

## CURRICULUM VITAE OF MATTHEW STEELE-MACINNIS

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### EDUCATION

**2013 PhD** Geosciences, Virginia Tech. Dissertation: *Thermodynamics of geologic fluids*  
**2008 BSc** (Honours) Earth Sciences (minor in mathematics), Memorial University

### APPOINTMENTS

**2021 –** Associate Professor, Earth and Atmospheric Sciences, University of Alberta  
**2017 – 2021** Assistant Professor, Earth and Atmospheric Sciences, University of Alberta  
**2015 – 2017** Assistant Professor, Geosciences, University of Arizona  
**2013 – 2015** Marie Curie postdoctoral fellow, Inst. f. Geochemie und Petrologie, ETH Zürich  
**2012 – 2013** Research/teaching assistant, Department of Geosciences, Virginia Tech  
**2008 – 2012** ICTAS Doctoral Scholar, Department of Geosciences, Virginia Tech  
**2010 – 2011** Visiting Researcher, GeoForschungsZentrum (GFZ) Potsdam  
**2007 – 2008** Teaching Assistant, Department of Earth Sciences, Memorial University  
**2007 – 2008** Research Assistant, MUN/CREAIT Laser Ablation ICPMS Laboratory  
**2007** Summer Intern, basin-centered gas group, Shell Canada  
**2006** Summer Field Assistant, Geologic Survey of Newfoundland

### FUNDING HISTORY

**2020-2026** Canada Foundation for Innovation (CFI) Infrastructure Operating Fund (IOF),  
Project # 37876-IOF, "Properties of geologic fluids: Linking physical and  
atomic-scale properties at elevated temperatures and pressures."  
Sole PI. [\$52,860]

**2020-2021** Northwest Territories Geological Survey grant, "Evaluation of Nechalacho High  
Purity Quartz and Ore- Forming Fluids at Pine Point"  
Sole PI. [\$27,425]

**2019-2020** Northwest Territories Geological Survey grant, "Paragenesis and Ore-Forming  
Fluids at Pine Point."  
Sole PI. [\$25,000]

**2019-2024** Canada Foundation for Innovation (CFI) John R. Evans Leaders Fund (JELF),  
Project # 37876, "Properties of geologic fluids: Linking physical and atomic-  
scale properties at elevated temperatures and pressures."  
Sole PI. [\$211,440]

- 2019-2024** Alberta Economic Development and Trade (EDT) Project # RCP-19-013-SEG, "Properties of geologic fluids: Linking physical and atomic-scale properties at elevated temperatures and pressures."  
Sole PI. [\$211,440]
- 2018-2019** Northwest Territories Geological Survey grant, "Hydrothermal fluids at Pine Point."  
Sole PI. [\$7,000]
- 2018-2023** NSERC Discovery grant# RGPIN-2018-04370, "Hydrothermal properties of complex aqueous solutions, and applications to ore-forming systems."  
Sole PI. [\$252,500]
- 2018-2021** NSERC Discovery Accelerator Supplement  
Sole PI. [\$120,000]
- 2017** NSF-EAR-CH grant# 1653977, "CAREER: Mass Transport and Fluid-Rock Reactions Driven by Multicomponent Aqueous Fluids."  
Sole PI. [\$506,961 (USD)]
- 2016-2018** American Chemical Society Petroleum Research Fund grant# 56766-DNI2, "Fluid+thermal history reconstruction of basins and fault zones, from combined fluid-inclusion and (U+Th)/He analyses applied to hematite."  
Sole PI. [\$110,000 (USD)]
- 2013-2015** Marie Curie International Incoming Fellowship *FLUIDEQ* "A new equation of state for solutes in high-temperature fluids" [€184,709.40 (EUR)]

### **SYNCHROTRON BEAMTIME**

- 2017** Advanced Photon Source, proposal #46509: "Solubility and speciation of iron in magmatic-hydrothermal fluids." Sole PI. 9 shifts. March 14-16, 2017.

### **AWARDS AND FELLOWSHIPS**

- 2018** NSERC Discovery Accelerator Supplement: Awarded "*to researchers who have an established, superior research program that is highly rated in terms of originality and innovation, and who show strong potential to become international leaders within their field.*"
- 2018** Young Scientist Medal, Mineralogical Association of Canada: Awarded "*to a young scientist who has made a significant international research contribution in a promising start to a scientific career.*"
- 2017** Hisashi Kuno Award, Volcanology, Geochemistry, and Petrology Section of the American Geophysical Union: Awarded "*to an early career scientist for outstanding contributions to the fields of volcanology, geochemistry, and petrology.*"
- 2017** CAREER award, US National Science Foundation. NSF's "*most prestigious awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization*"
- 2014** Best Reviewer Award for the journal *Geofluids* in 2013
- 2013** College of Science 2013 Outstanding Doctoral Student, Virginia Tech

- 2013 Department of Geosciences Outstanding Service Recognition Award  
 2013 Marie Curie Postdoctoral Fellowship  
 2013 ETH Postdoctoral Fellowship [declined, in order to accept Marie Curie Fellowship]  
 2008 – 2013 ICTAS Doctoral Scholarship, Virginia Tech (competitive, fully funded graduate fellowship for PhD research)  
 2008 NSERC – Undergraduate Student Research Award [declined, in order to accept ICTAS doctoral scholarship]

## **TEACHING EXPERIENCE**

- 2021 EAS 333: Advanced Geology Field School. First Endeavour Silver Economic Geology Field School (co-taught with P. Lecumberri-Sanchez)  
 2020 EAS 488/568 Geochemical Processes, Geochemistry of Ore Deposits.  
 2019 EAS 333: Advanced Geology Field School (co-taught with S. Johnston)  
 2019 EAS 468/568: Geochemical Processes, Geochemistry of Ore Deposits. [Overall USRI scores 4.9/5.0]  
 2017 GEOS 251: Physical Geology (Arizona) [Overall TCE scores 4.3/5.0]  
 2016 GEOS 400/500: Introduction to Geochemistry (Arizona) [Overall TCE scores 4.5/5.0]  
 GEOS 596A (Graduate seminar): Fluids in the Earth (Arizona) [Overall TCE scores 4.8/5.0]  
 2015 GEOS 400/500: Introduction to Geochemistry (Arizona, co-taught with J. Quade) [Overall TCE scores 4.7/5.0]  
 2015 651-4069-00L: Fluid and Melt Inclusions, Theory and Practice (ETH Zürich, co-taught with T. Driesner, P. Lecumberri-Sanchez & M. Wälle)  
 2013 651-4221-00L: Numerical Modeling of Ore-forming Hydrothermal Processes (ETH Zürich, co-taught with T. Driesner and P. Lecumberri-Sanchez)  
 2012 GEOS 3504: Mineralogy: Graduate Teaching Assistant, Virginia Tech [Overall SPOT scores 3.7 and 3.9 out of 4.0]  
 2008 EASC 3811: Paleontology: Teaching Assistant, Memorial University  
 2007 EASC 3210: Economic Mineral Deposits: Teaching Assistant, Memorial University

## **STUDENTS SUPERVISED**

### ***postdoctoral researchers and visiting scholars***

- 2018 – 2019 Yury Klyukin, postdoc, UAlberta  
 2018 – 2019 Xinghui Li, visiting scholar, UAlberta  
 2018 – 2019 Miao Wang, visiting scholar, UAlberta

### ***Current position***

- postdoc, U of Calgary  
 postdoc, Chinese Acad. Sciences  
 postdoc, China U of Petroleum

### ***graduate students – primary supervisor***

- 2021 – Spencer Poulette, MSc student, UAlberta  
 2020 – Jackson Barrier, MSc student, UAlberta  
 2020 – Ashley Went, MSc student, UAlberta  
 2020 – Emily Creaser, MSc student, UAlberta

### ***Current position***

<b>2015 – 2020</b>	Wyatt Bain, PhD student, UAlberta	Postdoc at Lakehead University
<b>2018 – 2019</b>	Macey Jamieson, MSc student, UAlberta	Self employed
<b>2016 – 2018</b>	Hanna Brooks, MSc 2018, UAlberta	PhD student, U of Maine
<b>2016 – 2018</b>	Jordan Jensen, MS 2018, U of Arizona	Geologist, ExxonMobil
<b>2015 – 2017</b>	Drew Barkoff, MS 2017, U of Arizona	PhD student, U of Nevada Las Vegas

***graduate students – supervisory committee member***

**2019 –** Simone Pujatti, PhD, U of Calgary  
**2019 –** Cameron Peddle, MSc, U of Alberta  
**2019 – 2019** Morgan Snyder, PhD, U of Alberta  
**2016 – 2019** D. Matthew Sublett, PhD, Virginia Tech  
**2016 – 2017** Caleb King, PhD, U of Arizona  
**2016 – 2017** Jason Burwell, MS, U of Arizona  
**2016 – 2017** Roy E. Greig, PhD, U of Arizona  
**2015 – 2017** Jack V. Gibbons, PhD, U of Arizona  
**2015 – 2017** Simone Runyon, PhD, U of Arizona  
**2015 – 2016** Jennifer M. Dabbs, MS, U of Arizona

***Current position***

Teaching Prof., Acadia University  
 Geologist, ExxonMobil  
 Geologist, Newmont  
 Geologist, ExxonMobil  
 PhD student, U of Arizona  
 Geologist, MineraLogic Inc.  
 Assistant Prof., U of Wyoming  
 Geologist, Tetra Tech Inc.

***undergraduate students***

**2020 – 2020** Jordan Koop, UAlberta  
**2019 – 2019** Emily Creaser, UAlberta  
**2019 – 2019** Brandon Campbell, UAlberta  
**2018 – 2020** Paul Mickelsen, UAlberta  
**2018 – 2019** Marko Szmihelsky, UAlberta  
**2018 – 2019** Kelsey Bulbuc, UAlberta  
**2017 – 2018** Paulo Coutinho, U of Arizona  
**2017 – 2018** Michael Decindis, U of Arizona  
**2016 – 2017** Luke Berry, U of Arizona  
**2016 – 2016** Raquel Guimaraes, Uni. de Brasília

***Current position***

BSc student, UAlberta  
 MSc student, UAlberta  
 Geologist, Sil Industrial Minerals  
 Geologist, Dahrouge Consulting Ltd.  
 MSc student, Memorial University  
 MSc student, UAlberta  
 MS student, U of Arizona  
 MS student, U of Arizona  
 Production Manager, Lehigh Hanson  
 MSc student, Uni. de Brasília

**SERVICE**

***Extramural***

**2021 – 2023** Associate Editor, *Mineralium Deposita*  
**2020 – 2022** Associate Editor, *American Mineralogist*  
**2020 – 2021** Associate Editor, *Lithosphere*  
**2019 – 2020** Guest Editor, *Elements*, Volume 16(6), “Hydrothermal Fluids”  
**2019 – 2020** Editor, Mineralogical Association of Canada Short Course, Volume 49, “Fluid and Melt Inclusions: Applications to Geologic Processes”  
**2019 – 2022** Member-at-large, Geological Society of America Research Grants Committee  
**2019** Proposal reviewer for US National Science Foundation (NSF) Major Research Instrumentation (MRI) program  
**2019** Convener, session GAC-MAC 2019 (Québec QC)  
**2019 –** Proposal reviewer for National Science and Engineering Research Council (NSERC) Discovery Grants program.  
 1 proposal in 2019

- 1 proposal in 2020
- 2018** – Member, Hisashi Kuno award committee of the American Geophysical Union
- 2018** – Proposal reviewer for Canada Foundation for Innovation (CFI)
- 2018** – Proposal reviewer for the US Department of Energy (DOE)
- 2018** – Proposal reviewer for the Israel Science Foundation (ISF)
- 2018** – Proposal reviewer for the American Chemical Society, Petroleum Research Fund
- 2017** – Co-convener, session V51G. What Can Inclusions Tell Us? American Geophysical Union Fall Meeting 2017 (New Orleans)
- 2017** – Co-convener, session T152. Fluids and Melts in Geologic Systems. Geological Society of America Annual Meeting 2017 (Seattle)
- 2017** – Co-convener, session 06g: Fluid, Mineral and Melt Inclusions as Petrologic Indicators to Unravel Geologic Processes. Goldschmidt 2017 (Paris)
- 2016** – Associate Editor, *The Canadian Mineralogist*
- 2015** – Ad hoc proposal reviewer for the US National Science Foundation (NSF)
- 1 proposal in 2015
- 1 proposal in 2016
- 3 proposals in 2017
- 1 proposal in 2019
- 2012 – 2014** Associate Editor, *Central European Journal of Geosciences*
- 2011** – Journal reviewer. Approximately 35 manuscripts per year over past 5 years. Journals including: *American Journal of Science*; *American Mineralogist*; *Brazilian Journal of Chemical Engineering*; *Chemical Geology*; *Contributions to Mineralogy and Petrology*; *Earth and Planetary Science Letters*; *Economic Geology*; *Environmental Science & Technology*; *European Journal of Mineralogy*; *Geochemical Perspectives Letters*; *Geochemistry, Geophysics, Geosystems (G<sup>3</sup>)*; *Geochimica et Cosmochimica Acta*; *Geofluids*; *Geology*; *Journal of Geochemical Exploration*; *Journal of Petrology*; *Journal of Physical Chemistry*; *Journal of Raman Spectroscopy*; *Lithos*; *Marine Georesources & Geotechnology*; *Mineralium Deposita*; *Nature Communications*; *Nature Geosciences*; *Ore Geology Reviews*; *PLOS ONE*; *Precambrian Research*; *Science Advances*; *Tectonophysics*; *Terra Nova*
- Awarded the "Best Reviewer Award" for *Geofluids* in 2013.

### ***Intramural***

- Chair of PhD Candidacy exam: Martin Schwangler, 2021, University of Alberta
- Arms-length examiner: PhD Candidacy exam of Alex Sheen, 2020, University of Alberta
- Arms-length examiner: Kevin Byrne, PhD 2019, University of Alberta
- Chair of examining committee: Janina Czas, PhD 2018, University of Alberta
- Arms-length examiner: Pedro Waterton, PhD 2018, University of Alberta

- 2016 – 2017** UArizona Dept. of Geosciences Peer Performance Evaluation Committee member
- 2015 – 2017** UArizona Dept. of Geosciences Graduate Admission Committee member
- 2015 – 2016** UArizona Dept. of Geosciences Colloquium Series organizer

### **WORKSHOPS**

- 2019** Invited lecturer, *Industry-Rice Earth Science Symposium – Energy & Mineral Resources*. Rice University, Mar. 21-22, Houston TX.

- 2018** Invited principal lecturer, *Geofluids and Fluid Inclusions*. China University of Petroleum Qingdao, Oct. 29-30, Qingdao, China.
- 2018** Co-organizer, *MDSpec workshop on ab initio molecular dynamics*. Virginia Tech, Sept. 5-7, Blacksburg VA.
- 2018** Presenter, *WITec Raman Microscopy Workshop*. University of Calgary, April 18-19, Calgary AB.
- 2016** Participant, *Early Career Geoscience Faculty Workshop: Teaching, Research and Managing Your Career* workshop organized by the National Association of Geoscience Teachers ("On the Cutting Edge"). University of Maryland, July 24-29, College Park.
- 2016** Lecturer, short course on *Short Course on Cu, Mo, and Au Porphyry Deposits*, University of Arizona, Dec. 6-15, Tucson. Lecture on fluid inclusions in ore deposits.
- 2015** Lecturer, short course on *Porphyry, IOCG, and Alkalic Cu-Au Deposits*, University of Arizona, Dec. 8-17, Tucson. Lecture on fluid inclusions in ore deposits.
- 2014** Participant, short course on *Transitions from porphyry to epithermal ore environments*, University of Geneva, Sept. 21<sup>st</sup>, Geneva.
- 2014** Participant, Lowell Program in Economic Geology field course on *Ore Deposits Mapping*, August 28-September 6<sup>th</sup>, Yerington, NV.
- 2014** Assistant organizer and participant, ETH Zürich field course on *Ore Deposits, Magmatism and Precambrian Geology of Finland* (led by K. Schlöglóvá and C.A. Heinrich), July 10-28<sup>th</sup>, Finland.
- 2014** Participant in the 2014 Swiss *Journée Metallogénique*, March 14<sup>th</sup>, Geneva.
- 2014** Participant, short course in *Hydrothermal modeling with CSMP++*, January 7-17<sup>th</sup>, Zürich.
- 2013** Participant, Lowell Program in Economic Geology short course on *Porphyry Cu, Mo and Au*, December 3-12<sup>th</sup>, Tucson AZ.
- 2013** Participant, 2013 Mineralogical Society of America short course on *Thermodynamics of Geothermal Fluids*, August 24-25<sup>th</sup>, Florence, Italy.
- 2012** Participant, 2012 Gordon Research Conference on *Geochemistry of Mineral Deposits*, July 15-20<sup>th</sup>, Andover NH. Presented a poster entitled "Fluid inclusions in submarine hydrothermal systems and volcanogenic massive sulfide deposits."
- 2010** Participant, 2010 EURISPET (European Intensive Seminars in Petrology) Zürich on *Experimental petrology and rock deformation*, Nov. 20-27<sup>th</sup>, Zürich. Presented a poster entitled "Quartz solubility and speciation in multi-component fluids."

### **INVITED PRESENTATIONS**

- 2019** Invited lecture at *Rice University, Industry-Rice Earth Science Symposia (IRESS)*. Ore-forming fluids [hosted by Cin-Ty Lee]
- 2018** Invited presentation at *China University of Petroleum Qingdao*. Fluids in the Earth and Theory, Methods and Applications of Fluid Inclusions [hosted by Yong Chen]
- 2017** Colloquium Series, Dept. of Earth and Atmospheric Sciences, *University of Alberta*, "Reconstructing physical and chemical conditions of ore formation, and using ore-forming conditions to reconstruct geologic processes" [hosted by S. Johnston]
- 2016** Colloquium Series ("Geocheminar"), Earth Planetary and Space Sciences, *University of California – Las Angeles*, "The Secret Life of Salts" [hosted by C.E. Manning]
- 2014** Brown bag seminar, Fluids and Mineral Deposits Group, *ETH Zürich*, "Salty fluids in hydrothermal systems: The fluid inclusion perspective" [hosted by T. Driesner]

- 2014** Invited presentation at the 24<sup>th</sup> V.M. Goldschmidt Conference, Sacramento CA., "Linking structural and thermodynamic properties of solutes in high-temperature fluids"
- 2013** Geosciences Colloquium Series, Department of Geosciences, *University of Arizona*, "Fluids in geologic systems: New insights into subduction zones, volcanoes and mineral deposits" [hosted by M. Barton]
- 2013** Brown bag seminar, Lowell Program in Economic Geology, *University of Arizona*, "Hydrothermal fluids in ore-forming systems: Theoretical, experimental and analytical approaches to submarine and terrestrial hydrothermal systems" [hosted by M. Barton]
- 2013** Geosciences Seminar, *University of Nevada - Las Vegas*, "Fluids in magmatic-hydrothermal ore-forming systems: New insights from experimental, analytical and theoretical studies" [hosted by J. Cline]
- 2010** Invited presentation, Fluids and Mineral Deposits Group, *ETH Zürich*, "Volumetric constraints on CO<sub>2</sub> storage in saline aquifers" [hosted by C.A. Heinrich]

### **PROFESSIONAL MEMBERSHIPS**

American Geophysical Union, European Geosciences Union, Geological Society of America, Geological Association of Canada, Society of Economic Geologists, Geochemical Society, Mineralogical Association of Canada

### **PRESS**

- 2020** Article in *Nature Geoscience* was featured in a "News & Views" highlight: <https://www.nature.com/articles/s41561-020-0644-8>
- 2017** Kuno award announcement: <https://eos.org/agu-news/steele-macinnis-and-watkins-receive-2017-hisashi-kuno-award>.  
<https://www.ualberta.ca/earth-sciences/about-the-department/news/2017/november/congratulations-to-pilar-lecumberri-sanchez-and-matt-steele-macinnis>
- 2016** Article in *American Mineralogist* was featured in the "Notable Papers" section: [http://www.minsocam.org/MSA/Ammin/AM\\_Notable\\_Articles.html](http://www.minsocam.org/MSA/Ammin/AM_Notable_Articles.html)
- 2016** Article in *ChemPhysChem* was featured on the back cover of the journal: <http://onlinelibrary.wiley.com/doi/10.1002/cphc.201600406/full>
- 2015** Article in *Geology* was highlighted in the "News Releases" section: <http://www.geosociety.org/GSA/News/Releases/GSA/News/pr/2015/15-73.aspx>
- 2015** Article in *American Mineralogist* was featured in the "Highlights and Breakthroughs" section (highlight by J. Lowenstern): <http://dx.doi.org/10.2138/am-2015-5254>
- 2013** Virginia Tech newsletter: <http://www.vtnews.vt.edu/articles/2013/04/040213-gradschool-collegewinners.html>
- 2013** Virginia Tech Institute for Critical Technology and Applied Science (ICTAS) newsletter article: <http://www.ictas.vt.edu/communication/fullStory.php?id=90>
- 2013** Article in *Geochemistry, Geophysics, Geosystems (G<sup>3</sup>)* was featured in the "Editors' Highlights" section of that journal, as well as the Research Spotlight section of *Eos*: [doi:10.1002/2014EO170014](https://doi.org/10.1002/2014EO170014)

**2012** Article in *Environmental Science & Technology* was featured in the "Editors' Choice" segment of the journal *Science*:  
[doi:10.1126/science.337.6101.1435-c](https://doi.org/10.1126/science.337.6101.1435-c)

## **PUBLICATIONS**

*Citations: 1725; h-index: 20; Google Scholar profile: [Matthew Steele-MacInnis](#)*

\* denotes graduate student or postdoc author

† denotes undergraduate student author

### **Published/in press articles:**

73. Ashley, K.T., Fuller, M.A., Kotowski, A.J., Behr, W.M., **Steele-MacInnis**, M., Bodnar, R.J. (2021) Evaluation of a zircon-in-garnet geothermometer and application to blueschists from Syros, Greece. *The Canadian Mineralogist*, accepted.
72. Wang\*, M., **Steele-MacInnis**, M., Chen, Y., Bain\*, W.M., Meng, F. (2021) Fluid evolution of a hematite-dominated, magmatic-hydrothermal Cu-Au deposit at Qibaoshan, Shandong Province, China. *Ore Geology Reviews*, in press.
71. Zoheir, B., El-Bialy, M., Ragab, A., Deshesh, F., Zeh, A., **Steele-MacInnis**, M. (2021) Orogenic collapse and felsic magmatism in the Central Eastern Desert of Egypt: Inferences from whole-rock geochemistry and zircon U-Pb-Hf isotopes. *Precambrian Research*, **354**, 106044. <https://doi.org/10.1016/j.precamres.2020.106044>
70. Walter, B.F., Giebel, R.J., **Steele-MacInnis**, M., Marks, M.A.W., Kolb, J., Markl, G. (2021) Fluids associated with carbonatitic magmatism: A critical review and implications for carbonatite magma ascent. *Earth-Science Reviews*, in press. <https://doi.org/10.1016/j.earscirev.2021.103509>
69. Sublett, D.M., Sendula, E., Lamadrid, H., **Steele-MacInnis**, M., Spiekermann, G., Burruss, R.C., Bodnar, R.J. (2020) Raman spectral behavior of N<sub>2</sub>, CO<sub>2</sub> and CH<sub>4</sub> in N<sub>2</sub>-CO<sub>2</sub>-CH<sub>4</sub> gas mixtures from 22-200°C and 10-500 bars. *Journal of Raman Spectroscopy*, in press. <https://doi.org/10.1002/jrs.6033>
68. Szmihelsky†, M., **Steele-MacInnis**, M., Bain\*, W.M., Falck, H., Adair, R., Campbell†, B., Dufrane, S.A., Went\*, A., Corlett, H.J. (2020) Mixing brine with oil triggered sphalerite deposition at Pine Point, Northwest Territories, Canada. *Geology*, in press. <https://doi.org/10.1130/G48259.1>
67. Bain\*, W.M., **Steele-MacInnis**, M., Li, K., Li, L., Mazdab, F.K., Marsh, E. (2020) A fundamental role of carbonate-sulfate melts in formation of iron oxide-apatite deposits. *Nature Geosciences*, **13**, 751–757. <https://doi.org/10.1038/s41561-020-0635-9>
66. Klyukin\*, Y.I., Haroldson, E.L., **Steele-MacInnis**, M. (2020) A comprehensive numerical model for the thermodynamic and transport properties of H<sub>2</sub>O-NaCl fluids. *Chemical Geology*, **557**, 119840. <https://doi.org/10.1016/j.chemgeo.2020.119840>
65. **Steele-MacInnis**, M., Lecumberri-Sanchez, P., Marshall, D., Kontak, D. (2020) Contribution of fluid inclusions to genetic models for ore deposits. Mineralogical Association of Canada short course volume **49**, in press.
64. Lecumberri-Sanchez, P., **Steele-MacInnis**, M., Runyon, S.E., Kontak, D., Aksu, B. (2020) Fluid and melt inclusions in mineral deposit exploration: Identification and vectoring. Mineralogical Association of Canada short course volume **49**, in press.



63. **Steele-MacInnis**, M., Manning, C.E. (2020) Hydrothermal properties of geologic fluids. *Elements*, **16**, in press
62. Schwarzenbach, E., **Steele-MacInnis**, M. (2020) Fluids in submarine mid-ocean ridge hydrothermal settings. *Elements*, **16**, in press.
61. Li\*, X.H., Klyukin\*, Y.I., **Steele-MacInnis**, M., Fan, H.R., Yang, K.F., Zoheir, B. (2020) Phase equilibria, thermodynamic properties and solubility of quartz in saline-aqueous-carbonic fluids: Application to orogenic and intrusion-related mesothermal gold deposits. *Geochimica et Cosmochimica Acta*, in press. <https://doi.org/10.1016/j.gca.2020.06.008>
60. Walter, B.F., **Steele-MacInnis**, M., Giebel, R.J., Marks, M.A.W., Markl, G. (2020) Complex carbonate-sulfate brines in fluid inclusions from carbonatites: Estimating compositions in the system H<sub>2</sub>O-Na-K-CO<sub>3</sub>-SO<sub>4</sub>-Cl. *Geochimica et Cosmochimica Acta*, **277**, 224-242. <https://doi.org/10.1016/j.gca.2020.03.030>
59. Wang\*, M., Chen, Y., Bain\*, W.M., Song, G., Liu, K., Zhou, Z., **Steele-MacInnis**, M. (2020) Direct evidence for fluid overpressure during hydrocarbon generation and expulsion from organic-rich shales. *Geology*, **48**, 374–378. <https://doi.org/10.1130/G46650.1>
58. Walter, B.F., Jensen\*, J.L., Coutinho†, P., Laurent, O., Markl, G., **Steele-MacInnis**, M. (2020) Formation of hydrothermal fluorite-hematite veins by mixing of continental basement brine and redbed-derived fluid: Schwartzwald mining district, SW-Germany. *Journal of Geochemical Exploration*, **212**, 106512. <https://doi.org/10.1016/j.gexplo.2020.106512>
57. Sublett, D.M., Sendula, E., Lamadrid, H., **Steele-MacInnis**, M., Spiekermann, G., Burruss, R.C., Bodnar, R.J. (2020) Shift in the Raman symmetric stretching band of N<sub>2</sub>, CO<sub>2</sub>, and CH<sub>4</sub> as a function of temperature, pressure and density to 500 bars and temperatures from near critical up to 450°C. *Journal of Raman Spectroscopy*, in press. [doi:10.1002/jrs.5805](https://doi.org/10.1002/jrs.5805)
56. Worthington, J.R., Ratschbacher, L., Stübner, K., Khan, J., Malz, N., Schneider, S., Kapp, P., Chapman, J.B., Stevens-Goddard, A., Brooks\*, H., Lamadrid, H., **Steele-MacInnis**, M., Rutte, D., Jonckheere, R., Pfänder, J., Hacker, B.R., Oimahmadov, I., Gadoev, M., (2020) The Alichur dome, South Pamir, western India–Asia collisional zone: detailing the Neogene Shakh dara–Alichur syn-collisional gneiss-dome complex and connection to lithospheric processes. *Tectonics*, **39**, e2019TC005735. [doi:10.1029/2019TC005735](https://doi.org/10.1029/2019TC005735)
55. Lecumberri-Sanchez, P., Luo, M., **Steele-MacInnis**, M., Runyon, S.E., Sublett, D.M., Klyukin\*, Y., Bodnar, R.J. (2020) Synthetic fluid inclusions XXII: Phase equilibria and microthermometric behavior of fluid inclusions trapped under vapor- and halite-saturated conditions. *Geochimica et Cosmochimica Acta*, **272**, 78-92. [doi:10.1016/j.gca.2019.12.018](https://doi.org/10.1016/j.gca.2019.12.018)
54. Zoheir, B., Lehmann, B., Emam, A., Radwan, A., Zhang, R., Bain\*, W.M., **Steele-MacInnis**, M., Nolte, N. (2020) Extreme fractionation and hydrothermal processes of the Abu Dabbab rare-metal granite system, Eastern Desert, Egypt. *Lithos*, **352-353**, 105329. [doi:10.1016/j.lithos.2019.105329](https://doi.org/10.1016/j.lithos.2019.105329)
53. Brooks\*, H.L., **Steele-MacInnis**, M. (2019) A model for the solubility of minerals in saline aqueous fluids in the crust and upper mantle. *American Journal of Science*, **319**, 754-787, [doi:10.2475/09.2019.02](https://doi.org/10.2475/09.2019.02)
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### **Invited presentations at scientific meetings:**

- Steele-MacInnis**, M., Brooks\*, H.L. (2019) Solubilities of minerals in hydrothermal saline fluids. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26. **Keynote**
- Steele-MacInnis**, M., Ashley, K.T., Barkoff\*, D.W. (2018) Mineral inclusion thermobarometry: A new approach to estimate the temperatures and pressures of hydrothermal ore formation. The Edwin Roedder 14<sup>th</sup> Pan-American Current Research on Fluid Inclusions (PACROFI-XIV) Conference, Houston TX, USA, June 11-16. Abstracts with Program, p. 93-94.
- Steele-MacInnis**, M. (2018) Hydrothermal properties of geologic fluids: Causes and consequences. Resources for Future Generations, Vancouver BC, June 16-21. **MAC Young Scientist Medal Lecture**
- Steele-MacInnis**, M., Esposito, R., Bain\*, W.M., Runyon, S.E. (2018) Compositions of magmatic fluids exsolved from mafic and felsic melts: Implications for volatile fluxes and ore formation. European Geosciences Union, Vienna, Austria, April 8-13. **AGU-VGP Hisashi Kuno Award Lecture**
- Steele-MacInnis**, M., Schlegel, T., Ridley, J., Heinrich, C.A. (2015) Deciphering compositions of saline, multicomponent fluid inclusions from combined microthermometric and microanalytical data: Approaches for interpreting fluids containing multiple major salts. AGU-GAC-MAC-CGU Joint Assembly, Montréal QC, Canada, May 3-7. Abstracts Volume, p. 586.
- Steele-MacInnis**, M., Bieler, N., Zezin, D., Hünenberger, P., Driesner, T. (2014) Linking structural and thermodynamic properties of solutes in high-temperature fluids. 24<sup>th</sup> V.M. Goldschmidt Conference, Sacramento CA, USA, June 8-13. Abstracts Volume p. 2374.

### **Abstracts of scientific meeting presentations:**

- Steele-MacInnis**, M., Brooks\*, H.L. (2019) Solubilities of minerals in hydrothermal saline fluids. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26.
- Klyukin, Y.I., **Steele-MacInnis**, M., Tutolo, B., Pujatti, S., Lecumberri-Sanchez, P., Bodnar, R.J. (2019) Critical homogenization of low-salinity fluid inclusions: Modeling, heating experiments, and oddities. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26
- Bain, W.M., **Steele-MacInnis**, M., Luo, Y., Pearson, D.G., Mazdab, F.K., Marsh, E.E., Dufrane, A. (2019) Apatite, magnetite, and inclusion compositions from the Buena Vista deposit, Nevada (USA): Implications for a new genetic model for Kiruna-type deposits. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26
- Bain, W.M., **Steele-MacInnis**, M., Marsh, E.E. (2019) Compositions of silicate, salt, and aqueous fluid inclusions hosted in unidirectional solidification textures from the Saginaw Hill Porphyry Stock, Arizona. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26
- Wang, M., **Steele-MacInnis**, M., Chen, Y., Liu, T.Y., Meng, F.C. (2019) Fluid evolution of iron-

- oxide copper gold mineralization: Qibaoshan, China. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26
- Sublett, D.M., Sendula, E., Lamadrid, H., Steele-MacInnis, M., Spiekermann, G., Bodnar, R.J. (2019) Raman-based N<sub>2</sub>, CH<sub>4</sub>, and CO<sub>2</sub> densimeters and barometers from the liquid-vapor curve to elevated temperatures and pressures. 25<sup>th</sup> European Current Research on Fluid Inclusions (ECROFI-XXV), Budapest, Hungary, June 24-26
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