

The following citation was prepared and presented by S.J. Barnes:

Sarah Dare is an adventurous soul which is probably what led her into geology. Her Ph.D. was on ophiolites from United Arab Emirates and involved field work in a country where driving is a blood sport. On her arrival in Canada, to begin her post doc on trace elements in magmatic sulfides, I sent her to Sudbury to commence sampling while the snow was still on the ground. But she did not complain she just asked where to buy thermal underwear. During her first post-doc we visited some of the remote corners of China and sampled some of the most exotic dishes, and here I do not mean chicken feet, there are bits of animals that westerners have never thought of eating, but she gamely ate it all. Of course I should mention that everything was washed down with a fiery white alcohol called Baijiu and after a few glasses the food does not seem exotic anymore.

I consider Dr. Sarah Dare as one of the best post-doctoral students that it has been my pleasure to supervise. Sarah has accomplished a lot in a very short time. She obtained her Ph.D. in 2008 from Cardiff University with the world famous Prof. Julien Pearce. The topic was trace element contents of chromites and their use in petrogenetic studies. This work resulted in two publications one in Chemical Geology and in Gondwana Research and has been well received in the academic community.

For her post-doctoral work she moved to the Univerisite du Quebec a Chicoutimi and into world of economic geology. This work was funded by the Canada Research Chair in Magmatic Ore Deposits and directed by myself. The topic of her post-doctoral work was chalcophile and siderophile element contents of pyrrhotite, pentlandite, pyrite and chalcopyrite from the Sudbury Igneous Complex, the World's largest or second largest magmatic nickel sulfide camp. The project addressed both petrogenetic and economic topics by considering the question of the role of base metal sulfides in controlling these elements as against the role of platinum-group minerals. The detailed laser and SEM analyses produced surprising variations in the minerals controlling platinum, such as the result that in some deposits sperrylite crystallized early and depleted the sulfide minerals in Ir, Rh and Pt, whereas in other deposits these elements are concentrated in pyrite. She also showed convincingly that many elements such as As, Bi, Te, Sb along with Pt, Pd and Au concentrate into the fractionated sulfide liquid and thus should be found in the most fractionated ore or in veins. This work has produced 4 papers in Economic Geology and Mineralium Depositia and again has been well cited.

From 2011 to 2014 she carried out her second post-doctoral fellowship funded at first by Vale-DIVEX-NSERC and later by TGI4 on the use of trace elements in magnetite as an exploration tool. This work was co-directed by Professors Barnes and Beaudoin. Sarah's work focussed on magmatic magnetites first from Vale's Ni-Cu sulfide deposits; Sudbury, Thompson and Voisey's Bay. Here she was able to show that the magnetites show a strong variation in trace element contents with crystallization of the sulfide liquid and that we can use the trace elements to distinguish magnetites from this type environment from magnetites from other settings. She then moved on to magnetites from layer intrusions and massif type anorthosites. In each case showing that their compositions differed and could potentially be used in exploration. Finally in the world of Fe-oxides there is an outstanding question of whether immiscible Fe-oxide liquids exist. The El Laco deposits of Chile are always cited as an example of such a liquid. Sarah visited and sampled these and showed that there is an evolution in the trace elements content of the magnetites. Disseminated magnetites in the andesites have trace element patterns that resemble igneous magnetites whereas trace element patterns from magnetites from the massive Fe-oxides resemble skarn deposits. These observations suggest that the massive Fe-oxides form by replacement rather than from an iron-oxide liquid. The magnetite studies have produced 4 papers

in *Mineralium Depositia*, *Geochimica Acta* and *J. Exploration Geochemistry*. Her work in magnetite studies led to her being the keynote speaker at SGA in 2013 in the Fe-oxide session.

In 2015 she moved to University of Ottawa to take up a position as an assistant professor. Her research in using magnetite as an exploration tool continues with projects funded by the GSC and NSERC. In addition she has expanded her repertoire to include the trace element content of apatites with a project funded by DIVEX. She is currently supervising 3 M.Sc. students.

In 2016 she was awarded the Gross Medal by the Geological Association of Canada. This medal is awarded to a geoscientist less than 40 years of age (as of December 31 of the nomination year) who has made a significant contribution to the field of economic geology in a Canadian context.

Quite apart from her academic credentials Sarah is a good manager when working on the Fe-oxide project she has had to learn to deal with the different needs and personalities involved in the projects, from the academic/fundamental approach at one end (me), through the bureaucratic (GSC) to the applied end (Vale-INCO) this skill should stand her in good stead in the changing funding environment.

Finally I should mention that Sarah is cheerful and helpful. As part of the chair team she was generous with her time, helping graduate students and supervising B.Sc. projects.

As you can tell from the above Dr. Dare is a can-do person. She is very competent and energetic. She is also very optimistic and enthusiastic and I think is an excellent choice for the young scientist award.