



# The Rock Record - March 2016

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Please contribute to the SGS  
Newsletter

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

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## Saskatchewan Geological Society Friday Afternoon Talk

Friday, April 8<sup>th</sup>, 2016

Geological and Geotechnical Modelling of  
the Cigar Lake Uranium Deposit

Shawn Harvey, Cameco Corp.

### VENUE:

The Artful Dodger, 1651 11th Ave

Time: 3:30 p.m.

Cost: \$5 (to cover venue)

Come have a drink and enjoy a great talk!

## DETAILS OF APRIL 8<sup>th</sup> TALK – Shawn Harvey

### ABSTRACT – Geological and Geotechnical Modelling of the Cigar Lake Uranium Deposit

The Cigar Lake uranium deposit is the world's second largest known high-grade uranium deposit (2nd behind Cameco's McArthur River Operation), but is the highest grade uranium deposit with mineral reserves at an average grade of approximately 16.7% U<sub>3</sub>O<sub>8</sub> (as of Dec 31, 2015). The deposit was discovered in 1981 and officially achieved commercial production in May of 2015 after a series of geotechnical difficulties were cleared. Cigar Lake consists of two separate deposits known as Phase 1 and Phase 2. As of December 31st, 2015 total Proven and Probable mineral reserves consist of 601,800 tonnes at 16.7% U<sub>3</sub>O<sub>8</sub>, for a total of 221.6 Mlbs U<sub>3</sub>O<sub>8</sub>. Inferred Mineral Resources total 103.1 Mlbs (284,700 tonnes at an average grade of 16.43 U<sub>3</sub>O<sub>8</sub>). As of the end of 2015, Cigar Lake has mined approximately 11.6 Mlbs U<sub>3</sub>O<sub>8</sub> from the Phase 1 deposit.

The deposit is situated at the unconformity between Paleoproterozoic variably graphite-bearing pelitic basement rocks of the Wollaston Domain and overlying Paleo- to Meso-Proterozoic Athabasca Group sandstone and conglomerate. Within the graphitic pelite are a network of foliation parallel semi-brittle to brittle faults that coincide with the uranium mineralization at the intersection with the unconformity. The faults commonly exhibit evidence for multiple reactivations and show a relative enrichment in graphite. Cross-cutting structures are largely found with north-northwest orientations and, more rarely, northeast orientations.

Overprinting the fault network is variable clay alteration that is strongest proximal to the mineralization but extends into both the basement and the overlying sandstone to vertical distances of up to 50 m. This clay alteration has geotechnical challenges to both underground mine development through drifting, artificial ground freezing and the production through the jet-boring system (JBS). The modelling of the geological structures, rock strength and the associated clay alteration is important for continued forward planning and mine development.

### BIOGRAPHY – Shawn Harvey, Cameco Corp.

Shawn graduated from University of Regina with a Bachelor of Science (Honours) in 1998. He then went to work for Shell Canada in 1998 before returning to the University of Regina to complete a Master of Science thesis on the Structural Geology of the Deilmann Uranium Orebody, Key Lake, Saskatchewan.

While completing my thesis he started working for Saskatchewan Energy and Mines as an Industrial Minerals geologist where he worked for four years. This included a variety of commodities with a particular emphasis on diamonds.

Utilising this experience on diamonds he went to the private industry to work as a Geology Manager at Shore Gold Inc. and was involved in the implementation of exploration and evaluation of several kimberlites in Saskatchewan and Alberta for seven years.

In 2013, he returned to the uranium field with Cameco Corporation as a Senior Structure Geologist within Mineral Resources Management. This work has included projects in Australia, Kazakhstan and Canada with prioritization on the Cigar Lake deposit.



## President's Message

Thank you to all who came out to the Tartan curling club for the annual curling bonspiel last weekend. It was a terrific event again this year and a lot of fun for all who attended. We had a total of 12 teams participate, with some pretty stiff competition. It was a hard-fought tournament and the championship game in particular was a real nail biter. I won't get into the details other than to say that the winning team included both the current and past-president (though it was really the spouses that carried the team!). A big thanks goes out to the bonspiel organizers, including members of the D.M. Kent Club Executive who did a lot of work and contributed greatly to the success of the event.

The main message I want to pass on to members this month is to encourage you all to come out to the annual **Public Lecture**, which is taking place on **Tuesday, April 19<sup>th</sup> at 7:00 pm** (see poster and bio/abstract below). We are very excited to have Dr. William McKinnon coming to deliver the lecture this year. Dr. McKinnon is a planetary scientist at Washington University in St. Louis (MO) and is deputy lead of the Geology and Geophysics/Imaging team for NASA's New Horizons Mission. He will be speaking about some of the recent findings of the mission, including some of the newly acquired images and data and what they mean for our understanding of Pluto. It's taking place at the Royal Saskatchewan Museum (2445 Albert Street) and we'd love to have a packed house, so please come out and also spread the word to family, friends, students, coworkers, etc. It should be a fascinating lecture – hope to see you there!

Ryan Morelli



## Public Lecture Abstract:

### NASA's New Horizons Mission: To Pluto and Beyond!

The New Horizons encounter with the Pluto-Charon (PC) system in July, 2015, more than provided scientific surprises — it revolutionized our view of what it means to be a planet. Pluto's surface exhibits a diverse, complex, and active geology undreamt of by even the most optimistic of the mission's scientists. This includes spectacular mountain ranges, evidence for present and past glacial activity, and young, cold (or cryo-) volcanoes. Even Charon, half Pluto's size, had a wild geologic past. Pluto's atmosphere is very, very thin, but filled with extensive haze layers. Dr. McKinnon will describe the New Horizons mission, why it was built and flown to the very edge of our planetary system, and most of all, what it accomplished at Pluto and its five moons. And it's not even done!

### William B. McKinnon bio

Professor William B. McKinnon is a Professor of Earth and Planetary Sciences and a member of the McDonnell Center for the Space Sciences at Washington University in Saint Louis, Missouri. A recognized leader in his field, Dr. McKinnon's own research focuses on the structure, origin, evolution, tectonics, and bombardment histories of outer planet satellites and bodies in Kuiper belt beyond (such as Pluto), as well as fundamentals of impact cratering throughout the Solar System.

Dr. McKinnon is a Science Team member on NASA's New Horizons mission to Pluto and the Kuiper belt, where he serves as a Deputy Lead for the Geology and Geophysics/Imaging (GGI) Theme Team. He is also a science team member for ESA's upcoming Jupiter Icy Moons Explorer mission and NASA's upcoming Europa Multiple Flyby mission.

Dr. McKinnon is a past Chair of the Division for Planetary Sciences of the American Astronomical Society, and past President of the Planetary Sciences section of the American Geophysical Union. He is a Fellow of the Geological Society of America (GSA) and the American Association for the Advancement of Science, and in 2014 he received the G.K. Gilbert Award from the Planetary Geology Division of the GSA for outstanding contributions to the solution of fundamental problems in planetary geology. Asteroid 9526 Billmckinnon is named in his honor.

Dr. McKinnon holds a bachelor of science degree from MIT and a master of science and Ph.D in Planetary Sciences and Geophysics from Caltech.





# SASKATCHEWAN GEOLOGICAL SOCIETY

## **New Horizons: Pluto and Beyond**

Dr. William McKinnon

NASA New Horizons Mission

Tuesday, April 19th  
7:00 pm

Royal Saskatchewan Museum  
2445 Albert Street

Free Admission!



## OTHER NEWS AND EVENTS

### Membership Renewals PLEASE

SGS membership is on a calendar year basis. It is now time to renew your membership for 2016. The most convenient way to renew your membership is to do it online and pay by Paypal; you do not need a PayPal account to do this: <http://sgshome.ca/membership>.

### Photo Contest for the 2017 SGS Geological Wall Calendars

The SGS Calendar Committee is excited to announce a photo contest for our second geological wall calendar. To enter the contest, please submit your photo to [Sask.Geological.Calendar@outlook.com](mailto:Sask.Geological.Calendar@outlook.com) by March 31, 2016. See <http://sgshome.ca/products/geological-calendar> for contest rules and guidelines.

### Upcoming Talks

Here is what's in the works for the months to come, submitted by Jason Cosford and Mike Thomas. Many of the talks are still quite tentative, as you can see. It has been difficult this year to firm up the AAPG talks.

List of Speakers:

- 1) Shawn Harvey (April 8 confirmed)
- 2) William McKinnon (April 19th confirmed)
- 3) Omid Mahmoodi (May - date yet to be confirmed)
- 4) Colin Card (May - date yet to be confirmed)

For the fall:

- 5) Mike Demuth - U of S
- 6) Shayne McDonald - U of R
- 7) Kate McLachlan – APEGS

Suggestions for other potential speakers are always welcome. Please contact either Jason Cosford or Mike Thomas with your ideas.

### News from the D.M. Kent Club

Congratulations to Ryan Bachynski, U of R geology student and Society student member, for taking home top prize in the PDAC-SEG Student Minerals Colloquium in the undergraduate honors category. His winning poster presentation was on his B.Sc. thesis work focused on base metal mineralization in the Brabant Lake area. Way to go Ryan!!

### Royal Saskatchewan Museum still looking for a Provincial Fossil

Please remember to visit the museum to cast your vote. Learn more details by visiting their website: <http://royalsaskmuseum.ca/education/inquiry-project/fossil-candidates>. Voting closes on April 25<sup>th</sup>, so get your vote in now!



OUR 2016 CORPORATE MEMBERS:

