

Kenneth S. Befus

APPOINTMENTS

2023 – current Associate Professor of Practice, Jackson School of Geosciences, University of Texas at Austin
2015 – 2023 Assistant to Associate Professor, Geosciences, Baylor University
2014 – 2015 Blaustein Visiting Scholar, Stanford University
2009 – 2014 Teaching and Research Assistant, Jackson School of Geosciences, University of Texas at Austin
2007 – 2008 K-12 Teacher, Bear Creek School, Redmond, WA
2005 – 2006 Teaching Assistant, Geology Department, Texas Christian University

PUBLICATIONS

Befus, K.S., Ruefer, A.C., Allison, C.M., Thompson, J.O., 2023, Quartz-hosted inclusions and embayments reveal storage, fluxing, and ascent of the Mesa Falls Tuff, Yellowstone, Earth and Planetary Science Letters, 10.1016/j.epsl.2022.117909.

Sonder, I., Graettinger, A., Neilsen, T. B., Matoza, R. S., Taddeucci, J., Oppenheimer, J., Lev, E., Befus, K. S., 2022, Experimental Multiblast Craters and Ejecta—Seismo-Acoustics, Jet Characteristics, Craters, and Ejecta Deposits and Implications for Volcanic Explosions, Journal of Geophysical Research: Solid Earth, 127(8), e2022JB023952.

Thompson, J.O., Contreras-Arratia, R., Befus, K.S., Ramsey, M.S., 2022, Thermal and seismic precursors to the explosive eruption at La Soufriere Volcano, St. Vincent in April 2021, Earth and Planetary Science Letters, 10.1016/j.epsl.2022.117621.

Bassoo, R., Befus, K., 2022. A look at diamonds and diamond mining in Guyana. Gems & Gemology, 58(2).

Ruefer, A.C., Befus, K.S., Thompson, J.O., Andrews, B.J., 2021, Implications of multiple disequilibrium textures in quartz-hosted embayments, Frontiers in Earth Science, 10.3389/feart.2021.742895.

Bassoo, R., and Befus, K.S., 2021, Composition of the sub-cratonic mantle of the Guiana Shield inferred from diamond-hosted inclusions, G-cubed, 10.1029/2021GC009841.

Bassoo, R., Befus, K.S., Forman, S.L., Kopylova, M., 2021, Paragenesis and provenance of Guyana's diamonds, American Mineralogist, v. 105, 7486.

Befus, K.S., Walowski, K.J., Hervig, R.L., Cullen, J.T., 2020, Hydrogen isotope composition of a large silicic magma reservoir preserved in quartz-hosted glass inclusions of the Bishop Tuff Plinian eruption, G-cubed, 10.1029/2020GC009358.

Bassoo, R., Befus, K.S., 2020, Finders, keepers: Field trip to Crater of Diamonds, USA, Gems and Gemology, v. 56, 311-314.

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.

FUNDING

NSF CAREER – 2020
Measuring the tectonic and volcanic stresses preserved in crystals
\$532,850

NSF – 2020
Are embayments faithfully welded to magma ascent?
\$144,600

NSF – 2017
Residual stress preserved in crystals from explosive and effusive eruptions
\$128,100

NSF – 2017
An integrated study of silicic lava flow emplacement
\$46,700

Industry
Gems and Ore Minerals
\$6,000

EDUCATION

Ph.D. in Geology
University of Texas at Austin

M.S. in Geology
Texas Christian University

B.S. in Geology
Texas Christian University

PUBLICATIONS *cont.*

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.

Leggett, T.N., Befus, K.S., Kenderes, S.M., 2020, Rhyolite lava emplacement dynamics inferred from surface morphology, *Journal of Volcanology and Geothermal Research*, v. 395, 106850.

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.

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.

Befus, K.S., Manga, M., Stan, C., Tamura, N., 2019, Volcanoes erupt stressed quartz crystals, *Geophysical Research Letters*, v. 46, p. 8791-8800.

Befus, K.S., Manga, M., 2019, Lava Creek Tuff and the hollow reentrants, *Geology*, v. 47(8), p. 710-714.

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.

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.

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.

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.

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.

Befus, K.S., 2016, Natural crystallization kinetics in rhyolitic melts using oxygen isotope thermometry: *Geophysical Research Letters*, v. 43(2), p. 592-599.

Befus, K.S., and Gardner, J.E., 2016, Magmatic storage conditions of recent eruptions at Yellowstone Caldera: *Contributions to Mineralogy and Petrology*, v. 171(4), p. 30.

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.

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.

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.

PUBLICATIONS *cont.*

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.

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.

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.

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.

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.

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.

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: Meetings and Invited Talks

Meetings

- 2020 – Chair session “Silicic melt production and storage and its ultimate fate” (AGU)
- 2019 – Long Valley and Yellowstone calderas erupt stressed quartz crystals (GSA)
- 2019 – Supersaturation nucleation and growth of plagioclase (GSA - invited)
- 2018 – Lava Creek Tuff love (Goldschmidt)
- 2017 – Chair session “Conduit and surface dynamics of silicic magmas and lavas” (AGU)
- 2017 – Chair session “What can inclusions tell us? Certainly more than pyroclasts” (AGU)
- 2017 – Crystal textures produced by continuous decompression of Pinatubo magma (AGU)
- 2017 – Bringing Raman barometry to the people (IAVCEI)
- 2017 – Residual stresses in zircon from Bishop Tuff record volcanic stresses (IAVCEI)
- 2016 – Raman barometry for magmatic systems using feldspar and pyroxene (GSA)
- 2016 – Quartz preserve volcanic stresses at Long Valley and Yellowstone calderas (AGU)
- 2015 – Magma storage of the Central Plateau Member Rhyolites, Yellowstone (AGU)
- 2014 – Natural spherulite crystallization kinetics in rhyolitic melts (AGU)
- 2014 – Magmatic volatile contents of Yellowstone (GSA)
- 2013 – Microscopic and macroscopic assessment of the emplacement of obsidian (AGU)
- 2012 – Rhyolite eruption dynamics inferred from pyroxene and feldspar microlites (AGU)
- 2011 – Spherulites and cooling histories of obsidian lavas, Yellowstone (AGU)
- 2010 – Storage of large volumes of rhyolite lava: Solfatara Plateau, Yellowstone (AGU)
- 2009 – Cretaceous basaltic phreatomagmatic volcanism in West Texas (GSA)

Invited Talks

2020 – University of Texas at Austin – Tectonic and magmatic stresses in crystals
2020 – Smithsonian Institution – Measuring Crystal Stresses
2019 – University of Arizona – Raman and X-ray diffraction of gems and volcanic crystals
2017 – Texas Christian University – Yellowstone caldera volcanism
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

Professional Service

Ad-hoc reviewer for:

- + Journals: *Contributions to Mineralogy and Petrology*, *Frontiers in Earth Science*, *Geology*, *Journal of Volcanology and Geothermal Research*, *GSA Bulletin*, *Earth and Planetary Science Letters*, *Bulletin of Volcanology*, *American Mineralogist*, *Nature Communications*
- + Funding Agencies: *National Science Foundation*

Also involved with service to the Mineralogical Society of America and United States Faceting Guild

Classes Taught

- + **Volcanology** – graduate level, pre-eruptive magmatic triggers, conduit ascent, fragmentation, dispersal
- + **Dynamic Earth** – intro to geosciences for majors and non-majors
- + **Mineralogy** – geology majors learn theory and application of crystallography, mineral formation and systematic mineralogy
- + **Igneous and Metamorphic Petrology** – geology majors learn the formation and tectonic implications of high temperature rocks
- + **Volcanology Seminar** – graduate level topical discussions and literature review
- + **Gems and Gem Minerals** – intro to optics, gemology, and mineralogy to non-majors
- + **Spectroscopy of Earth Materials** – graduate level course on FTIR, Raman, X-ray, etc applied to minerals and glasses
- + **Field Trips** to Arkansas Mineralogy, Big Bend National Park Volcanology, Llano Uplift (TX) Petrology, Death Valley general geology, Eastern California Volcanology