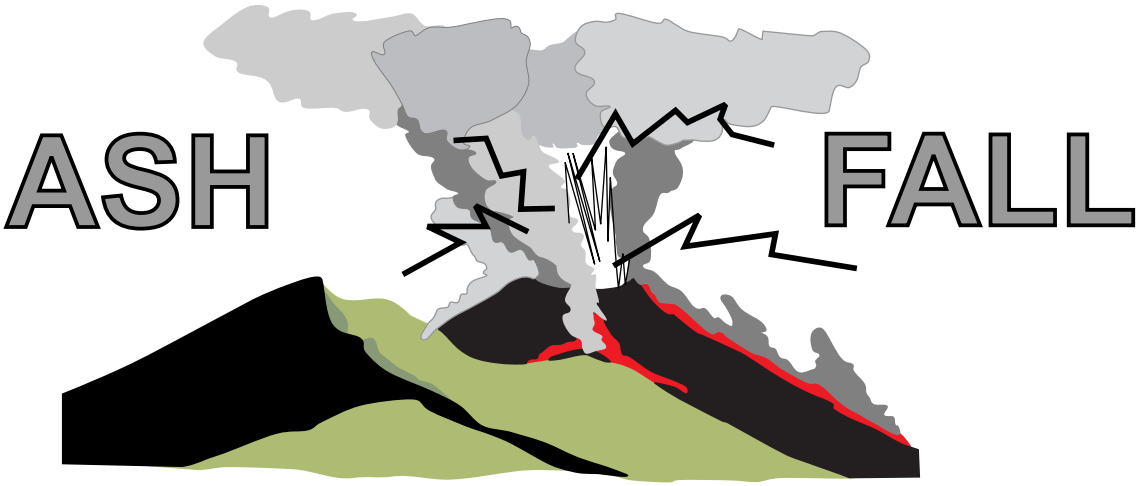


Newsletter of the Volcanology and Igneous Petrology Division
Geological Association of Canada

No. 82 January 15, 2020

In this issue

A message from the VIP Chair

VIP is doing quite well this year with increasing membership and engagement, while transitioning from the leadership of John Greenough to myself. I thank him for his many years of service to VIP & GAC. Michelle DeWolfe (Mount Royal University) is our new vice chair of VIP replacing me, so welcome Michelle! James Braid (StFX) is continuing as Treasurer, Donnelly Archibald (StFX) as Secretary, Melissa Anderson (UofT) as Outreach Coordinator, Pete Hollings (Lakehead) is our webmaster, and Shae Nickerson (StFX) is our new student coordinator. Thanks as well to the regional representatives Stephen Piercey (MUN), Pierre-Simon Ross (INRS), and Ian Coulson (U Regina).

The Atlantic Geoscience Society held its annual meeting in Fredericton in February, which included two Special Sessions (related to VIP). (1) In Memory of Dr. Trevor MacHattie (1974–2018); Chaired by Geoff Baldwin, Chris White, Daniel Kontak, Jacob Hanley (2) Minerals, Metals, Melts, and Fluids Associated with Granitoid Rocks: New Insights from Fundamental Studies into the Genesis, Melt Fertility, and Ore-forming Processes; Chaired by Nadia Mohammadi, Donnelly Archibald, Chris

McFarlane, and Kay Thorne. The fantastic GAC meeting in Quebec City which hosted 3 (VIP related Symposiums; (1) The growth of Laurentia: recent advances in reconstructing metamorphosed, deformed and deeply eroded continental margins with Conveners: D. van Rooyen, D. Corrigan, D., A. Indares, (2) Golden magmas: Precambrian magmatism features and relationship to gold and base metals mineralisation with Conveners: L. Mathieu, M. Jébrak, & (3) Greenstone belt architecture and metal endowment of the Superior craton with Conveners: P. Thurston, J. Ayer, J., H. Gibson, B. Lafrance, R. Sherlock.

There were also 7 Special Sessions (related to VIP).
(1) Canadian volcanology, Archean to recent, depth to surface, at home and abroad with Conveners: P.-S. Ross, S. Kolzenburg, K. Berlo,
(2) Crustal melting, migration, and mineralization processes: Partial melting through fractionation to volatile saturation, from the micron to the continental scale with Conveners: M. Steele-MacInnis, B. Dyck, Z. Azadbakht, E. Sawyer,
(3) Melt, fluids and architecture of accretionary orogens with Conveners: D. Kellett, S. Barr, G. Layne, D. Archibald,
(4) The cratonic mantle, its carbonate-rich melts, kimberlites and carbonatites with Conveners: M. Kopylova, A. Chakhmouradian,
(5) Submarine volcanism and marine minerals: Key resources for the future Conveners: M. DeWolfe, M. Stewart,
(6) Recent advances on ore forming processes related to magmatic Ni-Cu-PGE, Cr-PGE, and Fe-Ti-V deposits and their implications for mineral exploration: A special session in memory of Dr. Thomas Lane with Conveners: M. Houlé, J. Smith, A.-A. Sappin, and a General Session (related to VIP)
(7) Petrography, mineralogy and crystallography with Conveners: M. Constantin, C. Guilmette.

Kudos to the Local Organizing Committee, especially Michel Malo (Chair) who, who helped pull together this excellent conference.

Geoscience Canada published a couple of papers coordinated by Jarda Dostal (SMU).
"Igneous Rock Associations 24. Near-Earth Asteroid Resources: A Review" co-authored by Liam Robert, John Innis and Gordon R. Osinski. The other paper is entitled "Age, Geochemistry and Origin of the Ardara Appinite Plutons, Northwest Donegal, Ireland" co-authored by J. Brendan Murphy, R. Damian Nance, Logan B. Gabler, Alexandra Martell, and Douglas A. Archibald.

Our next conference is Geoconvention in Calgary. Several sessions may be of interest to the VIP membership:

(1) Advances in Microanalytical Methods in the Study of Economic Deposits
Chaired by Ian Coulson Katharina Pfaff

Characterizing the mineralogy, modal abundances and textures of ore deposit lithologies is critical to understanding any mineral paragenesis, timing of fluid expulsion, mineralization window, and ultimately the origin of such deposits. In the case of deposits hosting critical metals, minerals can be small and phase identification can be problematic. This interdisciplinary session focuses on advances in micro−analytical methods and instrumentation, highlighting any novel approaches in the study of economic mineral deposits. Given the importance of metals and native elements in the development of renewable technologies we invite a wide range of ore-mineralization researchers to present their investigations and insight concerning best practice in micro-analytical studies of economic deposits.

(2)Critical Metals and Raw Materials: research, exploration, and production
Chaired by Tania Martins, Lee A. Groat, Robert Linnen, David Lentz

Critical metals and raw materials are crucial to Canada's economy and security. This is also true to many other countries. Both the European commission and the USGS publish lists of these critical metals subject to a regular review and update. These critical metals fuel our society and have a variety of uses in industry, manufacturing,

modern technology, and the environment due to the use of raw materials in the so called clean or low carbon technologies (e.g., solar panels, wind turbines, electric vehicles). Critical metals and raw materials are mineral commodities that have important uses and no readily available substitutes, and can face potential disruption in supply. Graphite, cobalt, lithium, rare - earth - elements and tantalum are a few examples. Their importance also varies with time since a mineral commodity may have been considered critical 20 years ago but may not be critical now, and one considered critical now may not be so in the future. For this session, we call for a pooling of critical and raw materials expertise to outline the current status of Canadian and international research, exploration and production projects. We would like to have a mix of contributions from all research fields, from field - based, analytical to experimental or theoretical.

(3)Fluid and Melt Inclusions

Chaired by Matthew Steele - MacInnis, Pilar Lecumberri - Sanchez, Wyatt M. Bain, Vanessa Elongo, Ben Tutolo, Simone Pujatti

Fluids are key drivers of geologic processes, and fluid and melt inclusions are commonly the best available tools to determine the properties and roles of fluids in the geologic record. This session aims to bring together researchers from a variety of fields - from surficial environments to Earth's deep interior - who study geologic fluids and use fluid and melt inclusions to address geologic problems. We welcome diverse contributions featuring theoretical, analytical and applied studies of fluid and melt inclusions as well as their implications for broader geologic questions.

(4)Mineral Chemistry and Igneous Processes

Chaired by Zeinab Azadbakht, Shannon Zurevinski

This session is dedicated to the usage of mineral geochemistry in different aspects of the igneous process including but not limited to the estimation of physicochemical characteristics of the parent magma, its evolution history, and ore potential as well as the secondary hydrothermal processes and their effect on mineral chemistry.

(5)Volcanology, Igneous Petrology, Geochemistry

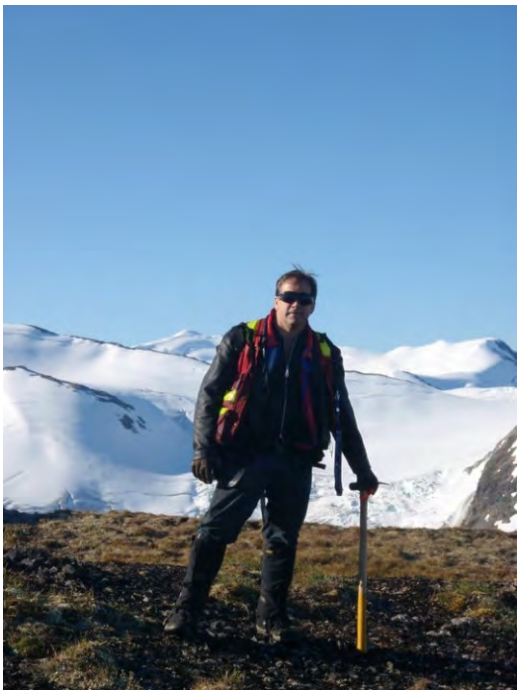
Chaired by Xueming Yang, David Lentz

This general session invites contributions that address physical volcanology, use of geochemistry to understand eruption mechanisms and magma evolution, spatial and temporal relations within igneous bodies, element partitioning during igneous processes etc. We invite contributions from both field based studies and experimental studies.

We are looking into building an Atlas of Igneous Textures, with an emphasis on Canadian examples, so please pass this around, as there will be a call for contributions in the near future.

Lastly, VIP welcomes new and continuing members of GAC and VIP, as well as invite you all to contribute to future ASHFALL newsletters and also to GEOLOG; we are always interested in your activities and to spread the word about this GAC Division. Hope to see you in Calgary!

David Lentz (2019-2020 VIP Chair)



Career Achievement Award

The Volcanology and Igneous Petrology Division of the Geological Association of Canada in recognition of career achievements in the field of volcanology and/or igneous petrology present the Career Achievement Award. Candidates are judged on their lifetime scientific contributions.

Dr. Donald B.Dingwell for his lifetime scientific contribution to the fields of Volcanology and Igneous Petrology

Nomination Letter

I am pleased to provide you with the nomination of Professor Donald Bruce Dingwell for the 2019 Career Achievement Award of the Geological Association of Canada. Don is a Canadian geoscientist who has made tremendous contributions (intellectual as well as academics) to geology in the past four decades. The body of his work on the physics and chemistry of geological materials, some 430 peer-reviewed publications, reflects his intellectual abilities as well as his adaptability to explore widely contrasting questions and push frontiers. For the contributions that he has made on various aspects of geological sciences, Don has received many awards (Arthur L. Day Medal, Peacock Medal, Bowen award, and many more). Despite this laudatory recognition, none of his awards express the achievement and far-reaching impact of his life's work as bestowed by the GAC Career Achievement Award.

Don completed his undergraduate studies at the University of New-Foundland before undertaking his doctorate studies with Prof. Scarfe at the University of Alberta. This marked the beginning of a prolific research career (in Canada, the USA and Germany) in which he rigorously made full use of physics and chemistry to provide the geological community with an extraordinarily complete description of the physicochemical properties of silicate liquids, glasses and magmas. His integration of the most relevant petrologically derived intensive variables, P, T, and compositional indices has allowed volcanologists and igneous petrologists to bridge the gap between equilibrium and largely static magma chambers, to highly disequilibrium systems comprising magmas flowing in conduits, erupting, fragmenting and interacting with the atmosphere, the hydrosphere, the biosphere and the lithosphere. His contributions have been acknowledged with over 20,600 citations, impacting a myriad of magmatic and volcanic processes, forming a basis for developments in the modern field of experimental volcanology.

Don's remarkable scientific ability is in recognising the problem and knowing how to create innovative and simple, yet robust experiments to unravel the fundamental principles that underlines it; he also has an amazing talent to recognise the broader impacts of findings. In the last decade, Don and his research group have sought to explore many new research avenues, integrating yet a wider range of disciplines (lightning physics, leachate chemistry, bio-reactivity of volcanic ash, mineral reaction, sintering, coal ash slag) into his curriculum. This vibrant activity has been the source of a fertile research output, which is likely to impact other disciplines and future geological studies in ways we cannot imagine yet.

In his career, Don's ties with Canada have always remained strong. He has supervised the doctoral studies of multiple Canadians, both in his laboratory as well as externally. He has also kept active collaborations with a number of researchers in Canada (e.g., Kelly Russell, Cliff Shaw, etc). In his career, Don has been, and remains, an exemplary ambassador for Canadian geosciences. Don's passion for geosciences has lent him to be involved in many outreach and academic initiatives. Amongst the many societal activities he has been involved with, Don has acted as 3rd Secretary General of the European Research Council (ERC), President of the European Geoscience Union (EGU), and he is currently President of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI). His contribution to the development of early career scientists has now influenced a large pool of geoscientists, as more than 750 graduates and researchers have visited Munich in the last 18 years to attend his annual 1-week long short-course on Melts, Glasses and Magmas, which addresses first-order rheological principles in geosciences.

In summary, I suggest that Donald Bruce Dingwell is exactly the type of scientist that the Geological Association of Canada wishes to reward with a Career Achievement Award - a person who has contributed to the very forefront of geological science, who can reach out to unify the voices in his field, and who will bring honour to our community for many decades to come

Kind Regards,

Prof. Yan Lavallée
Earth, Ocean & Ecological Sciences
University of Liverpool, United Kingdom

Nomination support letter

It is hard to imagine, let alone think of, a native Canadian who has contributed more internationally to Volcanology and Igneous Petrology than Professor Dingwell. He has had over 400 peer-reviewed publications, and more Science or Nature publications than anyone I know. He has had dozens of editorships and many positions of trust in scholarly organizations, but, even more remarkable, he founded 4 different journals. He has received numerous prestigious awards, including the MAC Peacock Medal from the Mineralogical Association of Canada in 2015. He has supervised dozens of graduate students. He is certainly very deserving of the GAC-VIP Career Achievement award for 2019.

John Greenough
Past-Chair, VIP.

Donald Dingwell accepting his Career Achievement Award from VIP Past Chair John Greenough.

Field Trip Report

Komatiitic to rhyolitic, effusive to explosive submarine volcanism, Abitibi greenstone belt

Leaders
- Pierre-Simon Ross, Institut national de la recherche scientifique, rossps@ete.inrs.ca
- Lyndsay Moore, Rio Tinto
- Jean Goutier, Université du Québec en Abitibi-Témiscamingue

Sept. 10-12, 2019

A group comprising graduate students from Institut national de la recherche scientifique and Université Laval, exploration geologists from the private sector, plus mappers and metallogenists from Ministère de l'Énergie et des Ressources naturelles du Québec, participated in a three day fieldtrip on physical volcanology and mineral deposits in the southern Abitibi Greenstone Belt, of Archean (2.7 Ga) age. Most stops were located in the Blake River Group near Rouyn-Noranda, although we went to the Malartic Group to see the famous komatiites at Spinifex Ridge.

Lyndsay Moore actually explaining the Glenwood Rhyolite to fieldtrip participants while Pierre-Simon Ross is busy posing for a photo to show his kids what geologists do for a living.

The concept was to show both submarine effusive and explosive rocks, if possible, for each of the main subalkaline magma types (komatiite to komatiitic basalt; basalt to basaltic andesite; andesite; dacite to rhyolite). Because these rocks can contain volcanogenic massive sulfide deposits, nickel deposits, and various types of gold deposits, we also included examples of mineralisation and hydrothermal alteration in the program, which was as follows:

Day 1: komatiites and basalts
- A.M.: komatiitic lava flows at Spinifex Ridge, which include sheet flows, tube flows, and volcaniclastic rocks
- P.M.: basaltic pillowed to massive lavas, hyaloclastites, sills and dikes near Rouyn-Noranda, as well as a basaltic lava lake

Day 2: andesites
- A.M.: explosive andesitic products of the D'Alembert tuff, ranging from thick coarse proximal beds to distal turbidites
- P.M.: andesitic lavas and hyaloclastites in the Monsabrais area, including a possible block lava, pillows, and mass flows

Day 3: felsic volcanic rocks and VMS deposits
- the rhyodacitic lavas and volcaniclastic rocks of the Glenwood flow complex
- the Horne and Quemont sectors, including outcrop from Horne West and Quemont, and drill cores from the Horne 5 VMS deposit
- the Amulet VMS deposit area, including exhalites and hydrothermal alteration

Part of the group looking at drill cores of andesitic volcaniclastic rocks, intercalated shales, and gabbros. Photo taken using the pole aerial photography technique.

Some students who had registered for a 3-credit graduate course at INRS stayed another three days afterwards to carry out practical mapping and core logging exercises:
- detailed volcanological mapping in a submarine rhyolite complex
- mapping a volcanogenic mineralisation and alteration system
- core logging for volcanic facies, alteration and mineralization

The field trip was very enjoyable, despite variable weather. In the future, we hope to offer this field trip and graduate course every other year, and open it to other universities.

Submitted by Pierre-Simon Ross

Leopold Gélinas Medals

Every year, the Volcanology and Igneous Petrology Division of the Geological Association of Canada presents three medals for the most outstanding theses, written by Canadians or submitted to Canadian universities, which comprise material at least 50% related to volcanology and igneous petrology. A gold medal is awarded for the best Ph.D. thesis, a silver medal for the best M.Sc. thesis and an antique copper medal for the best B.Sc. thesis. Nominated theses are evaluated on the basis of originality, validity of concepts, organization and presentation of data, understanding of volcanology and petrology, and depth of research.

Gold Medal
Dr. Melissa O. Anderson
University of Ottawa

The 2019 winner of the Volcanology and Igneous Petrology (VIP) Léopold Gélinas Gold Medal award for the best Ph.D. thesis goes to Melissa O. Anderson for her astounding thesis titled “Relationships Between Tectonics, Volcanism, and Hydrothermal Venting in the New Hebrides and Mariana Back-Arc Basins, Western Pacific” supervised by Dr. Mark Hannington at the University of Ottawa.

Nomination letter

This work has contributed significantly to the understanding submarine volcanology in the western Pacific. In her thesis, Melissa explores the relationships between magmatism, geodynamics, and submarine hydrothermal systems in nascent back-arc rifts of Vanuatu and the Marianas. The thesis is a remarkable scientific and scholarly document that brings together original mapping in a virtuallyunmapped region of the world's deep oceans. Her examining committee unanimously agreed that the scope and breadth of enquiry, encompassing structural geology, petrology, geochemistry, and geophysics, were unprecedented for research at this level. Among the major scientific achievements was the demonstration of how large-scale plate dynamics are manifested at the seafloor in terms of anomalous deep-sea structure and magmatism, with significant implications for hydrothermal activity.

Nomination by Mark Hannington

Melissa’s Response

I am honored to receive the Leopold Gelinas Gold medal, and I would like to thank the Volcanology and Igneous Petrology Division of the Geological Association of Canada for select-

ing my thesis for this award. This was a dream project for me, with exciting opportunities to participate in research cruises in the western Pacific and work with fantastic people along the way. It was all made possible by the support (scientific, mental, and financial) of my supervisor, Prof. Mark Hannington at the University of Ottawa. I would like to thank Mark for making me a better researcher and writer, and for opening many doors for me along the way. I would also like to thank my many collaborators who contributed to this work, including researchers at GEOMAR, Univ. Erlangen, and NOAA-PMEL. I would also like to thank Tim McConachy and Neptune Minerals, Inc., for giving me access to data and samples and providing feedback along the way. I have been fortunate to have many mentors who have contributed to my success throughout my career, including: Hamid Mumin, Dave Lentz, Hendrick Falck, John Jamieson, and Sven Petersen. I hope that I will be able to do for others what you all have done for me. Finally, I would like to thank my wonderful husband, Marek, who kept me alive throughout it all.

Many thanks,
Melissa Anderson

Silver Medal
Gabriel Sombini Dos Santos
Acadia University

This year's winner of the Leopold Gélinas Silver Medal for an outstanding MSc thesis in the fields of volcanology and/or igneous petrology is Gabriel Sombini Dos Santos (Acadia University). for his thesis: Petrology, geochemistry,age and tectonic setting of the Margaree pluton, Aspy terrane, Cape Breton Island, Nova Scotia.

The thesis under the supervision of Sandra Barr. The goal of his research project was to acquire a better understanding of the age and petrogenesis of the Margaree pluton using detailed field mapping, petrographic and geochemical analysis, and U-Pb dating to better understand the tectonic setting durign emplacement of the Margaree pluton. Gabriel's thesis was substantive in its analysis, especially considering the difficult study area. The thesis is well-written, very thorough, and deserving of the Leopold Gélinas Silver Medal.

Citation by David Lentz and Donnelly Archibald

Melissa Anderson accepting her Léopold Gélinas Gold Medal from VIP Secretary Donnelly Archibald

Gabriel Sombini Dos Santos accepting his Léopold Gélinas Silver Medal from VIP Chair David Lentz.

Gabriel's Response

I am honored to be named the 2019 recipient of the Léopold Gélinas Silver Medal for my MSc research project. First and foremost, I would like to thank the Volcanology and Igneous Petrology Division of the Geological Association of Canada for recognizing my research by awarding me this medal. It is a tremendous honor. I would also like to extend my everlasting gratitude to Dr. Sandra Barr, for her unwavering support, mentorship, and friendship during my too short time under her supervision at Acadia University.

I was extremely fortunate to be able to rely on many great people during this research. I would like to acknowledge Chris White, for the company during many long days of field work in the Cape Breton Highlands. Many thanks to Deanne van Rooyen, for all the help with the geochronology. I would also like to extend my appreciation to Cliff Stanley, for indulging my curiosity. And of course, Pam Frail, for the innumerable and impeccable thin sections. Being able to conduct my research in Canada and to work on the Appalachians with so many great people has been a tremendous opportunity, for which I am very grateful. I would like to extend my appreciation to the staff of Department of Earth and Environmental Science at Acadia University, for the support during my MSc thesis. Finally, I would like to thank my parents, Edson and Vera. Without their constant support and encouragement none of this would have been possible.

Thank you again to the GAC-VIP Division for granting me this award.

Gabriel Sombini Dos Santos

Bronze Medal
Rebecca Canam
University of British Columbia

Nomination letter

I have known Rebecca since Sept 2014 when I taught her Introductory Mineralogy and subsequently taught her in three other courses in addition to supervising her thesis. Rebecca is an exceptional student with a tremendous work ethic who I think will make a real impact in geology in the future.

She excels in all aspects of mineralogy, petrology, structure, geochemistry, and mineral deposits, and she is also a superb field geologist. All of this is relevant to her BSc Honours thesis on the mineralogy, geochemistry, and geochronology of a recently discovered hornblende lamprophyric intrusion at Hjalmar Lake in the Northwest Territories that she mapped in summer 2018. She returned to Vancouver in September with several pails of remarkable hornblende-phyric igneous rocks that she soon deduced from their mineralogy represented the plutonic equivalent (appinite) to a calc-alkaline lamprophyre. She then set about pulling apart these rocks from as many different directions as possible - petrography, SEM imaging, amphibole and feldspar mineral compositions, whole rock geochemistry, and zircon geochronology and geochemistry by LA-ICP-MS.

Working with Rebecca was a delight. She asks perceptive questions, digs into the literature, works long hours, and exceeds expectations. By the end of her thesis, as she was writing up the Discussion, she was presenting strong arguments for her intepretations and defending them with vigour. The work that you see contained in the thesis is hers - my contributions reside only in guiding her to the appropriate analytical techniques, serving as a sounding boards for ideas, and providing some edits on the final document.

I very highly recommend Rebecca Canam for the Leopold Gelinas Bronze Medal.

Nomination by James Scoates

Rebecca's Response

I'm extremely honoured to receive the Leopold Gélinas Bronze Medal for my undergraduate thesis on appinitic lamprophyres in the south Rae craton and I thank the Volcanology and Igneous Petrology Division of the Geological Association of Canada for awarding me this medal. This thesis would not have been possible without the help of many people. Specifically, I would like to thank my supervisor Dr. James Scoates for his guidance,

support and encouragement throughout the project, as well as Nichole Moerhuis at UBC for her valuable assistance. I am also grateful to Edith Martel and Hendrik Falck of the Northwest Territories Geological Survey for their advice and feedback. Financial support was provided by the NTGS, the Society of Economic Geologists Canada Foundation Undergraduate Scholarship, and NSERC Discovery. Thanks again to GAC, it is a very real privilege to be the recipient of this award.

Citation by Rebecca Canam

Rebecca Canam with her Léopold Gélinas Bronze Medal.

VIP Awards Reminders

The Career Achievement Award - the deadline is **31 January 2020**
Please send nominations to Dave (jdlentz@unb.ca)

The Gold Gélinas medal for an outstanding PhD thesis in the fields of volcanology and igneous petrology - the deadline is **28 February 2020**.

The Silver Gélinas medal for an outstanding MSc thesis in the fields of volcanology and igneous petrology - the deadline is **28 February 2020**.

The Bronze Gelinas medal for an outstanding Honours thesis in the fields of volcanology and igneous petrology - the deadline is **15 April 2020**.

Please send nominations for the Gélinas medals to Donnelly (darchiba@stfx.ca).

2019-2020 VIP Executive

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Secretary/ Ashfall Editor:	Donnelly Archibald	darchiba@stfx.ca
Treasurer:	James Braid	jbraid@stfx.ca
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