

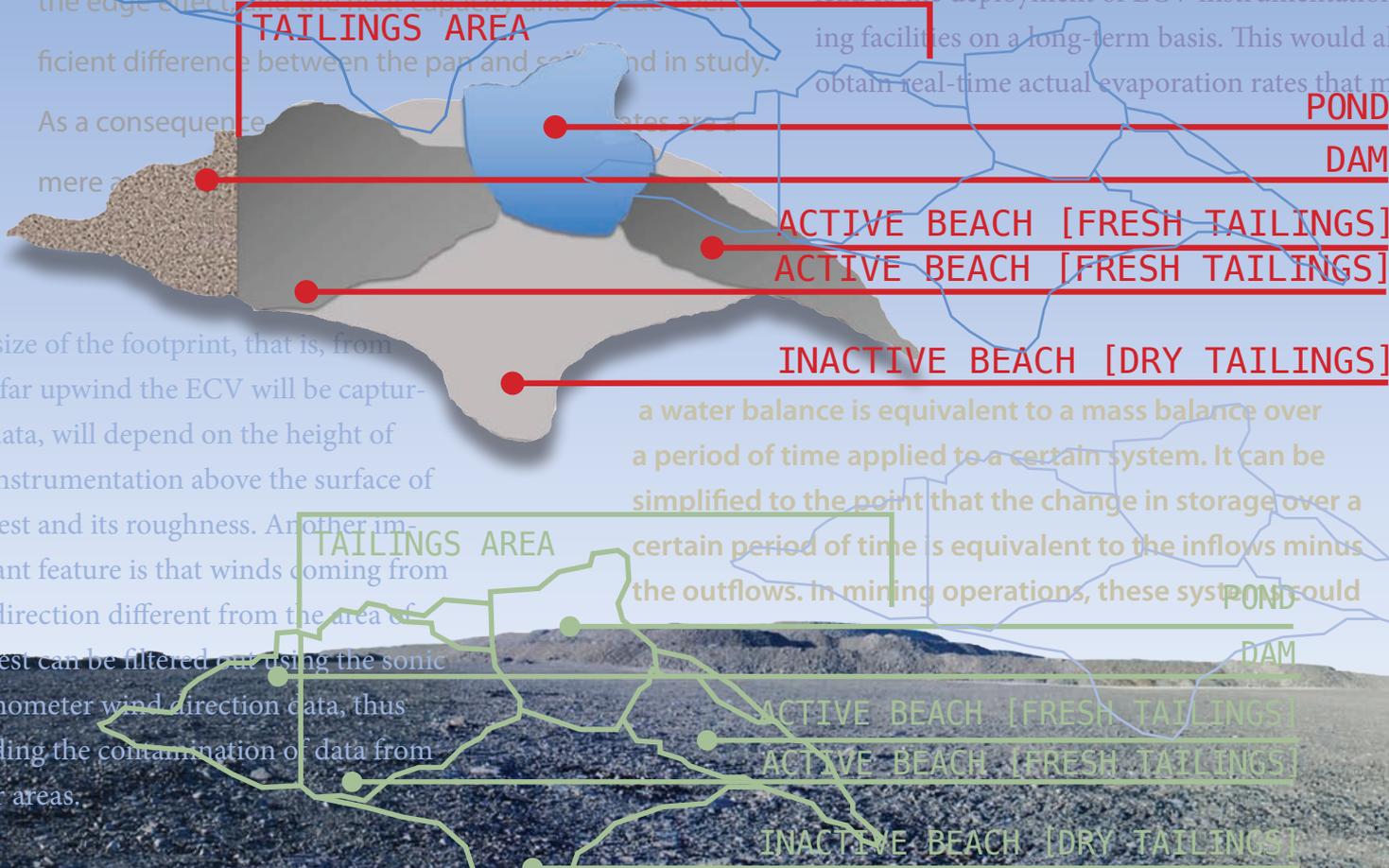


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Volume 37 • Number 1 • March 2019

GEOTECHNICALnews

Improving Mine Site Water Balances using the Eddy Covariance Method



Conventional tailings operations usually have at least three areas with different evaporation rates depending on their surface water content and albedo coefficient: the pond, the active

POND
DAM
P= Precipitation
Int= Interception by vegetation
Roff= Runoff
ET= Evapotranspiration
Perc= Percolation
Change in storage

a water balance is equivalent to a mass balance over a period of time applied to a certain system. It can be simplified to the point that the change in storage over a certain period of time is equivalent to the inflows minus the outflows. In mining operations, these systems could

It is expected that the success of these measurements will lead to the deployment of ECV instrumentation in mining facilities on a long-term basis. This would allow us to obtain real-time actual evaporation rates that may result in more efficient tailings management.



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email gn@geotechnicalnews.com
web www.geotechnicalnews.com

GEOTECHNICAL NEWS is published quarterly.

Paper subscription rates:

- within North America: \$60.00 CDN per year
- overseas: \$100.00 US per year through BiTech Publishers Ltd.

Electronic version:

GEOTECHNICAL NEWS is also available in electronic version.

For details, visit

www.geotechnicalnews.com

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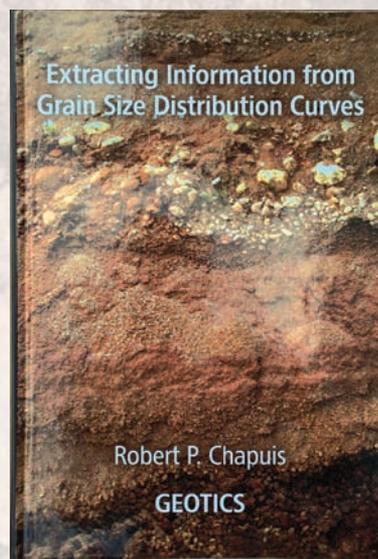
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— from the foreword by International Society of Hydrogeonomy (ISH) and Robert P Chapuis

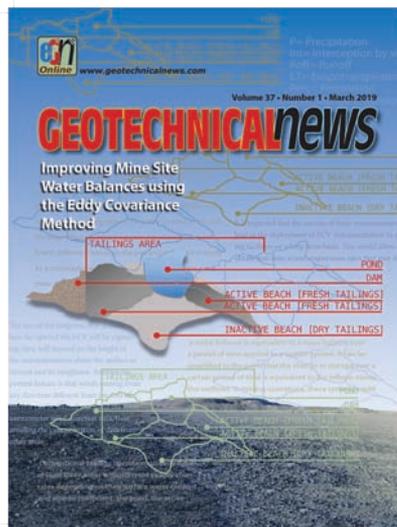


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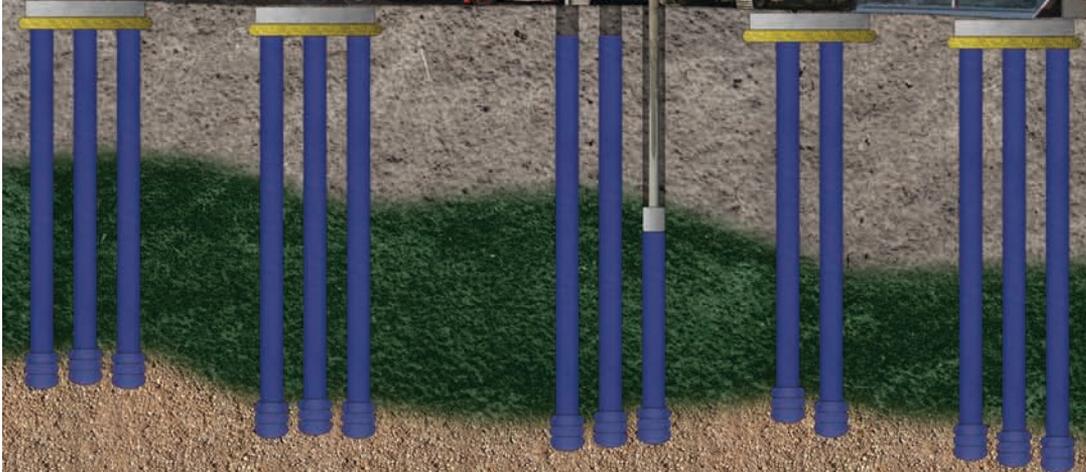
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Message from the President



Mario Ruel 2019-2020 Canadian Geotechnical Society President.

A word from Mario - Un mot de Mario

Bonjour – Hello everyone, I am eager to attack my mandate as your new CGS President

My team and I are taking the direction of a very good ship and I am glad to report that our CGS is in better shape than ever. This is mainly due to the dedicated hard work of the previous administration under the friendly leadership of Dharma Wijewickreme. In addition to running the affairs of the society flawlessly, important progress has been accomplished on;

- enhanced member services (such as a better website with a personalized “myCGS” dashboard (I invite you to log on and try it!)),
- the development of a strategic communication plan by a new special task force,

- completion of the final CFEM 4th edition errata,
- setting up the stage to develop the new CFEM online version,
- member engagement (new student chapters, improved relations with local sections),
- improved control of finances based on more balanced budget, despite increasing challenges.

On behalf of the CGS I’d like to express our appreciation and sincere thanks to my predecessor, President **Dharma Wijewickreme**, for his great contribution, leading his team with efficiency and class all accomplished with his engaging smile.

During the next two years, our team will follow this lead, striving for significant progress on their initiatives. Joining me on the **CGS Executive Committee will be;**

- **Rob Kenyon** as the new **VP Technical** who will also have a strong focus on advancing the production of the new online CFEM. Rob, a senior consultant at KGS in Manitoba, is taking over from Suzanne Powell in this challenging role. Thanks, Suzanne, for your passion and efficiency and for also for having kick started the enormous task of the CFEM update.
- **Judith Bouchard** will follow the footsteps of Jean Côté as your **VP Communication & Member Services**. Judith, a Senior Geotechnical Engineer at Hydro-Québec will take the leadership to crystalize the strategic “communication” plan and work on innovative ways to serve our membership. Merci “dynamo” Jean for all your initiatives which you carried to success with relentless energy while always having (contagious) fun doing it.
- **Kent Bannister** has accepted to continue his diligent work on hold-

ing the finances together as **VP Finance**. Ken, VP at TREK Geotechnical in Winnipeg, will work on strengthening our finances and I will support his efforts to harmonize management of membership with local sections across Canada. I appreciate your sticking with us for another two year mandate.

- **Jack Seto** will be our **Technical Division Rep**. Jack, a Senior Geotechnical Engineer for BGC Engineering in Calgary, will replace Nicholas Vlachopoulos.
- **Andrea Lougheed**, a Senior Geotechnical Engineer for BGC Engineering in Vancouver, will pursue her role as our **Section Representative** for her second year.
- **Maraika De Groot**, Education Ambassador at Forthlane Partners in Toronto, will ensure continuity as **Young Professionals Representative** until next Fall.

We need to express our gratitude to all the volunteers who, with two and three-year mandates on different positions, are donating their time and energy with passion for the success of our CGS. In order to continue the legacy and keep the CGS well organized through the years, we can count on a very efficient administration team at the CGS National Office lead by Executive Director Michel Aubertin with support from Lisa McJunkin, Wayne Gibson, and Emily Fournier.

As I work with the CGS I shall always pay special attention to attracting young geoprofessionals, encouraging the participation of more women in our field, making francophones feel more welcome as part of our “grande famille” and finally, I will endeavor to open the doors for more practitioners to participate and share their experience. If you have any questions, suggestions, or comments please feel free to communicate with any mem-

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bers of your Executive Committee and National Office. I also welcome you to communicate with me directly at president@cgs.ca. We exist to serve you, the members.

I am truly eager to work with our executive team and our Board of Directors to serve you, members of our CGS, for the next two years. I am looking forward to meeting most of you directly at the 72nd Canadian Geotechnical Conference, **GeoSt. John's 2019**. You should really make a special effort and hopefully are already planning to attend. It always boosts my enthusiasm to network with our Canadian colleagues, learn from the presentations and discussions, while having fun earning professional development credits. It is great to see the latest tools and expertise through exhibitors and, most importantly, take advantage of this rare opportunity to discover the natural beauty of Newfoundland. This is one conference you do not want to miss!!!

A bientôt mes amis – See you later, my friends!!!

*Provided by Mario Ruel
CGS President 2019 - 2020*

Message du président

Un mot de M. Ruel/A word from Mario

Bonjour/Hello everyone! J'ai hâte de m'attaquer à mon mandat en tant que nouveau président de la SCG!

Mon équipe et moi prenons la barre d'un très bon navire et je suis heureux de signaler que notre SCG est en meilleure forme que jamais. Cela est principalement dû au travail acharné et dévoué de l'administration précédente sous la bienveillante direction de Dharma Wijewickreme. En plus de gérer les affaires de la Société à la perfection, elle a réalisé d'importants progrès sur plusieurs fronts :

- l'amélioration des services aux membres (comme un meilleur

site Web avec le tableau de bord personnalisé « maSCG » [je vous invite à vous connecter et à l'essayer!]);

- l'élaboration d'un plan de communication stratégique par un nouveau groupe de travail spécial;
- l'achèvement de la version définitive de l'erratum de la 4e édition de la version anglaise du Manuel canadien d'ingénierie des fondations (MCIF);
- l'établissement des bases pour créer la nouvelle version en ligne du MCIF;
- l'engagement des membres (de nouvelles sections d'étudiants et des relations plus étroites avec les sections locales);
- l'amélioration du contrôle des finances grâce à un budget mieux équilibré, malgré des défis grandissants.

Au nom de la SCG, j'aimerais exprimer notre reconnaissance et nos sincères remerciements à mon prédécesseur, le président **Dharma Wijewickreme**, pour sa grande contribution, menant son équipe avec efficacité et classe, le tout accompli avec son sourire chaleureux.

Au cours des deux prochaines années, notre équipe suivra cet exemple et s'efforcera de faire progresser considérablement ses initiatives. Les personnes suivantes se joignent à moi au sein du Comité exécutif de la SCG :

- Le **Rob Kenyon** à titre de nouveau v.-p. technique, qui se concentrera également sur l'avancement de la production d'un nouveau MCIF en ligne. Le Kenyon, consultant principal chez KGS au Manitoba, succède à la Suzanne Powell à ce rôle stimulant. Merci, Suzanne, pour votre passion et votre efficacité et aussi pour avoir lancé l'énorme tâche de la mise à jour du MCIF.
- **Judith Bouchard** suivra les traces de Jean Côté en tant que votre **v.-p. aux communications et aux services aux membres**.

Mme Bouchard, géotechnicienne principale chez Hydro-Québec, se chargera de cristalliser le plan de communication stratégique et travaillera sur des façons novatrices de servir nos membres. Merci «dynamo» Jean pour toutes les initiatives que tu as menées à bien avec une inlassable énergie et en ayant toujours du plaisir (contagieux) à le faire.

- **Kent Bannister** a accepté de poursuivre son travail assidu sur la bonne gestion des finances à titre de **v.-p. aux finances**. M. Bannister, vice-président de TREK Geotechnical à Winnipeg, travaillera à renforcer nos finances, et j'appuierai ses efforts pour harmoniser la gestion des adhésions avec les sections locales partout au Canada. Je suis heureux que vous restiez avec nous pour un autre mandat de deux ans.
- Le **Jack Seto** sera notre représentant des divisions techniques. Le Seto, géotechnicien principal chez BGC Engineering à Calgary, remplacera le Nicholas Vlachopoulos.
- **Andrea Lougheed**, géotechnicienne principale chez BGC Engineering à Vancouver, continuera d'occuper son rôle de **représentante des sections** pour une deuxième année.
- **Maraika De Groot**, ambassadrice à l'éducation chez Forthlane Partners à Toronto, assurera la continuité en tant que **représentante des jeunes professionnels** jusqu'à l'automne prochain.

Nous devons exprimer notre gratitude à tous les bénévoles qui, à différents postes pour des mandats de deux ou de trois ans, donnent de leur temps et de leur énergie avec passion pour la réussite de notre SCG. Pour perpétuer l'héritage et assurer la bonne organisation de la SCG au fil des ans, nous pouvons compter sur une équipe administrative très efficace au Bureau national de la SCG, dirigée par

Michel Aubertin, directeur général, avec l'appui de Lisa McJunkin, de Wayne Gibson et d'Emily Fournier.

Dans le cadre de mon travail à la SCG, j'accorderai toujours une attention particulière à attirer de jeunes professionnels en géotechnique, à encourager la participation d'un plus grand nombre de femmes dans notre domaine, à faire en sorte que les francophones se sentent mieux accueillis et aient l'impression de faire partie de notre «grande famille» et enfin, je tenterai d'ouvrir les portes à une participation accrue des praticiens et à la transmission de leur savoir-faire. Si vous avez des questions, des suggestions ou des commentaires, n'hésitez pas à communiquer avec un membre de votre Comité exécutif et le Bureau national. Je vous invite également à m'écrire directement à president@cgs.ca. Vous, les membres, êtes notre raison d'être.

Je suis vraiment impatient de travailler avec notre Comité exécutif et notre Conseil d'administration pour servir vous tous, membres de la SCG, au cours des deux prochaines années. J'espère également rencontrer la plupart d'entre vous en personne à la 72e conférence canadienne de géotechnique, **GéoSt.John's 2019**. Vous devriez vraiment faire un effort

particulier pour y assister, et j'espère que vous avez déjà l'intention de le faire. Cela stimule toujours mon enthousiasme de faire du réseautage avec nos collègues canadiens, d'apprendre des présentations et des discussions, tout en m'amusant à obtenir des crédits de perfectionnement professionnel. C'est formidable de voir l'expertise et les outils les plus récents par l'entremise des exposants et, surtout, de profiter de cette rare occasion de découvrir la beauté naturelle de Terre-Neuve-et-Labrador. C'est une conférence à ne pas manquer!

À bientôt mes amis/See you later, my friends!

*Fourni par Mario Ruel
SCG Président 2019-2020*

From the Society

Call for Nominations of next CGS President-Elect

The next President-Elect for the Canadian Geotechnical Society (CGS) will be appointed January 1, 2020 and this individual will become CGS President for 2021 and 2022. The process leading to this appointment, which will be confirmed at the 72nd

Canadian Geotechnical Conference (GeoSt.John's 2019) to be held in St. John's, Newfoundland and Labrador, September 29 - October 2, 2019, has now commenced.

In accordance with the CGS By-Law, a Nominating Committee was formed in 2018 to propose a suitable candidate. The committee comprised then President Dharma Wijewickreme (who served as Chair of Nominating Committee), **Dennis Becker** (previous President), **Jacques Locat** (general member of CGS) and **Mamadou Fall** (general member of CGS).

The Nominating Committee has put forward the name of Dr. **Ian Moore**. Dr. Moore has agreed to be a candidate, and his statement of qualifications and objectives for the Society follows this announcement.

Dr. Moore has been an active member of the CGS for over 25 years, and his roles as the CGS Vice-President Technical (2003-2004), Co-Editor of the 4th Edition of the Canadian Foundation Engineering Manual (2006), and Editor of the Canadian Geotechnical Journal (2007 – 2018) are considered of particular relevance with respect to the announcement herein. Ian also initiated and led the development of the very successful

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local Kingston Chapter of the Society. Dr. Moore is a renowned researcher in the field of geotechnical engineering and an internationally-recognized leader in the design of buried infrastructure. His scholarly strengths are diverse and he has published over 280 referred journal and conference papers and chapters in books. Dr. Moore has received many awards for his achievements including the RM Quigley Award and G. G. Meyerhof Award that he received from the CGS.

While Dr. Moore is the candidate proposed by the Nominating Committee, other nominations are also welcomed. Any general member of the CGS may nominate a candidate for the position of President-elect. Nominations must be received in writing by the CGS National Office by June 15, 2019 (execdir@cgs.ca). Nominations must include the printed names, signatures and membership numbers of at least eighteen (18) general members of CGS, and a statement by the nominated candidate expressing a willingness to serve as President-Elect and then President, if elected.

If there is no additional candidate, Dr. Ian Moore will be acclaimed at the CGS Board of Directors meeting in St. John's this fall. In the event additional candidates are nominated, the selection of the President-Elect will be made by a general members' ballot during the summer of 2019.

For further information on this matter, please contact the CGS Executive Director, Michel Aubertin at the National Office (execdir@cgs.ca or admin@cgs.ca).

*Submitted by Dharma Wijewickreme,
Past President (2017-2018)*

President-Elect Objectives: Nomination Statement of Dr. Ian Moore

It is a huge honour to be selected by the Nominating Committee of the Canadian Geotechnical Society (CGS) for consideration as our Society's next President. I accept this nomination and if elected will work to serve the Soci-

ety as President-elect during 2020, and for a two-year term as President commencing January 2021. I joined the CGS soon after I immigrated to Canada in the early 90s. Indeed – my decision to follow the opportunity to move to Canada from Australia was influenced, in part, by the high regard with which Canadian geotechnique is held by the international community. Since becoming involved in the work of the Society about 2 decades ago, a number of its characteristics have become very clear to me. Firstly, there is an extraordinary culture of volunteering to serve the membership and other beneficiaries of the Society's activities – by our many local volunteers, our regional and division members and office holders, right up to our unpaid National Executive (the President, Vice-Presidents and Regional and Division representatives). Secondly, the Society is made up of an exceptional mix of geotechnical engineering and geoscience professionals, with both industry and academia strongly represented – a mix that strengthens everything we do (from student training to the support the Society provides towards continuing education and input for our professional members to lead and responsibly practice geotechnical engineering and make changes to that practice). As a result, the Society is in a strong position financially, is well regarded by the profession across Canada and beyond, and has enviable depth and breadth relative to many other learned societies – groups who generally have much more expensive executives and much weaker levels of volunteering and activity at the local and regional level, who often have poor representation from industry (most learned societies are dominated by academicians), and frequently face declining memberships and operating budgets. The responsibility associated with the CGS legacy is large – and involves building on the successes of the past, while addressing new challenges.

This was the case in two of my previous volunteer positions with the society – during my work with Dennis Becker as co-Editors of the 4th (2006) Edition of the Canadian Foundation Engineering Manual, and my work as Editor of the Canadian Geotechnical Journal. Each case involved continuing an exceptional legacy, while addressing and even capitalizing on new issues and challenges. For the CFEM, the challenge was to identify and motivate suitable experts across Canada to undertake either major revisions in areas of rapid change in theory and practice, or timely updates needed to previous material, during that period 15 to 20 years ago when workloads in both industry and academia grew very substantially. As a result of the efforts of the team of people who contributed, I believe that the 4th edition of the manual has enjoyed exceptional success (many sales producing a strong revenue stream for the Society, and highly influential, very helpful support towards geotechnical engineering practice).

For the CGJ, the period of my editorship from 2007 to 2018 covered very significant changes, including the way paper reviews and the associated communications were managed (the move from Osprey to the Scholar One editorial system), changes in the publisher from the public sector to become a private not-for-profit enterprise, and consequently the way the editorial office was financed and managed, a three-fold increase in the number of manuscripts submitted to the journal and therefore substantial growth needed in the board and the team of well qualified and effective reviewers, together with raised author expectations for timely reviews and increased competition from existing and many new journals. With support from additional editors Drs Sheng and Lake and an outstanding editorial board, authors and reviewers, the journal rose to the challenge, significantly increasing Impact Factor and other metrics and further strengthening its position as

one of the preeminent journals in the world, while continuing to emphasise articles of value to practicing professionals.

None of these achievements were the result of the efforts of any individual alone – rather they reflect outcomes from a motivated and productive team with different abilities, experiences and ideas who come together to realise something remarkable. Of course, this sums up the modus operandi of the Canadian Geotechnical Society.

So, the first of my objectives during 2021-22 is to further our efforts to engage a broad representation of members of our profession in the activities and operation of the Society – working to engage women, Engineers in Training in industry (consulting companies, construction, government and manufacturing) as well as new Assistant Professors and others in academia. Another objective is to investigate low-cost (in terms of financial and human investment) ways to build added value for society membership – both technical and non-technical. Clearly, the financial viability of the society depends on continuing the success of enhancing member numbers, growing income beyond membership subscriptions, and

controlling costs without compromising quality and impact. Finally, I aim to strengthen ways we recognize our volunteers – to reward excellence and effort and to motivate existing and new members to engage in local and national activities.

Appel de candidatures pour le prochain président désigné de la SCG

Le prochain président désigné de la Société canadienne de géotechnique (SCG) sera nommé le 1er janvier 2020, et cette personne deviendra président de la SCG pour 2021 et 2022. Le processus menant à cette nomination, qui sera confirmée à la 72e conférence canadienne de géotechnique (GéoSt.John's 2019) qui aura lieu à St. John's, à Terre-Neuve-et-Labrador, du 29 septembre au 2 octobre 2019, est maintenant commencé.

Conformément aux règlements de la SCG, un comité de candidatures a été mis sur pied en 2018 pour proposer un candidat approprié. Celui-ci était composé de l'ancien président **Dharma Wijewickreme** (qui a agi à titre de directeur du Comité de candidatures), de **Dennis Becker** (ancien président), de **Jacques Locat** (membre de la

SCG) et de **Mamadou Fall** (membre de la SCG).

Le Comité de candidatures a proposé le nom du Dr **Ian Moore**. Le Dr Moore a accepté d'être candidat, et son énoncé de qualités ainsi que ses objectifs pour la Société suivent cette annonce.

Le Dr Moore est un membre actif de la SCG depuis plus de 25 ans, et le fait qu'il ait occupé les postes de vice-président technique de la SCG (2003-2004), de corédacteur de la 4e édition de la version anglaise du *Manuel canadien d'ingénierie des fondations* (2006) et de rédacteur de la *Revue canadienne de géotechnique* (2007-2018) renforce particulièrement la pertinence de la présente annonce. Il a également entrepris et dirigé la mise sur pied de la section locale de Kingston de la Société, qui connaît un grand succès. Le Dr Moore est un chercheur renommé dans le domaine de la géotechnique et un chef de file reconnu à l'échelle internationale dans la conception d'infrastructures enfouies. Ses forces théoriques sont diverses, et il a publié plus de 280 articles de revue et de conférence à comité de lecture et de chapitres de livre. Le Dr Moore a reçu de nombreux prix pour ses réalisations, y compris le Prix R.M. Quigley

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The GeoSt.John's 2019 featured theme **Under Land and Sea** will highlight recent achievements in both offshore and nearshore geotechnical engineering. In addition to this maritime focus, the technical program will cover a wide range of primary and special geotechnical topics.

GeoSt.John's 2019 conference program highlights will include:

- R.M. Hardy Address presented by Dr. Ryan Phillips (C-Core)
- CGS Colloquium presented by Dr. Kathy Kalenchuk (Mine Design Engineering)
- Comprehensive Industry Trade Show with 60+ exhibitors
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- Rock Mechanics and Engineering Geology
- Landslides and Geohazards
- Mining Geotechnics and Hydrogeology
- Geoenvironmental Engineering
- Transportation Geotechnics
- Geosynthetics
- Cold Regions Geotechnology
- Sustainable Geotechnics
- Professional Practice

SPECIAL GEOTECHNICAL

- Offshore and Nearshore Geotechnical Issues
- Dams and Embankments
- Pipelines and Trenchless Technologies
- Soft and Sensitive Clays
- Application of Remote Sensing and Mapping



The conference will be held at the **St. John's Convention Centre**, located in the heart of downtown and right next door to the city's famous George St. The sea (and the cod and the rum) are calling – see you in St. John's this fall!

Go to the conference web site at www.geostjohns2019.ca for detailed conference information and to register online. Be sure to sign on **before July 31, 2019** to take advantage of early pricing discounts!

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et le Prix G. G. Meyerhof que lui a remis la SCG.

Bien que le Dr Moore soit le candidat proposé par le Comité de candidatures, d'autres candidatures sont également les bienvenues. Tout membre de la SCG peut poser la candidature d'un candidat au poste de président désigné. Les candidatures doivent être reçues par écrit par le Bureau national de la SCG d'ici le 15 juin 2019 (*execdir@cgs.ca*). Elles doivent comprendre les noms en lettres moulées, les signatures et les numéros de membre d'au moins dix-huit (18) membres de la SCG, et une déclaration du candidat nommé exprimant sa volonté d'agir à titre de président désigné, puis de président, s'il est élu.

S'il n'y a pas d'autres candidats, le Dr Ian Moore sera élu par acclamation lors de la réunion du Conseil d'administration de la SCG à St. John's, cet automne. Si d'autres candidats sont mis en candidature, le président désigné sera élu à la suite d'un vote des membres durant l'été 2019.

Pour obtenir de plus amples renseignements à ce sujet, veuillez écrire au directeur général de la SCG, Michel Aubertin, au Bureau national (*execdir@cgs.ca* ou *admin@cgs.ca*).

Soumis par Dharma Wijewickreme, ancien président (2017-2018)

Objectifs du président désigné : déclaration de candidature du Dr Ian Moore

C'est un grand honneur d'être choisi par le Comité de candidatures de la Société canadienne de géotechnique (SCG) comme prochain président potentiel de notre Société. J'accepte cette nomination et, si je suis élu, je travaillerai à servir la Société à titre de président désigné en 2020, et pour un mandat de deux ans en tant que président à compter de janvier 2021. Je me suis joint à la SCG peu après mon arrivée au Canada, au début des années 1990. En effet, ma décision de saisir l'occasion de quitter l'Australie pour venir au Canada a été influencée,

en partie, par la haute estime que la communauté internationale accorde à la géotechnique canadienne. Depuis que je participe au travail de la Société il y a une vingtaine d'années, un certain nombre de ses caractéristiques sont devenues très claires pour moi. Premièrement, il existe une culture extraordinaire de bénévolat au service des membres et des autres bénéficiaires des activités de la Société, assurée par nos nombreux bénévoles locaux, nos membres régionaux et de division et nos titulaires de charge, jusqu'aux membres non rémunérés de notre Comité exécutif national (le président, les vice-présidents et les représentants régionaux et de division). Deuxièmement, la Société est composée d'un mélange exceptionnel de professionnels de la géotechnique et des géosciences, dans lequel l'industrie et le milieu universitaire sont fort bien représentés, un mélange qui renforce tout ce que nous faisons (de la formation des étudiants au soutien que la Société fournit à la formation et à la rétroaction continues de nos membres professionnels pour qu'ils puissent être des chefs de file, pratiquer de façon responsable la géotechnique et apporter des changements à cette pratique). Par conséquent, la Société est dans une bonne situation financière, jouit d'une bonne réputation auprès de la profession au Canada et à l'étranger et bénéficie d'une profondeur et d'une envergure enviables par rapport à de nombreuses autres sociétés savantes; des groupes qui ont généralement des dirigeants beaucoup plus coûteux et des niveaux de bénévolat et d'activités beaucoup plus faibles à l'échelle locale et régionale, dans lesquels l'industrie est souvent mal représentée (la majorité des sociétés savantes sont dominées par des universitaires) et dont les effectifs et les budgets de fonctionnement sont souvent en déclin. La responsabilité associée à l'héritage de la SCG est importante et consiste à tirer parti des réussites du passé tout en relevant les nouveaux défis.

Cela a été le cas dans le cadre de deux des précédents postes de bénévole que j'ai occupés auprès de la Société, c'est-à-dire pendant que je travaillais avec Dennis Becker à titre de corédacteur de la 4^e édition (2006) de la version anglaise du *Manuel canadien d'ingénierie des fondations* (MCIF) et dans mon travail en tant que rédacteur de la *Revue canadienne de géotechnique* (RCG). Dans chaque cas, il s'agissait de perpétuer un héritage exceptionnel, tout en s'attaquant à de nouveaux enjeux et défis, et même en tirant parti de ceux-ci. Pour le MCIF, le défi consistait à trouver et à motiver des experts qualifiés au Canada pour entreprendre soit des révisions majeures dans des domaines où la théorie et la pratique évoluent rapidement, soit des mises à jour opportunes de documents antérieurs, créés il y a de 15 à 20 ans, lorsque les charges de travail dans l'industrie et le milieu universitaire ont augmenté considérablement. Grâce aux efforts de l'équipe de personnes qui ont contribué, je crois que la 4^e édition de la version anglaise du *Manuel* a connu un succès exceptionnel (de nombreuses ventes qui ont généré des revenus importants pour la Société et un soutien très influent et très utile à la pratique de la géotechnique).

Pour la RCG, la période de mon mandat de rédacteur de 2007 à 2018 a vu des changements très importants, y compris la façon dont les révisions d'articles et les communications connexes étaient gérées (le passage d'Osprey au système rédactionnel Scholar One), les changements chez l'éditeur du secteur public pour devenir une entreprise privée sans but lucratif, et, par conséquent, le mode de financement et de gestion du bureau de la rédaction, une multiplication par trois du nombre de manuscrits soumis à la Revue et, donc, la nécessité d'une croissance substantielle du conseil d'administration et de l'équipe de réviseurs qualifiés et efficaces, ainsi que des attentes accrues des auteurs en matière de révision rapide

et l'augmentation de la concurrence de revues existantes et de nombreuses nouvelles. Avec l'appui de deux autres rédacteurs, les Drs Sheng et Lake, ainsi que d'un comité de rédaction, d'auteurs et de réviseurs exceptionnels, la *Revue* a relevé le défi, augmentant considérablement son facteur d'impact et d'autres indices de mesure et renforçant davantage sa position comme l'une des revues les plus en vue dans le monde, tout en mettant toujours en valeur les articles qui ont de l'importance pour les praticiens.

Aucune de ces réalisations n'est le fruit des efforts d'une seule personne; elles reflètent plutôt les résultats des membres d'une équipe motivée et productive ayant des capacités, des expériences et des idées différentes et qui se réunissent pour réaliser quelque chose de remarquable. Bien sûr, cela résume bien le *modus operandi* de la SCG.

Ainsi, le premier de mes objectifs pour 2021-2022 est de poursuivre nos efforts pour faire participer une large représentation des membres de notre profession aux activités et au fonctionnement de la Société, en travaillant à recruter des femmes, des ingénieurs en formation dans l'industrie (sociétés d'experts-conseils, construction, gouvernement et fabrication) ainsi que de nouveaux chargés d'enseignement et d'autres professionnels du milieu universitaire. Un autre objectif est d'étudier des moyens peu coûteux (en ressources financières et humaines) de créer une valeur ajoutée, tant technique que non technique, pour les membres de la Société. De toute évidence, la viabilité financière de la Société dépend de la poursuite du succès de l'augmentation du nombre de membres, de la hausse des revenus au-delà des cotisations des membres et du contrôle des coûts sans compromettre la qualité et l'influence. Enfin, je cherche à renforcer les façons dont nous reconnaissons nos bénévoles, pour récompenser l'excellence et l'effort et motiver les membres actuels

et nouveaux à participer à des activités locales et nationales.

Call for CGS Award Nominations

It's that time again to look closely at your colleagues and identify a geotechnical professional that deserves recognition!

The CGS recognizes the considerable contributions and achievements by geotechnical professionals in Canada and abroad with a family of awards, many of which will be presented during the Awards Ceremony at the CGS Annual Conference in St. John's, Newfoundland and Labrador – GeoSt. John's 2019 (September 29 to October 2, 2019). Funding for many of these awards is provided by the Canadian Foundation for Geotechnique, so remember to please support them when renewing your CGS membership this year. The various awards are summarized below and you can go to https://www.cgs.ca/awards_honours_cgs.php for more information and the list of past recipients, or contact the CGS National Office at admin@cgs.ca.

If you know of someone deserving of any of the CGS Awards, nominate them and send your submissions by **May 15, 2019** to CGS National Office:

The Canadian Geotechnical Society
8828 Pigott Road
Richmond, BC
V7A 2C4, Canada
Email: admin@cgs.ca

Nominations should include the name and contact information of the nominator, a resume or curriculum vita of the nominee, and a letter highlighting the contributions and achievements Geosynth that make the nominee a worthy candidate for that specific award. Letters of support from others, CGS members and non-members, are encouraged. If possible, nominations should include an appropriate head and shoulders photo of the nominee.

Submission details for Student Awards are available on the CGS website at https://www.cgs.ca/students_awards.php, or contact **Ryley Beddoe**, Chair of the CGS Student Awards Selection Committee, at ryley.beddoe@rmc.ca

Appel de mise en candidatures pour les prix de la SCG Appel de candidatures pour les prix de la SCG

C'est de nouveau le moment de songer attentivement à vos collègues et de cibler un professionnel en géotechnique qui mérite d'être reconnu!

La SCG reconnaît les importantes contributions et réalisations des professionnels en géotechnique au Canada et à l'étranger, à l'aide d'un ensemble de prix, qui seront pour la plupart présentés durant la cérémonie de remise de prix lors de la conférence annuelle de la SCG à St. John's, à Terre-Neuve-et-Labrador – GéoSt. John's 2019 (du 29 septembre au 2 octobre 2019). La Fondation canadienne de géotechnique finance plusieurs de ces prix, nous vous prions donc de ne pas oublier de la soutenir également lorsque vous renouvellerez votre adhésion à la SCG cette année. Les différents prix sont résumés ci-dessous et vous pouvez consulter la page http://www.cgs.ca/awards_honours_cgs.php?lang=fr pour en savoir plus ainsi qu'obtenir la liste des précédents lauréats, ou écrire au Bureau national de la SCG, à admin@cgs.ca.

Si vous connaissez une personne qui mérite de recevoir l'un des prix de la SCG, présentez sa candidature d'ici le **15 mai 2019** au Bureau national de la SCG:

La Société canadienne de géotechnique
8828 Pigott Road
Richmond, C.-B.
V7A 2C4, Canada
Courriel: admin@cgs.ca

Les candidatures doivent comprendre le nom et les coordonnées de la personne qui les soumettent, un curriculum vitae du candidat et une lettre soulignant les contributions et

Award of Honour	Brief Description/Comments
CGS Society Awards	
Legget Medal	For significant lifelong contribution to the geotechnical field in Canada. The most senior and prestigious CGS award.
RM Quigley Award	For the best paper published in Canadian Geotechnical Journal in the preceding year. Two runners-up are also recognized. CGS membership is not required.
Honorary Life Member	For longstanding exemplary service to the CGS, and/or exemplary technical contributions to the geotechnical field in Canada or abroad. Only awarded occasionally.
CGS Division Awards	
G. Geoffrey Meyerhof Award	Soil Mechanics & Foundation Division. For outstanding contribution to soil mechanics and foundation engineering.
Thomas Roy Award	Engineering Geology Division. For outstanding contribution (publication or otherwise) to engineering geology.
Roger JE Brown Award	Cold Regions Geotechnology Division. For outstanding contribution (publication or otherwise) to permafrost science or engineering. Awarded biannually.
John A Franklin Award	Rock Mechanics Division. For outstanding publication in rock mechanics and/or rock engineering. Awarded biannually.
Geosynthetics Award	Geosynthetics Division. For outstanding publication in the application of geosynthetics to civil, geotechnical or geoenvironmental engineering. Awarded biannually.
Geoenvironmental Award	Geoenvironmental Division. For outstanding contribution (publication or otherwise) in geoenvironmental engineering. Awarded biannually.
Joint Awards	
Robert N Farvolden Award	Joint award of the CGS Groundwater Division and the International Association of Hydrogeologists Canadian National Chapter . For outstanding contributions by an individual or group to the disciplines of earth science or engineering that emphasize the role or importance of groundwater.
Schuster Medal	Joint award of the CGS Geohazards Committee and Engineering Geology Division and the Association of Environmental and Engineering Geologists . For outstanding contribution to geohazards research in North America. Awarded biannually to a CGS member.
CGS Student Awards	
Graduate Presentation	For best 15-minute technical presentation on video submitted by a graduate student at a Canadian university. One runner-up is also recognized. CGS membership is not required.
Undergraduate Individual Report	For best undergraduate student report by an individual in Canada. One runner-up is also recognized. CGS membership is not required.
Undergraduate Group Report	For best undergraduate student report by a group in Canada. One runner-up is also recognized. CGS membership is not required.
CGS Service Awards	
AG Stermac Award	For outstanding service to the CGS by a member at the local, national or international level. More than one award can be presented each year.
Certificates of Appreciation	For deserving CGS members recognized by the President or others as having contributed noteworthy service to the CGS.

les réalisations qui font en sorte que le candidat mérite ce prix. Des lettres de recommandation d'autres personnes,

membres ou non de la SCG, sont les bienvenues. Si possible, les candi-

datures doivent inclure une photo en buste du/de la candidat(e).

Prix ou distinction	Courte description/Commentaires
Prix de la SCG	
Médaille Legget	Pour avoir contribué de manière importante au domaine de la géotechnique au Canada tout au long de sa vie. Le plus prestigieux prix de la SCG.
R.M. Quigley	Pour le meilleur article publié dans la Revue canadienne de géotechnique durant l'année précédente. Deux finalistes sont également reconnus. Il n'est pas nécessaire d'être membre de la SCG.
Membre honoraire à vie	Pour un service exemplaire de longue date à la SCG et/ou des contributions techniques incomparables au domaine de la géotechnique au Canada ou à l'étranger. Décerné occasionnellement seulement.
Prix des divisions de la SCG	
Prix G. Geoffrey Meyerhof	Division de la mécanique des sols et des fondations – Pour une contribution exceptionnelle au domaine de la mécanique des sols et de l'ingénierie des fondations.
Prix Thomas Roy	Division de la géologie de l'ingénieur – Pour une contribution exceptionnelle (dans une publication ou autrement) au domaine de la géologie de l'ingénieur.
Prix Roger J.E. Brown	Division de la géotechnique des régions froides – Pour une contribution exceptionnelle (dans une publication ou autrement) au domaine de l'ingénierie ou de la science du pergélisol. Décerné tous les deux ans.
Prix John A. Franklin	Division de la mécanique des roches – Pour une publication exceptionnelle sur la mécanique et/ou l'ingénierie des roches. Décerné tous les deux ans.
Prix de la géosynthétique	Division de la géosynthétique – Pour une publication exceptionnelle sur l'application de la géosynthétique en géotechnique, ou en génie civil ou géoenvironnemental. Décerné tous les deux ans.
Prix du géoenvironnement	Division du géoenvironnement – Pour une contribution exceptionnelle (dans une publication ou autrement) au domaine du génie géoenvironnemental. Décerné aux deux ans.
Prix communs	
Prix Robert N. Farvolden	Prix commun de la Division des eaux souterraines de la SCG et de l' International Association of Hydrogeologists – Canadian National Chapter . Pour une contribution exceptionnelle d'une personne ou d'un groupe dans les domaines des sciences de la terre et du génie qui met l'accent sur le rôle ou l'importance des eaux souterraines.
Médaille Schuster	Prix commun du Comité sur les géorisques et de la Division de la géologie de l'ingénieur de la SCG, ainsi que de l' Association of Environmental and Engineering Geologists . Pour une contribution remarquable à la recherche sur les géorisques en Amérique du Nord. Décernée tous les deux ans à un membre de la SCG.
Prix de la SCG pour les étudiants	
Présentation d'un étudiant gradué	Pour la meilleure présentation technique de 15 minutes sur vidéo soumise par un étudiant gradué d'une université canadienne. Un finaliste est également reconnu. Il n'est pas nécessaire d'être membre de la SCG.
Rapport d'un étudiant de premier cycle	Pour le meilleur rapport d'un étudiant de premier cycle au Canada. Un finaliste est également reconnu. Il n'est pas nécessaire d'être membre de la SCG.
Rapport d'un groupe d'étudiants de premier cycle	Pour le meilleur rapport d'un groupe d'étudiants de premier cycle au Canada. Un finaliste est également reconnu. Il n'est pas nécessaire d'être membre de la SCG.
Prix de service de la SCG	
Prix A.G. Stermac	Pour un service exceptionnel rendu à la SCG par un membre, au niveau local, national ou international. Plus d'un prix peut être présenté chaque année.
Certificats d'appréciation	Pour des membres méritants de la SCG reconnus par le président ou d'autres personnes pour avoir rendu un service digne de mention à la SCG.

Les renseignements concernant les candidatures pour les Prix pour les étudiants sont affichés sur le site Web de la SCG,

à https://www.cgs.ca/students_awards.php. Vous pouvez aussi écrire à **Ryley Beddoe**, directrice du Comité de sélection pour les Prix pour les étudiants, à ryley.beddoe@rmc.ca.



Call for Nominations for 2020 Awards and Fellowships Engineering Institute of Canada (EIC)

As a constituent Society of the **Engineering Institute of Canada (EIC)**, CGS members are eligible for awards and fellowships of the EIC which are summarized below. CGS members are encouraged to submit EIC nominations of fellow members to CGS Headquarters by **July 15, 2019**.

Nominations must include:

1. a completed EIC Nomination Form which is available from http://eic-ici.ca/honours_awards/
2. a nomination letter
3. supporting letters from colleagues, preferably Fellows of the EIC (FEIC).

Past CGS member recipients of EIC Awards and Fellowships can be found on the CGS website http://www.cgs.ca/awards_honours_eic.php. It is recommended that nominators review the awards details and criteria prior to preparing nominations. For more

Award of Honour	Brief Description/Comments
Sir John Kennedy Medal	For outstanding service to the profession or for noteworthy contributions to the science of engineering, or to the benefit of the EIC. EIC's most distinguished award (awarded every two years).
Julian Smith Medal	For achievement in the development of Canada; up to two medals can be awarded.
John B. Stirling Medal	For leadership and distinguished service at the national level within the EIC and/or its member societies.
CP Rail Engineering Medal	For leadership and service at the regional, branch and section levels by members of EIC member societies.
K.Y. Lo Medal	For significant engineering contributions at the international level, such as promotion of Canadian expertise overseas; training of foreign engineers; significant service to international engineering organizations; and advancement of engineering technology recognized internationally.
Fellowship of the AIC	For excellence in engineering and services to the profession and to society.
Honorary Member	For non-members of the EIC and its member societies, and on occasion non-engineers, who have achieved outstanding distinction through service to engineering and the profession of engineering in Canada.

information contact CGS Headquarters at:

The Canadian Geotechnical Society
8828 Pigott Road
Richmond, BC
V7A 2C4, Canada,
Fax: (604) 277-7529
E-mail: admin@cgs.ca

Appel de candidatures pour les prix et titres de Fellow 2020 Institut canadien des ingénieurs (ICI)

À titre de société membre de l'Institut canadien des ingénieurs (ICI), les membres de la SCG sont admissibles aux prix et aux titres de Fellow de l'ICI décrits ci-dessous. Les membres de la SCG sont encouragés à soumettre la candidature de collègues membres pour les distinctions de l'ICI au Bureau national de la SCG d'ici le **15 juillet 2019**.

Les candidatures doivent inclure :

1. un formulaire de candidature de l'ICI dûment rempli qui est disponible sur le site http://eic-ici.ca/honours_awards/;
2. une lettre de candidature;
3. des lettres de recommandation de collègues, préférablement de Fellows de l'ICI (FICI).

Les noms des membres de la SCG qui ont déjà reçu des prix et des titres de Fellow de l'ICI sont affichés sur le site Web de la SCG, à http://www.cgs.ca/awards_honours_eic.php?lang=fr. Il est recommandé que les personnes qui soumettent des candidatures examinent les renseignements et les critères des prix avant de les préparer. Pour obtenir de plus amples renseignements, communiquez avec le siège social de la SCG à:

Prix du distinction	Courte description/Commentaires
Médaille Sir John Kennedy	Pour un service exceptionnel rendu à la profession ou pour des contributions dignes de mention au domaine de la science de l'ingénierie ou au profit de l'ICI. Plus prestigieux prix de l'ICI; décerné tous les deux ans.
Médaille Julian Smith	En reconnaissance de réalisations dans le développement du Canada; jusqu'à deux médailles remises chaque année.
Médaille John B. Stirling	Pour des qualités de chef et des services émérites rendus à l'ICI et/ou à ses sociétés membres à l'échelle nationale.
Médaille CP Rail Engineering	Pour les qualités de chef et le service rendu dans les régions et les chapitres de membres des sociétés membres de l'ICI.
Médaille K.Y. Lo	Pour des contributions remarquables au domaine de l'ingénierie au niveau international, comme la promotion de l'expertise canadienne à l'étranger, la formation d'ingénieurs étrangers, un service exceptionnel rendu à des organisations d'ingénierie internationales et l'avancement d'une technologie d'ingénierie reconnue sur la scène internationale.
Titre de Fellow	Pour l'excellence en ingénierie et des services rendus à la profession et à la société.
Membre honoraire	Pour les non-membres de l'ICI et de ses sociétés membres, et occasionnellement pour des personnes qui ne sont pas ingénieurs, qui se méritent cette remarquable distinction en raison de services rendus au domaine de l'ingénierie et à la profession de l'ingénierie au Canada.

sity Masters or PhD program that is directly related to an identified field of geotechnique, is eligible. Programs include geotechnical engineering, geological engineering, mining engineering, geoenvironmental engineering or geoenvironmental geoscience, engineering geology and hydrogeology. Nominees must have high academic standing and preference will be given to those who have some practical experience and are active, or show leadership, in the geotechnical community.

Nominations are limited to **one per academic department** and require a letter, accompanied by rationale, written and signed by the graduate supervisor. Rationale should include evidence of academic standing, research output, contributions to practice, and leadership/activity in the geotechnical community. A nomination package is limited to **five pages**. For award ceremony purposes, the nomination package should also include a digital image (300 dpi) of the nominee.

(New) The Dennis Becker MSc Prize

This is the first time The Foundation will be offering a \$5,000 (CAD) award to a full-time post-graduate student at a Master's level attending a Canadian university whose research focus is directly related to the field of geotechnique. Eligible programs include geotechnical engineering, mining engineering, geoenvironmental or geoscience, engineering geology, and hydrogeology. The award is granted primarily on the basis of academic excellence, the purpose and relevance of the research project to the practice of geotechnique, and the quality of the research summary. Students who have displayed activity in volunteer or leadership roles in geotechnique will receive special consideration. For award ceremony purposes, the nomination package should also include a digital image (300 dpi) of the nominee.

La Société canadienne de géotechnique
 8828 Pigott Road
 Richmond, C.-B.
 V7A 2C4, Canada
 Téléc. : 604-277-7529
 Courriel: admin@cgs.ca

Canadian Foundation for Geotechnique



2019 Canadian Foundation for Geotechnique Graduate Scholarships

Kevin Biggar, President of the Canadian Foundation for Geotechnique (la Fondation canadienne de géotechnique), is pleased to announce the call for nominations for its two annual graduate student awards.

The Michael Bozok National Graduate Scholarship

The \$5,000 scholarship was established by the Canadian Foundation for Geotechnique in 2007, on the occasion of the 60th Canadian Geotechnical Conference in Ottawa.

Any graduate student entering or registered in a Canadian univer-

It is understood that due to the time required for students to complete courses and conduct research sufficient to support a quality application for the MSc Prize, and the time for application processing and adjudication, the award will generally be provided as a prize to the student after they have completed their program, rather than a scholarship to help support them during their studies. The nominee must either be currently in their Master's program, or have graduated within the past 12 months.

Nominations are limited to **one per academic department**. Applicants must submit a completed application form available at the CGS Education Committee and the Canadian Foundation for Geotechnique websites and supporting documents to the Award Committee. The required supporting documents are:

- Official transcripts of graduate level courses (note students should have completed all the course requirements for their Master's program).
- A signed statement of support from the research supervisor endorsing the application.
- A 500-word synopsis of their research project describing the purpose and relevance of the expected or actual outcome, and how it is expected to improve the current state-of-practice in regards to geotechnique. A statement regarding the expected time to completion of the thesis (if not already completed) should also be included.

The 2019 awards will be presented this fall at the Canadian Geotechnical Conference in St John's, Newfoundland.

Nominations for the 2019 Scholarships will be accepted by the Selection Committee Chair, **Ryley Beddoe** either by mail or electronically (c/o Royal Military College of Canada, Department of Civil Engineering, PO Box 17000, Station Forces, Kingston

ON Canada. K7K 7B4, telephone (613) 541-6000 ext. 6162, **Ryley Beddoe@rmc.ca**) up until **May 15, 2019**. If submitted by email, nominations **must be signed** by the supervisor and include the words "Canadian Foundation for Geotechnique National Graduate Scholarship" or "Canadian Foundation for Geotechnique MSc Prize in the subject line.

For further information, refer to the Foundation's website www.cfg-fcg.ca or contact Kevin Biggar, kbiggar@telus.net

*Provided by Kevin Biggar,
President of the Canadian Foundation
for Geotechnique*

Fondation canadienne de géotechnique

Bourses d'études supérieures de la Fondation canadienne de géotechnique pour 2019

Le **Kevin Biggar**, président de la Fondation canadienne de géotechnique, est heureux d'annoncer l'appel de candidatures pour ses deux bourses annuelles d'études supérieures.

La Bourse nationale pour études supérieures Michael Bozozuk

Cette bourse de 5 000 \$ a été établie par la Fondation canadienne de géotechnique en 2007, lors de la 60e conférence canadienne de géotechnique, qui a eu lieu à Ottawa.

Tout étudiant gradué qui s'inscrit ou est inscrit à un programme de maîtrise ou de doctorat directement lié à un domaine de la géotechnique d'une université canadienne est admissible. Au nombre de ces programmes, mentionnons la géotechnique, le génie géologique, le génie minier, le génie géo-environnemental ou la géoscience géo-environnementale, la géologie de l'ingénieur et l'hydrogéologie. Les candidats doivent démontrer un excellent rendement scolaire. La préférence sera accordée à ceux qui ont de l'expérience pratique et sont actifs

ou font preuve de leadership dans la communauté géotechnique.

Les candidatures sont limitées à **une par département**. Elles doivent être accompagnées d'une lettre et d'un exposé raisonné, rédigés **et signés** par le directeur de thèse. L'exposé raisonné devrait inclure des données sur le rendement scolaire du/de la candidat(e), ainsi qu'une description de ses résultats de recherche, de ses contributions à la pratique et de son leadership ou de ses activités dans la communauté géotechnique. Un dossier de candidature se limite à cinq pages. Aux fins de la cérémonie de remise, le dossier de candidature devrait aussi comprendre une image numérique (300 ppp) du/de la candidat(e).

(Nouveau) Le Prix Dennis Becker pour les étudiants à la maîtrise

C'est la première fois que la Fondation offre une bourse de 5 000 \$ (CAD) à un étudiant à temps plein à la maîtrise dans une université canadienne dont les travaux de recherche sont directement liés au domaine de la géotechnique. Les programmes admissibles comprennent la géotechnique, le génie minier, le génie géo-environnemental ou la géoscience, la géologie de l'ingénieur et l'hydrogéologie. La bourse est accordée principalement en fonction de l'excellence des résultats universitaires, du but et de la pertinence du projet de recherche par rapport à la pratique de la géotechnique et de la qualité du résumé de la recherche. Les candidatures d'étudiants qui ont assumé des rôles de bénévoles ou de leadership dans le domaine de la géotechnique recevront une attention particulière. Aux fins de la cérémonie de remise, le dossier de candidature devrait aussi comprendre une image numérique (300 ppp) du/de la candidat(e).

Il est entendu qu'en raison du temps requis pour que les étudiants terminent leurs cours et effectuent des recherches suffisantes pour appuyer une candidature de qualité pour le Prix

pour les étudiants à la maîtrise, et du temps nécessaire au traitement des candidatures reçues et à la sélection de celle qui sera retenue, la bourse sera généralement attribuée comme prix à l'étudiant après la fin de son programme, plutôt que comme bourse pour l'aider pendant ses études. Le candidat doit être actuellement à la maîtrise ou l'avoir obtenue au cours des 12 derniers mois.

Les mises en candidature sont limitées à **une par département universitaire**. Les candidats doivent envoyer un formulaire de candidature dûment rempli (qu'ils peuvent se procurer sur les sites Web du Comité sur l'éducation de la SCG et de la Fondation canadienne de géotechnique) et les documents justificatifs au Comité sur les prix. Les documents justificatifs requis sont les suivants :

- Les relevés de notes officiels des cours de deuxième cycle (veuillez noter que les étudiants doivent avoir satisfait à toutes les exigences de cours de leur programme de maîtrise).
- Une déclaration d'appui signée par le directeur de recherche qui soutient la candidature.
- Un résumé de 500 mots de son projet de recherche décrivant le but et la pertinence du résultat attendu ou réel, et comment il devrait améliorer l'état actuel de la pratique dans le domaine de la géotechnique. Un énoncé concernant la durée prévue de la thèse (si elle n'est pas déjà terminée) devrait également être inclus.

Les bourses pour 2019 seront présentées cet automne, à la conférence canadienne de géotechnique à St. John's, à Terre-Neuve-et-Labrador.

Les candidatures pour 2019 seront acceptées par la directrice du Comité de sélection, **Ryley Beddoe**, soit par la poste ou par voie électronique (a.s. de: Collège militaire royal du Canada, Département de génie civil, C.P. 17000, Succ Forces Sawyer 2124, Kingston (ON), Canada,

K7K 7B4, téléphone : 613-541-6000, poste 6162, Ryley.Beddoe@rmc.ca) **jusqu'au 1er mai 2019**. Les candidatures envoyées par courriel **doivent être signées** par le directeur de thèse et comprendre la mention «Bourse nationale pour études supérieures de la Fondation canadienne de géotechnique» ou «Prix pour les étudiants à la maîtrise de la Fondation canadienne de géotechnique» dans la ligne Objet.

Pour en savoir plus, consultez le site Web de la Fondation, <http://www.cfg-fcg.ca/index.php/fr/>, ou écrivez au Kevin Biggar, à kbiggar@telus.net.

*Fourni par Kevin Biggar,
Président de la Fondation canadienne de géotechnique*

CGS Membership Registration for 2019

It is time to renew your Canadian Geotechnical Society membership for 2019! (For the first time in eight years, membership fees have been increased). Please visit www.cgs.ca for more details or email admin@cgs.ca for assistance.

Membership benefits include:

- online access to the monthly Canadian Geotechnical Journal, including all past issues and special price for the printed Canadian Geotechnical Journal
- online and printed copies of the quarterly Geotechnical News magazine
- the monthly electronic CGS E-News to help keep you updated on important geotechnical related news and events
- online access to all past CGS Conference proceedings, various keynote lectures, CCLT talks, other affiliated specialty conference proceedings, vast Heritage files and archives, etc.
- special member pricing for all CGS conferences and some specialty conferences

- information about the spring and fall CGS Cross Country Lecture Tours (CCLT)
- membership in one or more of 7 CGS technical divisions and associated international societies
- involvement in one of 20 CGS local sections and any of the 8 CGS standing committees
- ability to connect and network with other geotechnical professionals across the country and internationally

We welcome all new and renewing members and look forward to your participation in 2019!

Adhésion à la SCG pour 2019

Il est temps de renouveler votre adhésion à la Société canadienne de géotechnique (SCG) pour 2019! (Pour la première fois en huit ans, les cotisations des membres ont été revues à la hausse.) Veuillez consulter le site <http://www.cgs.ca/index.php?lang=fr> pour en savoir plus ou nous écrire à admin@cgs.ca pour obtenir de l'aide.

Les avantages de l'adhésion comprennent :

- un accès en ligne à la Revue canadienne de géotechnique mensuelle, y compris à ses numéros précédents, et à un tarif spécial pour sa version imprimée;
- des versions imprimée et en ligne du magazine trimestriel Geotechnical News;
- un bulletin électronique mensuel, l'E-info de la SCG, pour vous tenir informé des nouvelles et des événements importants liés à la géotechnique;
- un accès en ligne aux comptes-rendus de toutes les conférences précédentes de la SCG, à différentes conférences d'honneur, aux conférences données dans le cadre de la Tournée de conférences transcanadienne (TCT), à d'autres comptes-rendus de conférences spécialisées affiliées, aux vastes

fichiers patrimoniaux, aux archives, etc.

- des prix spéciaux pour toutes les conférences de la SCG et certaines conférences spécialisées;
- de l'information sur les TCT du printemps et de l'automne de la SCG;
- une adhésion à une ou à plusieurs des sept divisions techniques de la SCG et aux sociétés internationales associées;
- une participation aux activités de l'une des 20 sections locales de la SCG et à l'un des huit comités permanents de la SCG;
- une possibilité d'interagir et de réseauter avec d'autres professionnels en géotechnique au pays et à l'international.

Nous souhaitons la bienvenue à tous les nouveaux membres ainsi qu'à ceux qui renouvellent leur adhésion et sommes impatients de vous voir participer en 2019!

Upcoming Conferences and Seminars



St. John's, Newfoundland and Labrador.

72nd Canadian Geotechnical Conference September 29 to October 2, 2019, St. John's, Newfoundland and Labrador, Canada

The **Geotechnical Society of St. John's** and the **Canadian Geotechnical Society (CGS)** invite you to **GeoSt.John's 2019**, the 72nd Canadian Geotechnical Conference. The conference will be held at the St. John's Convention Centre in St. John's, Newfoundland and Labrador, Canada from **Sunday, September 29 to Wednesday, October 2, 2019**. With a population of over 200,000, the metropolitan St. John's area is the economic and cultural centre of the province and offers a natural environment, clean air, safe streets and all the amenities of a larger city with a European flavour. Our rich history and culture and "small town" quality of life make St. John's a pleasure to visit. For over 500 years St. John's has been visited by explorers and adventurers. Rich with history, rife with culture, and sprawling with natural beauty, St. John's is a city of exaggerated proportions. All these wonders have been here for thousands of years, embraced by those who happened upon them. And while finding the true spirit of this land, you'll stumble upon everything from wildlife, to people, to amazing vistas, to an abundance of culture. In fact, being the most easterly point in North America merits our very own time zone, half-an-hour off-kilter with the rest of the world! Around every corner, around every bend, you will find a little piece of heaven, an unex-

pected delight, and a playful breeze that will help your journey.

The theme for **GeoSt.John's 2019** is **Under Land and Sea**. Growth of the offshore oil and gas industry in Atlantic Canada has created many opportunities for the geotechnical community. This conference intends to highlight recent achievements in offshore and nearshore geotechnical engineering. The technical program will also cover a wide range of geotechnical and hydrogeological topics, including specialty sessions that are of local and national relevance. In addition to the technical program and plenary sessions, **GeoSt.John's 2019** will include a complement of distinguished keynote speakers, high calibre short courses, social events, and technical tours. The official languages for the conference will be English and French.

For the latest information about the conference, please visit the conference website at <http://www.geost-johns2019.ca>.

See you in St. John's!

Conférences et séminaires à venir

72e conférence canadienne de géotechnique Du 29 septembre au 2 octobre 2019, St. John's, Terre-Neuve-et-Labrador, Canada

La **Société géotechnique de St. John's** et la **Société canadienne de géotechnique (SCG)** vous invitent à **GéoSt.John's 2019**, la 72e con-



St. John's, Newfoundland and Labrador.

férence canadienne de géotechnique. La conférence aura lieu au Centre des congrès de St. John's à St. John's, à Terre-Neuve-et-Labrador, au Canada, du **dimanche 29 septembre au mercredi 2 octobre 2019**. Avec une population de plus de 200 000 personnes, la région métropolitaine de St. John's est le centre économique et culturel de la province et offre un environnement naturel, de l'air pur, des rues sûres et toutes les commodités d'une grande ville à saveur européenne. La richesse de son histoire et de sa culture ainsi que sa qualité de vie correspondant à celle d'une petite ville font de St. John's un endroit agréable à visiter.

Depuis plus de 500 ans, St. John's est visitée par des explorateurs et des aventuriers. Forte d'une histoire riche, d'une culture diversifiée et d'une beauté naturelle étendue, St. John's est une ville aux proportions exagérées. Toutes ces merveilles sont ici depuis des milliers d'années et ont été adoptées par ceux qui les ont vécues. De plus, en découvrant le véritable esprit de cette terre, vous tomberez sur tout, de la faune aux gens, en passant par les paysages magnifiques et l'abondance de la culture. Le fait d'être le point le plus à l'est de l'Amérique du Nord nous vaut notre propre fuseau horaire, une demi-heure de décalage avec le reste du monde! À chaque coin de rue, à chaque virage, vous trouverez un petit coin de paradis, un délice inattendu et une brise enjouée qui agrémentera votre voyage.

Le thème de **GéoSt.John's 2019** est **Sous la terre et la mer**. La croissance de l'industrie pétrolière et gazière extracôtière au Canada atlantique a créé de nombreuses possibilités pour la communauté géotechnique. Cette conférence a pour but de mettre en lumière les réalisations récentes dans le domaine de la géotechnique côtière et extracôtière. Le programme technique couvrira également un large éventail de sujets géotechniques et hydrogéologiques, y compris des séances spécialisées d'intérêt local

et national. En plus du programme technique et des séances plénières, **GéoSt.John's 2019** comprendra un éventail d'éminents conférenciers d'honneur, de cours intensifs de haut calibre, d'activités sociales et de visites techniques. Les langues officielles de la conférence seront le français et l'anglais.

Pour obtenir les derniers renseignements sur la conférence, veuillez consulter son site Web, à <http://www.geostjohns2019.ca/index.php?lang=fr>.

Au plaisir de se voir à St. John's!

**18th Global Joint Seminar on Geo-Environmental Engineering (GEE)
May 30 to 31, 2019
Concordia University, Montréal, Québec**

The 18th Global Joint Seminar on Geo-Environmental Engineering (GEE) will be taking place on **May 30 and 31, 2019** at Concordia.

Since its inception in 2001, the GEE has taken place annually in Japan, Korea, Canada and France. The objective of the GEE is to provide an international forum for the exchange of ideas and recent advances in the field of geo-environmental engineering and to give students and young researchers the opportunity to present their work to an international and expert audience.

More information about the conference can be found by visiting the conference website at <http://www.concordia.ca/cuevents/encs/water-energy/2019/05/30/18th-joint-global-seminar-on-geo-environmental-engineering.html>

**8th International Conference on Cold Regions Engineering and the 8th Canadian Permafrost Conference
August 18 to 22, 2019
Québec City, Québec**

The 18th International Conference on Cold Regions Engineering and the 8th

Canadian Permafrost Conference will be held at the Quebec City Convention Centre, in Canada, from **August 18th to 22nd, 2019**. Sustainable infrastructure development and permafrost science, in a climate change context, will be the focus of the discussions of this international conference.

More information about the conference can be found by visiting the conference website at <http://iccre-cpc2019.com/welcome>



**2019 6th Canadian Young Geotechnical Engineers & Geoscientists Conference
September 26 to 28, 2019
St. John's, Newfoundland and Labrador**

The next Canadian Young Geotechnical Engineers and Geoscientists Conference (6th cYGEgc) will be held from **September 26th to 28th 2019**, in the beautiful port city of St. John's, Newfoundland. The event will be held the week prior to GeoSt.John's 2019, the 72nd Canadian Geotechnical Conference, making it easy for delegates to attend both conferences.

The Canadian Young Geotechnical Engineers and Geoscientists Conference (cYGEgc) is an event held every three years that gathers students and young professionals from across Canada and beyond. The conference focuses on providing an opportunity to young professionals and students with geotechnical and geosciences backgrounds to meet their peers, exchange technical knowledge and interact with experts in a relaxed environment.

More information about the conference can be found by visiting the conference website at <http://cygegc2019.com>

Members in the News

2019 EIC Medals and Fellowships Six CGS Members Recognized

The Engineering Institute of Canada has announced the recipients of the 2019 EIC Medals and Fellowships. The CGS is very pleased to report that CGS members will receive four of the six EIC Medals, and two of the 20 EIC Fellowships.

CGS members receiving 2019 EIC Medals are:

- **Suzanne Lacasse**, CGS Legget Medal Recipient (2007), CGS President (2003-2004) and Managing Director (1991-2012) of the Norwegian Geotechnical Institute, Norway, will be awarded the **Sir John Kennedy Medal** “for outstanding service to the profession and contributions to the science of engineering”;
- **Jacques Locat**, CGS Legget Medal Recipient (2015) and Professor Emeritus, Faculty of Science and Engineering, Université Laval, Quebec QC, will be awarded the **Julian C. Smith Medal** “for achievement in the development of Canada”;
- **Doug Stead**, CGS Legget Medal Recipient (2017), CGS Vice-president Technical (2009-2010), and Professor/FRBC Chair in Resource Geoscience & Geotechnics at Simon Fraser University, Burnaby BC, will be awarded the **John B. Stirling Medal** “for leadership and distinguished service at the national level by members of EIC Societies”; and
- **Kevin Biggar**, President, Canadian Foundation for Geotechnique, and Principal at K.W. Biggar Engineering Consulting Ltd, St Albert AB, will be awarded the **Canadian Pacific Railway Medal** “for leadership and distinguished service at the regional level by members of EIC Societies.”

CGS members who were awarded 2019 EIC Fellowships include:

- **Jean Côté**, CGS Vice-president Communications and Member Services (2017-2018) and Professor, Department of Civil and Water Engineering, Université Laval, Quebec QC;
- **Craig Lake**, Editor, Canadian Geotechnical Journal and Professor, Department of Civil and Resource Engineering, Dalhousie University, Halifax NS.

Since 1965 when the EIC began awarding medals and fellowships, CGS members have been awarded 68 EIC medals and 154 EIC Fellowships. The CGS would like to thank the CGS members who prepared the nominations and those who wrote letters of support. Without nominations and letters of support there would be no recipients.

2018 CGS Awards: Geoenvironmental Award

In this and future issues of the CGS News, the 2018 CGS award recipients are being featured. In this issue, **Steven Rose**, winner of the 2018 Geoenvironmental Award of the CGS’s Geoenvironmental Engineering Division, is highlighted. This award is to recognize an outstanding contribution (publication or otherwise) in geoenvironmental engineering. Since it was established in 2000 it is awarded biannually in even years. Steven’s citation reads:

Following his death earlier this summer, **Steve Rose** leaves a remarkable legacy in the field of geoenvironmental engineering. Founding President of Malroz Engineering, a Kingston, Ontario-based company, his expertise has spanned a wide range of engineering design, construction, and environmental consulting projects, including the development and planning of research investigations, site and construction activities.

Past project work across four continents included onshore and offshore

studies of soils, groundwater, surface water, coastal processes, sedimentation and remediation, and decommissioning of commercial and industrial sites. Over his 30+ year career, he has authored numerous geoenvironmental papers, including a textbook on brownfields revitalization. Mr. Rose represented Canada twice as a delegate to NATO Pilot Study Workshops on closed landfills and urban brownfields redevelopment.

Steve was active in the CGS Kingston Section serving on the executive since 2006, including five years as CGS section director. Always with an eye on advancing the geoenvironmental profession, he held an adjunct faculty position at Queen’s University teaching at both the undergraduate and graduate levels.

The recognition of Steve’s professional and volunteer accomplishments include being made a fellow of Engineers Canada, as well as his inauguration in Professional Engineers Ontario’s Order of Honour, along with being awarded that body’s President’s Award for volunteering.

For his lifetime of professional achievement, CGS is honoured to award **Steve Rose** with a posthumous 2018 Geoenvironmental Award.”

Committee News

GeoEdmonton 2018 Retrospective 71st CGS and 13th CGS/IAH- CNC Conference September 23 - 26, 2018

In the days leading up to the start of GeoEdmonton 2018, the weather was less than auspicious. A cold front had dropped temperatures to well below zero and blanketed Edmonton with over 10cm of fresh snow. Delegates arriving from much warmer climates were certainly taken aback by the near whiteout conditions that greeted them as they started to arrive for the conference. Fortunately, as more guests

arrived, the atmosphere at the conference warmed and so did the weather. By mid-conference the temperature had risen to the mid teens and the snow had melted into memory.

The conference was held in the Shaw Conference Centre located in downtown Edmonton. The building itself is a geotechnical marvel. Built in the early 1980's with the help of Dr. Norbert Morgenstern, it cascades down the north river bank of the North Saskatchewan River and is situated on the backscarp of a massive translational landslide that occurred in 1901. A perfect setting for the 71st CGS and 13th CGS/IAH-CNC Conference. The theme of the conference was Transportation Geotechnique - Moving Forward, a reflection of the importance of the various pieces of transportation infrastructure needed to tie such a vast country together and to acknowledge the numerous geohazards that plague them.

As is tradition, the conference started on Sunday with the annual CGS Board Meeting. Concurrently, four short courses were offered which attracted an attendance of 73 delegates. At the end of a busy first day, it was time to relax and to rekindle old friendships with good food and drink at the Ice Breaker Reception. At this conference, the Local Organizing Committee (LOC) wanted to make a special effort to ensure that both students and young professional just starting their careers, were warmly welcomed into the CGS family. This started with registration. For the first time, student registrations included admittance to all the social functions at the conference. This was



Diana Allen and Masaki Hayashi.

possible through the generous donations from three diamond sponsors (Clifton Associates, Mobile Augers and Nilex). In addition, just prior to the official ice breaker festivities, a special mixer was arranged in the exhibitor's hall where our students and young professionals were encouraged to come specifically meet with some of our more "seasoned" professionals, to talk informally and begin to develop professional networks. This was followed up with a panel discussion chaired by **Emily Rowe**, where **Suzanne Powell** and **Kent Bannister** of the CGS and **Diana Allen** of the IAH, offered their opinions, advice and stories of the early days of their careers to the young people in the audience.



Left to right: Chris Bunce, Derek Martin, David Elwood.

On Monday, the conference began in earnest, starting with R.M. Hardy keynote address delivered by **Derek Martin** from the University of Alberta and the 2018 Darcy Lecture, delivered by **Masaki Hayashi** from the University of Calgary.

In addition to Monday's regular slate of paper presentations, the Professional Practice Committee in association with the LOC, hosted a specialty session focusing on Diversity and Inclusion: Women in Engineering. The session featured presentations by six prominent female professionals on inclusion and diversity in engineering and academia, exploring the challenges and opportunities for building more equitable workplaces. Following their presentations, **Margaret-Ann Armour**, **Gillian Ranson**, **Anjum**

Mullick, **J. Suzanne Powell**, **Ginger Gibson** and **Ania Ulrich** all participated in a moderated question and answer period that was very well received.

At Monday's Legget Award Luncheon, the 2018 inductee was named. This year saw Michel Aubertin join the list of distinguished geoprofessionals who have received the CGS's highest recognition, the Legget Award.

The day closed with the 11th annual CGS/IAH-CNC Awards Banquet where many CGS and IAH members were recognized for their meritorious and professional service achievements. Hosted by local media personality **Rob Christie**, the evening included a fine meal and wine, featuring local entertainment including the String Beans string quartet and the headline act, the world famous Shumka Dance Company, who dazzled the crowd with their breathtaking show of athleticism and dance artistry.



Dr. Matt Lato giving the CGS Colloquium.

Tuesday morning was highlighted by two traditional plenary presentations. The first was the CGS Colloquium, given by **Matt Lato**. He was then followed by the CGS Graduate Student Paper, presented by **Bradley Forbes**. Following the break after their presentations, delegates were back shuffling through the five concurrent streams of presentations on various geoscience themes. In total nearly 250

papers were presented over the three days of the conference, along with a poster session. From Sunday night through to Tuesday, delegates were also encouraged to visit the booths of the 72 exhibitors who helped support this conference and to hear 22 of them make special exhibitor presentations.



Hoop Dancer.

Tuesday's program was capped in the evening with the Local Colour Night. Held in the expansive Hall D of the convention centre with a panoramic view of the North Saskatchewan River Valley, it was a warm and beautiful evening and all vestiges of the weekend snow fall had long melted away. The theme for the Local Colour Night was a Taste of Edmonton. Based on the very successful three day Heritage Festival held in Edmonton every August, the evening was designed to showcase a small slice of what can be sampled at the main festival. Delegates were treated to performances by first nation performers, a Chinese lion dance, dancers from east India and Poland. The evening was capped off with a flute performance and hoop dance by Dallas Arcand Jr.

Accompanying the on-stage entertainment were posters recognizing local geoprofessional pioneers, displays from several local cultural museums and possibly the most talked about event at the conference, the opportunity for delegates to hold and touch various large birds of prey from the Alberta Birds of Prey Nature Centre (www.burrowingowl.com). Finally, delegates were also treated a menu

featuring traditional and modern Albertan foods and craft beverages. The last day of the conference was Wednesday and the last technical sessions were slowly being wrapped up. Wednesday's lunch was billed as the Heritage Luncheon. It was an opportunity to recognize, celebrate and reflect on the passing of several prominent practitioners during the previous year, including the CGS Conference iron man himself, **Gordon McRostie**. On a much less somber note, **Andrea Lougheed** hosted a special presentation recognizing some of the first women in geotechnique in Canada, four of whom were able to attend the conference and to unveil posters chronicling their struggles and successes in the early days of their careers.



Andrea Lougheed's First Women in Geotechnique in Canada presentation at the Heritage Luncheon.

By the end of Wednesday afternoon, many of the delegates had already started their journeys home. Hopefully they left with warm and lasting memories of their stay in Edmonton and their time at GeoEdmonton 2018. The organizing and hosting of the CGS Annual Conference is the result of countless hours of work by the volunteers of the LOC over two and a half years, along with the financial support of 27 sponsors, 72 exhibitors and aided by the staff at the Gibson Group Management Inc. (**Wayne Gibson, Lisa McJunkin and Emily Fournier**). The LOC for GeoEdmonton 2018 consisted of **Don Lewycky** and **Sean MacEoin**(Co-Chairs),

David Elwood (Geotechnical Program Chair), **Kristen Tappenden** (Geotechnical Program and Secretary), **Brian Smerdon** (IAH-CNC Representative and Hydrogeological Program Chair), **Christina Tatarniuk** (Social Program), **João Küpper** (Treasurer), **Emily Rowe** and **Mariaka De Groot** (Students and Young Engineers Program), **Kevin Louey** and **Rohi Sati** (Partner Program), **Hillary Smith** (Volunteer Coordinator) and **Murray Innes** (GSE Representative). The LOC was also aided by a number of students from the University of Alberta, who provided invaluable assistance in hosting this conference. Many thanks to them all and we encourage you to attend the next CGS conference in St. John's, Newfoundland!

*Submitted by Don Lewycky -
Geo-Edmonton Co-Chair*

Canadian Legends

The **Heritage Committee** has started a project aimed at publishing profiles of distinguished Canadian geotechnical professionals which highlight the wisdom gained from their lives and their professional careers. The profiles will include:

- interviews previously published in the American Society of Civil Engineers' GeoInstitute GeoStrata magazine, and reproduced with permission from that organization,
- interviews conducted in the 1980s in association with the CGS Canadian Heritage Project,
- interviews conducted in collaboration with the CGS Education Committee, and
- other such profiles.

The initial focus is on past RF Legget Medal recipients, CGS Past Presidents, and past Cross Canada Lecture Tour speakers. To learn more about this project and look at some of the profiles, visit the CGS Virtual Archives: http://cgs.ca/virtual_archives_overview.php

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GROUNDWATER PROBLEM?



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CANADIAN FOUNDATION ENGINEERING MANUAL
4TH EDITION, 2006

ISBN 978-0-920505-28-7
504 pages.
Catalogue price:
\$280.00 CAD
CGS Members
\$200.00 CAD
Student price :
\$135.00 CAD

MANUEL CANADIEN D'INGÉNIERIE DES FONDATIONS
4E ÉDITION, 2013

ISBN 978-0-920505-55-7
488 pages.
Prix de catalogue:
280,00 \$CDN
Prix pour les membres
de la SCG : 200,00 \$CDN
Prix pour les étudiants :
135,00 \$CDN

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Publications of the Canadian Geotechnical Society
Available from/Disponible chez
BiTech Publishers Ltd.
www.geotechnicalnews.com

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CGS Young Professionals Icebreaker at GeoEdmonton, 2018

Rebecca Stevenson

This is the first contribution from the Canadian Geotechnical Society's Young Professionals, and was facilitated by Maraika DeGroot, CGS Young Professional Representative.



Panel members from l. to r. Suzanne Powell, Kent Bannister and Diana Allen, with facilitator Emily Rowe (photo credit Leroy Schulz).

Students, early-career professionals, and senior engineers and geoscientists came together at the 71st CGS Annual Conference, GeoEdmonton 2018, for a Young Professionals Icebreaker. The event was attended by approximately 100 conference delegates who were keen to make new connections and learn from more experienced Canadian geotechnical professionals.

The event came together from a desire to encourage more students and early-career engineers and geoscientists to become engaged in the geotechnical community. National conferences can often be overwhelming and it helps to see some friendly faces in the crowd. Young delegates networked among their peers and with mentors and, because the event was held on the opening night of the conference, it allowed the delegates to meet early in the week and continue conversations throughout the conference.

A short panel presentation was held where panel members shared career lessons learned and highlighted

important ways in which industry and academia are changing. The panelists included: **Diana Allen**, Professor in the Department of Earth Sciences at Simon Fraser University; **Kent Bannister**, Vice President of Engineering at Trek Geotechnical Inc. and CGS Vice President Finance; and **Suzanne Powell**, Associate and Branch Manager at Thurber Engineering Ltd. and CGS Vice President Technical.

The panel discussion was facilitated by **Emily Rowe**, BGC Engineering, who guided the panel members to share their experiences. The panel commented on the things they wished they knew when starting out, such as: ask lots of questions; extend outside of your comfort zone; take advantage of opportunities that come your way; be open to feedback; and the importance of doing technically strong work and publishing it. The panel members also shared some of their challenges, including: the skill of really listening to clients; being adaptable; and standing up for yourself when you need to. When asked how the industry has changed over time, the prevailing comment was the increased use of technology and amount of data collected, as well as improved safety standards.

The audience was certainly engaged as many were eager to ask questions of the panel members and talk

with them afterwards. The audience wanted pointers for learning the business side of consulting and the panel commented that communication and building relationships are essential. When asked how companies hire, the panel agreed that attitude and a good fit with the company or research team are necessary, because technical skills can be learned. The panel members were also prompted to share their thoughts on addressing climate change and discussed the need for multidisciplinary teams, suggesting that these are areas where future generations of young professionals can excel.

On the whole, the Young Professionals Icebreaker was a great success. Making connections and sharing ideas is what conferences are all about and the young professionals were excited to have one more way to make this happen. We hope to continue this event in future years! A big thank you to **Emily Rowe** and **Rebecca Stevenson** of BGC Engineering, and **Olenka Forde** of the University of British Columbia for organizing this event!

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Women in Canadian Geotechnique Part 2 of 3

Andrea Lougheed

This is a contribution from the CGS Heritage Committee.

Andrea Lougheed (BGC Engineering Inc.) is a member of this committee and its Task Force on Women in Canadian Geotechnique.

Introduction to Part 2 of the Series

Part 1, published in September 2018, profiled four of the first women in Canadian Geotechnique: **Anna Lankford Burwash, Dr. Suzanne Lacasse, Gretchen Minning and Danielle Zia-koff**. In this issue, four more women are profiled. A total of 12 women were featured at the 71st Canadian Geotechnical Conference in Edmonton (GeoEdmonton 2018). Posters detailing their careers were displayed and a portion of the Heritage Luncheon was devoted to them. It is hoped that all the posters will be uploaded to the CGS website (www.cgs.ca).

Sue Aitken



Sue Aitken.

Sue Aitken grew up in a small town in New Zealand and, thinking that women could not be engineers, pursued mathematics and obtained a teaching certificate. Subsequently, she

met several engineers while skiing and decided to return to school and study civil engineering. She obtained her Bachelor's degree from the University of Canterbury in 1978. Sue left New Zealand in 1979 for Canada where she worked for Batoni Structures, a precast concrete fabrication firm in Edmonton. Particularly enjoying her exposure in university to soil mechanics, she was encouraged by her soil mechanics professor to go to graduate school at the University of Alberta. Sue studied part-time while raising two young daughters, and obtained her Master's in Civil Engineering-Geotechnical in 1988.

During Sue's career, she worked for several well-known consulting firms such as Thurber Engineering, AGRA Earth and Environmental, Jacques Whitford Associates, and Klohn Crippen Berger in Edmonton and Calgary, before returning to New Zealand with Beca Ltd. in 2003. Her career has mostly involved numerical modelling associated with dams and tailings.

Sue's dedication to professional involvement has extended throughout her career. She has been involved with CGS's Calgary Geotechnical Society, the CGS national body, the Association of Professional Engineers, Geologists and Geophysicists of Alberta, the Tunnelling Association of Canada, the Canadian Dam Association, the North American Society of Trenchless Technology, and the Australian Institute of Mining and Metallurgy. In 2000, Sue became the first female President of Association of Professional Engi-

neers, Geologists and Geophysicists of Alberta. During this tenure, she also chaired the Alberta Government Commission on Parental Leave, and was voted one of the Top 50 Most Influential Albertans by Alberta Venture.

In recognition of her professional involvement, Sue received the CGS Services Award (now the Stermac Award) in 1997. She was made a Fellow of Engineers Canada in 2009 and an Honorary Fellow of Geoscience Canada in 2013.

Dr. Gail Atkinson



Gail Atkinson.

Gail Atkinson was accidentally introduced to geotechnique as a first-year student when she took geology to avoid studying biology. This resulted in her pursuing earth sciences and getting a job as a research assistant in the field of earthquake hazards. She found the interface between seismology and

engineering very interesting and has been exploring this ever since.

After graduating from Carleton University in 1978 in physics and geology, Gail pursued a Master's in civil engineering at Western University, graduating in 1980. Subsequently, she worked in consulting with Klohn Leonoff in Vancouver and Acres International in Toronto. Returning to the world of academia, she completed her Doctorate at Western University in geophysics in 1993 focusing on seismic hazards. Since then, she has been a professor at Carleton University and currently Western University, including holding an Industrial Research Chair in Earth Sciences. She has continued her consulting as a specialist with various geotechnical and civil engineering firms.

Gail has focused her career on the role of induced seismicity and exploring a better understanding of the potential ground motions from small-to-moderate induced events and their damage potential. She thinks that induced seismicity could revolutionize our understanding of earthquakes. One recent project was the Fundão tailings dam failure in Brazil, where she investigated the potential role of small earthquakes in the failure.

Gail has been the President of both the Seismological Society of America (2001-2003) and the Canadian Geophysical Union (2011-2013). Remarkably she was the first woman, and first non-American, to be President of the Seismological Society of America. Her most notable honour has been becoming a Fellow of the Royal Society of Canada in 2014.

Heather Cross

Heather Cross initially completed a Bachelor of Arts at Queen's University in 1969. While working at Dalhousie University she took a hydrogeology course taught by Dr. John Jones. It is here that she found her calling and, shortly after, enrolled in a graduate program in hydrogeology. She graduated with her Master's in 1974 with



Heather Cross (front row, right, courtesy of APGENS, 2014).

her thesis being entitled "Natural and Manmade Variations in Groundwater Flow and Chemistry in the Birch Cave and Sackville Areas, Halifax County, Nova Scotia".

Heather then worked for the Nova Scotia Department of Environment in the late 1970s and early 2000s. Apart from this she had her own hydrogeology consulting firm in Halifax and worked all over Nova Scotia conducting water quality and quantity investigations and assessments. Heather also taught part-time at Dalhousie University in the Earth Sciences and Civil Engineering departments, served on the Program Advisory Committee of the Nova Scotia Community College Water Resources Technology Program, and assisted the Nova Scotia Ground Water Association (NSGWA) with contractor training and exams.

Heather has extensively volunteered with professional organizations, such as International Association of Hydrogeologists – Canadian National Chapter (IAH-CNC), NSGWA, Groundwater Relief (formerly known as Hydrogeologists without Borders), and the US National Ground Water Association. She also holds the distinction of being a founding member of the Association of Professional Geoscientists of Nova Scotia (APGNS) holding membership #002. She has received several awards, including the Nova Scotia Environmental Award (1983), NSGWA's W.E. Brown Founders Award (2001 and 2015), APGNS Excellence in Geosci-

ence Award (2009), and Fellow of Geoscience Canada (2015).

Glynnis Horel



Glynnis Horel.

Glynnis Horel grew up on Salt Spring Island with a desire to work outdoors. At the advice of a friend she enrolled in geological engineering at the University of British Columbia. During her first-year, she was one of only four women in the entire engineering student body of 1,100. Glynnis found getting summer work could be challenging as a woman, however, she found employment as an assistant to a female mineral exploration geologist and worked for four months above the tree line in the Mount Waddington area of BC. After graduation in 1975, Glynnis spent most of her time carrying out field work in the Northwest Territories and northern BC. She received her Master's in Civil Engineering-Geotechnical from the University of Alberta in 1984.

Glynnis has worked as a geotechnical and geological engineer in consulting, with government (Yukon Territory) and crown corporations (BC Railway), and in private industry (MacMillian Bloedel). Her career has focused on geotechnical aspects of road design, construction and maintenance; terrain hazards; and geomorphic and hydro-

logic processes related to forestry harvesting and other land use activities.

While in the Yukon, Glynnis was very active with the Association of Professional Engineers of Yukon Territory (APEY). In fact, she was the first female President of that association and served two terms between 1987 and 1991. Upon moving back to British Columbia in 1992, she became very active with the Association of Professional Engineers and Geoscientists of British Columbia (formally APEGBC, now EGBC) serving on several committees, task forces and joint practice boards. She was the founding chair of EGBC's Division

of Engineers and Geoscientists in the Forest Sector.

Glynnis has received numerous awards, including the BC Watershed Restoration Award (1998), BC Forest Engineering Award of Excellence (1999), EGBC Professional Service Award (2007), Fellow of Engineers Canada (in both 2008 and 2010), and an Honorary Forest Professional (2012).

To be continued...

Part 3, the last of the series, will profile **Dr. Jean Hutchinson, Dr. Angela Küpper, Dr. Catherine Mulligan,** and **Anne Poschmann.**

Acknowledgements

Several individuals have worked on the Women in Canadian Geotechnique initiative by interviewing the profiled women, creating the posters and assisting with French translations. These individuals are acknowledged in Part 1 of the series published in the September 2018 issue of Geotechnical News.

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6th Symposium on Mines and the Environment in Rouyn-Noranda, QC

Thomas Pabst

This contribution is from the CGS Committee on Mining Geotechnique, Chair Dr. Thomas Pabst.

Introduction

The 6th Symposium on Mines and the Environment took place last summer in Rouyn-Noranda, QC. Since the first symposium in 2002, the objective has been to exchange knowledge between industry and academia on the responsible development of natural resources. This symposium was organized by the Research Institute on Mines and the Environment (RIME) UQAT-Polytechnique and the Canadian Institute of Mining, Metallurgy and Petroleum. The symposium has become more successful over the years and this year it attracted 420 delegates from all across Canada, and abroad. In 2018, women and their significant contribution to the advancements in the field were highlighted, and 45% of the presentations were given by women.

High caliber technical program

The technical program consisted of four sessions, presented both in Eng-

lish and French thanks to simultaneous translation:

1. Conventional and innovative mine waste management approaches, the importance of integrating mine waste management and considering all geotechnical and environmental aspects before and during the operations.
2. Prediction of mine water quality and its treatment, including geo-environmental characterization and the development of stable isotope analyses.
3. Reclamation of mining sites including the difficulty of reclaiming heavily oxidized mine sites and impact of vegetation on the long-term performance of reclaimed sites.
4. Responsible development and innovation of the mining sector, technoeconomic approaches for the development of mine waste

valorization, and the integration of climate change in reclamation methods.

Each session concluded with a 3-minute presentation of a project by selected PhD students.

A plenary session involved several experts who discussed mine closure and long-term responsibility. Topics included: the design for closure approach, integrated mine waste management and long-term stability issues, both physical and chemical. It was clearly stated that the life span of mining structures greatly exceeds those of people and the companies that built them, and it is important to keep our responsibility towards future generations in mind.

Weaving links

In addition to the technical program, three half-day workshops and short courses were presented on applied mineralogy, mine water treatment and



Figure 1. Student Hamza Berrouch (RIME UQAT-Polytechnique) presents his research at the well attended poster session. / L'étudiant Hamza Berrouch (IRME UQAT-Polytechnique) présente ses travaux de recherche lors de la session d'affiches (©IRME-RIME).

the use of geomembranes and bentonite geocomposites as cover materials. A poster session allowed 40 students to present and discuss their projects with colleagues and industry specialists (Fig. 1). A trade show brought together equipment and service suppliers with users.

During the symposium the prestigious Frederick W. Firlotte Career Award was presented to **Michel Aubertin**,

Professor Emeritus Polytechnique Montréal and Executive Director of the CGS (Fig. 2). A renowned researcher, Professor Aubertin pioneered research in mining environment in Canada and this well-deserved award recognized his vision, commitment and significant influence in the field.

Field visits to the Westwood (Iamgold), Laronde (Agnico-Eagle) and



Figure 2. Prof. Michel Aubertin was awarded the Frederick W. Firlotte Career Award / Le Prix carrière Frederick W. Firlotte a été attribué au Prof. Michel Aubertin. (©IRME-RIME).

Eleonore (Goldcorp) mine sites, as well as in the Cobalt area, concluded the symposium. In parallel, an interactive workshop, *Digging Further*, was organized by the Expert Network in Mining Innovation to discuss the challenges facing the mining industry.

The 6th Symposium on Mines and the Environment was a great success and helped strengthen the ties of the geotechnical mining community. There are many good reasons to be optimistic about the future. See you in 2021 for the next symposium!

6e édition du Symposium sur l'Environnement et les Mines de Rouyn-Noranda, QC

Thomas Pabst

Cette contribution est proposée par le Comité de Géotechnique Minière de la SCG, Président: Dr. Thomas Pabst

Introduction

La 6e édition du Symposium sur les Mines et l'Environnement s'est tenue l'été dernier à Rouyn-Noranda. Depuis sa création en 2002, l'objectif du Symposium a été d'encourager l'échange de nouvelles connaissances entre le milieu industriel et académique

afin de favoriser le développement responsable des ressources minérales. Organisé par l'Institut de Recherche en Mines et Environnement (IRME) UQAT-Polytechnique et l'Institut canadien des mines, de la métallurgie et du pétrole (ICM), le Symposium est devenu de plus en plus populaire,

et a attiré cette année 420 congressistes provenant de tout le Canada et d'ailleurs dans le monde. En 2018, l'expertise des femmes et leur contribution significative à l'avancement du secteur ont été mis de l'avant avec 45% des conférences données par des femmes.

Un programme technique de qualité

Le programme comptait quatre sessions de conférences, toutes présentées en Anglais et en Français grâce à un système de traduction simultanée:

1. Gestion conventionnelle et intégrée des rejets miniers, et prise en compte des aspects géotechniques et environnementaux avant et pendant les opérations.
2. Prédiction de la qualité et traitement des eaux minières, incluant la caractérisation géoenvironnementale et le développement de l'analyse des isotopes stables de métaux.
3. Restauration des sites, en particulier des sites fortement oxydés, et impact de la végétation sur la performance à long terme des sites restaurés.
4. Développement responsable et innovation minière, approches technico-économiques pour le développement d'opportunités de valorisation des rejets miniers et intégration des changements climatiques aux méthodes de restauration.

Chaque était complétée par des présentations en 180 secondes de projets de thèse d'étudiants sélectionnés.

Une session plénière a clôturé le programme technique en rassemblant plusieurs experts sur le thème de la fermeture des sites et responsabilité à long terme. Les discussions ont

notamment porté sur l'approche de design for closure, la gestion intégrée des rejets et la stabilité (physique et chimique) à long terme des ouvrages. Il a aussi été clairement rappelé que la durée de vie de ces ouvrages dépasse largement celles des personnes et des compagnies qui les ont construits et qu'il est primordial de garder à l'esprit notre responsabilité vis-à-vis des générations futures.

Renforcer les liens

En plus du programme technique, trois ateliers de formation intensive d'une demi-journée ont été organisés sur les thèmes de la minéralogie appliquée, le traitement des eaux minières et l'utilisation de géomembranes et géocomposites bentonitiques comme matériaux de recouvrement. Une session d'affichage a permis à une quarantaine d'étudiants de diverses universités canadiennes de présenter leurs projets et de discuter avec les industriels (Fig. 1). En parallèle, un salon commercial a permis la rencontre des fournisseurs de biens et services avec les utilisateurs.

Le Symposium a également été l'occasion de remettre le prestigieux Prix carrière Frederick W. Firlotte décerné cette année à **Michel Aubertin**, professeur émérite de Polytechnique Montréal, directeur général de la SCG (Fig. 2). Chercheur de renom, le professeur Aubertin a été un pionnier de la recherche en environnement minier au Canada et cette distinction recon-

naissait sa vision, son engagement et son influence dans le domaine.

Des visites de terrain aux sites Westwood (Iamgold), Laronde (Agnico-Eagle) et Éléonore (Goldcorp) ainsi que dans la région de Cobalt ont conclu ce symposium. Parallèlement, une journée en mode solution sous le thème: Creuser plus loin était organisée par le Réseau d'expertise en Innovation minière (MISA) afin d'échanger sur les défis qui attendent l'industrie minière.

Cette édition 2018 du Symposium sur les Mines et l'Environnement a été un succès et a contribué à renforcer les liens de notre communauté. Grâce à des présentations de qualité, la variété des thèmes abordés et les liens noués entre les différents acteurs et avec la prochaine génération de spécialistes, on a de bonnes raisons d'être optimistes pour l'avenir. Rendez-vous en 2021 pour la prochaine édition du Symposium !

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Improving Mine Site Water Balances using the Eddy Covariance Method

Sebastián Fernández

A word on water balances

In simple words, a water balance is equivalent to a mass balance over a period of time applied to a certain system. It can be simplified to the point that the change in storage over a certain period of time is equivalent to the inflows minus the outflows. In mining operations, these systems could represent the comminution plant, the Tailings Storage Facility (TSF), or perhaps the Waste Rock Dump (WRD). While the water balance in the comminution plant could be obtained with the aid of flowmeters and densimeters installed in the different pipelines / flumes that enter and exit the system, this approach cannot be applied to spaces exposed to the nature where TSF and WRD are located, since variables as precipitation, runoff, evaporation and infiltration are also involved.

The water balance for a TSF and WRD are based on the general equation used for a vegetated soil surface:

$$P - \text{Int} - \text{Roff} = \text{ET} + \text{Perc} + \Delta S$$

Where:

P= Precipitation; Int= Interception by vegetation; Roff= Runoff; ET= Evapotranspiration; Perc= Percolation; ΔS = Change in storage

For bare soils, the interception is zero, and the term ET is replaced by evaporation. For an operational TSF, the terms that account for incoming water in tailings, recovered water and entrainment water losses must be considered in addition to the variables expressed in the equation above.

Out of the presented variables in equation 1, and considering the large areas involved in TSFs and WRDs, only precipitation can be measured accurately through the use of rain gauges. All the other variables are estimated, evaporation being the most difficult to estimate (Cui and Zornberg, 2005).

Importance of estimating evaporation accurately

For a TSF located in an arid region, the evaporation rates are related to the water losses that have to be replaced from an alternative source, such as fresh or desalinated water, in order to continue processing minerals at the same rate. An accurate evaporation rate estimation and forecast could lead to improvement of the tailings discharge efficiency via increasing the number of discharge points or even by increasing the tailing discharge concentration if thickeners could be added in the process. In severe cases of water scarcity, it could even lead to the construction of desalination plants.

In the case of tailings located in areas where the precipitation is higher than the evaporation, improving the drying cycles of the discharged tailings lifts may improve the overall efficiency of dewatering.

In the case of waste rock dumps, evaporation plays a critical role for the closure design (Carey, 2005). The use of an engineered cover that limits the water percolation and the oxygen diffusion to minimize the transport and reaction of the contained material is based on a proper account of the evaporation rate.

Why use the Eddy Covariance Method?

The most widely used method to estimate the actual evaporation is based on pan evaporimeters. Daily readings are made to estimate the raw evaporation, and these values are adjusted by a coefficient that should take into consideration among others the water content in the soil, the edge effect, and the heat capacity and albedo coefficient difference between the pan and soil/pond in study. As a consequence, the obtained evaporation rates are a mere approximation, hence the closure of equation 1 is rarely satisfied unless adjustments in the pan coefficients are made.

The Eddy Covariance method (ECV) offers a unique advantage difficult to match: it can measure actual evaporation rates in a direct manner.

How does ECV work?

The Eddy Covariance method is a micrometeorological technique that measures water vapor fluxes fast enough to account for the air turbulences that occur in the surface.

The air flow has a net horizontal component and is composed by many rotating eddies in 3D. Each eddy transports compounds at different concentrations and rotates at different velocities. The eddies closer to the ground tend to rotate fast, while higher eddies tend to rotate slow (Burba, 2013).

The Eddy Covariance method can be understood as the covariance between a concentration of interest and wind speed. If we know the amount of

molecules that went down at time 1 and the amount of molecules that went up at time 2, then we can calculate a net flux over a period of time (Burba, 2013).

Typical sampling rates for ECV applications are in the order of 10 Hz or higher, producing large amounts of data. This data is processed via applying a series of conversions and corrections that are computer intensive that at the end lead to the evaporation rates.

One of the important characteristics of the method is that the ECV instrumentation has to be installed downwind of the area of interest. The size of the footprint, that is, from how far upwind the ECV will be capturing data, will depend on the height of the instrumentation above the surface of interest and its roughness. Another important feature is that winds coming from any direction different from the area of interest can be filtered out using the sonic anemometer wind direction data, thus avoiding the contamination of data from other areas.

A bit of history, applications and advantages of the use of ECV

The ECV method has been around in the scientific community for a couple of decades. The theoretical development of the method was done in 1948, but it was not until 1962 that the 3D sonic anemometer and the water vapor gas analyzer were available. Only in 1988 a real-time data processing software was developed, and by the year 2000 a methodology and the organization of an international network (FLUXNET) was established (Aubinet, 2012).

The ECV method has been widely used to measure gaseous exchange between the forests and the atmosphere at different latitudes worldwide. The Centre for Earth Observation Sciences (CEOS) at the University of Alberta, led by Dr. Arturo Sánchez-Azofeifa, currently operates two ECV stations that are

monitoring boreal and tropical dry forests.

The ECV method is suitable for measuring water vapor fluxes in large and flat extensions of areas, either vegetated or not. The main restriction is that the instruments must be located downwind of the area of interest. The main advantages of the method applied in mining settings are:

- It causes no disturbances on the surface and can be used in tailings ponds since it can be installed at the edge of the TSF, downwind of the area to be measured.
- Obtains spatially averaged fluxes for areas with footprint fetches ranging from 200 m to 800 m.
- It can provide flux estimations for periods of hours to years, depending on how long the instrument is deployed on site.
- It is the only method for actual evaporation measurement that enables quality assurance of the obtained results through mathematical calculations (cospectra analysis), leading to reliable evaporation rates.

ECV equipment

The main components of the ECV are the gas analyzer, which measures water vapor and carbon dioxide concentrations, and the sonic anemometer that measures wind speed and direction. Both instruments sample at frequencies of at least 10 Hz in order to capture small eddies (Foken, 2012). In addition, the system has a datalogger and a processor that is able to pre-process and store the data collected from

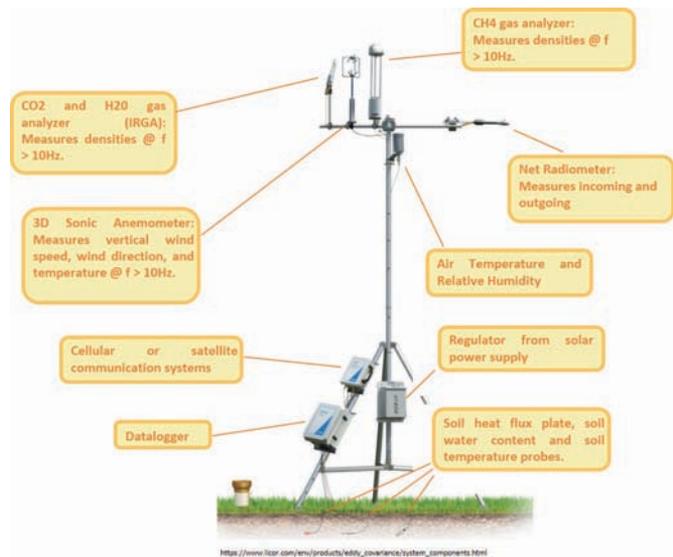


Figure 1: Typical ECV set up. Source: https://www.licor.com/env/products/eddy_covariance/system_components.html.

the ECV. Also, meteorological data is collected on site, and biosensors are installed in the ground. Figure 1 shows a typical ECV set up:

In addition to water vapor and carbon dioxide measurements, a methane gas analyzer can be added. The system, if provided with a cellular or satellite communication package, can be monitored remotely, allowing for real-time data collection and processing.

Finally, depending on the type of surface where the ECV will be installed (e.g. tailings or waste rock dump), an additional energy balance closure check could be performed. This can be conducted using the measurements of net radiation and ground heat flux, together with the latent and sensible heat fluxes measured by the ECV. For this reason, a net radiometer and a soil heat flux plate are usually considered for typical site deployment.

Ongoing research

The Department of Civil and Environmental Engineering at the University of Alberta is currently conducting research supervised by Professor G. Ward Wilson in collaboration with Dr. Sánchez-Azofeifa and led by PhD student Sebastián Fernández to adapt and apply the ECV method on mine

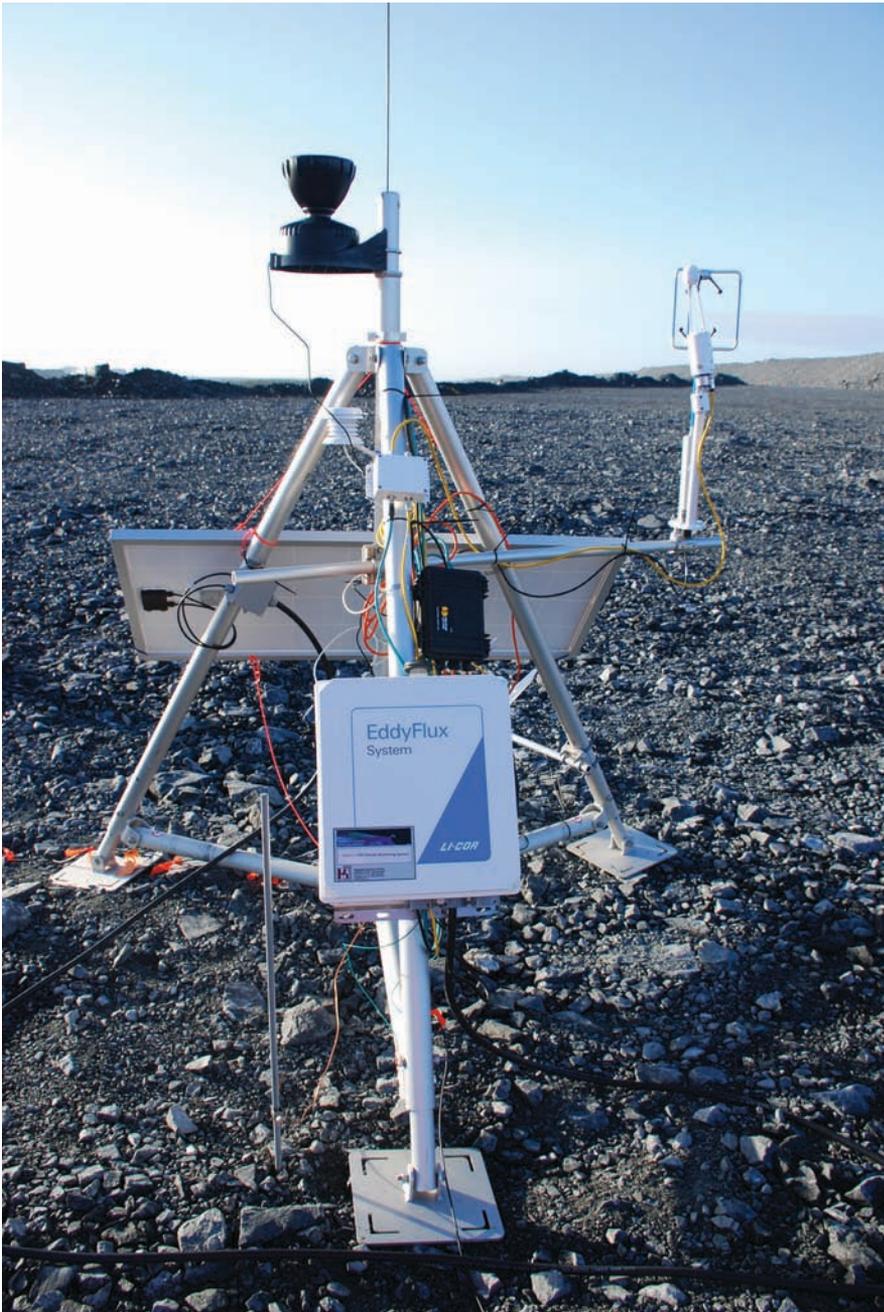


Figure 2: ECV used at one of the waste rock dumps studied.
Credit: Sebastian Fernandez

site facilities in order to obtain reliable evaporation rates. The main difference between vegetated areas (where usually the ECV method is used) and mine sites is that certain areas of the latter are typically subject to dust transport that may affect the optical reader of a gas analyzer, which is based on a laser beam. Also, despite the fact that mines are extended areas,



Figure 3: Available footprint to perform ECV measurements. Berms and pile benches present a challenge in terms of aerodynamic interferences. Credit: Sebastian Fernandez.

they are usually intervened by structures or mass accumulation of some sort that creates aerodynamic interferences.

As part of the research project, ECV instruments have been deployed at two waste rock dumps located in the Yukon and Ontario, Canada, during 2018 (see Figure 2).

The present research project aims to make this technology available to the mining industry in order to improve the closure design of waste rock dumps and the water management of TSFs. This is a continuation of a project led by Janeen Ogloza at the University of Alberta under the direction of Dr. Wilson in 2017 that focused on the measurement of evaporation rates in oil sands tailings ponds. From that research, we better understood the difficulties that the aerodynamic interferences (generated by the dykes containing the tailings) imposed on the measurements. Nevertheless, reliable evaporation rates were obtained that ranged between 58 and 76 times smaller than the potential evaporation (Ogloza, 2017).

To overcome aerodynamic interferences, a proper ECV location and height adjustment considering surface roughness is fundamental to sample data that is contained within the available footprint limits (see Figure 3).

It is expected for the summer of 2019 to continue the deployment of the ECV instruments at other mine sites (in particular in TSFs). This would allow, depending on the positioning of the ECV instrumentation relative to the TSF and the predominant wind

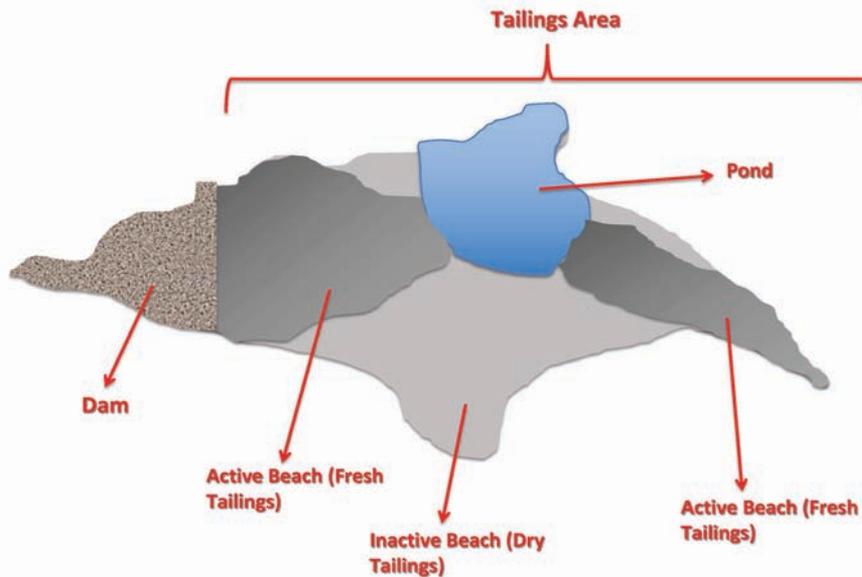


Figure 4: Conventional tailings operations usually have at least three areas with different evaporation rates depending on their surface water content and albedo coefficient: the pond, the active beach (fresh tailings) and the inactive beach (dry tailings).

direction, the acquisition of evaporation rates from the pond, tailings active beach and tailings inactive beach, in the case of a conventional tailings operation, either as separate sources of evaporation or a spatially averaged unique source of evaporation (see Figure 4).

Research application

It is expected that the success of these measurements will lead to the

deployment of ECV instrumentation in mining facilities on a long-term basis. This would allow us to obtain real-time actual evaporation rates that may result, in the case of TSFs located in humid areas, in optimizing drying cycles. For TSFs located in arid areas, it will help improve water management practices since it would quantitatively provide evidence of the differences in evaporation rates between the pond, the active beaches and the inactive

beaches. Finally, the collection of ECV data will definitively support the design and development of decommissioning plans of waste rock dumps.

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