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Education

2016 - 2020 **PhD** University of British Columbia (Vancouver, BC)
2012 - 2015 **MSc** University of British Columbia (Vancouver, BC)
2006 - 2010 **BA** Colorado College (Colorado Springs, CO)

Research and Teaching Experience

2023 - present **Research Scientist/Lab Manager** Rice University (Houston, TX)
2021 - 2023 **NSF Postdoctoral Fellow** University of Minnesota (Minneapolis, MN)
2020 - 2021 **Postdoctoral Associate** University of Minnesota (Minneapolis, MN)
2012 - 2020 **Research Assistant** University of British Columbia (Vancouver, BC)
2012 - 2018 **Teaching Assistant** University of British Columbia (Vancouver, BC)
2011 - 2012 **Contractor** Massachusetts Geological Survey (Amherst, MA)
2009 **Volunteer** Colima Exchange and Research in Volcanology (Colima, Mexico)

Awards and Funding

2023 - 2025 **Postdoctoral Fellowship** Alexander von Humboldt Foundation (*declined*)
2021 - 2023 **Postdoctoral Fellowship** National Science Foundation
2021 **Léopold Gélinas Gold Medal** Geological Association of Canada
2017, 2018 **Graduate Student Research Grant** Geological Society of America
2016 - 2020 **Four Year Doctoral Fellowship** University of British Columbia
2014, 2018 **Travel Grant** Mineralogical Association of Canada
2015 **Léopold Gélinas Silver Medal** Geological Association of Canada
2013 **Foundation Scholarship** Mineralogical Association of Canada
2010 **Association for Women Geoscientists Award** Colorado College
2009 **Buster Research Scholarship** Colorado College
2008, 2009 **Venture Grant** Colorado College

Collaborative Grants

- 2023 - 2026 **Co-PI** (unnamed) Standard Grant, Geophysics, EAR, NSF
"The rheological behavior of gouge at high temperature" (EAR-2240734)
- 2023 - 2026 **Project Partner** Pushing the Frontiers, UKRI, NERC
"Explosive-effusive volcanic eruption transitions caused by pyroclast sintering" (NE/X015440/1)

Service

- 2024 - present **Technical Editor** Volcanica
- 2022 **Participant** SZ4D Experimental Rock Deformation Workgroup
- 2017 - present **Peer Reviewer** Bulletin of Volcanology; Contributions to Mineralogy and Petrology; Earth and Planetary Science Letters; Geochemistry, Geophysics, Geosystems; Geology; Geophysical Journal International; Geophysical Research Letters; Journal of Volcanology and Geothermal Research; Transport in Porous Media

Invited Talks

- 2024 **Texas A&M** College Station, TX
- 2023 **Lamont-Doherty Earth Observatory** Palisades, NY
- 2023 **University of Georgia** Athens, GA
- 2021 **University at Buffalo** Buffalo, NY
- 2021 **GAC Volcanology and Igneous Petrology Division** virtual
- 2021 **University of Liverpool** virtual
- 2021 **Norwegian University of Science and Technology** virtual
- 2020 **United States Geological Survey** virtual

Articles

h-index: 13 (August 2025), † graduate student at Rice University

- 22. Ryan, A.G.**, Ferrante, G.†, Park, J.G.†, Michalsky, G., Gonnermann, H., French, M.E.
Outgassing of bubbly melts during deformation – an evolution from fracturing to coalescence with decreasing Deborah number. *In preparation.*
- 21. Ryan, A.G.**, Russell, J.K., Hansen, L.N., Heap, M.J., Savage, H. Solid-state sintering can cause explosivity and seismogenic unstable sliding during dome-building eruptions.

Journal of Geophysical Research: Solid Earth, 130, e2025JB032128.

<https://doi.org/10.1029/2025JB032128>

20. Ferrante, G.[†], Gonnermann, H.M., Fliedner, C., Giachetti, T., **Ryan, A.G.** (2025) Viscosity of bubbly magmas from torsion experiments on pumice. *Journal of Volcanology and Geothermal Research*, 461, 108297. <https://doi.org/10.1016/j.jvolgeores.2025.108297>
19. **Ryan, A.G.**, Hansen, L.N., Dillman, A., Pistone, M., Zimmerman, M.E., Williams, S.A.[†] (2025) Shear-induced dilation and dike formation during mush deformation. *Earth and Planetary Science Letters*, 651, 119164. <https://doi.org/10.1016/j.epsl.2024.119164>
18. Kereszturi, G., Heap, M.J., Schaefer, L.N., Darmawan, H., Deegan, F., Kennedy, B., Komorowski, J.-C., Mead, S., Rosas-Carbajal, M., **Ryan, A.G.**, Troll, V., Villeneuve, M., Walter, T. (2023) Estimating the strength and porosity of volcanic rocks using reflectance spectroscopy. *Earth and Planetary Science Letters*, 602, 117929. <https://doi.org/10.1016/j.epsl.2022.117929>
17. **Ryan, A.G.**, Hansen, L.N., Zimmerman, M.E., Pistone, M. (2022) Melt migration in crystal mushes by viscous fingering: insights from high-temperature, high-pressure experiments. *Journal of Geophysical Research: Solid Earth*, 127, e2022JB024447. <https://doi.org/10.1029/2022JB024447>
16. Heap, M.J., Jessop, D.E., Wadsworth, F.B., Rosas-Carbajal, M., Komorowski, J.-C., Gilg, A., Aron, N., Buscetti, M., Gential, L., Goupil, M., Masson, M., Hervieu, L., Kushnir, A.R.L., Baud, P., Carbillet, L., **Ryan, A.G.**, Moretti, R. (2022) The thermal properties of hydrothermally altered andesites from La Soufrière de Guadeloupe (Eastern Caribbean). *Journal of Volcanology and Geothermal Research*, 421, 107444. <https://doi.org/10.1016/j.jvolgeores.2021.107444>
15. Heap, M.J., Baumann, T., Gilg, H.A., Kolzenburg, S., **Ryan, A.G.**, Villeneuve, M., Russell, J.K., Kennedy, L.A., Rosas-Carbajal, M., Clynne, M.A. (2021) Hydrothermal alteration can result in pore pressurization and volcano instability. *Geology*, 49, 1348-1352. <https://doi.org/10.1130/G49063.1>
14. Sicola, S., Vona, A., **Ryan, A.G.**, Russell, J.K., Romano, C. (2021) The effect of pores (fluid-filled vs. drained) on magma rheology. *Chemical Geology*, 569, 120147. <https://doi.org/10.1016/j.chemgeo.2021.120147>
13. **Ryan, A.G.**, Russell, J.K., Heap, M.J., Zimmerman, M.E., Wadsworth, F.B. (2020) Timescales of porosity and permeability loss by solid-state sintering. *Earth and Planetary Science Letters*, 549, 116533. <https://doi.org/10.1016/j.epsl.2020.116533>
12. **Ryan, A.G.**, Heap, M.J., Russell, J.K., Kennedy, L.A., Clynne, M.A. (2020) Cyclic shear zone cataclasis and sintering during lava dome extrusion: Insights from Chaos Crags, Lassen Volcanic Center (USA). *Journal of Volcanology and Geothermal Research*, 401, 106935. <https://doi.org/10.1016/j.jvolgeores.2020.106935>
11. Kolzenburg, S., **Ryan, A.G.**, Russell, J.K. (2019) Permeability evolution during non-isothermal compaction in volcanic conduits and tuffsite veins: Implications for pressure monitoring of volcanic edifices. *Earth and Planetary Science Letters*, 527, 115783. <https://doi.org/10.1016/j.epsl.2019.115783>
10. **Ryan, A.G.**, Russell, J.K., Heap, M.J., Kolzenburg, S., Vona, A., Kushnir, A.R.L. (2019) Strain-dependent rheology of silicate melt foams: importance for outgassing of silicic lavas.

- Journal of Geophysical Research: Solid Earth, 124, 8167-8186.
<https://doi.org/10.1029/2019JB018099>
9. **Ryan, A.G.**, Kolzenburg, S., Vona, A., Heap, M.J., Russell, J.K., Badger, S. (2019) A proxy for magmatic foams: FOAMGLAS®, a closed-cell glass insulation. *Journal of Non-Crystalline Solids: X*, 1, 100001. <https://doi.org/10.1016/j.nocx.2018.100001>
 8. **Ryan, A.G.**, Russell, J.K., Heap, M.J. (2018) Rapid solid-state sintering in volcanic systems. *American Mineralogist*, 103, 2028-2031. <https://doi.org/10.2138/am-2018-6714>
 7. Zorn, E.H., Rowe, M.C., Cronin, S.J., **Ryan, A.G.**, Kennedy, L.A., Russell, J.K. (2018) Influence of porosity and groundmass crystallinity on dome rock strength; a case study from Mt. Taranaki, New Zealand. *Bulletin of Volcanology*, 80, 35. <https://doi.org/10.1007/s00445-018-1210-8>
 6. **Ryan, A.G.**, Friedlander, E.A., Russell, J.K., Heap, M.J., Kennedy, L.A. (2018) Hot pressing in conduit faults during lava dome extrusion: Insights from Mount St. Helens 2004-2008. *Earth and Planetary Science Letters*, 482, 171-180. <https://doi.org/10.1016/j.epsl.2017.11.010>
 5. Newton, D.E., **Ryan, A.G.**, Hilchie, L.J. (2018) Competence and lithostratigraphy of host rocks govern kimberlite pipe morphology. *Canadian Journal of Earth Sciences*, 55, 130-137. <https://doi.org/10.1139/cjes-2017-0019>
 4. Vona, A., **Ryan, A.G.**, Russell, J.K., Romano, C. (2016) Models for viscosity and shear localization in bubble-rich magmas. *Earth and Planetary Science Letters*, 449, 26-38. <https://doi.org/10.1016/j.epsl.2016.05.029>
 3. **Ryan, A.G.**, Russell, J.K., Hess, K.-U., Phillion, A.B., Dingwell, D.B. (2015) Vesiculation in rhyolite at low H₂O contents: A thermodynamic model. *Geochemistry, Geophysics, Geosystems*, 16, 4292-4310. <https://doi.org/10.1002/2015GC006024>
 2. **Ryan, A.G.**, Russell, J.K., Nichols, A.R.L., Hess, K.-U., Porritt, L.A. (2015) Experiments and model on H₂O retrograde solubility in volcanic systems. *American Mineralogist*, 100, 774-786. <https://doi.org/10.2138/am-2015-5030>
 1. Heap, M.J., Kolzenburg, S., Russell, J.K., Campbell, M.E., Welles, J., Farquharson, J.I., **Ryan, A.** (2014) Conditions and time-scales for welding block-and-ash flow deposits. *Journal of Volcanology and Geothermal Research*, 289, 202-209. <https://doi.org/10.1016/j.jvolgeores.2014.11.010>

Theses

3. **Ryan, A.G.** (2020) The timescales and consequences of solid-state sintering in volcanic systems. PhD thesis, UBC, 149 p. <https://dx.doi.org/10.14288/1.0392654>
2. **Ryan, A.G.** (2014) Water solubility and bubble growth dynamics in rhyolitic silicate melts at atmospheric pressure. MSc thesis, UBC, 138 p. <https://dx.doi.org/10.14288/1.0165561>
1. **Ryan, A.** (2010) Lava Flow Morphology and Rheology at Volcan de Colima, Mexico. BA thesis, CC, 158 p.

Databases

2. Rhodes, J.M., Koteas, C.G., Mabee, S.B., **Ryan, A.**, Isaacson, M. (2013) The Massachusetts Geothermal Data Project. Retrieved from <http://mgs.geo.umass.edu/biblio/massachusetts-geothermal-data-project> (last accessed Aug 2025).
1. Gagnon, T.K., Koteas, G.C., Steinen, R.P., **Ryan, A.**, Thomas, M.A. (2013) Connecticut Geothermal Energy Project Map Series. Retrieved from <https://portal.ct.gov/DEEP/Geology/Geothermal-Research> (last accessed Aug 2025).

Conference Presentations

- * presenter, ^ invited, † graduate student at Rice University, § undergraduate student (REU)
49. Wiesman, H.S.* , Hansen, L.N., Okamoto, K., Savage, H.M., **Ryan, A.G.** (2025) Frictional properties of quartz gouge at elevated temperatures (poster). AGU Fall Meeting, New Orleans, LA, USA.
 48. **Ryan, A.G.***, Ferrante, G.†, Park, J.G.†, Michalsky, G., Gonnermann, H., French, M.E. (2025) Outgassing of bubbly melts during deformation – an evolution from fracturing to coalescence with decreasing Deborah number (talk). AGU Fall Meeting, New Orleans, LA, USA.
 47. Guise, M.C.* §, **Ryan, A.G.**, French, M.E. (2024) Time-dependent permeability of proppant-filled fractures in Sierra White granite (poster). AGU Fall Meeting, Washington, DC, USA.
 46. Okamoto, K.K.* , **Ryan A.G.**, Savage, H.M., Hansen, L.N., Dillman, A. (2024) Dislocation density as a control on the frictional strength of fault gouge (poster). AGU Fall Meeting, Washington, DC, USA.
 45. **Ryan, A.G.***, Ferrante, G.†, Michalsky, G. (2024) Outgassing of bubble-rich magmas (poster). Gordon Research Conference, Lewiston, ME, USA.
 44. Okamoto, K.K.* , **Ryan, A.G.**, Savage, H.M., Hansen, L.N., Dillman, A.M. (2023) Dislocation density as a control on the frictional strength of fault gouge (poster). Gordon Research Conference, Lewiston, ME, USA.
 43. Okamoto, K.K.* , **Ryan, A.G.**, Savage, H.M., Hansen, L.N., Dillman, A.M. (2023) Dislocation density as a control on the frictional strength of fault gouge (talk). AGU Fall Meeting, San Francisco, CA, USA.
 42. Bieber-Stanley, R.*§ , **Ryan, A.G.**, Dillman, A.M., Hansen, L.N. (2023) Experimental investigation into the brittle failure envelopes of porous olivine aggregates (poster). AGU Fall Meeting, San Francisco, CA, USA.
 41. **Ryan, A.G.***, Hansen, L.N., Zimmerman, M.E., Pistone, M. (2023) Rapid melt migration as mushes “unlock” during high-temperature, high-pressure experiments (talk). IAVCEI Scientific Assembly, Rotorua, NZ.

40. Kereszturi, G.*, Heap, M.J., Schaefer, L.N., Darmawan, H., Deegan, F., Kennedy, B., Komorowski, J.-C., Mead, S., Rosas-Carbajal, M., **Ryan, A.G.**, Troll, V., Villeneuve, M., Walter, T. (2023) Porosity, strength, and alteration – Volcano stability assessment using VNIR-SWIR reflectance spectroscopy (poster). IAVCEI Scientific Assembly, Rotorua, NZ.
- [^] 39. **Ryan, A.G.***, Hansen, L.N., Zimmerman, M.E., Russell, J.K., Heap, M.J., Savage, H. (2022) Granular flow vs. sintering in high-temperature shear zones (talk). AGU Fall Meeting, Chicago, IL, USA.
38. **Ryan, A.G.***, Hansen, L.N., Zimmerman, M.E., Pistone, M. (2022) Rapid melt migration when mushes “unlock”: observations from high-temperature, high-pressure experiments (talk). AGU Fall Meeting, Chicago, IL, USA.
37. Caban, I.*[§], Hansen, L.N., **Ryan, A.G.**, Dillman, A.M. (2022) Experimental welding of the Bishop Tuff (poster). AGU Fall Meeting, Chicago, IL, USA.
36. Kreeger, L.*[§], Dillman, A.M., **Ryan, A.G.**, Hansen, L.N. (2022) Constraints on the conditions for bubble connection and degassing in silicic melts as revealed by deformation of FOAMGLAS (poster). AGU Fall Meeting, Chicago, IL, USA.
35. **Ryan, A.G.***, Hansen, L.N., Zimmerman, M.E., Russell, J.K., Heap, M., Savage, H. (2022) The competition between shearing and sintering in volcanic fault gouge (poster). Gordon Research Conference, Lewiston, ME, USA.
34. **Ryan, A.G.***, Hansen, L.N., Zimmerman, M.E., Pistone, M. (2022) An experimental study of melt migration in crystal-rich mushes (talk). EGU General Assembly, Vienna, Austria.
33. Kereszturi, G.*, Heap, M., Schaefer, L., Darmawan, H., Deegan, F., Kennedy, B., Komorowski, J.-C., Rosas-Carbajal, M., **Ryan, A.G.**, Troll, V., Villeneuve, M., Walter, T. (2022) Towards a global spectral-geomechanical database of volcanic rocks (talk). EGU General Assembly, Vienna, Austria.
32. Heap, M.J.*, Baumann, T., Gilg, H.A., Kolzenburg, S., **Ryan, A.G.**, Villeneuve, M., Russell, J.K., Kennedy, L.A., Rosas-Carbajal, M., Clynne, M.A. (2022) Hydrothermal alteration can result in pore pressurization and volcano instability (talk). Volcanic and Magmatic Studies Group Annual Meeting, virtual.
31. Kolzenburg, S.K.*, **Ryan, A.G.**, Heap, M.J., Russell, J.K. (2021) Flow to fracture – the effective viscosity of dome lavas from Chaos Crags (poster). AGU Fall Meeting, New Orleans, Louisiana, USA.
30. **Ryan, A.G.***, Zimmerman, M.E., Hansen, L.N. (2021) Deformation driven magma ascent in stratified magma reservoirs: an experimental study (vPICO). EGU General Assembly, virtual.
- [^] 29. **Ryan, A.G.***, Russell, J.K., Heap, M.J., Zimmerman, M.E., Wadsworth, F.B. (2020) Rapid healing of crystal-rich granular materials in volcanic and high-temperature upper-crustal environments: implications for fluid flow and deformation (talk). AGU Fall Meeting, virtual.
28. **Ryan, A.G.***, Heap, M.J., Russell, J.K., Kennedy, L.A., Clynne, M.A. (2020) Recovering ascent rates and eruption dynamics from the properties of sintered volcanic shear zones: A case study from Chaos Crags, Lassen Volcanic Center (USA) (talk). AGU Fall Meeting, virtual.

27. Sicola, S.*, Vona, A., Romano, C., **Ryan, A.G.**, Russell, J.K. (2020) The rheological behavior of porous magmas: Bubbles vs. Vesicles (talk). Goldschmidt Conference, virtual.
26. **Ryan, A.G.***, Russell, J.K., Heap, M.J., Vona, A., Kolzenburg, S., Kushnir, A.R.L. (2019) The onset of bubble coalescence and melt fracturing in impermeable melt foams: implications for efficient outgassing of bubbly magmas (talk). IUGG General Assembly, Montreal, Quebec, Canada.
25. **Ryan, A.G.***, Russell, J.K., Wadsworth, F.B., Heap, M.J. (2019) Timescales for healing of crystalline aggregates within volcanic environments: insights from sintering experiments and modeling (talk). IUGG General Assembly, Montreal, Quebec, Canada.
24. Kolzenburg, S.*, **Ryan, A.G.**, Russell, J.K. (2019) Permeability evolution during non-isothermal compaction in volcanoclastic deposits: Implications for outgassing patterns of explosive volcanoes (talk). IUGG General Assembly, Montreal, Quebec, Canada.
23. Sicola, S.*, Vona, A., Romano, C., **Ryan, A.G.**, Russell, J.K. (2019) Rheological behaviour of porous magmas (poster). IUGG General Assembly, Montreal, Quebec, Canada.
22. Kolzenburg, S.*, **Ryan, A.G.**, Russell, J.K. (2019) Non-isothermal viscous compaction of volcanoclastic deposits: Implications for volcanic outgassing (talk). GAC-MAC-IAH Conference, Quebec City, Quebec, Canada.
21. Sicola, S.*, Vona, A., Romano, C., **Ryan, A.G.**, Russell, J.K. (2018) Pores vs. bubbles: a rheological study (talk). Cities on Volcanoes Conference, Napoli, Italy.
20. **Ryan, A.G.**, Russell, J.K.*, Heap, M.J. (2018) Solid-state sintering contributes to cyclical explosive activity at dome-producing volcanoes (poster). Cities on Volcanoes Conference, Napoli, Italy.
19. **Ryan, A.G.**, Heap, M.J., Kolzenburg, S., Vona, A., Russell, J.K.* (2018) FOAMGLAS®: An ideal proxy for natural magmatic foams (poster). Cities on Volcanoes Conference (COV10), Napoli, Italy.
18. **Ryan, A.***, Heap, M.J., Russell, J.K., Kolzenburg, S., Vona, A. (2018) Permeability development in high porosity foams (poster). EGU General Assembly, Vienna, Austria.
17. **Ryan, A.***, Russell, J.K., Heap, M.J. (2018) Solid-state sintering drives rapid permeability loss in the volcanic conduit (talk). EGU General Assembly, Vienna, Austria.
16. Sicola, S.*, Vona, A., Romano, C., **Ryan, A.G.**, Russell, J.K. (2018) In-situ high-temperature rheology of pore-bearing magmas (poster). EGU General Assembly, Vienna, Austria.
15. Kolzenburg, S.*, **Ryan, A.G.**, Russell, J.K. (2018) Post eruptive permeability evolution of volcanic conduits and tuffisites (talk). EGU General Assembly, Vienna, Austria.
14. **Ryan, A.G.***, Friedlander, E.A., Russell, J.K., Heap, M.J., Kennedy, L.A. (2017) Solid-state sintering as a lithification mechanism in volcanic conduits (talk). Canadian Tectonics Group Workshop, Kelowna, British Columbia, Canada.
13. Sicola, S.*, Vona, A., Romano, C., **Ryan, A.G.**, Russell, J.K. (2017) Rheology of H₂O-filled bubble-bearing magmas: experimental determination at low strain rates (poster). Joint Congress of the Italian Geological Society, Pisa, Italy.
12. **Ryan, A.G.***, Friedlander, E.A., Russell, J.K., Heap, M.J., Kennedy, L.A. (2017) Hot pressing of gouge during the 2004-2008 eruption of Mount St. Helens (talk). IAVCEI Scientific Assembly, Portland, Oregon, USA.

11. **Ryan, A.G.***, Russell, J.K., Heap, M.J. (2017) Hot pressing and lithification of gouge during the Mount St. Helens 2004-2008 eruption: insights from high temperature deformation experiments (poster). EGU General Assembly, Vienna, Austria.
10. Zorn, E.* , Rowe, M.C., Cronin, S.J., **Ryan, A.**, Kennedy, L.A., Russell, J.K. (2016) Geochemistry and groundmass crystallinity controls on the physical properties and stability of the Mount Taranaki lava dome (talk). GSNZ Annual Conference, Dunedin, New Zealand.
9. Vona, A.* , **Ryan, A.G.**, Russell, J.K., Romano, C. (2016) Experiments on the rheology of vesicle-bearing magmas (talk). EGU General Assembly, Vienna, Austria.
8. Heap, M.J.* , Vona, A., Kolzenburg, S., **Ryan, A.G.**, Russell, J.K. (2016) Impermeable high-porosity magmas (poster). EGU General Assembly, Vienna, Austria.
7. Vona, A.* , **Ryan, A.G.**, Russell, J.K., Romano, C. (2015) Viscosity of bubble-rich melts (poster). Silicate Melts Workshop, La Petite Pierre, France.
6. **Ryan, A.G.**, Russell, J.K.* , Hess, K.-U., Phillion, A.B., Dingwell, D.B. (2015) Vesiculation in rhyolite at low H₂O contents: A thermodynamic model (poster). Silicate Melts Workshop, La Petite Pierre, France.
5. Newton, D.* , **Ryan, A.G.**, Porritt, L.A. (2014) Experimental modelling of the effect of country rock competence on kimberlite eruptive style (talk). GSA Annual Meeting, Vancouver, British Columbia, Canada.
4. **Ryan, A.G.***, Russell, J.K., Nichols, A.R.L., Porritt, L.A., Friedlander, E.A. (2014) Water solubility in rhyolitic silicate melts at atmospheric pressure (talk). EGU General Assembly, Vienna, Austria.
3. Koteas, C.* , Rhodes, M., Mabee, S., **Ryan, A.**, Schmidt, J., League, C., Goodhue, N., Adams, S., Gagnon, T., Thomas, M. (2012) Implications for non-traditional geothermal resources in southern New England: Variability in heat potential based on thermal conductivity and geochemistry studies (talk). Northeastern GSA Section Meeting, Hartford, Connecticut, USA.
2. Mabee, S.* , Koteas, C., Rhodes, M., Gagnon, T., **Ryan, A.**, Schmidt, J., Nathan, S. (2012) Thermal conductivity of surficial materials: An aid to ground source heat pump design (talk). Northeastern GSA Section Meeting, Hartford, Connecticut, USA.
1. Varley, N.* , Arambula, R., Lavallee, Y., Bernstein, A., **Ryan, A.**, Maskell, A. (2009) Magma ascent and lava dome evolution at Volcán de Colima, Mexico (talk). AGU Fall Meeting, San Francisco, California, USA.