

## Join us! APGO Networking and Learning Event in Timmins

June 5, 2017 from 4:00 p.m. to 7:00 p.m.

The Senator Hotel and Conference Centre, Ballroom C

Hosted by Bronwyn Azar, P.Geo., APGO Councillor-at-Large



Guest Speaker: Dr. Oliver Warr

Postdoctoral Fellow, Earth Sciences, University of Toronto

Presentation: Using geochemical footprints to explore the ancient hydrosphere of the crystalline basement

### About Dr. Oliver Warr

Dr. Oliver Warr, is a postdoctoral fellow in Earth Sciences at the University of Toronto working with Professor Barbara Sherwood Lollar and her research group. Originally from the southeast of England, he completed his combined bachelor's and master's degree in Geology at the University of Leicester, UK where he graduated with First Class honours. After this, he undertook a PhD at the University of Manchester where he worked on analysing and interpreting the role of noble gases as geochemical tracers in Carbon Capture and Storage (CCS) research. This research project involved the national consortium that included University of Cambridge, the British Geological Survey and the University of Leeds.

Once he received his PhD in 2013, he moved to the University of Oxford where he took a position as a postdoctoral researcher in the department of Earth Sciences. He worked with Professor Chris Ballentine on applying noble gases to constrain the isolation age of deep crustal systems, such as the one found in Kidd Mine, Timmins. It was here where, in 2013, fluids were identified with mean residence times of over 1 Ga. Working in collaboration with the University of Toronto and Oxford, his research has identified fluids at 9500 ft depth of Kidd Mine with residence times in excess of 1.6 Ga, even older than the fluids discovered at L7850 in 2013. This most recent discovery has sparked international interest and was featured in CBC, BBC, Canadian Geographic amongst other international news outlets. Dr. Warr continues his work to further unravel the complex history of these deep, highly saline, gas rich fluid systems using both conventional and emerging geochemical analytical techniques.

### Abstract

Highly saline fracture fluids, rich in reduced gases and noble gases, have been identified at depth in crystalline basement rocks throughout the Precambrian shields of Canada, Fennoscandia and South Africa. These types of geological terrain make up more than 70% of the Earth's continental crust and consequently may represent a significant, yet poorly constrained, groundwater reservoir within the continental crust (Warr et al. 2017, submitted). The noble gases demonstrate these fluids preserve geochemical components with residence times from millions to billions of years. These long geologic timescales, coupled with high water-rock ratios, permit the products of long-term water-rock reactions to accumulate in fractures, resulting in evolution of the original fluid geochemistry and production of substrates that can sustain deep subsurface microbial communities.

Through collaborations with mining companies and underground research laboratories throughout the world, our team has directly sampled these fluids via boreholes in active mines. Accordingly, it has been possible to begin to calculate residence times, and unravel the origin and evolution of these extreme fluid systems which lie beneath our feet. At the same time we are able to now investigate how and where life may be preserved and the potential implications this may have for geobiology beyond our planet.

### Registration

Member (P.Geo.'s and Geoscientists-in-Training): \$10 + HST

Student Member: Free

Non-member: \$20 + HST

Please visit <https://www.apgo.net/apgo-events> to register online.

Hors d'oeuvres will be served. Each attendee will get one complimentary drink ticket. Cash bar.

Contact information: Marilen Miguel, [mmiguel@apgo.net](mailto:mmiguel@apgo.net)