

## Research Associate

**Faculty / Division:** Faculty of Arts & Science

**Department:** Earth Sciences

**Specialty:** Noble Gas, Clumped and CHN Isotopes

**Campus:** St. George (downtown Toronto)

**Principal Investigator/Hiring Manager:** Barbara Sherwood Lollar

**Reason for Posting:** New Position

### DESCRIPTION:

The Stable Isotope Laboratory, Department of Earth Sciences at the University of Toronto invites applications for a Research Associate (Limited Term) for a 5 year appointment, subject to funding. The area of specialization includes: Isotope Geochemistry of CHN, clumped methane isotopes and noble gas (He, Ne, Ar, Kr, Xe) isotopes applied to fracture fluid and gas history, reactivity and habitability of the Precambrian crust. The anticipated start date is October 1, 2019.

The Research Associate will work with the group of Dr. Barbara Sherwood Lollar in research funded by Sherwood Lollar's NSERC and related research grants. Information on the Stable Isotope Laboratory can be found at [www.bsherwoodlollar.weebly.com](http://www.bsherwoodlollar.weebly.com). The successful candidate will have a proven track record in intellectual, laboratory, analytical, training, field and publication skills as described below under Required Experience and Required Skills. The successful applicant will lead a team of students and postdoctoral fellows in the Stable Isotope Laboratory in a multi-year program of research to investigate the geochemistry, isotopic signatures and production, residence times and flux of fracture fluids components and dissolved and free gases to 3 km depth in crystalline rock settings in Precambrian Shields. Their activities will include, among others, the planning and execution of sampling expeditions to remote (>3 km depth) locations globally, the collection of samples for fluid, gas and microbiological investigation, the analysis for composition and isotopic signatures (including CHN, noble gas, and clumped methane), the modelling of noble gas residence time and flux, and the interpretation of publication of results related to understanding the hydrogeological isolation, volume and distribution, habitability and biodiversity of such deep subsurface ecosystems. The successful candidate will collaborate on these topics with other members of the University of Toronto as well as researchers from other institutions, in particular have the ability to work with collaborators at Oxford University, UK, and in the United States.

In all these activities, there is the expectation that the appointee will supervise the work of undergraduate and graduate students and postdoctoral fellows in the Stable Isotope Laboratory and ensure their activities meet all health and safety standards of the University of Toronto. In addition to a record of lead authored publications on the topic of noble gas derived residence times of fracture fluids on the Canadian Shield, the successful candidate will have a record of having mentored graduate and undergraduate students to successful publications in research related to the geochemistry, habitability and microbiology of subsurface fluids in Precambrian settings (demonstrated by second authored or senior authored publications). The successful applicant will have a proven track record of good communication skills and demonstrated ability to prepare their work for scientific talks, public presentations and media interviews, and publication in scientific journals. Additional specific skills and experience are outlined below.

Applicants should apply online at the link below and include a covering letter, *curriculum vitae* and the names of three references with their contact addresses and phone numbers. Any questions regarding this position should be directed to Dr. Barbara Sherwood Lollar at [barbara.sherwoodlollar@utoronto.ca](mailto:barbara.sherwoodlollar@utoronto.ca).

## **MINIMUM QUALIFICATIONS:**

**Education** – PhD in Geology or Earth Sciences.

**Required Experience** – Minimum 4 years related Postdoctoral Research Associate experience in the noble gas and CHN geochemistry of subsurface fluids and gases, geochemistry of water-rock reaction in crystalline rock systems, fracture fluid residence time models derived from noble gases, the interpretation and analysis of clumped methane isotopes and carbon capture and storage. Experience with operation, troubleshooting, maintenance and training of other students and postdocs in compound specific continuous flow mass spectrometry for CHN isotope analysis and noble gas mass spectrometers as specified below (1991 Finnigan MAT 252 continuous flow prototype for carbon and nitrogen isotope analysis and for dual inlet carbon and hydrogen isotope analysis, late 1990's DeltaPLus XL mass spectrometer for compound specific continuous flow analysis of carbon, nitrogen, hydrogen isotopes run via chromium reactor; Helix SFT, ARGUS 6, and GVI). Experience with modelling radiogenic noble gas residence times in fracture fluids and flux and production rates from Precambrian crystalline rock. A record of lead author publications in the area of noble gas residence times of fracture fluids and dissolved gases to 3 km depth in the deep hydrogeosphere of the Canadian Shield. A record of leading major field expeditions to deep subsurface mines (up to 3 km depth) in Precambrian Shield settings and experience in collection of noble gas samples, dissolved and free gas phases, fracture fluids, clumped methane isotope samples, and biomass samples from these environments.

**Required Skills** – Ability to operate, trouble-shoot, repair and maintain, and train other HQP in 1991 Finnigan MAT 252 continuous flow prototype for carbon and nitrogen isotope analysis and for dual inlet carbon and hydrogen isotope analysis, late 1990's DeltaPlus XL mass spectrometer for compound specific continuous flow analysis of carbon, nitrogen, hydrogen isotopes (with experience in chromium reactor operation). Experience in Helix SFT, ARGUS 6, and GVI mass spectrometers for noble gas isotopic analysis and cryotrap prototypes for sample preparation of same. Experience in diffusion, turbo-molecular pumps and Toepler pumps modified for gas extraction analysis. Experience in noble gas crimpers and clamp technology. Experience in the planning, training, safety management and execution of dissolved gas and fracture fluid field sampling in underground mines at up to 3 km in remote locations (Canada, Africa, Brazil) and collection of dissolved gas, free gas phase, fracture fluid, clumped methane isotopes, and biomass samples. Experience in sampling under high pressure in commercial gas fields. Experience in database integration of CHON isotope data, noble gas isotope and microbiological data. Liaising with external laboratories and in particular able to QAQC data with particular reference to complex combinations of dissolved electrolytes, CHN QAQC grounded in IAEA international standards, and noble gas elemental and isotope data. Training in Priority Management of projects and objectives, as the foundation of the Stable Isotope Laboratory's field, laboratory and research team works in a highly integrated and coordinated way.

The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from racialized persons/persons of colour, women, Indigenous/Aboriginal People of North America, persons with disabilities, LGBTQ persons, and others who may contribute to the further diversification of ideas.

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

Apply to this job opportunity through the U of T careers website using the following link:  
<https://utoronto.taleo.net/careersection/10000/jobdetail.ftl?job=1902928&tz=GMT-04%3A00&tzname=America%2FToronto>

**Employee Group:** Research Associate, Limited Term

**Appointment Type:** Grant – Term

**Anticipated Start Date:**

**Schedule:** Full-time

**Travel:** Extended

**Salary:** Salary range: Min \$45,491 to Max \$85,295

**Job Posting:** July 15, 2019

**Job Closing Date:** Aug. 19, 2019