

Kenneth Befus

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Highlights

- + 5th year assistant professor at Baylor University
- + Awarded \$532k NSF CAREER grant to study strain in crystals
- + Published 25+ papers (13 first author)
- + Blaustein Visiting Scholar at Stanford University
- + NSF funding to date >\$850k

Education

- 2014 **Ph.D. in Geology**
University of Texas at Austin
 - 2006 **M.S. in Geology**
Texas Christian University
 - 2003 **B.S. in Geology**
Texas Christian University
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Positions

- 2015 – Now **Baylor University**
Assistant Professor
Department of Geosciences
- 2014 – 2015 **Stanford University**
Blaustein Visiting Professor
- 2009 – 2014 **University of Texas at Austin**
Teaching and Research Assistant
Jackson School of Geosciences
- 2007 – 2008 **Bear Creek School**
K-12 Teacher
Washington
- 2005 – 2006 **Texas Christian University**
Teaching Assistant
Geology Department

Grants

- 2020 National Science Foundation
Are embayments faithfully wedded to magma ascent?
\$144,600
 - 2020 NSF CAREER
Measuring the tectonic and volcanic stresses in crystals
\$532,850
 - 2017 National Science Foundation
Residual stress preserved in crystals from explosive and effusive eruptions
\$128,100
 - 2017 National Science Foundation
An integrated study of silicic lava flow emplacement
\$46,700
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Publications

(h-index=12, citations=360)

1. **Befus, K.S.**, Walowski, K.J., Hervig, R.L., Cullen, J.T., Hydrogen isotope composition of a large silicic magma reservoir preserved in quartz-hosted glass inclusions of the Bishop Tuff Plinian eruption, G-Cubed, in press.
2. Bassoo, R. (iGraduate student paper!), **Befus, K.S.**, Forman, S.L., Kopylova, M., 2020, Paragenesis and provenance of Guyana's diamonds, *American Mineralogist*, v. 105, 7486.
3. Andrews, B. J., **Befus, K. S.**, 2020, Supersaturation nucleation and growth of plagioclase: a numerical model of decompression induced crystallization, *Contributions to Mineralogy and Petrology*, v. 175, p. 1-20.
4. Leggett, T.N. (iGraduate student paper!), **Befus, K.S.**, Kenderes, S.M., 2020, Rhyolite lava emplacement dynamics inferred from surface morphology, *Journal of Volcanology and Geothermal Research*, v. 395, 106850.
5. Singleton, J., Rahl, J., **Befus, K.S.**, 2020, Rheology of a coaxial shear zone in the Virginia Blue Ridge: Wet quartzite dislocation creep at ~200-280 C, *Journal of Structural Geology*, 104109.
6. Sun, N., Brandon, A.D., Forman, S.L., Waters, M.R., **Befus, K.S.**, Stafford, T.W., 2020, Osmium isotope and highly siderophile element evidence for a volcanic origin of the Younger Dryas event, *Scientific Advances*, v. 6, EABB.
7. Cisneros, M., **Befus, K.S.**, 2020, New potential applications of elastic thermobarometry: insights from elastic modeling of inclusion-host pairs and example case studies, G-Cubed, 10.1029/2020GC009231.
8. **Befus, K.S.**, Manga, M., Stan, C., Tamura, N., 2019, Volcanoes erupt stressed quartz crystals, *Geophysical Research Letters*, v. 46, p. 8791-8800.
9. **Befus, K.S.**, Manga, M., 2019, Lava Creek Tuff and the hollow reentrants, *Geology*, v. 47(8), p. 710-714.
10. **Befus, K. S.**, & Andrews, B. J., 2018, Crystal nucleation and growth produced by continuous decompression of Pinatubo magma, *Contributions to Mineralogy and Petrology*, v. 173(11), p. 92.
11. **Befus, K.S.**, Lin, J-F., Cisneros, M., Fu, S., 2018, Feldspar Raman shift and application as a magmatic thermobarometer, *American Mineralogist*, v.103, p. 600-609.
12. Gardner, J.E., Llewellyn, E.W., Watkins, J.M., **Befus, K.S.**, 2017, Formation of obsidian pyroclasts by sintering of ash particles in the volcanic conduit, *Earth and Planetary Science Letters*, v. 459, p. 252-263.
13. Watkins, J.M., Gardner, J.E., **Befus, K.S.**, 2017, Nonequilibrium degassing, regassing, and vapor fluxing in magmatic feeder systems, *Geology*, 45, p. 252-263.

14. Gardner J.E., **Befus, K.S.**, Watkins, J.M., Clow, T., 2016, Nucleation Rates of Spherulites in Natural Rhyolitic Lava, *American Mineralogist*, v. 101, p. 2367-2376.
15. **Befus, K.S.**, 2016, Natural crystallization kinetics in rhyolitic melts using oxygen isotope thermometry: *Geophysical Research Letters*, v. 43(2), p. 592-599.
16. **Befus, K.S.** and Gardner, J.E., 2016, Magmatic storage conditions of the most recent eruptions at Yellowstone Caldera: *Contributions to Mineralogy and Petrology*, v. 171(4), p. 30.
17. **Befus, K.S.**, Manga, M., Gardner, J.E., Williams, M., 2015, Ascent and emplacement dynamics of obsidian lavas inferred from microlite textures: *Bulletin of Volcanology*, v. 77(10), p. 88.
18. **Befus, K.S.**, Watkins, J., Gardner, J.E., Richard, D., Befus, K.M., Miller, N.R., and Dingwell, D.B., 2015, Spherulites as geospeedometers in lava flows: *Geology*, v. 43, p. 647-650.
19. Gardner, J.E., **Befus, K.S.**, Ghiorso, M.S., Gualda, G.A.R., 2014, Experimental Constraints on Rhyolite-MELTS and the Bishop Tuff Eruption: *Contributions to Mineralogy and Petrology*, v. 168(2), p. 1051.
20. Gardner, J.E., **Befus, K.S.**, Miller, N.R., and Monecke, T., 2014, Cooling rates of Mid-Ocean ridge lava deduced from clinopyroxene spherulites: *Journal of Volcanology and Geothermal Research*, v. 282, p. 1-8.
21. Prather, T.J., Barnes, J.D., Cisneros, M., **Befus, K.S.**, Gardner, J.E., and Larson, T.E., 2014, Stable chlorine isotope behavior during volcanic degassing of H₂O and CO₂ at Mono Craters, CA: *Bulletin of Volcanology*, v. 76(3), p. 805.
22. **Befus, K.S.**, Zinke, R.W., Jordan, J., Manga, M., Gardner, J.E., 2014, Pre-eruptive storage conditions and eruption dynamics of Douglas Knob lava dome, Yellowstone volcanic field: *Bulletin of Volcanology*, v. 73, p. 1-12.
23. **Befus, K.S.**, Gardner, J.E., and Zinke, R., 2012, Analyzing volatile contents in unexposed glass inclusions in quartz crystals: *American Mineralogist*, v.97, p. 1898-1904.
24. Gardner, J.E., **Befus, K.S.**, Watkins, J., Hesse, M., and Miller, N., 2012, Compositional gradients surrounding spherulites in obsidian and their relationship to cooling and spherulite growth: *Bulletin of Volcanology*, v. 74, p. 1865-1879.
25. **Befus, K.S.**, Hanson, R.E., Breyer, J.A., Busbey, A.B., Miggins, D.P., 2009, Nonexplosive and explosive magma/wet-sediment interaction during emplacement of Eocene intrusions into Cretaceous to Eocene strata, Trans-Pecos igneous province, West Texas: *Journal of Volcanology and Geothermal Research*, v.181, 155-172
26. **Befus, K.S.**, Hanson, R.E., Lehman, T., and Griffen, W.R., 2008, Cretaceous basaltic phreatomagmatic volcanism in West Texas: maar complex at Peña Mountain, Big Bend National Park: *Journal of Volcanology and Geothermal Research*, v. 173, p. 245-264.

Presentations

Geological Society of America

- 2019 Long Valley and Yellowstone calderas erupt stressed quartz crystals
- 2019 Supersaturation nucleation and growth of plagioclase
- 2016 Raman barometry for magmatic systems using feldspar and pyroxene
- 2014 Magmatic volatile contents of Yellowstone
- 2009 Cretaceous basaltic phreatomagmatic volcanism in West Texas

AGU

- 2017 Conduit and surface dynamics of silicic magmas and lavas (Chair session)
- 2017 What can inclusions tell us? Certainly more than pyroclasts (Chair session)
- 2017 Crystal textures produced by continuous decompression of Pinatubo magma
- 2016 Quartz phenocrysts preserve volcanic stresses at Long Valley and Yellowstone calderas
- 2015 Magma storage and evolution of the Central Plateau Member Rhyolites, Yellowstone
- 2014 Natural spherulite crystallization kinetics in rhyolitic melts
- 2013 Microscopic and macroscopic assessment of the emplacement of obsidian lavas
- 2012 Eruption dynamics of high silica rhyolite inferred from pyroxene and feldspar microlites
- 2011 Spherulites and cooling histories of obsidian lavas, Yellowstone
- 2010 Storage and eruption of large volumes of rhyolite lava: Example from Solfatara Plateau, Yellowstone

IAVCEI

- 2017 Bringing Raman barometry to the people
- 2017 Residual stresses in zircon from Bishop Tuff record volcanic stresses

Goldschmidt

- 2018 Lava Creek Tuff love

Invited Talks

- 2020 Smithsonian – Measuring crystal stresses
- 2020 University of Texas – Measuring the tectonic and magmatic stresses
- 2019 GSA – Supersaturation nucleation and growth of plagioclase
- 2019 University of Arizona – Raman and X-ray diffraction of gems and volcanic crystals
- 2017 Texas Christian University – Yellowstone caldera: Volcanic history and recent activity
- 2016 Austin Geological Society – Spherulites in Obsidian: more than a curiosity
- 2015 USGS Menlo Park Volcanology seminar series
- 2014 Miami University of Ohio – Geology Department seminar series
- 2014 Stanford University – Chain Gang Hard Rock brown bag
- 2013 USGS Menlo Park Volcanology seminar series
- 2013 Presented lecture at UT Quest Lifelong Learning Institute

Teaching

- + **Dynamic Earth**
Introduction to geosciences for majors and non-majors
- + **Gems and Gem Minerals**
Introduction to optics, gemology, and mineralogy to non-majors
- + **Igneous and Metamorphic Petrology**
Geology majors learn the formation and tectonic implications of high temperature rocks
- + **Mineralogy**
Geology majors learn theory and application of crystallography, mineral formation and systematic mineralogy
- + **Volcanology**
Graduate level, pre-eruptive magmatic triggers, conduit ascent, fragmentation, dispersal
- + **Volcanology Seminar**
Graduate level topical discussions and literature review

Service

Reviewed articles for:

- + *American Mineralogist*
- + *Bulletin of Volcanology*
- + *Earth and Planetary Science Letters*
- + *Frontiers in Earth Science*
- + *Geology*
- + *GSA Bulletin*
- + *Mineralogy and Petrology*
- + *Nature Communications*
- + *Volcanology and Geothermal Research*

Reviewed proposals for:

- + National Science Foundation

Participated in:

- + Mineralogical Society of America
- + United States Faceting Guild