca.

Webinars and Videoconferences

- Webinars — October 25 and November 10, 15 and 23
- Videoconferences — October 26 and November 17

Survey

- Open at apegalegislativereview.ca from October 4 to December 2

WHAT DOES APEGA DO WITH YOUR FEEDBACK?

- The legislative review is a complex and lengthy process. We've been working on proposed recommendations for changes to legislation for at least two years, and we anticipate the review will take until spring 2019 to complete. We're consulting Members, Permit Holders, and other stakeholders in stages.
- So far, we've held three rounds of consultations — two in 2015 and a third in early 2016. A fourth round begins this October.
- During each consultation round, several face-to-face meetings, videoconferences, and webinars take place to share information and collect feedback about proposed legislative recommendations. Members and Permit Holders can also submit their feedback through a survey or directly by email.
- When a consultation and survey wraps up, APEGA posts a We're Listening report, which summarizes the feedback we've gathered. Based on this feedback, APEGA Council will endorse, or amend, the proposed recommendations.
- Because the *Engineering and Geoscience Professions Act (EGP Act)* is provincial legislation, the endorsed recommendations are sent to the Government of Alberta for its consideration.

The proposed legislative changes Council is forwarding to the provincial government are based on APEGA's stakeholder consultations. The province considers feedback from stakeholders an important part of legislative change.

The list of recommendations already endorsed by Council can be found at apegalegislativereview.ca.

COMMENTS OR QUESTIONS?

legislative-review@apega.ca

Quebec Government Limits Self-Governance of Quebec Engineers Through Appointment of Trustees

Quebec's provincial government has placed the Ordre des ingénieurs du Québec under its trusteeship, seriously compromising the engineering regulator's privilege of self-governance. It's a significant decision, and one that we at APEGA are closely monitoring while we move ahead on improvements in the way we regulate engineering and geoscience

The regulator of the practice of engineering in Quebec, Ordre des ingénieurs du Québec (OIQ), has faced financial pressure and internal challenges over recent years. It's reached the point that the province's Office des Professions, which oversees all of Quebec's professional bodies, has recommended that the government place OIQ under trusteeship, and the government responded by appointing three directors to oversee the board of the 61,000-Member order.

The office said in its news release that it had seen problems in governance, internal management, and the financial stability of OIQ, which challenge OIQ's ability to fulfill its primary role of public protection.

Although disappointed in the decision, OIQ President Kathy Baig, ing., said the order will continue to cooperate with the province. The newly elected president hopes the province will recognize the work done over the past year to enhance OIQ's management and governance practices.

Quebec government officials have not indicated how long the trusteeship will be in place.

The regulatory environment is much different in Quebec than it is here, but there are still important lessons that APEGA, as the regulator of engineering and geoscience in Alberta, can learn.

This journey of learning for APEGA began in early 2015. While developing our 2017–2019 strategic plan, APEGA Council and staff looked closely at the Charbonneau Commission Inquiry. The inquiry, led by Justice France Charbonneau, examined construction industry corruption in Quebec, including the unethical practice of some engineers and engineering firms. We also analyzed the findings in the Charbonneau Commission's final report, released last November. It suggested several improvements to Quebec's professional regulatory management systems.

In 2014, while OIQ was responding to events surrounding the Charbonneau Inquiry, the Office des Professions conducted a review of OIQ's administrative practices and rules on internal management. From that review, 21 recommendations for further improvements arose, covering areas such as board governance and committee structure, ethics training, and professional practice inspections.

There's a lot to learn from the Office des Professions recommendations as well, both from a regulatory operations standpoint for staff and from a governance standpoint for Council. Many of the recommendations have been discussed with Council, as we continue to explore ways to strengthen our regulatory management systems and associated resources. Like much of the work APEGA is doing, these efforts serve our goal of becoming a more effective regulator for the Alberta public.

The lessons learned from what happened in Quebec — as well as from other events like the Elliot Lake mall collapse and the Mount Polley mine tailings breach — will remain top of mind as APEGA enhances oversight of the professional practices of engineering and geoscience in Alberta.

WHAT WILL THIS MEAN FOR PROFESSIONAL MEMBERS AND PERMIT HOLDERS?

In the coming years, we'll introduce clearer practice standards, guidelines, and bulletins for Permit Holders, Responsible Members, and Members in general. These will enhance and clarify expectations, including better direction on expectations and oversight of Professional Practice Management Plans — ultimately improving our ability to self-regulate.

We're also making changes to our Continuing Professional Development program. These changes will emphasize the need for sustained professional and ethical competence, while deepening public confidence and trust in our professions. Changes will include the development of early ethics and professionalism training for university students, as well as new requirements for career-long ethics refreshers for professionals.

Members and Permit Holders can also expect to see APEGA engaging with them on the quality of their Professional Practice Management Plans and how they are used to oversee the quality of practice within their organizations.

While some of the work to design these regulatory improvements lies ahead, we're confident that the effort will be worthwhile in helping us achieve our mission of regulating the practices of engineering and geoscience to serve the public interest in Alberta.

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Movers&Shakers

APEGA STORIES REACH SUMMIT OF SUCCESS

They're inventors, they're Innovators, they're influencers — and they're also recipients of APEGA's 2016 Summit Awards. If you haven't heard about them yet, here's your chance to find out more about these high-achieving Members, their projects, and why they were honoured for professional, technical, and community excellence.

You can also visit apegasummit-awards.ca to watch short videos that highlight their achievements.

Note: Nominations for the 2017 Summit Awards closed September 15. Recipients will be honoured at a gala awards night, April 27, 2017, in Calgary.

PEAK PERFORMANCE
Recipients of 2016 APEGA Summit Awards and project recipient representatives pose for a group photo with the Honorable Lois E. Mitchell, CM, AOE, LLD, the Lieutenant Governor of Alberta. Back row: (from left) are Karen Sagar, P.Eng., Kamal Botros, P.Eng., PhD, Arden Spachynski, P.Eng., APEGA Past-President Connie Parenteau, P.Eng., FEC, FGC (Hon.), Russ Wlad, P.Eng., Aminah Robinson Fayek, P.Eng., PhD, Leon Prebeau-Menezes, P.Eng., and Lourdes Lugue, P.Eng. Front row: (from left) J.J. Roger Cheng, P.Eng., PhD; Paul Bauman, P.Eng., P.Geoph.; Lieutenant Governor Lois Mitchell and her husband Doug Mitchell; Robin Gardiner; and Jacques Georgy, P.Eng., PhD.

Centennial Leadership Award

Presented to Members who have attained the highest distinction relating to engineering or geoscience through directorship of an outstanding project, original research, or invention, or an exemplary career in teaching

At first, others called him crazy, but **Dr. J.J. Roger Cheng, P.Eng.**, proved them wrong. When he became chair of the Department of Civil and Environmental Engineering in the University of Alberta's Faculty of Engineering, he set a goal to raise $25 million in five years. "We not only made that goal, we surpassed it."

The funding helped transform the department into one of the largest for civil engineering in North America. It also consistently ranks as one of the top 100 places to study civil engineering in the world. Over Dr. Cheng's term, undergraduate enrolment has more than doubled to more than 1,000 students, and graduate enrolment has seen a 50 per cent increase to almost 500 students.

Dr. Cheng's other accomplishments include a 56 per cent increase in faculty positions and the establishment of the Nasseri School of Building Science and Engineering. The department used to have one industrial research chair under the Natural Sciences and Engineering Research Council of Canada (NSERC) — now it has eight.

Early Accomplishment Award

Presented to Members recognized by peers for their integrity, expertise, and outstanding accomplishments in fields related to engineering or geoscience at an early stage in their professional career

Since joining Statoil International in 2012, **Leon Prebeau-Menezes, P.Eng.**, has already demonstrated high levels of achievement in his field. As a senior well engineer with Statoil ASA, a Norwegian multinational oil and gas company, he works mainly with platform and subsea wells in the North Sea area. He was on

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What does one of those do? It enables Statoil to better control oil flow from wells with multiple branches, optimizing production at the one of the largest oil and gas fields in the North Sea, the Troll field.

Mr. Prebeau-Menezes was also one of about a dozen people selected to take part in the Statoil Talent Trader Program in 2014, and in 2015 he became one of the youngest recipients of the Society of Petroleum Engineers Completions Optimization and Technology Award for the North Sea.

Mr. Prebeau-Menezes is currently planning the design of a system application for the world's deepest steerable drilling liner. "What drives my passion for my work in petroleum engineering is pushing technological barriers and frontiers for both society and innovation," he says.

Environment and Sustainability Award

Presented to Members who have demonstrated excellence in the application of engineering or geoscientific methods towards preservation of the environment and the practice of sustainable development

Leachate, as you probably know, is any liquid that extracts soluble substances when passing through waste or other matter. Untreated, it is many times more polluted than raw municipal wastewater. But treated, it could someday be helping your garden grow — thanks in part to **Lourdes Lugue, P.Eng.**, of Calgary.

As project manager of the Leachate Treatment Pilot Plant at the East Calgary Waste Management Facility, Ms. Lugue evaluates the leachate generated by the three waste management facilities operated by the City of Calgary.

A one-year study at the pilot plant gauged the effectiveness of three technologies to treat raw leachate. Data showed that the quality of treated leachate not only met but exceeded the city's standards. Ms. Lugue then led her team in conducting a study to see if leachate can be used to irrigate city flowers and trees.

The project, with engineering firm **CH2M Hill Canada**, also won two Consulting Engineers of Alberta Awards of Merit. The city now hopes to build full-scale leachate treatment facilities for each of its waste management facilities. Ms. Lugue's leadership and engineering experience were key to the success of this pilot project.

Excellence in Education Award

Presented to Members who have made exemplary contributions to teaching and learning at a recognized post-secondary institution in Alberta

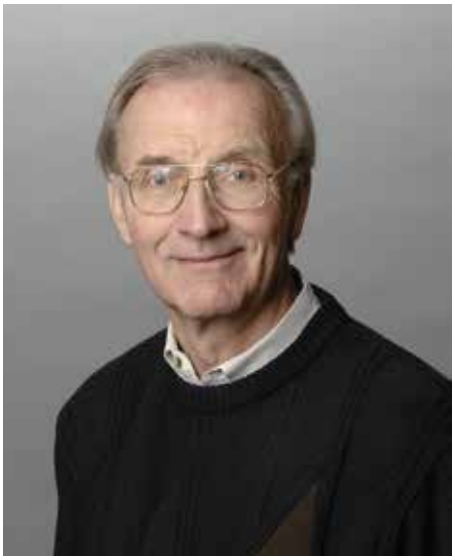
Teachers help students grow — and students help teachers grow. So says **Dr. Aminah Robinson Fayek, P.Eng.** It's something she's had happen in her own professional life, having served since 1997 as a professor of construction engineering and management at the University of Alberta's Department of Civil and Environmental Engineering, Faculty of Engineering.

"I feel very fortunate to work with such talented students, and I feel like I've been able to evolve and grow as a result of that experience," she says.

In the classroom, Dr. Fayek anticipates concepts that students may struggle with, then offers focused explanations that illustrate a clear connection to the broader discussion. She pays close attention to the needs of students, seeks input on the pace and clarity of her instruction, and encourages students to customize projects to fit their specific interests.

In 2013, she received the prestigious Killam Annual Professorship, which recognizes excellence across diverse domains of academic activity. She has also held the Ledcor Professorship in Construction Engineering since 2008. Through the latter role, she acts as a liaison between Ledcor and the U of A to administer scholarships and prepare engineering graduates for careers in industry or academia.

Her passion for her work has led her into a range of outreach activities focusing on advancing diversity and inclusivity in engineering, such as her involvement with Women in Scholarship, Engineering, Science & Technology (WISEST).



CALL HIM DR. BOARD OF EXAMINERS
Dr. Gary Faulkner, P.Eng., FEC, FGC (Hon.), has retired from the APEGA Board of Examiners after 27 years of service — 21 of them as Chair.

Frank Spragins Technical Award

Presented to Members recognized by their peers for their integrity, technical expertise, and outstanding accomplishments in fields relating to engineering or geoscience.

Dr. Kamal Botros, P.Eng., has spent more than 35 years solving fluid flow problems. He's a leading authority on gas dynamics, particularly in the areas of compressor surge, pressure-flow transients, acoustics, pulsation, and gas turbines. A research fellow with NOVA Chemicals Corporation, he says every work day is exciting. "Every day is a different problem. I put myself into the problem, try to solve it, become innovative. And this is amazing."

In recent years, Dr. Botros pioneered the development of a custom-built, shock-tube test facility. His research helps pipeline designers understand how to select material to prevent and contain a pipeline rupture, and prevent its spread across a wider area. Featuring the only piece of equipment of its type in the world, the facility has drawn international interest.

He's also one of the inventors of a two-stage supersonic ejector, which captures 100 per cent of fugitive emissions from gas compressor stations. The technology benefits the environment and makes gas transmission more cost effective.

Appointments

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Harjeet Panesar, M.Sc., P.Eng. (Principal / Branch Manager, Edmonton)

Harjeet received his B.Eng. (Civil) from Gulbarga University (India) in 1994, and his M.Sc. (Geotechnical) from Thapar Institute of Engineering and Technology (India) in 1997. After a stint in the United Arab Emirates, where he was involved with construction of heavy foundations and ground improvement, Harjeet joined Thurber's Edmonton office in 2003. His main areas of expertise include providing geotechnical investigation services for industrial plant sites and civil/transportation infrastructure projects. He has also been involved with geohazard related work in the Peace Region.

Dawit Abraha, M.Sc., P.Eng. (Principal, Calgary)

Dawit completed his B.Sc. in Civil Engineering in 1999 at Addis Ababa University in Ethiopia, and his M.Sc. in Geotechnical Engineering at the University of Alberta in 2004. He joined Thurber's Calgary office in 2004, and currently provides senior level geotechnical engineering and management services for a range of industrial, municipal and transportation infrastructure projects. Dawit's main areas of expertise include, design and analysis of water retention and tailings dams, slope stability assessment, seepage and drainage, geotechnical instrumentation, site investigation and foundation design.

Tarek Abdelaziz, Ph.D., P.Eng. (Principal, Edmonton)

Tarek completed his B.Sc. in Civil Engineering in 1997 at Cairo University in Egypt. He obtained his M.Sc in Geotechnical Engineering from Cairo University in 2001 and his Ph.D. from the University of Alberta in 2007. Tarek Joined Thurber in 2007 and currently provides senior level Engineering and management services for transportation, industrial facilities, housing and commercial complexes. Tarek's main areas of expertise include foundation design, landslide assessment and remediation, design and interpretation of geotechnical instrumentation, design and construction of earth retaining structures.

Robert (Bob) Saunders, M.Eng., P.Eng. (Senior Associate, Calgary)

Bob completed his B.Sc. in Civil Engineering from the University of Calgary in 1981 and his M.Eng. in Geotechnical Engineering from the University of Alberta in 1989. He joined Thurber's Calgary office in 2006. Bob has over 30 years of experience in geotechnical engineering in Northern and Western Canada. His areas of expertise include geohazard assessment, pipelines, slope remediation, permafrost engineering and trenchless construction. He is also active in integrating GIS and remote sensing into geotechnical engineering.

Donald Stefanyk, P.Eng. (Senior Associate, Edmonton)

Don completed his B.Sc. in Civil Engineering from the University of Alberta in 1985. He joined Thurber in 2007 where he currently provides senior level Construction Materials Engineering for industrial, municipal and transportation infrastructure projects. Don's main areas of expertise are pavement surfacing and rehabilitation engineering, condition assessments and forensic investigations for concrete structures for bridge structures, parkades, commercial and industrial buildings and historical buildings. He has also managed the quality assurance/quality control functions for a variety of projects during the construction

Jeremy E. S. Boswell, M.Eng., P.Eng. (Senior Associate, Calgary)

Jeremy obtained his Bachelors and Masters degrees from the Faculty of Civil Engineering at the University of the Witwatersrand, in Johannesburg, South Africa in 1980 and 1982, respectively. He joined Thurber's Calgary office in 2008, where his focus has been on tailings and geotechnical engineering, serving variously as project director, multidisciplinary team leader, reviewer and primary report author of a number of tailings engineering projects in the Oil Sands, Alberta, Canada and elsewhere internationally. Jeremy has authored over 50 papers in tailings engineering and related fields.

thurber.ca

Dr. Botros has published more than 195 technical papers in journals and for refereed conference proceedings. He has five patents, and he has co-authored two books.

Outstanding Mentor Award

Presented to Members of APEGA in recognition of exceptional achievement as a mentor

Effective mentors selflessly share their knowledge to help others succeed. Exemplary mentors also leave a lasting, positive influence on the lives of their mentees. Time and time again, **Arden Spachynski, P.Eng.**, ticks all those boxes with those he mentors.

As the Principal Engineer of Substation Engineering at ATCO Electric, Mr. Spachynski brings with him decades of experience in electrical engineering. He has an innate ability to explain complex problems in a way that his mentees understand, can relate to, and can apply to their own specific interests.

Mentees consider Mr. Spachynski a trusted source of leadership and knowledge. He treats their learning as being equal to the time commitment he would give to any supervisor or staff member. And his confidence in the capabilities of his mentees gives them the confidence in themselves they need to flourish in their fields.

"Arden has always been willing to share his knowledge with me whenever I need support," says one of Mr. Spachynski's mentees. "And yet not once did he do so because it was expected of him. He just genuinely wants to help others."

Project Achievement Award

Awarded in recognition of a project that has made a substantial contribution to technological progress and the betterment of society

The South Red Deer Regional Wastewater System, designed by Stantec, began operation in 2015, transmitting wastewater from communities in central Alberta to the upgraded City of Red Deer Wastewater Treatment Plant. This regional solution was developed to support growth and economic development, ease implementation of future wastewater treatment technologies, and allow participating communities to respond to changes in wastewater discharge standards.

By implementing the South Red Deer Regional Wastewater System, about 119 kilometres of sensitive river segments are now better protected — including a stretch that provides drinking water to more 150,000 people from Crossfield to Ponoka, along the corridor of the Queen Elizabeth II Highway.

Constructing the system required innovative approaches and leading-edge technology to manage long distances and high time variations in wastewater retention, ranging from one-and-a-half to four days along the length of the system.

"It's really critical to the sustainability and protection of the Red Deer River, and it's all about the long-term sustainability of our community," says **Russ Wlad, P.Eng.**, Executive Vice-President, Regional Operations Unit Leader, Stantec.

Research Excellence Award

Presented to Members who have conducted innovative research in engineering or geoscience that has been successfully applied to improve economic and social well-being

Has your navigation system ever failed you in the concrete jungle? Portable navigation in devices such as smartphones and wearables has improved with technology, but its unreliable accuracy in different environments still constrains devices and frustrates users. Navigation using global navigation satellite systems, such as GPS, is accurate in an open-sky, outdoor scenario. But accuracy often suffers downtown, indoors, and underground.

Dr. Jacques Georgy, P.Eng., is changing that. As director of navigation research and development at a leading sensor technology company, InvenSense, he has developed a system that enables a continuous, accurate, portable navigation experience. It works by using sensors integrated with other systems to provide a seamless, indoors-to-outdoors transition.

These sensors are self-contained, provide continuous information, require minimal power consumption, and are small and inexpensive to produce. The technology is now being incorporated into commercial devices and is available in many of today's smartphones.

Dr. Georgy's work contributes to Alberta's leadership in technological innovation, and his efforts have resulted in two patents and 32 more that are pending. He has published more than 80 papers and co-authored a book on his work.

Women in Engineering and Geoscience Champion Award

Presented to Members in recognition of exceptional achievement as a champion of women in engineering and geoscience.

Movers & Shakers

SUSTAINABLE FUTURE
The first phase of Edmonton's new Valley Line LRT will include three elevated stations, including the Davies Station.
-artist's rendering courtesy City of Edmonton

Klohn Crippen Berger (KCB) is an international engineering, geoscience, and environmental consulting firm. In its Calgary office, women make up 35 per cent of the total workforce and 26 per cent of the engineering and geoscience staff.

In 2013, employees **Karen Sagar, P.Eng.**, **Lucy Philip, P.Eng.**, Vanessa Bellardinelli, and Michelle Van Elsberg formed the Calgary Women in Klohn (CWiK) committee to further attract, retain, engage, and support women in KCB's Calgary office. **Chelsea Wisheart, E.I.T.**, joined the committee in 2015 as its representative of young professionals.

The committee holds staff events focusing on mentoring and coaching, leadership development, skill advancement, and relationship building. It has been influential in sparking changes to company policies that benefit all employees. For example, members of the committee collaborated with KCB's global Women in Klohn committee and human resources team to broaden the company's sick-leave policy, allowing employees to use sick-leave entitlement to accompany family members to medical appointments, or to care for them when they are sick.

The committee is also involved in Operation Minerva, a day of job shadowing for Grade 8 girls in Calgary, allowing them to interact with female mentors and employers in science, technology, engineering, and mathematics (STEM).

Honorary Membership Award

APEGA may confer honorary membership upon any person who has rendered eminent service to the engineering or geoscience professions resulting in the betterment of society through the development of new material, equipment, techniques, philosophy, or management

In his role as production operations manager at Shell Canada, **Robin Gardiner** has made significant contributions to process safety on a global scale, benefiting engineers, geoscientists, leaders, frontline workers, and society as a whole.

Mr. Gardiner successfully developed a process safety framework that makes it simple for engineers to connect frontline workers with established process safety guidelines. He also implemented process safety procedures for leaders to ensure competency and identify potential safety gaps.

He championed the living programs approach to process safety, which focuses workers and leaders on the regularity and importance of tasks and processes. He's also diligent in encouraging senior leaders to adopt a process safety conscience. Engineers at Shell are challenged and better equipped to challenge others' perspective on process safety, enabling them to foster a strong process safety culture and performance.

Community Service Award

Presented to Members in recognition of outstanding service and dedication to Canadian society through voluntary participation in community organizations, government sponsored activities, or humanitarian work

Books could be written about **Paul Bauman, P.Eng., P.Geoph.**, and his humanitarian and archaeological efforts in the

Middle East, Africa, and Europe. In this edition of *The PEG*, we've got what you might classify as a chapter — our Good Works feature, starting on page 69. Learn more about Mr. Bauman's most recent journey to Kakuma, Kenya, site of a remote and trouble-filled refugee camp, and his efforts to bring clean water to 185,000 civil war survivors and local tribespeople.

A BIG THANK-YOU FOR 27 YEARS OF APEGA VOLUNTEER SERVICE

The next Chair of APEGA's Board of Examiners (BOE) will have some mighty big shoes to fill with the recent retirement of one of APEGA's longest serving volunteers. **Dr. Gary Faulkner, P.Eng., FEC, FGC (Hon.)**, joined the BOE in 1989 as an academic examiner in mechanical engineering. He became the Chair in 1995, a role he held for 21 years.

Throughout his tenure on the BOE, Dr. Faulkner was devoted to supporting the growth of APEGA's membership while maintaining Alberta's high standards for professional licensure. Under his leadership, APEGA experienced significant growth in both the number of applications the board reviewed and in the size of the board itself, now at around 60 Members plus three public representatives.

The board — made up entirely of volunteers — is tasked with reviewing the qualifications of thousands of engineering and geoscience practitioners each year. They serve the public interest by ensuring that only those qualified to practise engineering and geoscience are licensed.

Well respected by other BOE volunteers and APEGA staff, Dr. Faulkner contributed thousands of hours of volunteer service over 27 years, not only reviewing membership applications but helping set and update BOE policies. Besides leading the BOE, Dr. Faulkner has also represented APEGA at the national level as a member of the Canadian Engineering Qualifications Board and as Chair of the International Engineering Academic Qualifications Committee.

Though he's leaving the board, Dr. Faulkner continues as an active, practising Professional Engineer. He's the Director of Rehabilitation Research and Technology Development at the Glenrose Rehabilitation Hospital, a position he's held since 2009. His research has focused on the evaluation and stability of transcutaneous implants used for bone-anchored hearing aids, and orbital and intraoral reconstructions.

Before joining Glenrose, Dr. Faulkner was a professor of mechanical engineering at the University of Alberta's Faculty of Engineering, where he led the development of a biomedical stream for mechanical engineering undergraduates. He's also involved with the head-and-neck reconstruction unit at Misericordia Hospital.

He holds a B.Sc. and an M.Sc. from the U of A, as well as a PhD from the University of California, Berkeley, all of them in mechanical engineering. Among his many awards are three APEGA Summit Awards (Excellence in Education, L.C. Charlesworth Professional Service, Volunteer Service) and the Queen Elizabeth II Diamond Jubilee Medal.

CALL HIM DR. WATER
APEGA President Dr. Steve E. Hurdey, P.Eng., is in high demand — and not only because of the elected APEGA position he holds. In June, he was a keynote speaker at the American Water Works Association's (AWWA) Annual Conference and Exposition, held in Chicago.

WATER SAFETY: A FAILURE TO LEARN FROM PAST LESSONS

When you use them all, a lot of post-nominal letters follow the name of **APEGA President Steve E. Hrudey, P.Eng., FEC, FGC (Hon.), FCAE, FSRA, FSRC, IWAF, PhD, DSc(Eng).** Many of them stem from the fact that he wrote the book on water safety — or books, actually. He and his wife, Elizabeth J. Hrudey, are the authors of two books that examine cases of drinking water contamination in developed nations, and the lessons to be learned from each outbreak.

So it's not surprising that Dr. Hrudey was invited to be a keynote speaker at the American Water Works Association's (AWWA) Annual Conference and Exposition in June. Held in Chicago this year, the conference typically attracts nearly 11,000 water professionals.

A world-renowned expert on drinking water safety, Dr. Hrudey was asked to share his perspective on a timely topic: the water crisis in Flint, Michigan. Officials in the state are accused of covering up evidence of lead contamination in the city's water supply, which was caused by corrosive river water running through aging pipes. The scandal has resulted in criminal charges

against local and state officials. Tragically, thousands of residents suffered long-term exposure to lead.

Addressing about 50 attendees at an invitation-only general managers' dinner, Dr. Hrudey pointed out that the crisis could have been prevented. "There was a colossal failure to apply knowledge that we already have — in spades; to recognize that doing what was done — or not done — could and ultimately did result in a public health disaster," he told the audience.

He compared the crisis in Flint to the water contamination tragedy in Walkerton, Ont., in May 2000, which killed seven people and made thousands ill. In both cases, he said, the inability of officials to perform competently was the primary driver of disaster. He advised attendees to take note of what happened in Flint, because it could happen in their community, too.

"You need to help decision-makers understand that providing safe, high-quality drinking water is a knowledge-intensive undertaking. It cannot be done successfully without a fundamental commitment to excellence," said Dr. Hrudey.

Dr. Hrudey was a member of the Research Advisory Panel for the resulting Walkerton Inquiry and has served on several expert panels on safe drinking water. He received the top AWWA research award in 2012, at the time only the second Canadian to receive the award since it was established in 1967.

LONGTIME COMMITMENT TO EARTH SCIENCE EARNS GEOLOGIST PRESTIGIOUS MEDAL

Brian Jones, P.Geol., heads south in October to spend some time in the beautiful Cayman Islands — but not for a holiday. He'll be attending Geology Week, volunteering his time to teach students, teachers, and government employees about the geology of the islands.

It's a subject he's intimately familiar with, having spent the last three decades of his career regularly visiting the islands to study the carbonates found there — limestone and dolostone mostly — to better understand what they can tell us about sedimentary process changes on Earth.

For the past three years he's been sharing his knowledge in the classroom as part of a new program started by the Cayman Islands Water Authority. This typically includes 30 lectures over four days to 500 high school students, plus a one-day course for teachers and government employees. "Many of the schools there follow the curriculum of the United Kingdom and geology is an integral part of the requirements, involving such subjects as plate tectonics, coral reefs, and the rock cycle," he explains.

His research in the Cayman Islands is just one reason Dr. Jones was awarded the Logan Medal from the Geological Association of Canada in June. The association's highest award, it honours Dr. Jones for his exemplary service to the Earth science community and his research on the role of organisms and fluids in the origin of carbonate sediments and rocks.

His interest in carbonates started when he was an undergraduate student at the University of Liverpool in the late 1960s. While this passion has taken him around the world, his studies have focused on Cayman Island carbonates, which are, geologically speaking, mere babes at 30 million years old.

-photo courtesy Dr. Brian Jones, P.Geol.

HEAT OF A MOMENT
This location, visited here by Dr. Brian Jones, P.Geol., is Frog's Mouth, featuring a temperature of about 100 C. It's in the Tengchong geothermal area in the province of Yunnan, China. And soon for something completely different, the Logan Medal recipient is off to the Cayman Islands for the territory's Geology Week.

"Such studies provide a measure of the heath of the environments in the face of universal changes such as ocean warming and ocean acidification and are critical to our understanding sediment generation changes with time," Dr. Jones wote in a newsletter of the Royal Society of Canada, of which he's a fellow.

Dr. Jones also studies hot spring deposits found in places like Kenya, New Zealand, Iceland, Chile, and Canada. More recently his focus has been on springs found in Yunnan Province, China. His research has provided a much clearer understanding of the role that microbes play in the formation of many different minerals.

A Distinguished Professor with the University of Alberta's Department of Earth and Atmospheric Sciences, he's been a role model for thousands of undergraduate and graduate students over the past 40 years. Last year, he co-authored a textbook, *Origin of Carbonate Sedimentary Rock*s, with professor Noel James, and he's currently Editor-in-Chief of the journal Sedimentary Geology.

He's also the recipient of the first Middleton Medal for Sedimentology and the Ambrose Medal, both awarded by the Geological Association of Canada.

MEET THE CANADIAN ACADEMY OF ENGINEERING'S LATEST INDUCTEES

Fellows of the Canadian Academy of Engineering (CAE) are among Canada's most distinguished and experienced engineers, providing strategic advice on matters of critical importance to Canada. In June, the academy inducted 43 new fellows, and among them are five APEGA Members.

First up is **Dr. Thomas Brown, P.Eng.**, a structural engineer and University of Calgary professor emeritus. Dr. Brown, an internationally recognized expert in Arctic engineering, is well known for his work on the Confederation Bridge, one of Canada's top engineering achievements. He's received numerous teaching awards and has been recognized by other engineering organizations for his contributions to structural engineering in Canada, from bridges to bobsled tracks.

Three other professors were recognized, all from the University of Alberta: **Dr. Jie Chen, P.Eng., Dr. J.J. Roger Cheng, P.Eng.**, and **Dr. Jingli Luo, P.Eng.**

Dr. Chen is a world-leading expert in biomedical devices. One of his inventions — miniaturized ultrasound devices for dental tissue formation — is considered a major medical breakthrough. He's the author of seven patents, 155 scientific articles, and two books. Dr. Chen has supervised 68 graduate students and helped found two companies. Honours and appointments bestowed upon him include fellowships from the Institute of Electrical and Electronics Engineers (IEEE) and the Engineering Institute of Canada, an IEEE distinguish Lecturer award, and Killam and McCalla professorships.

Next in our U of A list is Dr. Chen, who you may have already read about in this installment of Movers & Shakers — he's the recipient of the 2016 APEGA Centennial Leadership Award. The chair of the Faculty of Engineering's Department of Civil and Environmental Engineering at the U of A, Dr. Cheng is an expert in steel structures and pipelines. He's the author of more than 90 refereed journal publications and more than 150 refereed conference publications. And he's a fellow of the Canadian Society for Civil Engineering.

The U of A's Dr. Luo is internationally known for her research achievements on fuel cells and corrosion control. The Canadian Research Chair in Alternative Fuel Cells from 2004 to 2015, she pioneered several non-conventional fuel cells that cogenerate electricity. She holds six patents and has led three NSERC Strategic Projects. Dr. Luo has published over 270 papers in refereed journals, and found time to supervise 114 graduate students and postdoctoral fellows.

Calgary's **Heather Kennedy, P.Eng.**, is the fifth CAE inductee on our list. A part-time hearing commissioner with the Alberta Energy Regulator, she's a champion for the responsible development of Canada's oil sands. A former corporate executive with Suncor Energy and a former provincial assistant deputy minister, she's been committed throughout her career to safety, operational excellence, and the development of people and communities. A role model for women in the resource sector, Ms. Kennedy has mentored many young women towards successful careers of their own.

VALLEY LINE LRT GETS KUDOS FOR SUSTAINABLE DESIGN

The City of Edmonton is now a two-time winner of the Award for Governmental Leadership in Sustainable Infrastructure, presented each June by the Canadian Society for Civil Engineering. The first time was in 2012, for the city's Risk-Based Infrastructure Management System. This time around, the award is for the Valley Line Light Rail Transit project.

The award recognizes public sector decision-makers who develop programs or projects that lead to the extension of the useful life of Canadian infrastructure.

Construction on the Valley Line, the city's largest-ever infrastructure project, began in April. The first portion, which runs 13 kilometres from Mill Woods to downtown Edmonton, is expected to be operational in 2020. The project is guided by a concept called sustainable urban integration, which looks beyond building tracks and trains to creating neighbourhoods that are safe, attractive, and connected.

APEGA MEMBERS MAKE LIST OF FINALISTS FOR INNOVATION AWARDS

The ASTech Awards will celebrate innovation in science and technology in Alberta by presenting its annual awards, October 28 at the Chateau Lacombe in Edmonton. Congratulations to all 16 finalists — but especially to APEGA Members **Dr. Mohamed Gamal El-Din, P.Eng.**, and

Dr. Ian Gates, P.Eng.; and APEGA Permit Holders **Evolution Engineering Inc.**, of Calgary, and **SafeTracks GPS Canada Inc.**, of Red Deer.

First, a few notes about the Members on the list. Dr. Gamal El-Din, a professor at the University of Alberta, is an industry leader in developing new methods to handle and treat water affected by oil sands processes. Dr. Gates, a professor at the University of Calgary, is co-founder of several businesses in the oil and gas sector. His 36 patented innovations are improving the way Alberta harvests its fossil fuels.

And now, the Permit Holders. Evolution Engineering's measurement-while-drilling tool allows drilling rigs to communicate real-time data to operators up to 30 times faster than the tools it replaces. SafeTracks has developed TRiLOCTM, a personal monitoring device that uses GPS technology to allow round-the-clock tracking of dementia patients.

APEGA MEMBERS NAMED TO LIST OF ALBERTA'S TOP INFLUENCERS

The latest list of Alberta's 50 Most Influential People in 2016 — so named by *Alberta Venture* magazine — is called a round-up of "Albertans from every walk of life who are doing extraordinary things." This year's list includes some heavy hitters in the business world, some of whom also happen to walk the walk of being Professional Engineers.

We'll start with **Paul Douglas, P.Eng.**, President and CEO of Edmonton-based PCL Construction, and *Venture*'s 2015 Business Person of the Year. A civil engineer (University of Toronto, '78), he joined PCL in 1985 and was named CEO in 2009. His company is building some of the biggest infrastructure project in Alberta, including Edmonton's Rogers Place Arena and the Sturgeon Refinery. Mr. Douglas has received numerous other awards for his contributions to the construction industry and his community service, including the Queen Elizabeth II Diamond Jubilee Medal and the City of Edmonton Salute to Excellence Citation.

Another civil engineer, **Bob Gomes, P.Eng.**, (University of Alberta, '78), made the list — and for good reason. Under his leadership, Edmonton-based consulting giant Stantec has emerged as a global leader in engineering and design, with 22,000 employees working in over 400 locations worldwide. Edmonton employees will soon move into the 62-storey Stantec Tower, the tallest building in the city and the tallest in Canada beyond Toronto. Mr. Gomes joined Stantec in 1988 and became President and CEO in 2009. In March, the company closed the largest acquisition in its 62-year history, purchasing MWH Global for $1 billion and expanding its international portfolio from three per cent to 30 per cent.

Next up: entrepreneur **Scott Saxberg, P.Eng.** He's the co-founder and CEO of Calgary-based Crescent Point Energy. Thanks to many shrewd investments and acquisitions, the company has grown from a junior producer to the energy sector's seventh-most-valuable producer, all in a span of about 15 years. Despite the economic downtown, Mr. Saxberg continues to build the company's assets, recently acquiring Legacy Oil + Gas for $1.53 billion. A mechanical engineering graduate from the University of Manitoba, Mr. Saxberg got his start working for oil and gas companies in Saskatchewan, before launching Crescent Point. He's also a co-owner of a professional hockey team, the NHL's Arizona Coyotes.

Rounding out the list is **Neil Shelly, P.Eng.**, Executive Director of Alberta's Industrial Heartland Association. Since taking on the role in 2007, this U of A

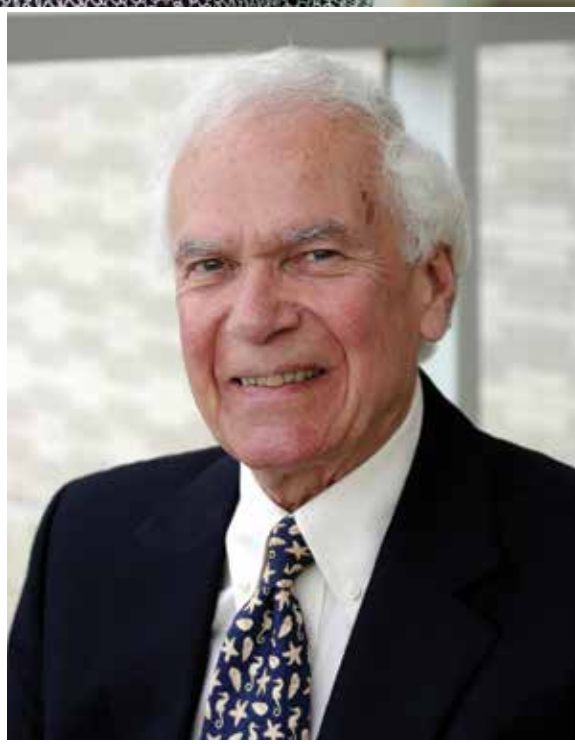
mechanical engineering graduate has been a strong proponent of diversifying the province's energy sector through value-added processing. The region he represents — a 600-square-kilometre area northeast of Edmonton — is already home to Canada's largest concentration of petrochemical processors, and another $15 billion in developments are under construction. Mr. Shelly began his career as a process engineer. He has also worked as an environmental contractor and in government.

TWO UNIVERSITIES, TWO HONOURS

Dr. Norbert Morgenstern, CM, P.Eng., FCAE, has another honour to add to his wall. Earlier this spring, he was granted the title of Honorary Professor from Zhejiang University, a national university in China. An internationally recognized authority in the field of geotechnical engineering, Dr. Morgenstern has over 40 major honours and awards, including honorary degrees from the University of Toronto and Queen's University.

Yet his modesty shines through. In fact Dr. Morgenstern credits this latest award to the work being done at the Department of Civil and Environmental Engineering at the University of Alberta, where he holds the title of Distinguished University Professor Emeritus. The centre, known for its leading-edge research in geotechnical and geo-environmental engineering, has a long-term link to Zhejiang University. "This honour came through an awareness of and respect for the University of Alberta Geotechnical Engineering Centre," he says.

A graduate of the University of Toronto (civil engineering, '56), Dr. Morgenstern is a member of the Alberta Order of Excellence and a member of the Order of Canada. He's also a past-recipient of the APEGA Centennial Award, the regulator's highest honour. Though technically retired, his skills are in high demand. In fact, he recently chaired a high-profile engineering panel — the one appointed by the B.C. Government to conduct an independent review of a tailings dam failure at Mount Polley copper mine.



RESPECT IN HIGH PLACES
Kim Sturgess, CM, P.Eng., FCAE, (above) calls her honorary degree from Queen's University, in Kingston, Ont., the achievement of an aspirational goal; Dr. Norbert Morgenstern, CM, P.Eng., FCAE, (right) says Zhejiang University deeply respects the University of Alberta Geotechnical Engineering Centre, which it demonstrated by naming him an Honorary Professor.

Receiving an Honorary Degree of Doctor of Science in the spring was **Kim Sturgess, CM, P.Eng., FCAE**, from Queen's University, in Kingston, Ont. A proud APEGA member and Queen's alumni, she obtained an engineering degree in engineering physics from Queen's in 1977. "Earning an honorary degree from Queen's has been an aspirational goal for me for a long time," *Queen's Gazette* newsletter quotes Ms. Sturgess as saying.

It's the latest in a long list of honours for Ms. Sturgess. In the spring installment of Movers & Shakers, we mentioned she'd been named a Member of the Order of Canada. "The Order of Canada was for family and country; the honorary degree is for me. This is as good as it gets," she says.

A former APEGA Councillor, Ms. Sturgess is the founder and CEO of Alberta WaterSMART, a company dedicated to improving the management of the province's water resources. Over her career, she's worked in industry as an engineer, a consultant, and a business analyst. She's also served as CEO for several technology companies.

APEGA's Mentoring Program: It's Back and It's Better

After a short hiatus, our mentoring program relaunches this fall. New, user-friendly software will make it easy for mentors and mentees to connect and find their ideal mentoring match

Over the years, Tom Greenwood-Madsen, P.Eng., FEC, FGC (Hon.), has mentored more than a dozen mentees through APEGA's Mentoring Program. He was one of the first Members to join the program when it launched in 2005, and he has continued to be one of its most active and dedicated mentors.

He's just one of hundreds of mentors who have contributed to the past successes of APEGA's Mentoring Program. Now, even more mentors and mentees will have the opportunity to connect, thanks to APEGA's launch this fall of a new and improved program.

Mr. Greenwood-Madsen has helped internationally trained mentees navigate Canadian cultural differences, enhance their resumes, and improve their job-search techniques. Sharing his skills and knowledge, he's helped mentees grow and advance in their careers.

"I really like to interact with people, I want to help others, and I have great pride in my profession and want to give back to it," explains Mr. Greenwood-Madsen, a principal engineer with ATCO Electric.

The people he's helped are not the only ones to grow from these relationships. For example, after mentoring several female professionals, Mr. Greenwood-Madsen has gained a better appreciation of the challenges women face in the workplace.

COFFEE AND CAREER BUILDING
Shirley McCuaig, P.Geol., PhD, and her mentee, Moe Elkayar, G.I.T., catch up over coffee. They were matched two years ago through APEGA's Mentoring Program.

"I really like to interact with people, I want to help others, and I have great pride in my profession and want to give back to it"

TOM GREENWOOD-MADSEN, P.ENG., FEC, FGC (HON.)
Principal Engineer, ATCO Electric
APEGA Mentor

The program he supports so much has been on hiatus for nine months as we looked for ways to match a growing number of participants more effectively and efficiently. It's continued to grow over the years, reaching more than 400 participants before the pause.

Currently, there are about 120 matched pairs of mentors. Existing mentoring relationships continued during the hiatus, but we did not accept new registrations.

NEW ONLINE APPLICATIONS: MENTORING MATCHES MADE EASY

Our new online mentoring software will enhance and expedite mentor and mentee matching.

We started testing the user-friendly software this summer, and we expect it to go live by the end of September. APEGA Members who want to sign up — either as mentors or mentees — will complete a simple online application, using their mobile device, laptop, or standalone computer.

Interested participants will be asked to share details about themselves, such as:

- discipline and professional designation
- place of residence
- industry or industries
- age and gender
- education
- employment status
- languages spoken

Mentor applicants will be asked to name the skills they can share with mentees; mentee applicants will be asked to name the areas they want to be mentored in.

An applicant may also choose to upload a resume, a photo of him or herself, and short personal and professional summaries. Filling out the application should take five to 10 minutes, depending on how much detail is provided.

Each applicant attends an orientation session, after which his or her account becomes active. The applicant will be able to log in and search the database to find the best match. Member privacy is important to us, so only the information required for the search will be visible to potential matches, until after a match is finalized.

Previously, APEGA staff used a manual process to find matches. This sometimes took from six to eight weeks. With the new software, we'll be able to create more customized and timely mentoring partnerships — possibly within a week of participants attending an orientation session.

Not only will it be faster, but the software will also provide more exact matches, based on details applicants provide. It all adds up to a process that's more effective, resulting in more successful mentor-mentee relationships.

To start, we're launching the new software for Members in Calgary and Edmonton. We hope to open the process up to Members for our other eight Branches across the province in early 2017.

APEGA'S Mentoring Program

JOIN IN 7 EASY STEPS

1. Complete our online application form.
2. Attend an orientation session for tips on how to get the most out of your mentoring relationship.
3. Use our new software to find the most suitable match in our database of available mentors and mentees.
4. Request a connection with your match.
5. Get to know your match at a few informal meetings.
6. Sign a mentoring agreement.
7. Start mentoring or being mentored.

MENTOR testimonials

Working with someone new to Alberta and North American work culture helps put into perspective how rich the composite provincial culture has become, with all the benefits of new ideas coming in from abroad. Through this program, APEGA isn't just helping new Members develop; it's also helping the general social strength in Alberta grow.
-Ray Nelson, P.Eng.

My mentee is a very sophisticated and experienced engineer. Our relationship was a mixture of professionalism and true friendship. There was a two-way street of teaching and learning from each other.
-Mohammadreza Sharifi-Zanjani, P.Eng.

Mentoring a young professional is a great opportunity to utilize your experience to assist them in advancing their career and help them tackle workplace and life issues. It also helps you by letting you gain insights into your younger colleagues, with whom you may work. You might be surprised how much value your own experience might benefit others.
-Gerry Langille, P.Geo., PhD

MENTEE testimonials

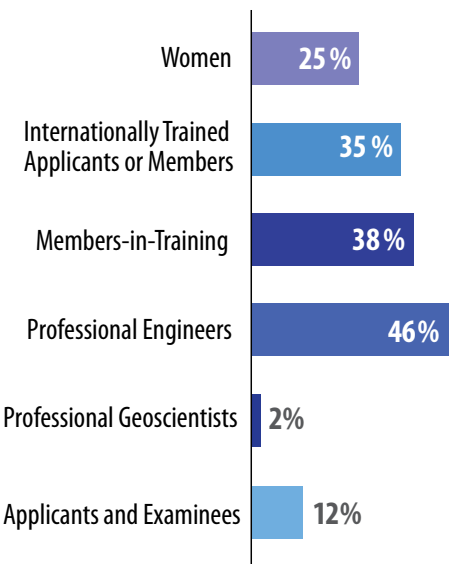
The mentorship program is amazing. First, it helps new engineers in Canada meet and interact with senior engineers. Through mentorship, I got the chance to talk about a lot of aspects of engineering soft skills that gave me a good understanding of leadership, conflict resolution, and workplace relationships that are different from the French system I come from.
-Cheick Diarrassouba, Provisional Licensee (Eng.)

It's a great opportunity for young professionals to share their thoughts and doubts and get on a right path to career advancement, all with the help of someone who has been there before.
-Kalie Yan, Applicant

This is a fantastic opportunity to reach out to someone who truly wants to help and is outside your current network. This provides a fresh and neutral perspective. I recommend the program to everyone who is looking to better themselves.
-Kathryn Leung, P.Eng.

PARTICIPANTS TO DATE: About 1,500

Demographic Detail



Top Five Areas of Practice — Mentors and Mentees

1. Chemical Engineering
2. Civil Engineering
3. Electrical Engineering
4. Mechanical Engineering
5. Petroleum Engineering

MORE MENTORING ON PAGE 33 ››

Congratulations

2016 Engineering Fellows

APEGA and Engineers Canada are proud to congratulate the 2016 recipients of the Engineers Canada Fellowship.

The Engineers Canada Fellowship program recognizes Professional Engineers and non-engineers who have made outstanding contributions to the engineering profession through their professional accomplishments.

Fred Apon, P.Geol., FGC, FEC (Hon.)
Andrea Brack, P.Eng., FEC, FGC (Hon.)
Diego Carducci, P.Eng., FEC, FGC (Hon.)
Satinder Chopra, P.Geoph., FGC, FEC (Hon.)
Duncan Cook, P.L.(Eng.), FEC (Hon.), FGC (Hon.)
Christopher Goulard, P.Eng., FEC, FGC (Hon.)
Brad Hayes, P.Geol., PhD, FGC, FEC (Hon.)
Wayne Kosik, P.Eng., FEC, FGC (Hon.)
Dionyz Kruger, P.Eng., FEC, FGC (Hon.)
Clark Laing, P.Eng., FEC, FGC (Hon.)
Brian Marcotte, P.Eng., FEC, FGC (Hon.)
Craig McFarland, P.Eng., FEC, FGC (Hon.)
Michael Ricketts, P.Eng., FEC, FGC (Hon.)
Tanvir Sadiq, P.Eng., PhD, FEC, FGC (Hon.)
Roghoyeh Salmeh, P.Eng., PhD, FEC, FGC (Hon.)
Kapal Sharma, P.L.(Eng.), FEC (Hon.)
Sanil Sivarajan, P.Geol., PhD, FGC, FEC (Hon.)
Morris Sych, P.Eng., FEC, FGC (Hon.)
Prasad Valupadas, P.Eng., FEC, FGC (Hon.)
Aldous Walters, P.Eng., FEC, FGC (Hon.)
Keith Wilson, P.Eng., FEC, FGC (Hon.)
Dustin Wiltermuth, P.Eng., FEC, FGC (Hon.)
Ron Wong, P.Eng., PhD, FEC, FGC (Hon.)

2016 Geoscience Fellows

APEGA and Geoscientists Canada are proud to congratulate the 2016 recipients of the Geoscientists Canada Fellowship.

The Geoscientists Canada Fellowship program honours individuals who have given noteworthy service to the geoscience profession, through service to Geoscientists Canada, service to one of the constituent associations of Geoscientists Canada, or service in another capacity.

Allen Adams, P.Eng., FEC, FGC (Hon.)
Fred Apon, P.Geol., FGC, FEC (Hon.)
Colette Bielech, P.Eng., FEC, FGC (Hon.)
Andrea Brack, P.Eng., FEC, FGC (Hon.)
Terry Brooker, P.Eng., FEC, FGC (Hon.)
Diego Carducci, P.Eng., FEC, FGC (Hon.)
Duncan Cook, P.L.(Eng.), FEC (Hon.), FGC (Hon.)
Leo Flaman, P.Eng., FEC, FGC (Hon.)
Frank George, P.Eng., FEC, FGC (Hon.)
Christopher Goulard, P.Eng., FEC, FGC (Hon.)
Steve Hrudey, P.Eng., PhD, DSc(Eng), FEC, FGC (Hon.), FCAE, FSRA
Wayne Kosik, P.Eng., FEC, FGC (Hon.)
Dionyz Kruger, P.Eng., FEC, FGC (Hon.)
Clark Laing, P.Eng., FEC, FGC (Hon.)
Shirley Layne, FGC (Hon.)
Vivianne Mansour, P.Eng., FGC (Hon.)
Brian Marcotte, P.Eng., FEC, FGC (Hon.)
Craig McFarland, P.Eng., FEC, FGC (Hon.)
John Ogilvy, P.Eng., FGC (Hon.)
Sadiq Pirani, P.Eng., FEC, FGC (Hon.)
Michael Ricketts, P.Eng., FEC, FGC (Hon.)
Tanvir Sadiq, P.Eng., PhD, FEC, FGC (Hon.)
Roghoyeh Salmeh, P.Eng., PhD, FEC, FGC (Hon.)
Sanil Sivarajan, P.Geol., PhD, FGC, FEC (Hon.)
Terri Steeves, P.Eng., FEC, FGC (Hon.)
Morris Sych, P.Eng., FEC, FGC (Hon.)
Prasad Valupadas, P.Eng., FEC, FGC (Hon.)
Aldous Walters, P.Eng., FEC, FGC (Hon.)
Robert Watson, P.Eng., FGC (Hon.)
Keith Wilson, P.Eng., FEC, FGC (Hon.)
Dustin Wiltermuth, P.Eng., FEC, FGC (Hon.)
Ron Wong, P.Eng., PhD, FEC, FGC (Hon.)

engineerscanada

APEGA The Association of Professional Engineers and Geoscientists of Alberta

GEOSCIENTISTS GÉOSCIENTIFIQUES CANADA

One Match, Two Stories: The Power of Mentoring

Two mentors forever changed Shirley McCuaig, P.Geol., PhD, and the direction of her career. As a geology student at Concordia University in Montreal, she worked summers for the Geological Survey of Canada in Ottawa. It was there that she met Dr. Roger McNeely and Dr. Bill Shilts, who provided her with invaluable guidance and advice that helped shape her future as a professional.

"They helped me immensely, even encouraging me to apply for NSERC and other fellowships that I hadn't heard of," recalls Dr. McCuaig. She ended up winning funding from NSERC — that's the Natural Sciences and Engineering Research Council of Canada — which spurred her on to grad school and a PhD in geography.

"Had these two mentors not supported and encouraged me, who knows where I would be today," she says. "They also honed my technical writing, and one taught me how to map surficial geology from aerial photos, which has been critical for my career."

Now well established — she's a senior terrain geologist with Tetra Tech EBA — Dr. McCuaig decided to pay it forward by signing up as a mentor with APEGA's Mentoring Program. "I wanted to be able to be that mentor to someone, to make a real difference in a person's life and career," she explains.

She was matched with Moe Elkayar, G.I.T., shortly after he graduated from the University of Alberta in 2014 with a bachelor of science degree in geophysics. He was looking for help with career planning — but he gained much more.

"Working with Shirley gave me better insight into how the industry works and how to approach the job market. She also helped me deal with work issues — like how to share things with my boss — and she continues to give me advice," says Mr. Elkayar. "She's been nothing short of spectacular."

During the first year of their mentorship, the mentoring pair met once or twice a month at local coffee shops. Initially, they worked on improving Mr. Elkayar's soft skills, including communication and interview techniques, and they also perfected his resume.

Dr. McCuaig's encouragement helped him gain the confidence to network with geoscientists in different industries, which in turn helped him narrow down which geophysics path to pursue. His new networking and interview skills also helped him land a job in a tough job market.

"Shirley helped me a great deal, by recommending books and events to attend. She helped me meet more experienced geophysicists who shared their experiences as well," he says.

The two continued to stay in touch, even after Mr. Elkayar moved out-of-province for employment in Saskatchewan's mining exploration sector.

For Dr. McCuaig, seeing her mentee grow as a professional has been extremely rewarding. "It was amazing watching the changes in Moe. He is very confident and has all kinds of ideas for his future and his career. I wouldn't be in the least bit surprised to find him running his own business one day," she says.

CALLING ALL POTENTIAL MENTORS

We're recruiting Professional Engineers and Professional Geoscientists to share their experience and knowledge with mentees through the APEGA Mentoring Program. If you have at least five years of Canadian professional experience, you can help other Professional Members, Members-in-Training, applicants, or examinees learn and grow in their careers. There are plenty of benefits for mentors, too.

Mentors get to:

- give back to their profession
- experience the satisfaction of being a role model and helping less-experienced professionals
- gain insights about different ages and cultural backgrounds — mentors report learning as much from a mentoring relationship as mentees do
- develop and enhance their mentoring skills
- claim up to 20 professional development hours (PDHs) per year under APEGA's Continuing Professional Development program
- have their service recognized at APEGA volunteer recognition events

Mentor and mentee application forms will be available this fall.

Angela Eickholt, P.Eng., works on her laptop in the reception area of the Lindberg Centre at the Edmonton APEGA Office. The Lindberg Centre is where most of the Edmonton sessions offered by APEGA are held.

APEGA PROFESSIONAL DEVELOPMENT: WHERE LEARNING MEETS CHANGE

This fall, we're launching a new season of full- and half-day professional development sessions to support Members' career-related learning. All sessions are eligible for Continuing Professional Development (CPD) Hours under the APEGA CPD program and include completion certificates.

New session topics in Edmonton and Calgary centres include:

- Employment Boot Camp
- Business Development for Consulting Engineers and Geoscientists
- Improving Your Employability
- Budgeting & Forecasting
- Commercialize Your Invention

Also, seasoned presenters are returning to deliver popular sessions, including Isolation Techniques in Piping Systems; Project Management; and Technical Writing.

As an added bonus, APEGA will host five free webinars on topics relevant to all workplaces. The APEGA calendar also includes APEGA regulatory professional development — namely, Permit to Practice seminars, and Requirements for Licensure sessions.

Check out our full professional development calendar at apega.ca.

QUESTIONS? PD@apega.ca

APEGA Professional Development

Employment Boot Camp: Application & Interview Dos and Don'ts
Presenter: Shairose Lalani, BA, CHRP
Calgary — October 4
Edmonton — November 1

Isolation Techniques in Piping Systems to Prevent Major Loss Incidents
Presenter: John R. Cocchio, P.Eng., MBA
Calgary — October 6
Edmonton — October 10

Improving Your Employability: Transferable Skills, Informational Interviewing & Networking
Presenter: Claudia Verburgh, CMC, CHRP
Edmonton — October 6
Calgary — November 3

Fundamentals of Project Management
Presenter: George Jergeas, P.Eng., PhD
Edmonton — October 12
Calgary — November 23

Effective Engineering Consulting: Practices and Processes
Presenter: Diana Ionescu, P.Eng.
Calgary — October 18
Edmonton — October 26

Managing the Unmanageable: The Art of Powerful Conversations for Performance Improvement
Presenter: Russell Stratton, MA, MCPID, MCMII
Edmonton — October 20
Calgary — October 27

Environmental Liability Practice and Science
Presenter: Barry Ronellenfitch, P.Eng.
Calgary and Edmonton (videoconference) — October 25

Challenging Conversations Made Easy
Presenter: Maurice Fritze
Edmonton — November 3
Calgary — November 8

FREE Webinars

The Totally Organized Professional is All About OUTCOMES
Presenter: Bruce Lee
Provincewide — October 19

Effective Communication Skills: It's Not What You Say, But How You Say It!
Presenter: Bruce Lee
Provincewide — November 9

Sessions run 8:30 a.m.-4:30 p.m. unless otherwise stated

APEGA

MORE SESSIONS AND INFO
Professional Development Program
PD@apega.ca
or
Visit apega.ca/Events

LOCATIONS
Edmonton
APEGA
Lindberg Conference Centre
1500 Scotia One
10060 Jasper Ave. NW

Calgary
APEGA
Windsor Conference Centre
2200 Scotia Centre
700 Second St. SW

The Value of Professional Services 2016

SALARY SURVEY HIGHLIGHTS

DEAR MEMBERS AND PERMIT HOLDERS,

For good reason, the *Value of Professional Services* is one of APEGA's most highly sought after publications. It provides APEGA Members — individual and corporate — with unbiased salary and benefits comparisons across a wide range of industries in Alberta. APEGA encourages the use of this resource, and any others at your disposal, to ensure fair compensation for individual practitioners and to help employers stay competitive in the labour market.

Early in May, we contacted Permit Holders to encourage participation, and we engaged the services of Aon Hewitt to administer and conduct the salary and benefits survey. Aon Hewitt also compiled the survey data for publication of the *Value of Professional Services* (known informally as the APEGA salary survey).

We are very pleased with the level of participation this year. The number of organizations participating was 177, the highest number since the survey's inception. That's up 13 per cent from 2015, when 156 employers took part.

Individual data points are up as well. The 2016 report encompasses 14,105 individual data points (about 19% of the APEGA membership), compared with 13,464 in 2015. APEGA's 10 regional Branches and Alberta's major industry sectors are represented.

We know from experience how popular and useful the *Value of Professional Services* is, and we appreciate the effort Permit Holders make each spring to complete the survey. Without your help, this service to Permit Holders and Members would not be possible.

Please feel free to contact us with your comments:

Hana Marinkovic, Acting Director of Outreach and Product Services
1-800-661-7020
salarysurvey@apega.ca

Visit apega.ca to view this summary report electronically and to purchase the full report.

HOW TO USE THE SALARY SURVEY RESULTS

Step 1: Determine your responsibility level (A- to F+)

Step 2: Determine 2016 cash compensation results based on responsibility level

Step 3: Review predicted salary increases, as reported by Permit Holders

Step 4: Review perquisites, additional cash compensation, and benefit plans

The flowchart on the following page gives an overview of responsibility levels. To determine your responsibility level more accurately, please visit the salary survey page on the website.

NOTES ON SALARY SURVEY METHODS

Again this year, APEGA engaged the services of Aon Hewitt to administer and conduct the *Value of Professional Services* salary survey. Invitations to participate were distributed to APEGA Permit Holders in May. Permit Holders that participated in the 2015 survey received a questionnaire with some of the fields prepopulated, simplifying the process. Results were gathered and compiled by Aon Hewitt in June and July.

A survey was completed by each participating Permit Holder's human resources department or other applicable department. Sources and their individual data are kept confidential.

The 10 industry categories used in this report are:

- Engineering and/or Geoscience Consulting Services
- Engineering, Procurement, and Construction
- Resource Exploitation (except oil and gas)
- Resource Exploitation (oil and gas only)
- Manufacturing (durables)
- Manufacturing (non-durables)
- Not-For-Profit Service, Control, and Utilities
- For-Profit Service, Control, and Utilities
- Information and Other Advanced Technologies

INFORMATION FROM PARTICIPANTS

Participation for the 2016 survey is based on 177 companies submitting data in time for inclusion in the final report. The 2016 survey captured current compensation data for 14,105 engineering and geoscience professionals across Alberta. Engineering professionals account for 94 per cent of the total data points, and geoscience professionals account for the remaining 6 per cent.

PREDICTED SALARY INCREASE

Based on 177 responses, 36 per cent of companies (57 per cent in 2015) plan to increase salaries in the next 12 months by an average of 2.6 per cent (3.0 per cent in 2015), with a range of 1.0 per cent to 5 per cent (1.5 per cent to 10 per cent in 2015). However, 57 per cent of companies (31 per cent in 2015) have forecast a salary freeze in the next 12 months. Respondents unable to provide predicted salary increases made up 7 per cent of respondents (12 per cent in 2015).

PREDICTED 2017 PROFESSIONAL STAFFING LEVELS

Of our survey respondents, 31 per cent indicated that they expect to add to their professional staff over the next year, 63 per cent indicated that they plan on maintaining current staffing levels, and 6 per cent planned on reducing professional staffing levels.

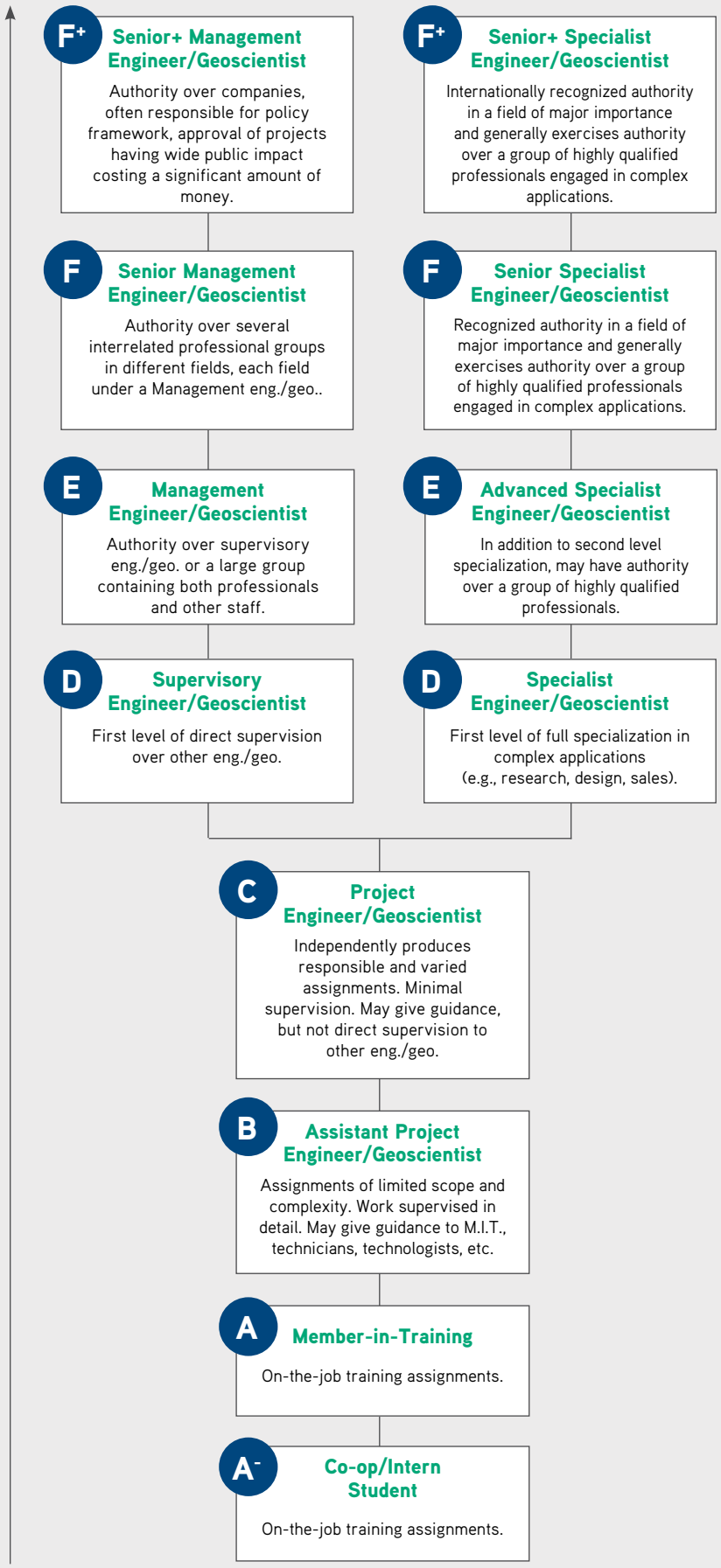
The full version of the *Value of Professional Services* is available for purchase from APEGA. Visit apega.ca for more information. Included are the full salary survey results, with other information pertaining to:

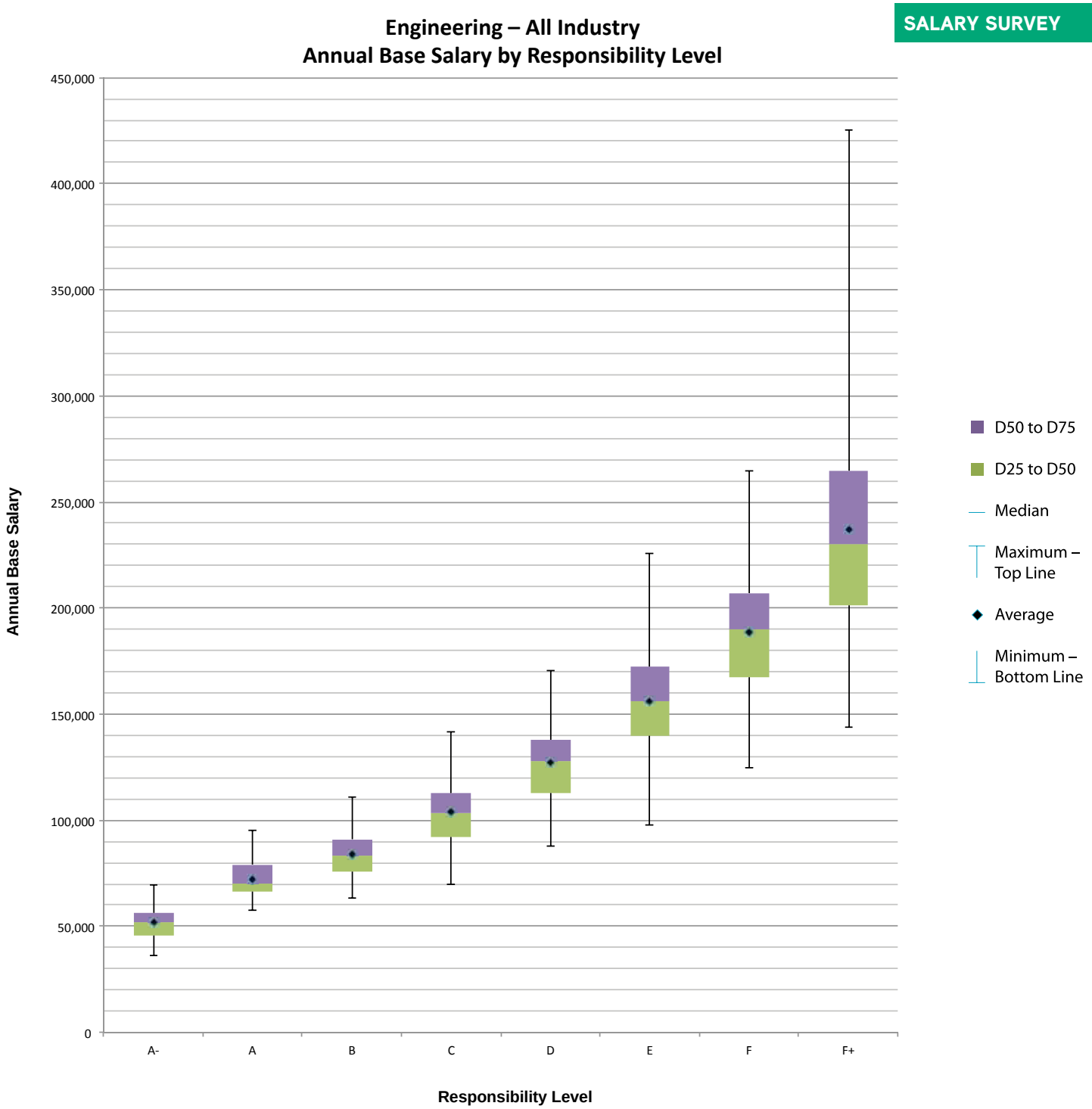
- Benefits and Additional Cash Compensation Plans
- Vacation Entitlement
- Personal and Family/ Sick Days
- Flexible Work Arrangements
- Overtime Policies
- Turnover
- Contract Employee Rates of Pay
- Gender
- Location
- Engineering Disciplines
- Years of Experience
- APEGA Licence
- Company Size
- Co-op Student Salaries
- Degrees

Participation in the salary survey is free and encouraged by all Permit Holders in an effort to garner the most robust and representative database possible. As survey participation grows, the representation of Member compensation improves.

Please contact us at salarysurvey@apega.ca to ensure you are sent your 2017 survey participation package next May.

JOB CLASSIFICATION FLOWCHART
BY LEVEL OF RESPONSIBILITY





For engineers (ranging from A- to F+), a review of average base salary and total compensation shows that most values have decreased for base salary, with the exception of levels C and E, while total compensation values decreased for all levels.

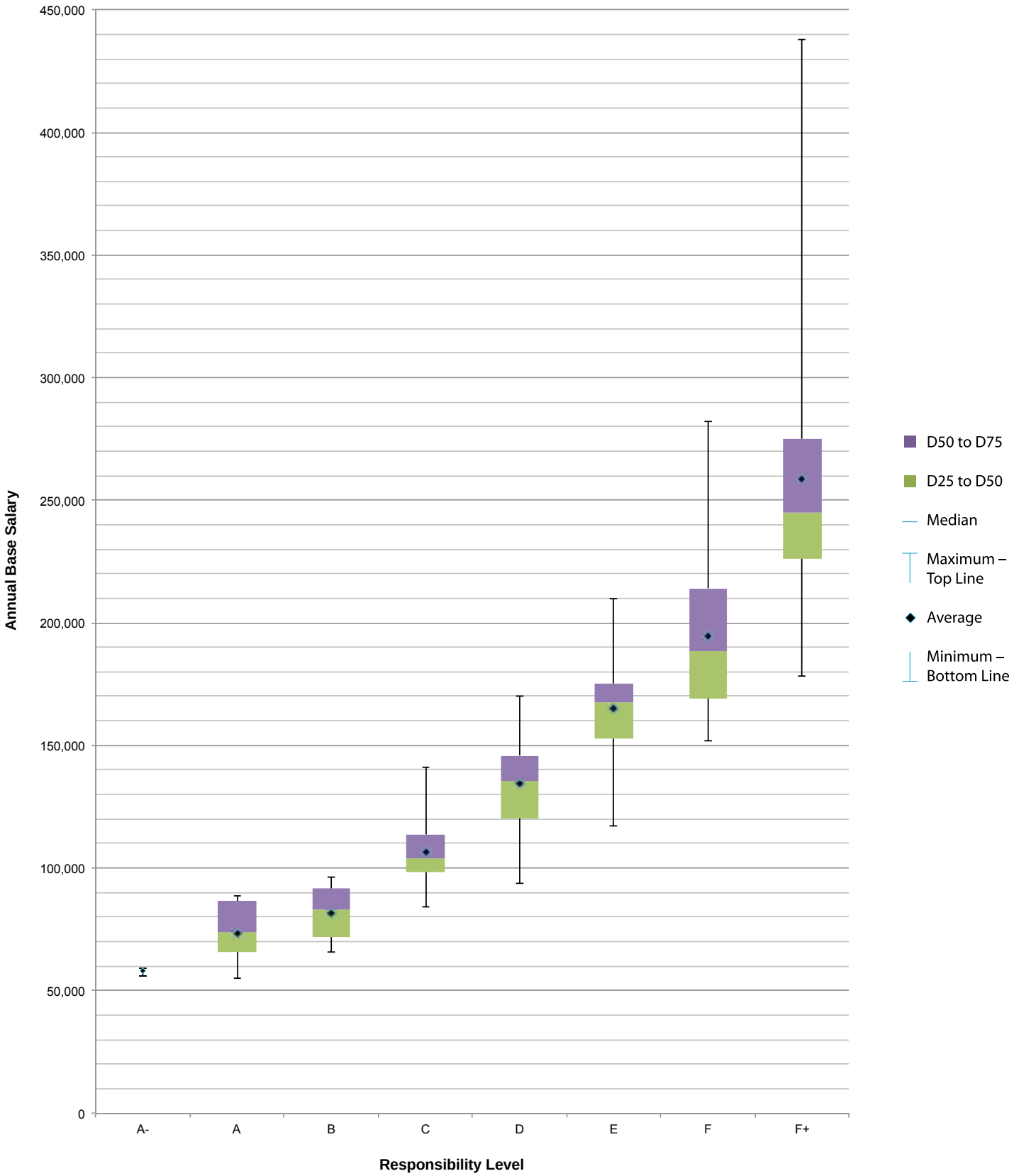
For geoscientists, with the exception of level A-, base salaries and total compensation values have decreased across all responsibility levels (ranging from A to F+).

The shock the Alberta economy is experiencing, due the decrease in oil prices, has resulted in what is expected to be a deeper and longer downturn than previously projected, the Province of Alberta explains in its *2016-2019 Fiscal Plan — Economic Outlook*. Weakness in the energy sector is feeding through the economy, causing activity to slow in many other sectors, including construction and manufacturing. Business investment is expected to decline again this year, and as companies reduce costs, the labour market is expected to shrink further. The July 2016 unemployment rate was 8.6 per cent in Alberta.

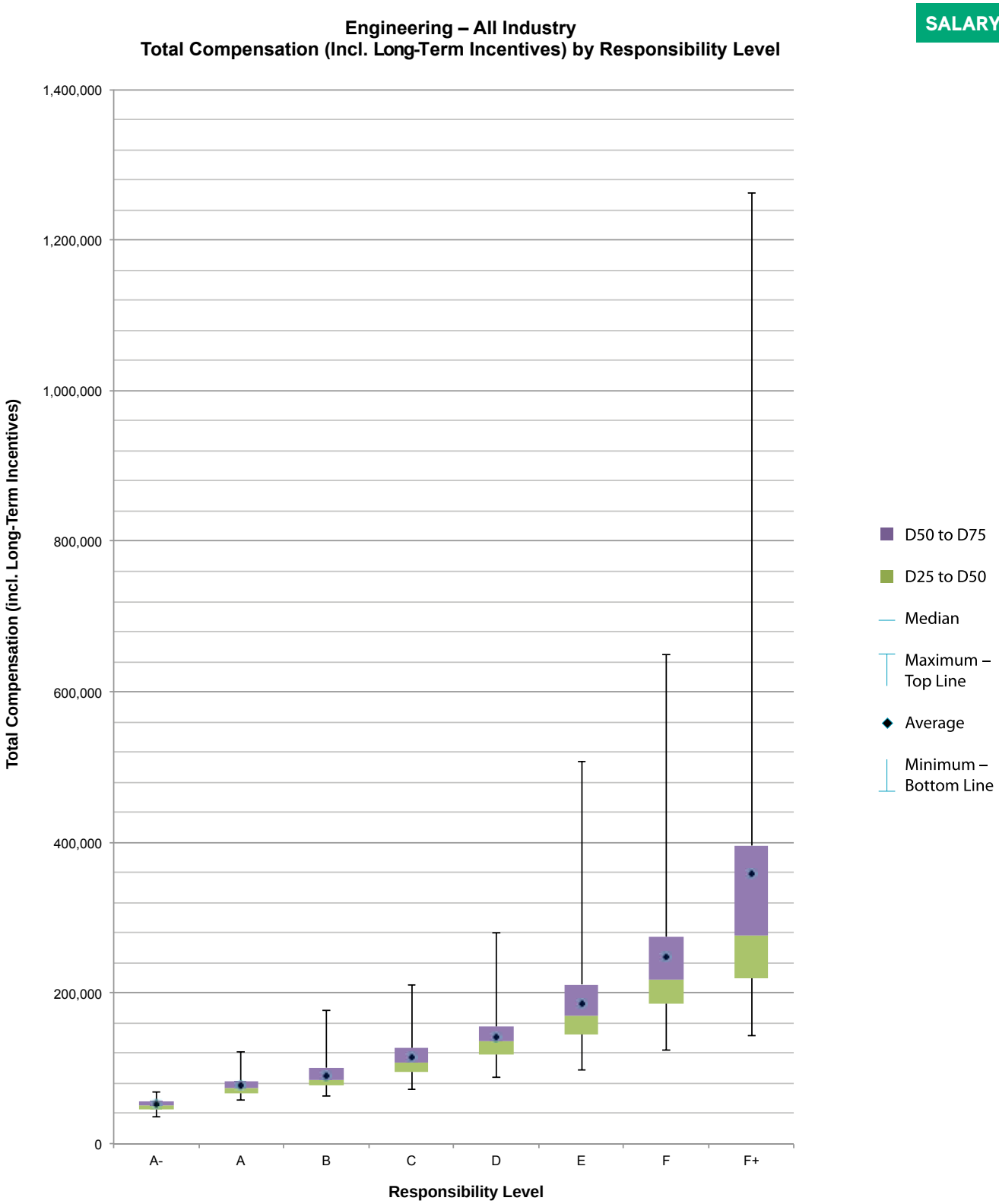
The *Fiscal Plan — Economic Outlook* mentions several factors that remain supportive of economic growth in the province. They are:

- Oil sands production will continue to expand in the near term, supporting exports
- The U.S. economy and weaker Canadian dollar will benefit export-focused industries

Geoscience – All Industry
Annual Base Salary by Responsibility Level



Note: Insufficient D25, D50, D75 perentile data for Level A-

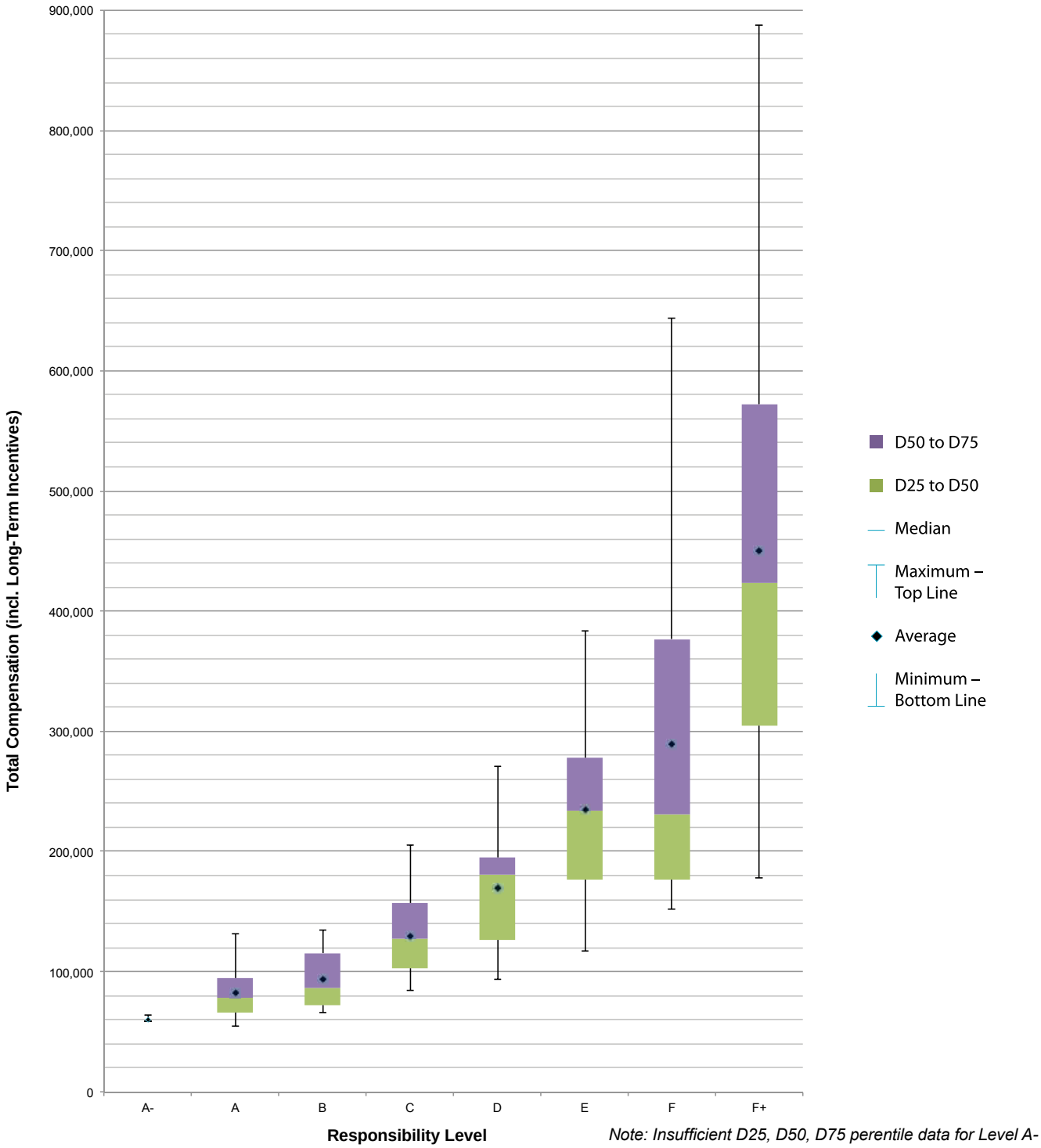


- Enhanced infrastructure spending will provide stimulus
- Spending on public services will be maintained
- Average income is expected to remain well above the national average

For more information, search online for Alberta Fiscal Plan Economic Outlook.

It is encouraging to see more females in the geosciences profession, who represent just over 30 per cent of the total geosciences data sample in the 2016 survey. Base salary survey results for female geoscientists are consistent and equitable with their male counterparts for the majority of responsibility levels. Base salary survey results for females in the engineering profession continue to show a shift towards equitability for the majority of responsibility levels.

Geoscience – All Industry
Total Compensation (Incl. Long-Term Incentives) by Responsibility Level



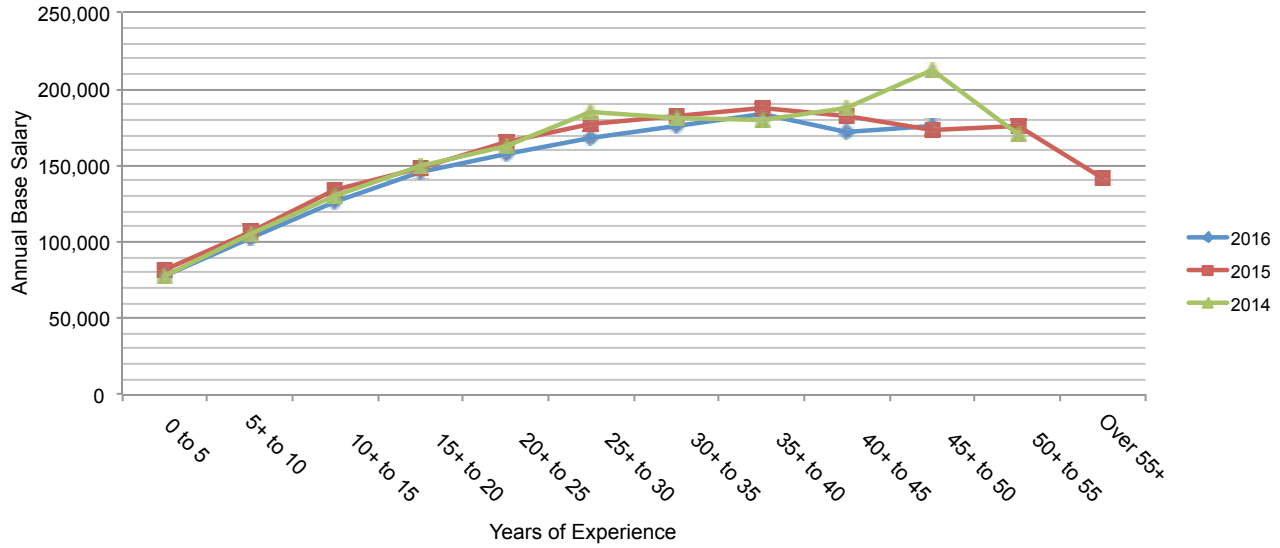
Note: Insufficient D25, D50, D75 perentile data for Level A-

When years of experience since graduation is calculated, it is assumed that an individual enters the workforce immediately upon completing his or her last degree. This may not necessarily be the case for all individuals, but it is considered the norm from a surveying perspective.

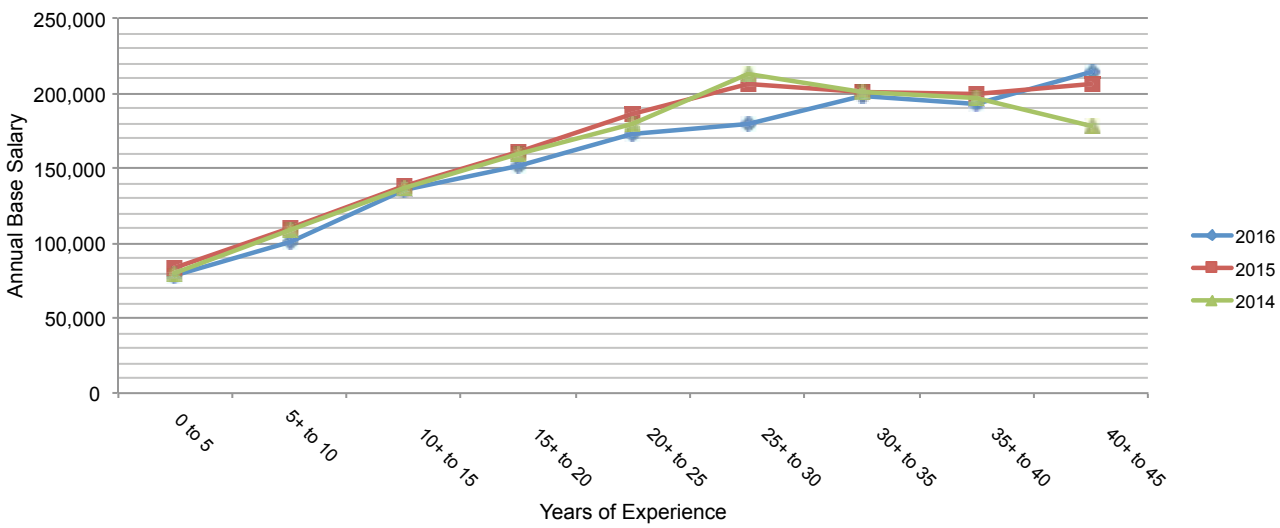
Typically, progression to the next responsibility level is also dependent on an individual's years of experience in the workforce. As more in-depth knowledge and specializations are gained over time, an individual's overall level of contribution and responsibility within a company progresses as well.

The highest average base salary is not necessarily solely related to years of experience. Generally, such salaries are more directly related to level of expertise and specialization, performance, and overall contribution within the employing organization.

Engineering
Annual Base Salary by Years of Experience
Comparison of 2014, 2015, and 2016



Geocience
Annual Base Salary by Years of Experience
Comparison of 2014, 2015, and 2016



Responsibility level A- has been omitted in these charts, as this level falls outside of the defined parameters for years of experience since graduation.

The top four industry sectors for engineers and geoscientists, when ranked against the all-industry average at various levels for **base salary**, are:

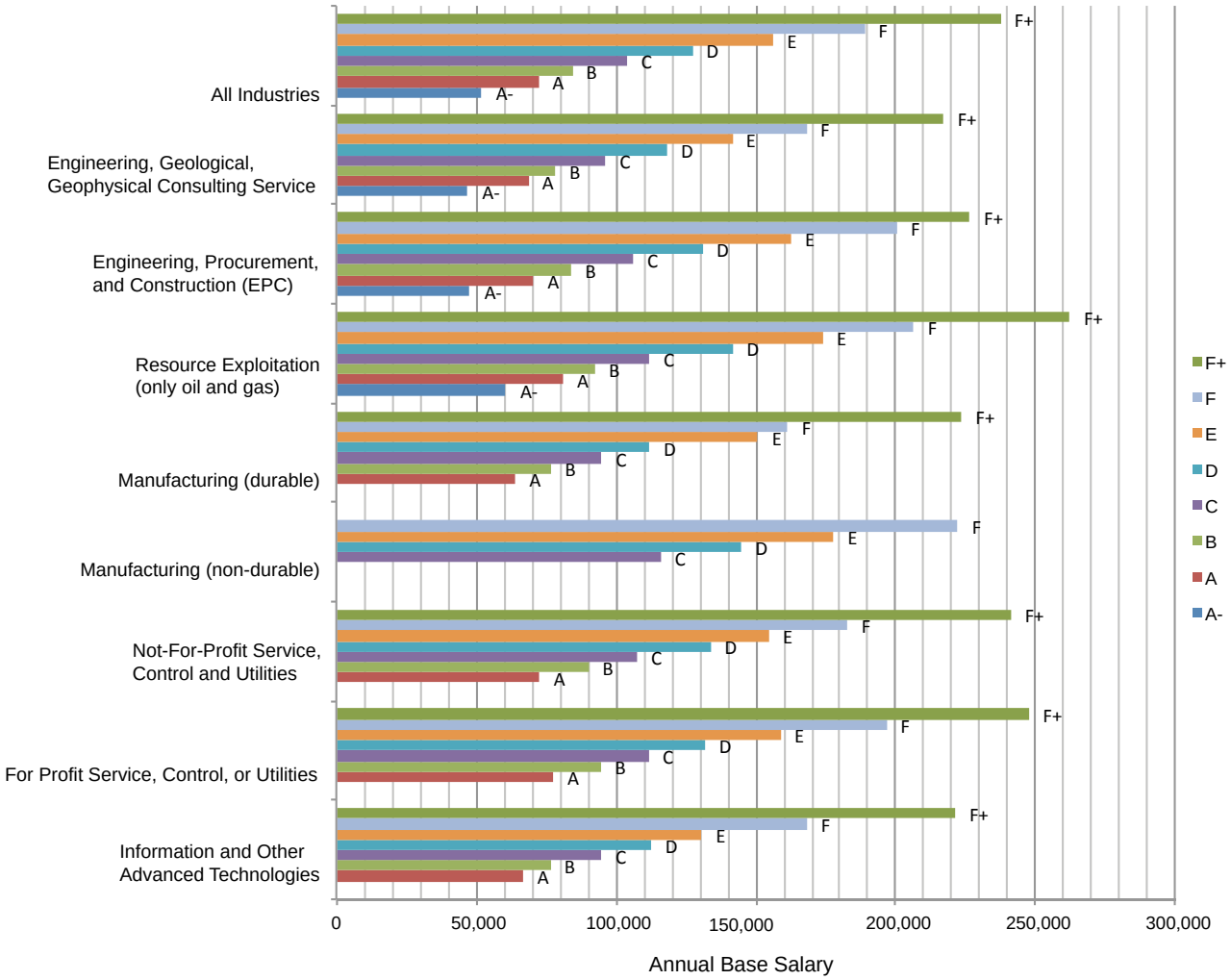
1. Resource Exploitation (only oil and gas), $60,526 to $269,522 for A- to F+
2. For-Profit Service, Control, or Utilities, $77,466 to $247,492 for A to F+
3. Not-For-Profit Service, Control, or Utilities, $72,699 to $241,014 for A to F+
4. Engineering, Procurement, and Construction (EPC) $47,780 to $226,082 A- to F+

The top four industry sectors for engineers and geoscientists, when ranked against the all-industry average at various levels for **total compensation** — including long-term incentives — are:

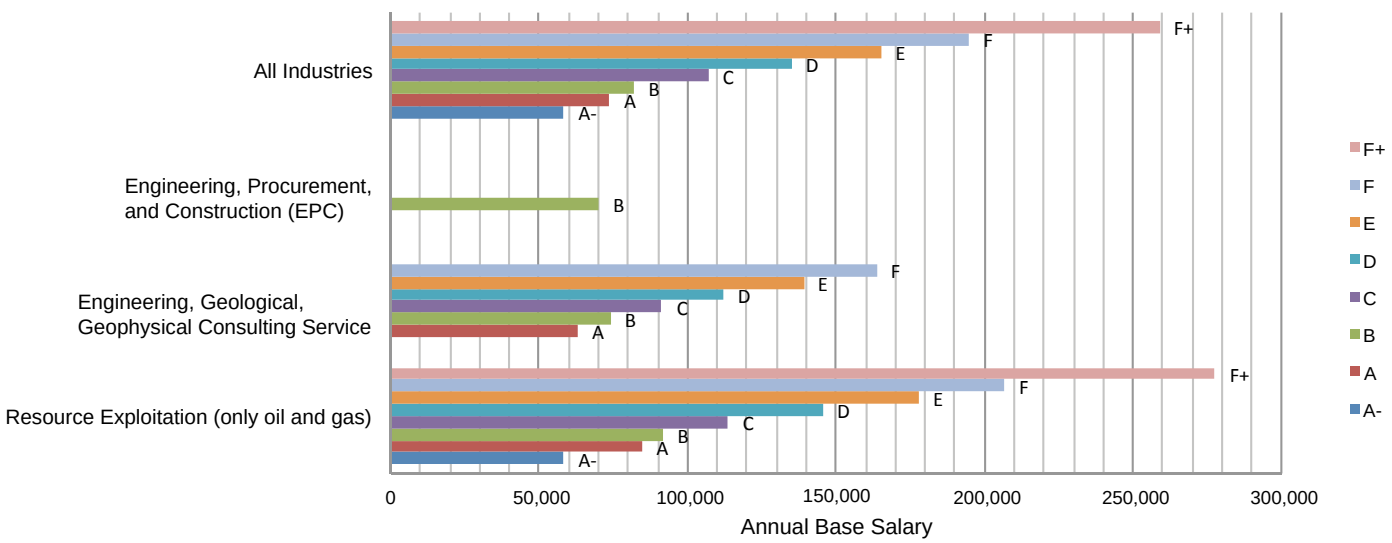
1. Resource Exploitation (only oil and gas), $62,238 to $494,101 for A- to F+
2. For Profit Service, Control, or Utilities, $85,729 to $472,240 for A to F+
3. Not For Profit Service, Control, or Utilities, $74,394 to $251,143 for A to F+
4. Manufacturing (non-durable), $133,844 to $355,364 for C to F

Not surprisingly, resource exploitation (only oil and gas) consistently ranks as one of the top four industry sectors in terms of overall total compensation at all levels of responsibility.

Engineering
Annual Base Salary – Comparison Across Industry



Geoscience
Annual Base Salary – Comparison Across Industry



EDMONTON BRANCH CALENDAR

LUNCHEONS

TUESDAY, OCTOBER 25
HDVC ELECTRICAL INFRASTRUCTURE
Peter Kuffel, P.Eng.

TUESDAY, NOVEMBER 15
Location: Holiday Inn Conference Centre,
4485 Gateway Blvd., Edmonton
Topic and speaker TBA

Luncheons held at *(unless otherwise noted):* Sutton Place Hotel, 10235 100th St., Edmonton

Schedule: 11:30 a.m. Registration
12 p.m. Lunch
12:30 p.m. Presentation

Cost: Members — $35 ($40 at door)
Non-Members — $40 ($45 at door)
Students — $20

To register: **apega.ca**
Or phone 780-426-3990, toll free 1-800-661-7020, ext. 2338
Or email events@apega.ca

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CALGARY BRANCH CALENDAR

LUNCHEONS

WEDNESDAY, OCTOBER 12
Alberta's Transmission System
Scott Thon, P.Eng., CEO, AltaLink

THURSDAY, NOVEMBER 17
Seven Generations of Successful Strategy
Patrick Carlson, P.Eng., CEO, Seven Generations Energy

THURSDAY, DECEMBER 8
Phase Out of Coal Generation Plants in Alberta
Wayne Stensby, P.Eng., Managing Director, ATCO Global Electricity Global Business Unit

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Luncheons held at: Fairmont Palliser Hotel, 133 Ninth Ave. SW

Schedule: 11:15 a.m. Registration
11:45 a.m. Lunch

Cost: Members & Guests — $50
Students — $25
ASAP (APEGA Student Advantage Program) — $15

To register: **apega.ca**
Or phone 403-262-7714, toll free 1-888-262-3688

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Make an Impact

Build the Future by Volunteering

Volunteer Opportunities

- Committees
- Special Events
- Youth and University Outreach
- Mentoring

Current APEGA volunteer opportunities are posted on the volunteering section of the APEGA website

Volunteer Benefits

- Earn Continuing Professional Development Credit
- Expand Your Business Network
- Develop Skills, Knowledge, and Experience
- Give Back to Your Profession
- Have Fun

Note: Your acceptance in a particular volunteer position depends on spaces being available and the suitability of your qualifications.

Contact Sue Armitage
Volunteer Management Coordinator
volunteer@apega.ca
403-262-7714

APEGA
Volunteer

Share Your Knowledge and Experience

APEGA Professional Members are needed for the following volunteer opportunities

Permit to Practice Seminar Presenters

Volunteers are needed to deliver APEGA's approved Permit to Practice Seminar material on behalf of the APEGA Permits Department.

Candidates must:

- be licensed with APEGA as a P.Eng., P.Geo., P.Geol., P.Geoph., P.L.(Eng.), or P.L.(Geo.).
- be a Responsible Member for an APEGA Permit Holder
- have at least five years of industry experience, with a proven ability for public speaking and handling in-person questions

Successful candidates serve one term, September to June (renewable), and deliver at least 2 presentations per term. Total commitment for this volunteer position is about 16 hours per term.

Each presentation takes 4 hours. You arrive half an hour early, present for 3 hours, and answer questions for half an hour.

Regular orientation and training sessions will be given throughout the term. Additional training can be obtained by request. Orientation and training are mandatory.

Calgary Member Events — Speakers

Do you have presentation and public speaking skills? Practising Professional Members are needed to present 15-minute speeches at special Member events throughout the year.

Possible topics include:

- being an active APEGA Member
- what belonging to APEGA has meant to you throughout your career
- volunteering
- voting in the APEGA Council Election
- self-regulation
- APEGA's legislative review process
- career topics relevant to the current economic climate in Alberta
- professional practice and what it means

Edmonton — Member Events Photographer

Do you have photography skills you would like to put to use in service to your professions?

APEGA Members are invited to volunteer to take photographs with an APEGA-owned DSLR camera, under the direction of the staff members, at APEGA events such as Professional Member Induction Ceremonies and Life Member Ceremonies.

Qualifications and Requirements

- APEGA Member in good standing — a Member-in-Training, Provisional Licencee, or APEGA Student Advantage Program (ASAP) member; or a Member licensed as a P.Eng., P.Geo., P.Geol., P.Geoph., P.L.(Eng.), or P.L.(Geo.)
- Working knowledge of DSLR cameras
- Portfolio of photographs (electronic or print) to present during interview
- Ability to take direction
- Willingness to sign a waiver stipulating that APEGA owns the photographs you shoot on APEGA's behalf

Calgary — Professional Member Induction Ceremony and Calgary Graduating Students' Workshop Volunteers

Do you have presentation and public speaking skills?

APEGA encourages Members to volunteer to welcome new Professional Members and graduating students to APEGA, by delivering positive and inspiring presentations at Member Induction Ceremonies and Graduating Students' Workshops.

Volunteers are needed to serve as:

- masters of ceremonies
- moderators
- speakers

You must be a practising P.Eng. or P.Geo. with public speaking experience.

Edmonton — 2016 APEGA Rock & Fossil Clinic

Are you a Professional Geoscientist, G.I.T., or geoscience university student in the Edmonton area? Do you want to share your passion with the next generation?

If so, consider volunteering at the 2016 APEGA Rock & Fossil Clinic on Saturday, October 15, at TELUS World of Science. Showcase your knowledge by identifying various rock samples. Serve as a role model and inspire young people.

UNIVERSITY OUTREACH EVENTS

APEGA Professional Engineers and Professional Geoscientists, along with human resources professionals, are invited to use their valuable knowledge and experience, at a series of fun and worthwhile events aimed at helping students prepare to launch their careers.

EDMONTON

- October 5: Speed Mock Interviews (Engineering)
- October 13: Speed Networking (Geoscience)
- November 2: Industry Mixer (Engineering and Geoscience)

5:00-8:00 p.m.
Venue at the University of Alberta to be confirmed
Light refreshments provided

CALGARY

- October 19: Speed Networking (Engineering)
- October 20: Speed Networking (Geoscience)
- November 24: Industry Mixer (Engineering and Geoscience)

5:00 to 8:00 p.m.
Calgary APEGA Office
Light supper provided

For further information on any of the volunteer opportunities listed on this page — or on other APEGA-related volunteer opportunities — please contact

Sue Armitage
Volunteer Management Coordinator
volunteer@apega.ca

Also feel free to check the volunteer section of the APEGA website, apega.ca, under Members & Permit Holders.

A Reimagined APEGA Education Foundation — the Executive Director Takes Stock

BY **ROD GAROSSINO**
Executive Director
APEGA Education Foundation

Editor's Note: Usually in this space, we publish features about students who've benefited from the donations you provide to the APEGA Education Foundation. This time, in keeping with the Success theme of this edition, we turn it over to the Executive Director of the foundation, so he can give you his perspective on how things are going after his first year on the job.

This being the Success edition of the magazine, I've been thinking a lot about what success looks like for AEF.

One very basic definition of success is simply meeting or exceeding one's own expectations or objectives. But before I expand on that that, let me remind you of what the APEGA Education Foundation is and what it is we do.

The foundation contributes to building stronger and more diverse engineering and geoscience professions in Alberta. Our goal is to inspire and enable young professionals to lead the development of innovative solutions to our most critical challenges. We promote and celebrate Professional Engineering and Professional Geoscience. We foster interest among young people in science, technology, engineering, and math by supporting educational outreach programs. And we invest in student success by providing scholarships and bursaries.

Our donors are Members and Permit Holders of APEGA — people and organizations that love what they do and want to give back to their professions.

It was not that long ago, in the spring edition, that *The PEG* introduced me. Let's have a look at how the foundation is doing under my stewardship.

AEF has succeeded in meeting its objectives of providing scholarships and bursaries to support engineering and geoscience students, as well as funding outreach programs in science education — programs that inspire young students to consider careers in engineering and geoscience.

Many of you have helped us do that, and we thank you for that support.

However, success is not just an outcome — it is a process. As I write this, Canadian athletes are competing in the Rio Olympics, so I can't resist a sports analogy. Every one of those athletes was successful at the local, regional, or even national level. At some point, however, every one of them decided to reach higher and to strive to be the best in the world.

Success is a process that begins with imagining a different future, deciding to go for it, and then doing the work and gathering the support required to get you there.

Last year, the AEF Board of Directors began reimagining what the foundation could be. It set out to find ways to

- make the organization grow
- have a more meaningful impact
- make a bigger difference
- make the foundation sustainable in the long term

It will be a lengthy process, but we've had good success in the early stages. We have a new strategic plan and progress has been made on the strategic imperatives in that plan. We've begun focusing AEF's investment on heightened impact, increased diversity, and increased understanding and appreciation of the professions.

The foundation has made grants to support a number of great initiatives this year. They include:

- **University of Lethbridge Summer Learning Quest Camps**
  - » Maker Girl camps to support girls in identifying themselves as capable young women who can succeed in pursuing STEM classes and careers
  - » engineering and robotics camps to foster children's interest in robotics and engineering
- **Calgary Youth Science Fair**
  - » awards for engineering and Earth sciences (elementary and secondary)
- **Red Deer College Summer Science Camps** (21 of them over seven weeks)
  - » focus on Aboriginal youth
  - » engage, inspire, and ignite youth through discovery and hands-on learning
  - » connect with community mentors

- **Burgess Shale Geoscience Foundation display upgrades**
  - » increased emphasis on importance as a fossil site
  - » physical upgrades to improve the educational experience
  - » new polymer casts and 3D print models of fossils and photographs
- **BrainSTEM Alliance**
  - » Girls Inc. Operation SMART
    - ★ This program in the Wood Buffalo region introduces girls aged 10 to 14 to a number of engineering disciplines, including mechanical, chemical, civil, mining, petroleum, electrical, environmental, aeronautical, and bioengineering
    - ★ Attitudes of participating girls shifted from 64 per cent with little or no interest in engineering to 86 per cent interested or very interested
  - » READesign
    - ★ This program combines literacy with engineering design by allowing students in Fort McMurray, Calgary, and High River to be engineering consultants for their favourite storybook characters. Students read a novel, identify challenges faced by characters in the book, and then use the engineering design process to come up with solutions. Students also show how they can use engineering to solve real-world problems and to build resiliency after natural disasters like fires and floods.

We've reached out to Alberta universities and begun the process of working with them to ensure that the scholarships and bursaries provided achieve our goal of making a truly meaningful impact on students' success.

In the meantime, we have continued to award our traditional scholarships and bursaries. Congratulations to all 71 students who received AEF-funded scholarships, bursaries, and awards in 2015. As usual, these young people prove that the future of the engineering and geoscience professions is bright. A complete listing of our 2015 recipients appears on page 51 of this *PEG*.

We have also strengthened the organizational alignment between AEF and APEGA. A memorandum of understanding was signed for 2016, formalizing and defining the relationship between APEGA and AEF. APEGA Council has endorsed the creation of a new MOU to ensure a strong relationship into the future.

AEF is here to help APEGA instill pride in its Members. We are grateful for all of the support that APEGA provides.

Our fund development committee is working hard on a new case for Member support, which will describe what AEF strives to achieve and invites Members of the engineering and geoscience communities to join with us to create that future.

Through the work we do, we hope to build your pride as a Professional Engineer or Professional Geoscientist — and as a Member of APEGA.

Would you like to learn more? Visit apegaeducationfoundation.ca or contact us at edufound@apega.ca.

"Success is a process that begins with imagining a different future, deciding to go for it, and then doing the work and gathering the support required to get you there."

GIVE BACK TO YOUR PROFESSION

By giving to the APEGA Education Foundation (AEF) you are investing in the education of Alberta's future Professional Engineers and Geoscientists.

AEF scholarships and bursaries reduce the financial burden for university students and enhance their success. AEF-funded outreach programs inspire the next generation to consider engineering and geoscience careers.

You are proud of your profession. You have had a fulfilling and meaningful career. And you want to give back.

Give back today with a tax-deductible donation to the APEGA Education Foundation. Together, we are investing in the future of the professions.

Donate today at **apegaeducationfoundation.ca**

APEGA | education FOUNDATION

CONGRATULATIONS to Recipients of 2015 APEGA Education Foundation Scholarships, Medals, and Bursaries

APEGA Education Foundation Undergraduate Scholarships

Augustine Gayang
University of Saskatchewan

Jenna Helmer
University of Calgary

Skye Lybbert
University of Alberta

Sunghoon Park
University of Waterloo

Jebina Shrestha
University of Calgary

APEGA Education Foundation Alex Hemstock Bursary

Canaan Ng
University of Calgary

APEGA Education Foundation Enbridge Aboriginal Bursary

Anastasia Johnson
University of Calgary

Ivan Finlay Awards for Student Society Presidents

University of Alberta

Sarah Elder, *Engineering Students' Society (ESS)*

Derek Hayes, *PS Warren Geological Society*

University of Calgary

Austin Bauer, *Rundle Group*

Maha Hassanin, *Petroleum & Energy Society*

Victor Hoang, *Geophysics Undergraduate Students' Society*

Anthony Santos, *Joli Fou*

Graduate Awards

University of Calgary

APEGA Education Foundation Graduate Scholarship
Brendan Clark
Eric Limacher

Undergraduate Awards

University of Alberta

Academic Excellence Award in Engineering
Sahar Ali
Aaron Espiritu
Alexander Granley
Alexander Kuebel
Callie Lissinna
Gillian Pierce
Curtis Stewart

Academic Excellence Scholarship in Engineering
Shannon Clark
Jordan Darrah
Haley Dittmann
Nathan Jen
Thomas Lorincz
Suzana Trac

Acuren Scholarship in Materials Engineering
Karl Wagner

HR Webb Memorial Scholarship
Mohamad Yassin

John A Allan Memorial Scholarship in Geology
Alexander Dorian

Scholarship in Geophysics
Sean Bettac

Undergraduate Scholarship in Geology and Geophysics
Paulina Hauf
Alexandra Hughes
Katarzyna Staniszewska
Alexandra Thompson

University of Calgary

Undergraduate Bursary in Engineering
Douglas McDonald
Adam Neufeldt
Tara Bavil Olyaee
Tong Xu

Undergraduate Bursary in Science
Shadia Elkadre
Melissa Loewen

Undergraduate Entrance Merit Scholarship in Engineering
Jappanjot Arora
Claire Gillis
Amy Liang
Daniel Mah
Karen Ngo
George Shang
Jay Stueck

Mount Royal University

APEGA Education Foundation Bursary in Geology
Taia Wyenberg-Henzler

APEGA Education Foundation Scholarship in Geology
Leela Witvoet

APEGA Past Presidents' Medals

University of Alberta

Shannon Arnell
Medal in Mining Engineering

Quinn Boser
Medal in Mechanical Engineering

Heidi Cossey
Medal in Civil Engineering

Balazs Gyenes
Medal in Engineering Physics

Shafi-ur Khan
Medal in Electrical Engineering

Emily Moffat
Medal in Geology

Elizabeth Ramsey
Medal in Geophysics

Benjamin Reeves
Medal in Materials Engineering

Sheldon Rhein
Medal in Petroleum Engineering

Nadia Shardt
Medal in Chemical Engineering

Isaac Supeene
Medal in Computer Engineering

University of Calgary

Gerald Andres
Medal in Engineering

Kathleen Ang
Medal in Engineering

Ruan Hassen
Medal in Engineering

Wing-Young Amanda Hau
Medal in Engineering

Soroosh Hemmati
Medal in Engineering

William Lancaster
Medal in Engineering

Kelsea Pedersen
Medal in Geology & Geophysics

Simon Schmitt
Medal in Engineering

Sinead Tracey
Medal in Geology & Geophysics

APEGA education FOUNDATION

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APEGA Calgary Branch Annual Golf Tournament

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APEGA Edmonton Branch Golf Tournament

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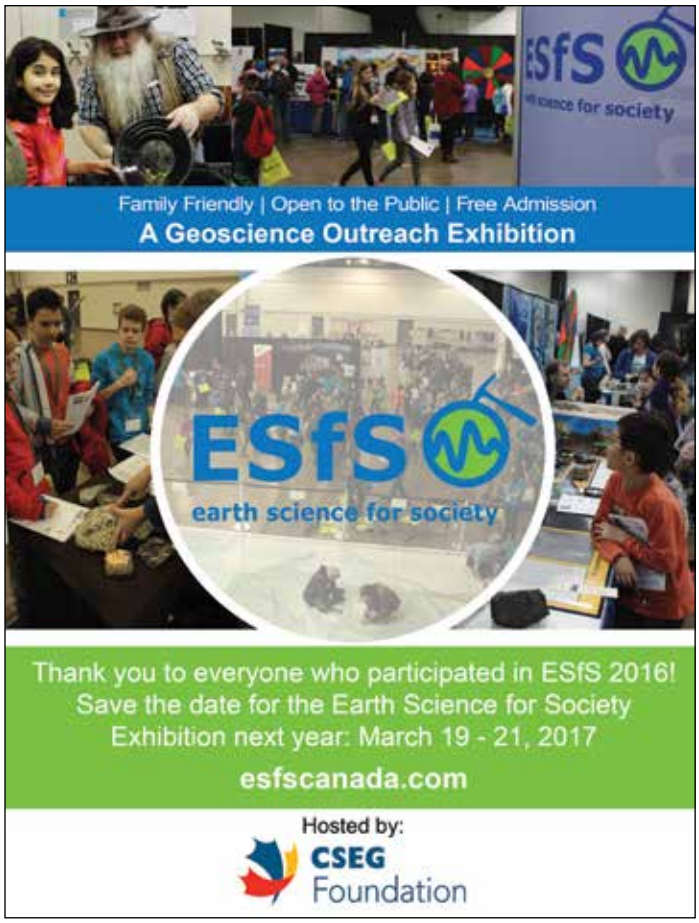
10TH Annual Golf Tournament & Silent Auction



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THANK YOU to the Sponsors of the 2016 Central Alberta Branch Golf Tournament

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by the experts

GAME ON

The first NHL hockey game at Rogers Place will see the Oilers take on their provincial rivals, the Calgary Flames, on October 12. The centrepiece of a downtown transformation leads up to that faceoff. And there's much more to come as the ICE District takes shape.

-photo courtesy Oilers Entertainment Group

TIMELINE

March 3, 2014
Excavation and foundation work begin

Fall 2014
Erection of steel and concrete structure

Spring 2015
Interior work begins

Summer 2015
Exterior completion

Spring 2016
Concrete ice slab is poured

September 8, 2016
Opening Day

Owner
City of Edmonton

Design and Construction Partner
Edmonton Arena Corporation

Operator
Oilers Entertainment Group

Project Manager
ICON Venue Group

Architect
HOK

Construction Manager
PCL Construction Management Inc.

Structural Steel Supplier
Structural-Heavy Steel Construction, a division of Canam Group

Local Subcontractors
Stantec, Hemisphere Engineering, DIALOG, AMEC, CDML, Bunt and Associates Engineering

Cost
$613.7 million (arena, winter garden pedestrian crossing, LRT link, land, pedestrian corridor, community rink)

Site area
9.5 acres (the site of an old railyard, several dirt parking lots, a casino)

ROGERS PLACE QUICK FACTS

- Shaped like an oil drop, it is the new home of the Edmonton Oilers NHL team.
- Replaces Rexall Place, which opened in 1974.
- Seats 18,641 people for NHL hockey games and more than 20,700 for concerts and other events.
- At 1.1 million square feet (over seven levels), it's more than double the size of Rexall Place.
- Expected to host upwards of 180 events and 2.2 million visitors annually.
- Has 15 escalators and 15 elevators. One of Canada' longest escalators will take people from the main concourse to the upper concourse.
- Wired for all the latest technology, including high-speed Wi-Fi. Visitors can use their smart devices to find the shortest concession and washroom lineups, and access interactive hockey and concert apps.
- Bistro bars along the main concourse open onto the bowl, allowing fans to purchase food and drink without missing any action.
- 1,200 TV screens are located throughout the building
- In addition to the main arena, Rogers Place is home to the Edmonton Downtown Community Arena, a city arena that seats over 1,000.
- The gateway into Rogers Place is Ford Hall, which spans 104 Avenue. It has 2,200 square metres of public space for corporate and cultural events.
- A pedway connects Rogers Place to the surrounding towers, hotels, LRT stations, and downtown.

-photo by Jeff Nash/Edmonton Oilers Hockey Club

-photo courtesy Oilers Entertainment Group

THE MATERIALS

- Built out of stainless steel and glass, Rogers Place tops out at 43 metres tall.
- Approximately 80,000 cubic metres of material was excavated from the building site. Maximum excavation depth was 4.5 metres.
- The building's foundation has 700 piles.
- 10,000 pieces of structural steel, weighing 9,000 tonnes in all, was lifted by cranes and bolted into place during construction, along with 24,000 cubic metres of structural concrete.

-photo courtesy Oilers Entertainment Group

LEED SILVER CERTIFIED

Rogers Place is on track to be the first NHL facility in Canada and only the second in North America to be certified silver by the Canada Green Building Council, through the program called Leadership in Energy and Environmental Design (known more commonly by its acronym, LEED). The international benchmark for design, LEED certifies construction and operation of high-performance green buildings.

- About 87 per cent of the construction debris from Rogers Place was diverted from landfills.
- More than 20 per cent of the materials used in Rogers Place — things like metal panels, steel, and carpeting — are recycled or contain recycled content.
- A reflective roof covering will help reduce heat gain inside the building.
- LED bulbs and motion-activated lights will reduce energy use by 14 per cent.
- Low-flow toilets and efficient fixtures will use about 37 per cent less water than arenas of similar size.
- The project even features 12 electric car charging stations.
- Rogers Place also earned LEED points for its downtown location, which improves density, encourages walkability, and reduces infrastructure needs, while optimizing use of public transit. There will be seven LRT stations within a 10-minute walk of Rogers Place, and numerous bus stops.

-photo courtesy Oilers Entertainment Group

BIG AND TALL

Hockey fans, rejoice. Game statistics, replays, crowd shots, promotions, and everything else you look for above the ice just got bigger. A lot bigger.

Rogers Place will feature the largest high-definition scoreboard in any NHL arena and possibly in the world.

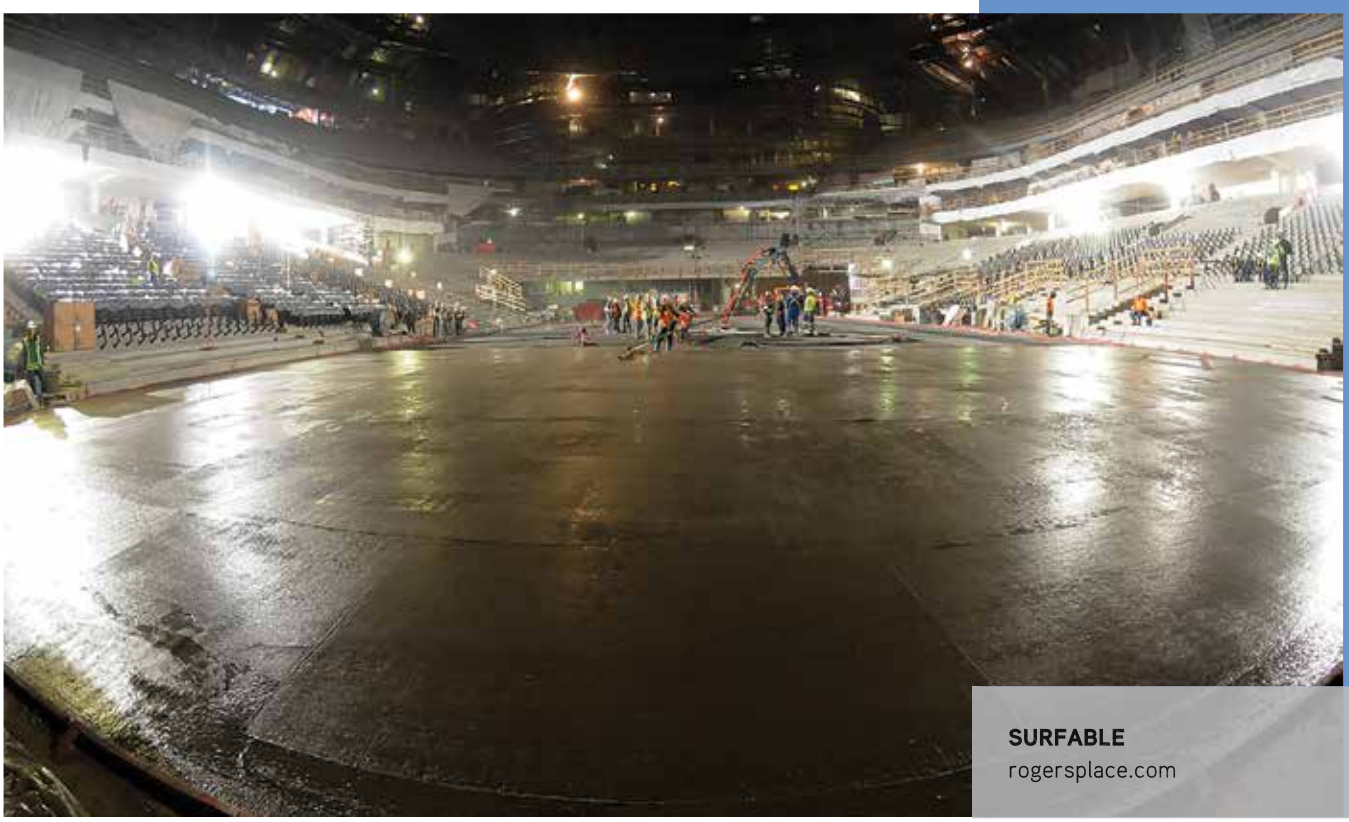
- The cube-shaped mega-board spans much of the rink's length, from blue line to blue line.
- It measures 14 metres wide by 14 metres deep, is 11 metres high, and weighs 40,800 kilograms — that's the weight of Connor McDavid times 475, and the size of the Rexall scoreboard times 4.5.
- The new scoreboard was built in the U.S. and shipped to Canada.
- Eight trucks delivered the frame; another eight delivered pieces of the LED screens.

ICE, ICE BABY

What does it take to build an ice slab foundation for an NHL hockey rink? Try 320 cubic metres of concrete, delivered by nearly 40 trucks. That's enough to build a standard city sidewalk about a half-kilometre long.

The 12-hour process involved 20 workers monitoring levels, installing over 16 kilometres of cooling pipe, conducting pressure checks, and meticulously smoothing out the concrete as it was being poured.

Most ice slabs are poured on a clay-and-gravel base. Not Rogers Place's, though. It's one of the few NHL rinks to sit atop a parkade. Beneath the eight-inch slab is another slab — a 16-inch structural one, above the parkade.



-photo by Andy Derlin/Edmonton Oilers Hockey Club

SURFABLE
rogersplace.com

Downtown Dreaming

A new arena in Edmonton has transformed an old railyard and empty parking lots into a world-class sports and entertainment venue. Managing construction of this once-in-a-lifetime project is a career highlight for PCL's Mike Widdifield, P.Eng.

Pile by pile. Beam by beam. Steel panel by steel panel.

Over the past 30 months, Edmontonians watched with anticipation — and even awe — as a shiny new downtown arena rose skyward from a giant hole in the ground.

From a construction trailer near the worksite, Mike Widdifield, P.Eng., had a front-row seat for all the action. In fact, you might even say he helped orchestrate it. Mr. Widdifield, with PCL, managed construction of the $483.5-plus million arena, its associated community rink, Ford Hall, LRT connection, and pedestrian pedway. Edmonton-based PCL was the construction manager on the entire project, which is valued at $613.7 million, inlcuding land.

"It's been very hard for me not to walk around from time to time with the eye of a fan who will be a user of the space," Mr. Widdifield said, a few days before the arena's September 8 grand opening.

As a civil engineer, a city resident and a devoted Oilers fan, the opportunity to manage this once-in-a-lifetime project was kind of a big deal for him, and for his company, too. Throughout construction, each milestone reached was a victory to be celebrated. The first and last steel erected. The first suspended slabs for the parkade. The pouring of the ice slab. The assembly of the colossal scoreboard. And on and on.

Constructing a facility like Rogers Place is rare in North America — which makes it special. Constructing such a facility in Edmonton is even rarer — which makes it even more special.

"This is what a lot of people refer to as a career or legacy project," says Mr. Widdifield. "With it being in my hometown, for my favourite NHL team, something that all my family and friends will use in the future — that makes this just so special to me. I think it will be tough to top what this project has meant for me both personally and professionally."

> 'I think it will be tough to top what this project has meant for me both personally and professionally.'
>
> **MIKE WIDDIFIELD, P.ENG.**
> *PCL Construction Manager*

The same is likely true for the many other APEGA professionals and engineering consulting firms involved in the design and construction of Rogers Place. Besides PCL, other APEGA Permit Holders involved in the development include Stantec, Hemisphere Engineering, DIALOG, AMEC, CDML, and Bunt and Associates Engineering.

A WORLD-CLASS ACCOMPLISHMENT

Touted as the most advanced sports and entertainment venue in North America, Rogers Place is part of an ambitious plan to revitalize Edmonton's downtown core. The facility is the heart of ICE District, a 25-acre, multi-billion-dollar development that also includes office towers, a hotel, condos, a public plaza, a casino, and stores — all in one area.

Long before arena construction began in March 2014, the debate went on for years over the need for a new arena and how it would be paid for. A public-private partnership deal was eventually negotiated between the City of Edmonton and Oilers owner Daryl Katz. Intense public interest increased as the arena began to take shape.

"The importance of this project for the city and the region was not lost on me," says Mr. Widdifield. "There was a significant amount of pressure, but that added to the excitement and the fulfilment of the project. It truly is a world-class facility that many people in the region will benefit from for many, many years. I'm very proud to have been a part of it."

Mr. Widdifield has worked for PCL for 12 years, since graduating with a civil engineering degree from the University of

ALMOST SHOWTIME
A few days before the grand opening of Rogers Place, construction manager Mike Widdifield, P.Eng., takes it all in outside the arena's southwest entrance.

EDMONTON ICE DISTRICT: A PRIMER

- Covering more than 25 acres, ICE District is a dynamic mixed-use development with Rogers Place at its heart. It spans 101st Street to 104th Street, from 103rd Avenue to 106th Avenue.
- Over $2 billion in projects are currently under construction, including office, residential, and retail space.
- Rogers Place opened September 8. Also opening this fall are:
  - ✓ Ford Hall, the $56.8 million, 25,000-square-foot public gathering space that serves as the gateway into Rogers Place, transporting visitors over 104th Avenue and into the arena
  - ✓ Edmonton Tower, a 27-storey, $300 million highrise, which will be home to 2,300 City of Edmonton employees
  - ✓ Edmonton Downtown Community Arena, a $25-million community rink owned and operated by the city, with seating for 1,000 spectators
  - ✓ Grand Villa Edmonton Casino, a $32 million facility attached to the arena
- Stantec Tower, the tallest building west of Toronto at 66-storeys — is under construction at the southeast corner of 102nd Street and 103rd Avenue. Set to open in 2018, it will be the global headquarters for engineering and consulting giant Stantec and its 1,700 Edmonton employees. Stantec designed the new $500 million project and will manage construction.
- A 50,000-square-foot public plaza adjacent to the arena and a 55-storey JW Marriott hotel and luxury condos are set to open in 2018.
- ICE District is connected to Edmonton's LRT and pedway systems. If you're driving, there are 2,500 underground parking stalls, including 350 at the arena. There are another 12,000 parking stalls within a 10-minute walk.
- Future residential and retail developments are planned for Phase 2 of ICE District, with openings expected in three to four years.

Alberta Faculty of Engineering in 2004. His focus at university was structural and geotechnical engineering, and construction management. It was an education that prepared him well for the responsibilities of leading a megaproject.

"The problem solving skillset is something that I think a lot of engineers take away from their studies," he says. Working at PCL, he built on those skills, finding solutions to the construction challenges and problems that often arise on a project.

Rogers Place took that to a whole new level. "The sheer scale and magnitude of this particular project added many challenges that we don't see every day," says Mr. Widdifield.

Things like organizing hundreds of workers — up to 1,250 were on site each day — and getting them the information they needed to do their jobs efficiently. And not getting overwhelmed by the enormity of the project. "It's been exciting to see the entire project team work together to overcome those challenges."

This team approach helped the project wrap up on time and on budget.

"It took an entire team of professionals from all career paths to make this happen, from all stakeholder groups. Speaking for PCL, we had an office and field management team of approximately 65 people at peak, all of whom had key roles and responsibilities and contributed to the success of the project," he notes.

FROM BUILDER TO SPECTATOR

Mr. Widdifield was among the 56,000 Edmontonians who packed Rogers Place

for a public open house on September 10, an experience he was able to share with family and friends. "I hope everything works!" he jokes. It was an opportunity to show them what he's been working on the past few years — and to thank them for their support.

"Like many on our team, I've had tremendous support from my wife and kids, and from my extended family and friends," he says. "The thing I'm most proud of is that my family and friends will be able to enjoy something I was part of building."

He's looking forward to eventually taking off his hard hat and experiencing Rogers Place like everyone else — as a spectator.

"The technology and space you have to move around on the concourse is going to blow people away. Also, the different seating options are really special. I think the PCL Loge Level will be a product that everyone will get to enjoy," he says.

In this area — one of seven levels — fans can enjoy games or shows while seated at semi-circular tables overlooking the lower bowl, with in-seat food and beverage service and access to an exclusive open concourse offering food and drink.

NOW WHAT?

The day after the open house, Mr. Widdifield spent a relaxing Sunday with his family. On the Monday, he was back at Rogers Place, but with a new focus. "There will still be a lot of work to do to wrap things up, with deficiencies and the like," he says.

What comes next for him is still up in the air.

"I actually don't know what or where my next project will be with PCL," he says. "I'm very excited with what the future may bring."

PROJECT MANAGEMENT: IT'S AS EASY AS 1-2-3

Yes, there are far more than three steps to successfully managing a megaproject like Rogers Place. But for Mike Widdifield, P.Eng., PCL's Construction Manager for the arena development, the following three approaches helped him and the PCL team move the project forward on time and on budget. They're published here in his own words.

1. *For us, as the builder, one of the biggest challenges was the organization of — and information flow to — the huge number of frontline workers that it took to achieve what was accomplished. In 30 months of construction, we carried out over 9,500 worker orientations and amassed over three million worker hours. Our peak workforce at any one time hit about 1,250 workers. This size of workforce isn't typical to the commercial construction market here in Edmonton. It took layers of supervision, a lot of meetings, and a heavy reliance on technology to ensure information was shared as quickly and efficiently as possible to the people putting the actual product in place.*
2. *One key to our success, at a high level, is ensuring each person in that large group has a vision of where the group is going and the clear path of how to get there. Then there's ongoing monitoring, revisiting of the path, revising as necessary, and removing roadblocks.*
3. *Specific to this project, breaking the large square footage of the building into areas — each with their own dedicated PCL supervisor and trade contractor foreman — was one tactic that worked very well. This was driven by our field leadership team. Dealing with the entire building in itself could be overwhelming, but breaking it into smaller, more manageable chunks allowed for more streamlined communication and implementation.*

Seeking Water in a Harsh Land

Amid cable-eating camels and curious children, a team of Calgary geoscientists discovers clean and reliable water sources for 200,000 people in the world's third largest refugee camp

LIFE ON THE LAGGA
A Turkana girl scoops water from a hole dug in dry river bed, or lagga. When this lagga dries up, herders will move on to a larger lagga nearby, in search of water for their livestock.
-photo courtesy Paul Bauman, P.Eng., P.Geoph.

For Paul Bauman, P.Eng., P.Geoph., an intensive, two-week water exploration trip to Kakuma Refugee Camp — in the middle of Kenya's Turkana desert — can be summed up in one word: crazy. How crazy? "Completely, totally crazy," he says. "Most people who have been there would say it's probably one of the most insane places on the planet. When you come back home, life just seems so boring."

Mr. Bauman and a crew of six colleagues from Calgary's Advisian, a division of APEGA Permit Holder WorleyParsons, travelled to the camp in January as part of a humanitarian mission funded by Geoscientists Without Borders. Their objective was to identify potential wellsites to supply fresh water to Kakuma, the world's third largest refugee camp, with a population nearing 200,000.

"It's pretty cool to be able to use your profession to help people. I've never experienced anything that felt so good," says crew member Erin Ernst, P.Geo. "It was really a unity of heart and mind."

"Seeing the camp was both exhilarating and terrifying," recalls Ms. Ernst. "Kakuma is like a bustling town with shops and restaurants and mud huts behind fences built of thorn bushes. It is amazing how tenacious humans are, eking out an existence in the most inhospitable place I have ever been."

Finding water in the desert is no easy task, though. Add in knife-wielding locals, gunfire, punishing temperatures reaching 40 C, herds of camels trying to eat your seismic cables — when the school kids aren't playing tug-of-war with the cables — and you've got yourself a real adventure.

"It was the unusual local hazards that made things a little challenging — but interesting," says Mr. Bauman.

AN NGO COMES CALLING

Despite Kakuma's size, Mr. Bauman — like many — had never heard of the sprawling mishmash of buildings, carved into four compounds and spread over 12 square

DATA RECOVERY (below)
Curious children from Kakuma Refugee Camp watch as Landon Wood, P.Geo., analyzes geophysical data.
-photo courtesy Josie Bauman

QUIET ON THE LINE? (right)
Refugee and Turkana children tag along on the survey line with Landon Woods, P.Geo. After school, hundreds of children play in the dry river beds and haul water to their homes — or, in this case, watch Mr. Woods spool 1,000 metres of cable across the sand.
-photo courtesy Paul Bauman, P.Eng., P.Geoph.

kilometres. That changed two years ago when he was contacted by IsraAID, an Israel-based non-governmental organization (NGO) involved in international development projects and humanitarian missions.

Would Mr. Bauman be interested in teaching Kakuma refugees and Turkana villagers a two-week groundwater and geophysical exploration course?

"I immediately said yes and looked at the map to figure out where Kakuma was," says Mr. Bauman. The program IsraAID explained, after all, was exactly in his wheelhouse.

The goal of the training: livelihood improvement.

Mr. Bauman is well known in the international aid community for his volunteer work in water-desperate places across Africa, the Middle East, and Southeast Asia. He's volunteered his technical skills on many projects, using geophysics to find solutions to groundwater challenges. This level of commitment is one of the reasons he received APEGA's 2016 Community Service Summit Award.

Refugees in Kenya are technically not allowed to work, but exempted are water and sanitation jobs with NGOs operating within the camp. Job prospects are also limited for the 120,000 Turkana people who live around the camp, but with the right skills they can find work with Kenyan water utilities.

For the 35 students accepted into the course, this was an incredible opportunity to gain life-changing employment skills. The course covered topics like geophysical water exploration techniques, water well construction and evaluation, environmental hydrochemistry, and groundwater monitoring.

Though Mr. Bauman has over 30 years of experience using geophysics to explore for groundwater, natural resources, tunnels, unexploded bombs, industrial waste, and ancient burial sites — basically anything you might want to find without drilling or digging — he had never taught a class quite like this one. He spent hours putting a course together from scratch, making his first trip to Kakuma in October 2014.

"I went there not really knowing or understanding anything about the camp or the real issues there," he says. His first impressions were of a dystopian society reminiscent of Mad Max movies — chaotic, remote, dry, dusty. And desperate. "You can't believe you're seeing 200,000 people plopped in the middle of the desert."

The refugees aren't allowed permanent housing, so they live in tin or mud huts. They can't grow their own food, so they're dependent on daily rations, including water, provided by the United Nations High Commissioner for Refugees (UNHCR). Most ended up in Kakuma after fleeing civil war, famine, or drought. Some have lived at the camp since it was established in 1992. Thousands were born there.

"Every person there is a survivor of some incredible, traumatic experience," says Mr. Bauman.

For the Turkana, the situation is also bleak. Semi-nomadic herders, they live traditional lives, roving the desert as they hunt for increasingly elusive water sources. They use sticks and pots to dig scoop holes in dry river beds, often drinking the same contaminated water as their livestock. "In the outlying areas, it's like stepping back in time," says Mr. Bauman.

While he was in Kenya teaching, he got a firsthand look at the camp's water system

when a flash flood swept through, ripping up water lines. Being the only hydrogeologist around, he was asked by UNHCR to do emergency well inspections and check up on water chemistry. He was appalled — both by the small volume of water and its low quality — coming from the camp's wells.

Those looking for water were using 1D resistivity sounding, which is "not the best option for the complex geology of the east African Rift Valley," says Mr. Bauman. As a result, a lot of dry or low-yield holes were being drilled. Another problem: many successful wells had to be abandoned because of toxic levels of fluoride, which is common in the volcanic rock of the Rift Valley.

With better technology, including 2D resistivity and seismic refraction, Mr. Bauman thought there was a good chance of locating high-volume water sources with less fluoride. Though more expensive and complicated, this technology provides better results, which can be more easily interpreted.

How would he make that happen? Back home in Calgary, Mr. Bauman filed a grant request with Geoscientists Without Borders, a charitable arm of the Society of Exploration Geophysicists. He proposed a two-week, intensive water exploration program for Kakuma. Funding for the project was quickly approved. Mr. Bauman's

BY THE NUMBERS

200,000 people living at Kenya's Kakuma Refugee Camp, from more than 20 different nations

600,000 refugees in Kenya

120,000 Turkana locals living around the Kakuma Refugee Camp

60 hours travel time from Calgary to Kakuma

3 flat tires, 5 hours, 125 kilometres — driving stats for the team, as it made its way from Lodwar, the capital of Turkana, to Kakuma, along one of Kenya's most treacherous highways.

16 wooden crates, 1,400 kilograms — geophysics survey equipment

55% of Kakuma children don't go to school

20 litres of water, per person, per day, that UNHCR aims to provide Kakuma refugees for drinking, cooking, and hygiene

225 litres of water per day, the amount the average Canadian uses

SURVIVAL (top)
A Turkana man and a goat drink water from the same scoop hole, which is likely contaminated with E. coli. Though the Turkana know this water is unhealthy, many can't afford to buy clean water. Locals must pay 10 Kenyan shillings — about US 10 cents — to fill a 20-litre jerry can from a hand pump or tap. Water is provided free to Kakuma refugees, though in limited quantities.

ON TAP (above)
Water taps only run during restricted hours during the day, creating long lineups. At night, pumps fill a small number of storage tanks to supply water for the next day.

-photos courtesy Paul Bauman, P.Eng., P.Geoph.

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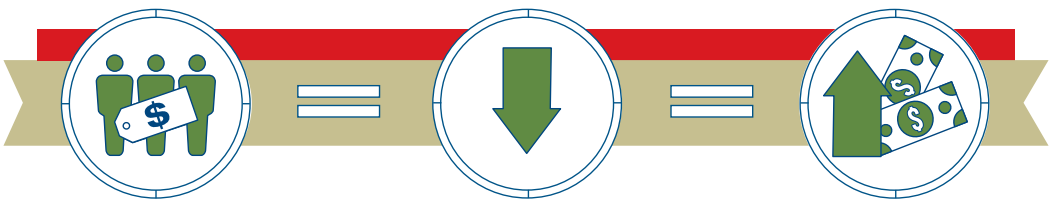

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Assumptions: The individual MER (management expense ratio) was calculated using the average Canadian equity mutual fund of 2.34 per cent obtained from Morningstar January, 2010. The group IMFE (investment management fee and expense) was calculated using the Jarislowsky Fraser Canadian Equity fund of 1.19 per cent plus GST. We've assumed a rate of return of five per cent on an investment of $500,000. $25,000 was withdrawn at the end of each year for 12 years. The accumulated assets in the chart have been rounded to the nearest dollar.

"Every person there is a survivor of some incredible, traumatic experience"

-PAUL BAUMAN, P.ENG., P.GEOPH.

employer also got on board, providing the necessary geophysics equipment.

Consent from the United Nations and NGOs at the camp took longer. But the project eventually got the go-ahead, shortly after Mr. Bauman returned to Kakuma last November to teach a second course to a new group of students.

Two months later he was back again, this time with a six-member team, 1,400 kilograms of equipment, and a two-person documentary film crew in tow. *See related story, below.*

PUTTING THINGS INTO PERSPECTIVE

Slashing their machetes through thickets of thorny acacia, team members thought they had a green light to lay cable near a village just outside the camp. But five angry Turkana men wearing wrist knives and waving sticks at them apparently missed the memo. Fortunately, a village elder they had previously negotiated with came to the rescue, calmed things down, and got their survey back on track.

A few days later it was the sound of nearby gunfire — AK-47s, to be specific — that sent hearts racing. Mr. Bauman and the others didn't know it at the time, but police had fired shots into the air to disperse an angry mob at a nearby health clinic, where a child had reportedly died after being given the wrong dose of medication. "I suppose it's not surprising that in a place where one's hold on life is so tenuous, tensions are always ready to be released at any provocation, especially as tragic an incident as this," Mr. Bauman wrote on his Calgary to Kakuma Facebook page, which tracked the team's progress.

Fortunately, moments like these were few. Indeed, for the Calgary team, the trip was an enriching experience they'll not soon forget.

As well as Erin Ernst, five others joined Mr. Bauman in Kenya. They were colleagues Landon Woods, P.Geo., Colin Miazga, G.I.T., Douglas MacLean, G.I.T., and Randy Shinduke; and University of Calgary geophysics PhD student Franklin Koch. Another colleague, Alastair McClymont, P.Geo., PhD, helped back in Calgary with organizational details and data processing.

"Kakuma was easily the most rewarding field program I've been on because of the humanitarian aspect," says Mr. Woods. He had previously visited the Turkana region for paleoseismic mapping for a hydrocarbon development, but he never knew about Kakuma until learning about Mr. Bauman's work there.

"To see the camp, smell the smells, feel the heat from the sun, constantly shake the sand out of everything, and see the lineups at the water taps — it really puts things in perspective," he says. "At times it was hard to grasp the situation the refugees are in. I am not sure that someone like me, with the privileges and relative safety I have in Canada, can ever fully understand what they've gone through."

Mr. Woods recalls working one day near a village, collecting survey data by a dry lagga, or riverbed. An elderly Turkana woman was in a scoop hole, almost up to her chest, lifting water into a metal basin for her five donkeys.

"It shows how desperate the water situation is there, and what the Turkana and their livestock have to do to survive. For them, it was business as usual," he says.

His favourite memory is interacting with local children, who tagged along trying to help out with the survey work, posing for pictures so they could see themselves on an iPad screen. An estimated 55 per cent of Kakuma's residents are children.

All's quiet on the seismic line? Not when school lets out.

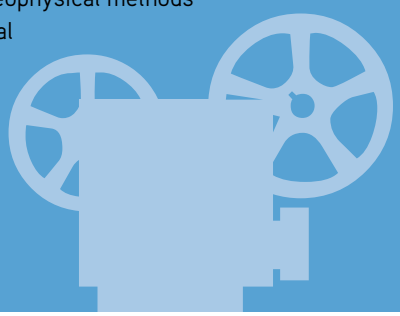
FINDING WATER — A DOCUMENTARY IN THE MAKING

It's hard to imagine the daily struggles faced by refugees and locals living with chronic water shortages in northwest Kenya. Alberta film maker Brendan O'Brien will bring their story to life in his new documentary, Finding Water. He spent two weeks in the desert, recording the work of Calgary geoscientists who travelled to Kenya last January in search of new water sources for the Kakuma Refugee Camp and local tribespeople.

Mr. O'Brien worked as a geophysical field technician with WorleyParsons before resigning his job to start Red Van Studios and pursue his dream of making movies.

Finding Water will provide an in-depth look at the geophysical methods geoscientists use to find water. It will also examine global water challenges and the potential for increased water shortages in the future.

The Society of Exploration Geophysicists and a crowdfunding campaign financed the documentary. Funders will get a sneak-peak at the movie at the end of September. It will be released online near the end of the year.



STRAIGHT TALK
University of Calgary student Franklin Koch and Douglas MacLean, G.I.T., discuss how to keep seismic cable straight on a steep river bank.
-photo courtesy Josie Bauman

"There are many curious children running around, which can be an interesting and funny problem when trying to collect seismic data. They would hang around in little groups of friends, laughing and giggling at the silly foreigners in their big wide brimmed hats and sunburned skin, messing about with long cables and wires," he says. "Some of the most fun I had was hanging around these kids, but the truth is that they likely do not know the reality of their situation yet."

More than half of Kakuma's children don't go to school due to issues like child labour and lack of resources. Many spend long hours waiting in line at water taps, filling up jerry cans and hauling them home to help their families survive.

The team's efforts to find more dependable water sources for the camp could help alleviate water shortages and wait times — but it wouldn't be easy.

MORE TWISTS AND TURNS THAN A SEISMIC CABLE

Wake at 6:30 a.m. Put on sunblock. Have chai mandazi — milk tea and fried bread — for breakfast. Load equipment. Head out into the desert heat. Complete seismic and electrical surveys. Drink water. Drink more water. Try to avoid sunstroke. Return home (the World Food Program compound for aid workers). Shower. Eat dinner (rice, vegetables, and goat meat). Process survey data. Sleep. Repeat.

Such was the typical day for the Calgary team and 28 Kakuma and Turkana students who joined the crew.

Between January 11 and 25, they collected 12 kilometres of tomography data using 2D electrical resistivity and six kilometres of seismic refraction data, on the hunt for drilling targets in an unforgiving landscape.

"All of the vegetation around Kakuma is trying to kill you," says Ms. Ernst with a laugh. But perhaps it's not much of an exaggeration. "Everything has giant thorns on it. Keeping the survey lines straight was a huge challenge."

The local students, who were paid for their work through grant money, worked closely with Calgary team members, getting hands-on field training. But learning is always a two-way street.

Says Mr. Woods: "The biggest thing that I learned from the students was patience. It seems everyone in Kakuma is patient — because you have to be. I also found out where many of them were from and had a chance to hear some of their stories."

The opportunity to share technical knowledge was another highlight. Says Ms. Ernst: "They were so keen to learn as much as

DID YOU KNOW?

Seismic refraction surveys define the tops of rocks, along with whether rocks are fractured or massive. Electrical surveys identify whether pores in rocks are filled with fresh or saline water.

WALK THE LINE
Erin Ernst, P.Geo., and student Peter Kuya lay cable in a dry river bed near the Kakuma camp. For the first few days of the trip, the team surveyed near existing boreholes — where the geology, water levels, and water chemistry were already known — to help them gain confidence in their data interpretations.
-photo courtesy Josie Bauman

possible, and by the end of our time there, they could pretty much run the surveys without any help or direction."

That included planting geophones, running GPS, laying cable, operating a truck-mounted seismic source, and doing other tasks — like chasing goats off the line and stopping camels from eating cables.

Early on, crews ran their geophysical lines through existing wells, where the geology, water levels, and water chemistry were already known. "Initially, we thought we'd go in and bang, bang, bang, it will all be easy," says Mr. Bauman. But the local geology proved a real challenge. Kakuma is located at the edge of a basin, or dish, filled with sediment, he explains. That dish is made of a variety of volcanic rocks, which rapidly rise and fall below the surface. The sediment can be sand, clay, volcanic gravels, sand and clay. It can be saturated with fresh water, it can be saturated with salt water. Or all of the above.

Interpretations of geophysical results, therefore, were complicated and uncertain.

Another twist was added by tribal chiefs from nearby villages. They demanded that the crew search for water for the Turkana, in exchange for access to their land. "The relationship between the Turkana and the refugees is very tense. The Turkana view the refugees as usurpers and are bitter that the aid provided to the refugees has not been extended to them," explains Ms. Ernst.

An agreement was hammered out by UNHCR, IsraAID, and the Turkana chiefs — and the scope of the project quickly expanded. "You definitely have to be able to adjust and have backup plans and deal with things you may not have been able to take into account," says Mr. Bauman.

After two exhaustive weeks, the team was able to gather and interpret enough data to identify several potential wellsites in zones of thicker gravel — locations that would likely have high volumes of water and minimal fluoride. Its final task was putting together a detailed report outlining the best water well targets.

Now it was up to the UN and NGOs to start drilling.

SO FAR, SO GOOD

Good news arrived in June: using data from the Alberta team's report, three wells had been drilled on the northern edge of the camp. All were successful. For Mr. Bauman and his team, that was a huge relief.

"In any kind of drilling program, there's some uncertainty. So we're pleased that we were correct," says Mr. Bauman. "Not only does it actually give the refugees water, but hopefully it gives them a better understanding of the aquifer and a methodology to move forward for developing new sources."

The UN's goal in any water drilling program is to supply 20 litres of water per person, per day. Together, the three new wells can supply that and more for to up to 140,000 people, including the Turkana, some of the existing Kakuma refugees, and residents of a new 60,000-person camp planned for incoming refugees escaping conflicts in South Sudan.

Mr. Bauman saw the new wells in action when he returned to Kakuma in September to teach a third class in groundwater and geophysical exploration. Like the Calgary to Kakuma Water Project, the course has had great results. More than 60 per cent of students have found employment. Some have even been repatriated because their new skills are in such high demand in their home countries.

"It's completely transformed their lives," says Mr. Bauman.

He'll continue doing humanitarian work in the region for as long as there's a need. "It's really satisfying to use your skills to do work that people genuinely and immediately appreciate and need. You can see the impact," he says. "The refugee situation in Africa is comparable to Syria, but not in the way it's represented in news media. I've learned so much about a part of the world that a few years ago I'd never even heard of. It's been an eye-opener — a profound experience."

APEGA Geoscientist Helps Unearth Holocaust Escape Tunnel — And Says No to Movie Maker James Cameron

Over the past two decades, Paul Bauman, P.Eng., P.Geoph., has volunteered on about 20 archeological projects around the world. He's been featured in documentaries, including National Geographic's Finding Atlantis and one that's about to be released about finding water wellsites for a Kenyan refugee camp.

Two weeks before heading to Lithuania for other projects, the famous director asked him to work on a sequel to Finding Atlantis.

Mr. Bauman couldn't fit the project into his schedule and had to turn Mr. Cameron down.

And off he went, to be part of a project that ended up having particular personal significance because of his Jewish lineage. Near the end of the Second World War, a group of prisoners held captive in a stone-lined pit dug their way to freedom. Of the 80 prisoners who attempted the daring escape from the Nazis, only 11 survived to tell the tale, becoming known as the Burning Brigade escapees. The exact location of their tunnel had been a mystery.

On the three-week archaeological expedition in Lithuania in June, the APEGA Summit Award recipient and colleague Alastair McClymont, P.Geo., PhD, helped discover the tunnel, using a geophysical imaging technique called electrical resistivity tomography (ERT). Similar to an X-ray or an MRI, the technology provides researchers with a picture of what's going on below the Earth's surface.

The images revealed a narrow tunnel, just 35 metres long and about 60 centimetres in circumference. Its location — the middle of a quiet forest near Lithuania's capital city, Vilnius — is historically significant. More than 70,000 Lithuanian Jews and 30,000 non-Jews were killed there early in the war. They were marched into the forest, shot by the Nazis, and buried in pits. It's considered one of the first sites of Nazi genocide. As the war came to an end and the Nazis attempted to destroy evidence, prisoners were forced to dig up bodies and burn them.

"It was only after we were there that the historical context started to sink in," says Mr. Bauman. His family is Jewish, with roots in nearby Belarus. "It certainly took on a lot more meaning for me."

Besides finding the tunnel, the researchers were able to determine the exact location of Pit One, the first pit used for the mass executions. They also found the trench leading into the pit, where people were herded to their deaths.

In Vilnius, Mr. Bauman and Dr. McClymont also worked with archaeologists to survey the subterranean floors of the Great Synagogue of Vilna. Built in the 17th century, it was partly destroyed during the war and later demolished. Thanks to the work of the geoscientists, however, archaeologists have already been able to excavate two floors down.

Mr. Bauman and Dr. McClymont were also part of a team exploring Rasu Prison for the burial site of Jacob Gens, a controversial Jewish leader who was appointed by the Germans to run the Vilna Ghetto. He was executed by the Nazis in 1943 and is said to be buried with a metal cigar box containing his memoirs.

The projects in Lithuania were led by the Maurice Greenberg Center for Judaic Studies at the University of Hartford, and the Israel Antiquities Authority. A documentary for the TV series NOVA, set for release next year, will tell the story of the Burning Brigade escapees, the search for the tunnel, and the other archeological work in Lithuania that's underway.

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MORE INFO

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IN MEMORIAM

Between May 1 and July 31, 2016, APEGA received notice of the deaths of the following Members.

Life Members

ALEXANDER, Lloyd, P.Eng.

BADUN, Walter, P.Eng.

BEVERIDGE, Stanley, P.Eng.

BROWNE, Gary, P.Eng.

COOPER, Richard, P.Eng.

CROWTHER, Edward, P.Eng.

DERWORIZ, David, P.Eng.

LOUGHEED, Donald, P.Eng.

MORGAN, George, P.Geol.

PAGE, Harold, P.Eng.

SCOVILL, Edwin, P.Eng.

SEDGEWICK, Ronald, P.Eng.

STELCK, Charles, P.Geol.

TOPPING, Doug, P.Eng.

TORRIE, James, P.Geol.

WHITE, Douglas, P.Eng.

WILKINS, Arthur, P.Geol.

Members

CLAYRE, Iain, P.Eng.

COLBOURNE, John, P.Eng.

CURTIS, William, P.Eng.

HEDINGER, Adam, P.Geol.

HOULIHAN, Richard, P.Eng.

NEIMAN, Owen, P.Eng.

REIDFORD, Wayne, P.Eng.

ZAZULA, Stanley, P.Eng.

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“I've learned so much about a part of the world that a few years ago I'd never even heard of. It's been an eye-opener — a profound experience.”

Paul Bauman, P.Eng., P.Geoph.
Recipient of the 2016 Community Service Award, APEGA Summit Awards