Michael A. Antonelli, Ph.D.

Born: Edmonton, AB
Nationality: Canadian citizen, French citizen
Marital status: Married
Languages: English (fluent), French (fluent)

Asst. Professor and TIMS lab director
Dept. of Earth and Atmospheric Sciences
University of Houston, Houston, TX
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EDUCATION

Ph.D., Earth & Planetary Science, University of California – Berkeley (Dec. 14)	2018
M.S., Geology, University of Maryland – College Park	2013
B.Sc. with First-Class Honors, Honors Geology, University of Alberta	2011

PROFESSIONAL APPOINTMENTS

Assistant Professor, University of Houston	2023 –
BNF Postdoctoral Researcher, ETH Zürich	2023 – 2023
Postdoctoral Research Fellow, ETH Zürich	2020 – 2022
Postdoctoral Researcher, Institut de Physique du Globe de Paris	2019 – 2020

HONORS AND AWARDS

ETH Zürich Postdoctoral Fellowship	2020 – 2022
Marie Skłodowska-Curie Individual Fellowship, European Commission	2020
Post-Graduate Scholarship – Doctoral (PGS-D3), Natural Sciences and Engineering Research Council of Canada (NSERC)	2013 – 2016
Student Travel Grant, Mineralogical Association of Canada (MAC)	2013
Post-Graduate Scholarship – Masters (PGS-M), NSERC	2012
Past Presidents Medal in Geology, Association of Professional Engineers and Geoscientists of Alberta	2011
Dean's Silver Medal in Science, University of Alberta	2011
MAC Undergraduate Award	2010
Michael Woollett Memorial Scholarship, University of Alberta	2010
2x ENCANA Geology and Geophysics Scholarship	2009, 2010
2x NSERC Undergraduate Student Research Award (USRA)	2009, 2010
P.S. Warren Memorial Prize in Earth History, University of Alberta	2009
SHELL Canada Scholarship in Geology	2009

FUNDING

Proposals under review

NSF Petrology and Geochemistry grant (PI); **463,475 USD**

Proposals funded

European Commission, Marie Skłodowska-Curie Action, Individual Fellowship (MSCA IF 895850 – CASIMS; Total Score: 95.6%); **191,149 €** (2020-2022), *declined for ETH fellowship*

ETH Zürich Postdoctoral Fellowship (19-2 FEL-33); **231,800 CHf** (2020-2022)

NSERC PGS-D3 (438843-2013); **63,000 CAD** (2013-2016)

NSERC PGS-M (420592-2012); **17,300 CAD** (2012-2013)

NSERC USRA; **4,500 CAD** (2010-2011)

NSERC USRA; **4,500 CAD** (2009-2010)

PUBLICATIONS

Submitted

16. Li, Z.-X., Zhang, S.-B., Zheng, Y.-F., **Antonelli, M.A.**, Zhang, W., Zhang, L., Sun, F.-Y., Liang, T. Transition from kinetic to equilibrium Zr isotope fractionations during magma crystallization. *Geochimica et Cosmochimica Acta (under review)*.

Published (Google Scholar – Citations: 658, i10-index: 13, h-index: 12)

15. **Antonelli, M.A.,** Sartori, G., Giuliani, A., Schauble, E.A., Hoffman, J., Schmidt, M. (2023) Calcium isotope fractionation during melt immiscibility and carbonatite petrogenesis. *Geochemical Perspectives Letters* 28, 13-19. https://doi.org/10.7185/geochemlet.2338
14. **Antonelli, M.A.**, Giuliani, A., Wang, Z., Wang, M., Zhou, L., Feng, L., Li, M., Zhang, Z., Liu, F., Drysdale, R.N. (2023) Subducted carbonates not required: deep mantle melting explains stable Ca isotopes in kimberlite magmas. *Geochimica et Cosmochimica Acta* 348, 410-427. https://doi.org/10.1016/j.gca.2023.03.025
13. **Antonelli, M.A.**, Yakymchuk, C., Schauble, E.A., Foden, J., Janoušek, V., Moyen, J.-F., Hoffmann, J., Moynier, F., Bachmann, O. (2023) Granite Petrogenesis and the δ^{44}Ca of Continental Crust. *Earth and Planetary Science Letters* 608, 118080. https://doi.org/10.1016/j.epsl.2023.118080
12. Cornet, J., Wotzlaw, J.-F., Laurent, O., **Antonelli, M.A.**, Otamendi, J., Bergantz, G., Bachmann, O. (2022) The role of reworking subducted sediments in arc magmas for the isotopic diversity of the continental crust. *Earth and Planetary Science Letters* 595, 117706. https://doi.org/10.1016/j.epsl.2022.117706

11. Watkins, J.M. & **Antonelli, M.A.** (2021) Beyond equilibrium: Kinetic isotope fractionation in high-T environments. *Elements* 17, 6, 383-388. https://doi.org/10.2138/gselements.17.6.383
10. **Antonelli, M.A.**, DePaolo, D.J., Christensen, J.N., Wotzlaw, J-F., Pester, N.J., Bachmann, O. (2021) Radiogenic ^{40}Ca in seawater: implications for modern and ancient Ca cycles. *ACS Earth Space Chem.* 5, 9, 2481–2492. https://doi.org/10.1021/acsearthspacechem.1c00179
9. **Antonelli, M.A.**, Kendrick, J., Yakymchuk, C., Guitreau, M., Mittal, T., Moynier, F. (2021) Calcium isotope evidence for early Archaean carbonates and subduction of oceanic crust. *Nature Communications* 12, 2534. https://doi.org/10.1038/s41467-021-22748-2
8. Mahan, B., **Antonelli, M.A.**, Burckel, P., Turner, S., Chung, R., Habekost, M., Jørgensen, A.L., Moynier, F. (2020) Longitudinal biometal accumulation and Ca isotope composition of the Göttingen minipig brain. *Metallomics* 12, 1585-159. https://doi.org/10.1039/d0mt00134a
7. **Antonelli, M.A.** & Simon, J.T. (2020) Calcium isotopes in high temperature terrestrial processes. *Chemical Geology* 548, 119651. https://doi.org/10.1016/j.chemgeo.2020.119651
6. **Antonelli, M.A.**, Mittal, T., McCarthy, A., Tripoli, B., Watkins, J.M., DePaolo, D.J. (2019) Ca isotopes record rapid crystal growth in volcanic and sub-volcanic systems. *Proceedings of the National Academy of Sciences, USA,* 116(41) 20315-20321. https://doi.org/10.1073/pnas.1908921116
5. **Antonelli, M.A.**, Schiller, M., Schauble, E.A., Mittal, T., DePaolo, D.J., Chacko, T., Grew, E.S., Tripoli, B. (2019) Kinetic and equilibrium Ca isotope effects in high-T rocks and minerals. *Earth and Planetary Science Letters* 517, 71-82. https://doi.org/10.1016/j.epsl.2019.04.013
4. **Antonelli, M.A.**, DePaolo, D.J., Chacko, T., Grew, E.S., Rubatto, D. (2019) Radiogenic Ca isotopes confirm post-formation K depletion of lower crust. *Geochemical Perspectives Letters* 9, 43–48. https://doi.org/10.7185/geochemlet.1904
3. **Antonelli, M.A.**, Pester, N.J., Brown, S.T., DePaolo, D.J. (2017) Effect of Paleo-Seawater Composition on Hydrothermal Reactions in Mid-Ocean Ridges. *Proceedings of the National Academy of Sciences, USA* 114(47). https://doi.org/10.1073/pnas.1709145114
2. **Antonelli, M.A.**, Kim, S-.T., Peters, M., Labidi, J., Cartigny, P., Walker, R.J., Lyons, J.R., Hoek, J., Farquhar, J. (2014) Early Inner Solar System Origin for Anomalous Sulfur Isotopes in Differentiated Protoplanets. *Proceedings of the National Academy of Sciences*, USA 111(50). https://doi.org/10.1073/pnas.1418907111

1. Cabral, R.A., Jackson, M.G., Rosa-Koga, E.F., Koga, K.T., Whitehouse, M.J., **Antonelli, M.A.**, Farquhar, J., Day, J.M.D., Hauri, E.H. (2013) Anomalous Sulfur Isotopes in Plume Lavas Reveal Deep Mantle Storage of Archaean Crust. *Nature* 496, no. 7446, 490-493. https://doi.org/10.1038/nature12020

DISSERTATION AND THESES

Antonelli, M.A. (Advisor: DePaolo, D.J.) Ca Isotopes in Igneous and High-Temperature Metamorphic Systems and the Hydrothermal Chemistry of Paleoseawater (2018). PhD Dissertation, University of California – Berkeley, 170pp.

Antonelli, M.A. (Advisor: Farquhar, J.) The Multiple Sulfur Isotopic Composition of Iron Meteorites: Implications for Nebular Evolution (2013). MS Thesis, University of Maryland – College Park, 105pp.

Antonelli, M.A. (Advisors: Chacko, T., Muehlenbachs, K.) Petrologic and Oxygen Isotopic Characteristics of Lower Crustal Granulite Xenoliths from the A154N Kimberlite, Diavik Diamond Mine, Canada (2011). BSc Thesis, University of Alberta, 133pp.

SELECTED CONFERENCE ABSTRACTS (*Oral/†Poster Presentation)

22. **Antonelli, M.A.***, Sartori, G., Giuliani, A., Schauble, E.A., Hoffman, J., Schmidt, M.W. Ca isotope fractionation during carbonatite petrogenesis and melt-immiscibility. AGU Annual Meeting, San Francisco, December 2023.
21. **Antonelli, M.A.*,** Hantsche, A.L., Schauble, E.A., Hoffman, J., Kouzmanov, K., Dini, A., Chelle-Michou, C. Disequilibrium $\delta^{44}Ca$ in calc-silicate minerals and kinetic isotope effects during skarn formation. AGU Annual Meeting, New Orleans, December 2021.
20. **Antonelli, M.A.***, Kendrick, J., Yakymchuk, C., Guitreau, M., Mittal, T., Moynier, F. Ca isotopes as tracers of geothermal gradients in TTG magmas: evidence for hot subduction throughout the Archean. V.M. Goldschmidt Conference, virtual, July 2021.
19. Mahan, B.†, **Antonelli, M.A.**, Burckel, P., Turner, S., Chung, R., Moynier, F. A longitudinal investigation of metal accumulation in brain regions of Göttingen minipigs, and a first glimpse of Ca isotopes in the mammalian brain. V.M. Goldschmidt Conference, virtual, June 2020.
18. **Antonelli, M.A.***, Moynier, F., Yakymchuk, C., Guitreau, M., Foden, J.D., Amsellem, E. Ca Isotope Composition of the Continental Crust Through Time: Insights from TTGs, Granites, and Adakites. AGU Annual Meeting, San Francisco, December 2019.
17. Pester, N.J.*, Brown, S.T., **Antonelli, M.A.**, DePaolo, D.J. Relationships between Na-Ca exchange, reaction temperature, and Sr isotopes in deep-sea hydrothermal fluids. AGU Annual Meeting, Washington D.C, December 2018.

16. **Antonelli, M.A.**[*], DePaolo, D.J., Chacko, T., Grew, E.S., Rubatto, D. Radiogenic ^{40}Ca in Garnet: A New Proxy for K Loss during Granulite Metamorphism. V.M. Goldschmidt Conference, Boston, August 2018.
15. **Antonelli, M.A.**, DePaolo, D.J.[*], Brown, S.T., Pester, N.J. Radiogenic ^{40}Ca in Seawater. V.M. Goldschmidt Conference, Boston, August 2018.
14. **Antonelli, M.A.**[†], Watkins, J., DePaolo, D.J. Growth Rates and Mechanisms of Magmatic Orbicule Formation: Insights from Calcium Isotopes. AGU Fall Meeting, New Orleans, December 2017.
13. **Antonelli, M.A.**[*], DePaolo, D.J., Schauble, E.A., Grew, E.S., Chacko, T., Rubatto, D. High-Temperature Calcium Isotope Fractionation: Theory vs. Nature. V.M. Goldschmidt Conference, Paris, August 2017.
12. **Antonelli, M.A.**, DePaolo, D.J.[*], Pester, N.J., Brown, S.T. Effects of seawater Ca/SO_4 and Mg on Sr isotope exchange in MOR hydrothermal systems. Goldschmidt Conference, Paris, August 2017.
11. Stolper, D.A.[*], **Antonelli, M.A.**, Ramos, D.S., Bender, M.L., Schrag, D.P., DePaolo, D.J., Higgins, J.A. Isotopic Constraints on the Formation of Carbonates During Low-Temperature Hydrothermal Oceanic Crust Alteration. AGU Fall meeting, San Francisco, December 2016.
10. **Antonelli, M.A.**[*], DePaolo, D.J., Grew, E.S. Large Ca Isotope Fractionation in Granulite Facies Minerals. V.M. Goldschmidt Conference, Yokohama, June 2016.
9. **Antonelli, M.A.**, DePaolo, D.J.[*], Brown, S.T., Pester, N.J., Sonnenthal, E.L. Effect of Paleoseawater Composition on Hydrothermal Exchange at Mid-Ocean Ridges. V.M. Goldschmidt Conference, Yokohama, June 2016.
8. **Antonelli, M.A.**[*], DePaolo, D.J. Ca Isotope Fractionation and Crystal Growth Rates of Volcanic Phenocrysts. V.M. Goldschmidt Conference, Prague, August 2015.
7. Arias-Del Razo, I.[*], **Antonelli, M.A.**, Dawson, T.E., Dirzo, R., Owlett, T., Young, H., Woodroffe, R. Tracking the Isotopic Changes of $\delta^{13}C$, $\delta^{15}N$, $\delta^{18}O$, and $\delta^{2}H$ of African Wild Dogs (Lycaon Pictus) Over a 12 Year Period in Laikipia, Kenya. Ecological Society of America Meeting, Baltimore, 2015.
6. Brown, S.T.[*], **Antonelli, M.A.**, Staudigel, H. Owens, T.L., DePaolo, D.J. The Ca Isotope Composition of Altered MORB. V.M. Goldschmidt Conference, Sacramento, June 2014.
5. Jackson, M.G.[*], Cabral, R.A., Rose-Koga, E.F., Koga, K.T., Whitehouse, M.J., **Antonelli, M.A.**, Farquhar, J., Day, J.M.D., Hauri, E.H. Returning from the deep: atmospheric fingerprints in modern hotspot lavas. AGU Fall meeting, San Francisco, December 2013.
4. **Antonelli, M.A**[†]**.**, Peters, M., Farquhar, J. Multiple Sulfur Isotope Analyses of Iron Meteorites: Implications for Nebular Evolution 44th Lunar and Planetary Science Conference, #1279, March 2013.
3. Cabral, R.A., Jackson, M.G.[*], Rosa-Koga, E.F., Koga, K.T., Whitehouse, M.J., **Antonelli, M.A.**, Farquhar, J., Day, J.M.D., Hauri, E.H. Mass independently fractionated sulfur isotopes in

HIMU lavas reveal Archean crust in their mantle source. V.M. Goldschmidt Conference, Florence, 2013.

2. Jackson, M.G.*, Cabral, R.A., Rose-Koga, E.F., Koga, K.T. Whitehouse, M.J., **Antonelli, M.A.**, Farquhar, J., Day, J.M.D., Hauri, E.H. Mass Independently Fractionated Sulfur Isotopes Reveal Recycling of Archean Lithosphere in Oceanic Hotspots. European Geosciences Union General Assembly, Vienna, 2013.
1. **Antonelli, M.A.***, Peters, M., Farquhar, J. The Sulfur Isotopic Compositions of Magmatic and Non-Magmatic Iron Meteorites. 43rd Lunar and Planetary Science Conference, #2081, March 2012.

INVITED LECTURES (ACADEMIA, NON-CONFERENCE)

2024 University of Texas – Austin (Sept. 12)

Rice University (Aug. 29)

2023 University of Toronto (Apr. 20)

University of Florida (Feb. 23)

University of Houston (Feb. 20)

Florida Atlantic University (Feb. 3)

2022 University of Tokyo (Nov. 21)

Swedish Museum of Natural History (Nov. 18)

Australian National University (June 17)

Woods Hole Oceanographic Institution (May 23)

Zhejiang University (May 18)

2021 University of Geneva (Nov. 30)

University of Bern (Nov. 26)

SwissSIMS Ion probe national facility (Aug. 26)

2020 ETH Zürich (June 10)

2019 ETH Zürich (May 9)

Institut de Physique du Globe de Paris (March 11)

TEACHING EXPERIENCE

Course Instructor

University of Houston, Dept. of Earth and Atmospheric Sciences

Geol 3370 – Mineralogy (Fall 2024)

Geol 1303 – Physical Geology (Spring 2024)

Guest Lecturer

University of Bern, Institute of Geology

Isotopic fractionation in geological processes, Nov. 25, 2021

Eidgenössische Technische Hochschule (ETH) Zürich

Stable & radiogenic Ca isotopes (and stable isotopes in general), Oct. 9, 2020

University of California – Berkeley, Dept. of Earth and Planetary Science

Stable Isotopes and Ice Ages, April 11, 2017

Geologic History of the Atmosphere and Oceans, April 18, 2017

Teaching Assistant

University of California – Berkeley, Dept. of Earth and Planetary Science

EPS 102. History and Evolution of Planet Earth. Course Leader: M.A. Richards (2017)

EPS 119. Geologic Field Studies. Course Leader: D.J. DePaolo (2018)

STUDENTS AND POSTDOCS MENTORED

Amberlee Enger, UH EAS – M.S. student	2024 –
Zachary Guess, UH EAS – M.S. student	2024 –
Suraj Singh Chauhan, UH EAS – Postdoctoral scholar	2024 –

PROFESSIONAL SERVICE AND OUTREACH

Journal Reviewer (>50 articles in 17 different journals)

Proceedings of the National Academy of Sciences; Science Advances; Nature Geoscience; Geology; Geochemical Perspectives Letters; PNAS Nexus; Communications Earth & Environment; Earth and Planetary Science Letters; Geochimica et Cosmochimica Acta; Lithos; Geophysical Research Letters; Precambrian Research; Chemical Geology; Journal of Geophysical Research: Solid Earth; Geochemistry, Geophysics, Geosystems; Marine Geology; Minerals; AGU Books.

Proposal Reviewer

National Science Foundation (NSF, 2023, 2024)

French National Centre for Scientific Research (CNRS, 2021)

Session Convener

Beyond equilibrium: Kinetic isotope fractionation in high-T environments, AGU Fall Meeting, New Orleans, USA, December 2021 (primary convenor and chair)

Calcium isotope geochemistry: from carbonates to comets, V.M Goldschmidt Conference, Lyon, France, July 2021 (co-convenor)

Crust-Mantle Processes: A Stable Isotope Perspective, V.M. Goldschmidt Conference, Yokohama, Japan, June 2016 (co-convenor)

Departmental and University Service

UH Carbon Capture and Utilization Strategies (CCUS) Graduate Certificate Program Development Committee (Fall 2024)

Outreach

Judge: BSc Poster Fair, Dept. of Earth Sciences, ETH-Zurich (May 30, 2022)

Judge: Outstanding Student Presentation Award (OSPA*)*, AGU Conference (Dec. 2021)

Member: We/Men, organization for the promotion of gender equality in Switzerland (July 2021 – present), https://we-men.net/support

Science Fair Project Mentor (7th grade students): Community Resources for Science - *Be a Scientist* program, Willard Middle School, Berkeley, California, USA (March 11 – April 29, 2017) https://crscience.org/outreach/beascientist/

Guest Judge (w/ James Farquhar)*:* Earth-Sciences Category, Prince George's Area Science Fair, Maryland, USA (March 9, 2013)

Society Memberships

Geochemical Society, American Geophysical Union, Houston Geological Society