

# Brandon Lutz

*Research Geologist*



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## Education

Ph.D., Geology, New Mexico Institute of Mining and Technology	2021
M.S., Geological Sciences, The University of Alabama	2013
B.S., Geological Sciences, Ohio University	2010

## Positions

Research Geologist, United States Geological Survey, Denver, CO	2022-present
Exploration Geologist, Rangefront Mining, Elkhorn Gold, Baker City, OR	2021-2022
Visiting Assistant Professor, New Mexico State University, Las Cruces, NM	2020-2021

*Courses:*

- GEOL-111G                      Survey of Geology (3 sections)
- GEOL-520                      Kinematic and Thermal Modeling
- GEOL-491                      Tectonic Evolution of North America
- GEOL-4/544                    GIS for Geology

Research Assistant and Instructor, New Mexico Tech, Socorro, NM	2016-2020
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*Courses:*

- GEOL-2340                      Whole Earth Structure and Composition
- GEOL-480                      Field Methods in Earth Science (TA)

Lead Geosteering Geologist, Lutz Consulting, Oxy, Inc. Williston Basin, ND	2014-2015
Geologist I, Geological Survey of Alabama, Tuscaloosa, AL	2013-2014
Head Teaching Assistant, GEO-101 Labs, The University of Alabama, Tuscaloosa, AL	2012-2013
Teaching Assistant, The University of Alabama, Tuscaloosa, AL	2010-2012

*Courses:*

- GEO-101L                      The Dynamic Earth Lab (6 sections)
- GEO-365                      Structural Geology
- GEO-367                      Sedimentology/Stratigraphy
- GEO-495                      Field Geology (2 summers)

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## Scientific Contributions

### Manuscripts in review or revision

**Lutz, B.M.**, High-resolution tectonic reconstruction of the central Basin and Range, *in revision* for *Geosphere*.

**Lutz, B.M.**, Hudson, M.R., Smith, T., Dechesne, M., McCafferty, A.E., Amaral, C. M., Griffis, N., Hirtz, J.A., Influence of inherited structure on flexural extension in foreland basin systems: evidence from the Arkoma Basin and southern Ozark Dome, USA, *in review* for Earth Science Reviews.

**Lutz, B.M.**, Axen, G.A., Mylonite, cataclasite, and gouge: reconstruction of mechanical heterogeneity along a low-angle normal fault: Death Valley, USA, *in review* for Earth and Planetary Science Letters.

Smith, T.M, Dechesne, M., Sharman, G.R., Hudson, M.R., **Lutz, B.M.**, Griffis, N.P, Per-Gondwanan-derived sediment in the Arkoma Basin...from the north?: The detrital zircon record of a uniquely unaltered non-Laurentian source in the Late Paleozoic, *in review* for *Geosphere*.

### Published products

Ouchchen, M., Abia, E.H., Soulaïmani, A., **Lutz, B.M.**, Benssaou, M., Abdelrahman, K., Abu-Alam, T., Echogdali, F.Z., 2023, The Missing Link in the Genesis of the Lower Paleozoic Copper Deposits of the Anti-Atlas (Morocco): The Late Triassic Central Atlantic Magmatic Province Event. *Minerals*, 13(4), 448, Doi: <https://doi.org/10.3390/min13040488>.

**Lutz, B.M.**, 2023, Orogenic gold in the Blue Mountains, eastern Oregon, USA. *Ore Geology Reviews*, 154, 105310. Doi: <https://doi.org/10.1016/j.oregeorev.2023.105310>.

**Lutz, B.M.**, Knott, J.R., Phillips, F.M., Heizler, M.T., Heitkamp, Jr, K.A., Griffie, E.L., Axen, G.A. and Calzia, J.P., 2023, Tectonically controlled drainage fragmentation in the southwestern Great Basin, USA. *Geological Society of America Bulletin*, published online Dec 20, 2022. Doi: <https://doi.org/10.1130/B36563.1>.

**Lutz, B.M.**, and Hirtz, J.A., 2022, Digital database of the previously published geomorphic-structural map of the Ouachita Mountains. U.S. Geological Survey Data Release. Doi: <https://doi.org/10.5066/P9PJ5STL>.

**Lutz, B.M.**, Axen, G.J., van Wijk, J.W. and Phillips, F.M., 2022, Whole-lithosphere shear during oblique rifting. *Geology*, 50(4), pp.412-416. Doi: <https://doi.org/10.1130/G49603.1>

**Lutz, B.M.**, Ketcham, R.A., Axen, G.J., Beyene, M.A., Wells, M.L., van Wijk, J.W., Stockli, D.F. and Ross, J.I., 2021, Thermo-kinematic modeling of detachment-dominated extension, northeastern Death Valley area, USA: Implications for mid-crustal thermal-rheological evolution. *Tectonophysics*, 808, p.228755. Doi: <https://doi.org/10.1016/j.tecto.2021.228755>.

Dissertation and thesis

**Lutz, B.M.**, 2021, Large-Magnitude Extension in the Death Valley Region, SW USA: Thermo-Kinematic Modeling, Whole-Lithosphere Shear, and Disruption of Drainage Systems. Ph.D. Dissertation, New Mexico Institute of Mining and Technology, Socorro, New Mexico, 198 p.

**Lutz, B.M.**, 2013, Kinematic analysis of the southern Funeral Mountains: implications for Cenozoic extensional tectonics. M.S. thesis, The University of Alabama, Tusclaoosa, Alabama, 36 p. Uri: <https://ir.ua.edu/handle/123456789/1802>

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## Invited Presentations and Seminars

10/26/2023, Late Paleozoic flexural extension in the Arkoma Basin and southern Ozark Dome: influence of pre-existing basement structure, U.S. Geological Survey RockTalks. Denver, Colorado.

07/19/2023, 3D modeling of faulted meshes from large subsurface datasets (IHS), joint inter-science center meeting between the ODABOuT project members and the Central Energy Resources Science Center attendees. Denver, Colorado.

02/02/2023, Integrating fault rocks with thermo-kinematic modeling to understand mechanics. U.S. Geological Survey RockTalks. Denver, Colorado.

10/28/2022, Tectonic controls on landscape, hydrological, and biological evolution in the Basin and Range province, USA. Purdue University weekly seminar, online, *invitation from Marty Frisbee*.

10/10/2022, What drove Basin and Range extension. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-379144, *invitations from Jens-Erik Lundstern, Theresa Schwartz, and Amy Gilmer*.

10/21/2022, Thermo-kinematic modeling of detachment-dominated extension. Seminar presentation to Petrobras, the Brazilian State Oil Company, online, *invitation from Mário Neto Araújo and Anna Eliza Svartman Dias*.

03/01/2021, Detachment faulting, mid-crustal strengthening, and whole-lithosphere shear in the Death Valley area, southeastern California. New Mexico State University Seminar Series, Las Cruces, New Mexico, online, *invitation from Brian Hampton*.

03/12/2020, Tectonics of the southern Great Basin, New Mexico Institute of Mining and Technology, Earth and Environmental Sciences Department Seminar Series. Socorro, New Mexico.

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## Awards and Recognition

2023. STARR award. For excellent performance within the ODABOuT project. Awardee: Mark Hudson, Geosciences and Environmental Change Science Center, U.S. Geological Survey
2023. STARR award. For conducting Science Center-level review for information distribution during a time of need and center director absence. Awardees: Lara Douglas, Harlan Goldstein, Geosciences and Environmental Change Science Center, U.S. Geological Survey
2022. STARR award. For excellent performance within the ODABOuT project. Awardee: Mark Hudson, Geosciences and Environmental Change Science Center, U.S. Geological Survey
2019. Field Trip Scholarship. Awarded for excellent proposal to attend field trip focused on metamorphic core complexes in Tuscon, AZ. Awardee: Structural Geology and Tectonics Division of the Geological Society of America.
2018. Travel Grant. Awarded for excellent proposal to attend independent numerical modeling software workshop (FETKin) and collaboration at University of Texas, Austin. Awardee: New Mexico Tech Graduate Student Association.
2018. Student Scholarship. Awarded for excellent proposal to attend Fall Field Conference. Awardee: New Mexico Geological Society.
2017. Travel Grant. Awarded for excellent proposal to attend GeoPRISMS Rift-focus meeting and field trips. Awardee: GeoPRISMS.
2013. Regional Challenge Bowl Champion. Awarded for success in tournament-style geoscience trivia-competition. Awardee: Society of Exploration Geophysicists.
2011. Gary Hooks Fund Scholarship. Awarded for outstanding proposal to fund masters thesis research field work in Death Valley, CA. Awardee: The University of Alabama Geological Sciences Advisory Board.
2011. Student Research Scholarship. Awarded for outstanding proposal to fund masters thesis research field work in Death Valley, CA. Awardee: Shreveport Geological Society.
2011. Student Travel and Shortcourse. Awarded for proposal to attend annual meeting and Arc-GIS for geoscience course. Structural Geology and Tectonics Division, Geological Society of America.
2010. Tarr Award. Awarded for outstanding academic performance by an undergraduate student. Awardee: Department of Geological Sciences, Ohio University.

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## Leadership and Scientific Service

### Undergraduate student advisees and mentees

2023-	M. Campos	Steven F. Austin State University Official Geological Society of America Mentor on career development
2019-2020	E. Haft	New Mexico Institute of Mining and Technology Informal advisor on thesis topic and course projects Informal advisor for student service at NMT Geology Club
2018.	E. Griffie	California State University Fullerton Informal advisor for abstract on B.S. research in Death Valley
2018.	E. Lackey	California State University Fullerton Informal advisor for abstract on B.S. research in Death Valley

### Graduate student advisees and mentees

2023-.	E. Sunday	Iowa State University Official Geological Society of America Mentor on career development
2020-2021	B.Schrotenboer	New Mexico State University Informal advisor on M.S. thesis project and graduate-level coursework

### Peer Reviewing and Other Scientific Service

2021-present.	Performed five invited peer reviews of manuscripts Geosphere, Economic Geology, Ore Geology Reviews, and AGU Special Volume, and one review of a Data Release submitted to USGS Science Base.
2023.	Served as interim deputy director in Information Product Development Responsibilities (IPDS), performing Science Center Level Review of publications and Data Releases. USGS Geosciences and Environmental Change Science Center.
2023.	Proposed technical session for April 2024 Joint North-Central South-Central Section Meeting of the Geological Society of America.
2023.	Coordinated organization and booking of a comprehensive workshop to be held at the Denver Federal Center on the Move structural modeling software for eight attendees, totaling over \$30,000.

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## Volunteering

2023.	Head Coach, U10-U12 Boys Soccer. Real Colorado, Spring and Fall seasons.
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2023. Head Coach, U10 Boys Youth Basketball. YMCA Boulder, Colorado, Winter season.
2019. Student Representative, geochemist/volcanologist search committee, New Mexico Tech.
- 2018-2019. Sound Partner. Phonics program volunteer, Cottonwood Valley Charter School.
- 2018-2019. President, Geology Club. New Mexico Tech.
- 2017-2018. Judge recruitment lead, Alamo Navajo School Science Fair.
- 2017-2018. Representative, Graduate Student Association, New Mexico Tech.
2015. Farm Hand, Walking Bear Ranch, Whitefish, Montana.
2014. Carpenter, Habitat for Humanity, Columbia Falls, Montana.
2011. Treasurer. AAPG Student Chapter, The University of Alabama.
- 2008-2010. Vice President, Sigma Gamma Epsilon student chapter, Ohio University.

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## Conference Abstracts (\*\*oral presentation)

### 2023

- \*\*Lutz, B.M.**, Hudson, M.R., Dechesne, M., Smith, T., Griffis, N., McCafferty, A., Amaral, C., 2023, Extensional strain partitioning in the northern Arkoma Basin, Arkansas. Geological Society of America Abstracts with Programs. Vol. 55 (6). doi: 10.1130/abs/2023AM-394286. Pittsburg, Pennsylvania.
- Griffis, N., Hudson, M., Dechesne, M., Smith, T., Mundil, R., Henderson, C., Shinn, M., Chandler, A., Pianowski, L., **Lutz, B.M.**, 2023, Refined temporal constraints for the Trace Creek Shale member, Atoka Formation, with implications for regional and global stratigraphic correlations of Carboniferous cyclicity. Geological Society of America Abstracts with Programs. Vol. 55 (6). doi: 10.1130/abs/2023AM-394265. Pittsburg, Pennsylvania.
- Smith, T., Dechesne, M., Hirtz, J., Sharman, G., Hudson, M., **Lutz, B.M.**, and Griffis, N., 2023, Peri-Gondwanan derived sediment in the Arkoma Basin from the north or the south?: the detrital zircon record of a uniquely concentrated non-Laurentian source signal in the Late Paleozoic. Geological Society of America Abstracts with Programs. Vol. 55 (6). doi: 10.1130/abs/2023AM-396250. Pittsburg, Pennsylvania.
- Lutz, B.M.**, Colgan, J., and Sweetkind, D., 2023, 3D modeling of range-bounding faults of the northern Basin and Range. Geological Society of America Abstracts with Programs. Vol. 55 (4). Reno, Nevada. doi: 10.1130/abs/2023CD-387585

### 2022

**\*\*Lutz.B.M.**, 2022, Controls on orogenic gold endowment in the Blue Mountains, eastern Oregon, USA. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-377139.

**\*\* (Invited) Lutz.B.M.**, 2022, What drove Basin and Range extension. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-379144.

**Lutz.B.M.**, Hudson, M., Dechesne, M., Hirtz, J., 2022, Preliminary 3D modeling of the Ouachita fold-thrust belt and Arkoma foreland basin. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-380221.

van Wijk, J., **Lutz.B.M.**, Axen, G., Phillips, F., 2022, Formation of a continental whole-lithosphere shear zone. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-381298.

Hudson, M., Hirtz, J., Dechesne, M., **Lutz.B.M.**, 2022, Transition from sedimentary to tectonic fabrics from AMS in a transect from the foreland to fold and thrust belt of the Ouachita orogen in western Arkansas. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-380155.

Dechesne, M., Sharman, G., Hirtz, J., Hudson, M., **Lutz.B.M.**, 2022, Provenance changes and sediment routing in the Pennsylvanian Arkoma foreland basin, Arkansas and Oklahoma. Geological Society of America Abstracts with Programs. Vol 54, No. 5, doi: 10.1130/abs/2022AM-382089.

**\*\*Lutz, B.M.**, 2022, High-resolution tectonic reconstruction of the central Basin and Range. Geological Society of America Abstracts with Programs 54(2). Las Vegas, Nevada. Doi: 10.1130/abs/2022CD-374186.

#### 2020-2021

**\*\*Lutz.B.M.** Axen, G., van Wijk, J., 2021, Whole-lithosphere shear during oblique rifting, Geological Society of America Abstracts with Programs. Vol. 53, No. 4 doi: 10.1130/abs/2021CD-363180

**\*\*Lutz.B.M.** and Axen, G., 2020, Integrating fault-rock types and fabrics with thermo-kinematic modeling to understand the mechanics of a low-angle normal fault. GSA 2020 Connects Online.

#### 2019

**\*\*Lutz.B.M.**, Axen, G., Wells, M., Ketcham., R., 2019, Crustal-scale mechanical heterogeneity along a low-angle normal fault: Funeral Mountains, California. Abstract T32A-02 presenting at 2019 Fall Meeting, AGU, San Fransisco, CA, 11-15 Dec.

**\*\*Lutz B.M.**, Berry, M., Umek, J., Phillips, F., Sada, D., Knott, J., van Wijk, J., Axen, G., 2019, Tectonic fragmentation of landscape drives species endemism in Death Valley springs. Geological Society of America Abstracts with Programs. Vol. 51, No. 5

**\*\*Lutz.B.M.**, Axen, G.A., Ketcham, R.A., 2019, Thermo-kinematic modeling of detachment faulting: Funeral Mountains, California. Cordilleran Section - 115th Annual Meeting - 2019; Portland, OR

Berry, M., **Lutz.B.M.**, van Wijk, J., Phillips, F., Axen, G., 2019, Influence of tectonics on Mio-Pliocene drainage development in the Death Valley Region. Geological Society of America Abstracts with Programs. Vol. 51, No. 5

Knott, J., **Lutz.B.M.**, Heizler, M., Phillips, F., Heitkamp, K., 2019, Tectonic reorganization in the Death Valley Area at 4 Ma. Geological Society of America Abstracts with Programs. Vol. 51, No. 5

**Lutz B.M.**, Phillips, F.M., Axen, G.A., 2019, 3D tectonic reconstruction of the Death Valley Region. Geological Society of America Abstracts with Programs. Vol. 51, No. 5

Phillips, F., **Lutz.B.M.**, Axen, G., Knott, J., 2019, Regional-scale detachment faulting as a mechanism for crustal extension in the northern portion of the Eastern California Shear Zone. Geological Society of America Abstracts with Programs. Vol. 51, No. 5

#### 2012-2018

Phillips, F.M., **Lutz B.M.**, and Axen, G.A., 2018, Novel Modes of slip partitioning in transtensional settings inferred from data on the White Mountain fault zone, California. Geological Society of America Abstracts with Programs. GSA 2018; Indianapolis

Knott, J.R., **Lutz.B.M.**, Griffie, E., Clemens-Knott, D., Chen, N.M., Calzia, J.P., 2018, Identification of Hunter Mountain Batholith Clasts in the Furnace Creek Formation, Death Valley, California, Paper 3-3 Geological Society of America Abstracts with Programs. Vol. 50, No. 5

Walker, A., Mueller, N.J., **Lutz.B.M.**, Knott, JR, Lackey, JS, 2018, Geochemical correlation of Basalts in the Sylvania Mountains, California and Nevada. Paper 62-4. Geological Society of America Abstracts with Programs. Vol. 50, No. 5

Avila, ST, Lackey, JS, **Lutz, B.M.**, Knott, JR, Mueller, N, 2018, Paleogeographic Interpretation of the Fish Lake Valley/Horse Thief Hills Area Using Geochemistry of Volcanic Rocks. Paper 62-5 Geological Society of America Abstracts with Programs. Vol. 50, No. 5

**Lutz B.M.**, Axen, G.A. and Phillips, F.M. (2017) New Geologic Map and Structural Cross Sections of the Death Valley Extended Terrain (southern Sierra Nevada, California to Spring Mountains, Nevada): Toward 3D Kinematic Reconstructions, Abstract T41B-0625 presented at 2017 Fall Meeting, AGU, New Orleans, LA, 11-15 Dec.

Sizemore, T., Çemen, I., Wielicki, M., Stockli, D., Heizler, M., and **Lutz.B.M.** (2017) Exhumation of the Black Mountains in Death Valley, California, with new thermochronometric data from the Badwater Turtleback, AGU New Orleans, LA, 11-15 Dec.

**Lutz B.M.** and Çemen, I., 2012, Kinematic Analysis of the southeastern Funeral Mountains: Magnitude of Extension and Shortening. Geological Society of America Abstracts with Programs Vol. 44, No. 7. Session 255.

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## Geologic Mapping Experience

<b>USGS work</b> , Ouachita Mountains, Arkoma Basin, Ozark Dome, Arkansas and Oklahoma	2022-2023
1:12,000 detailed structural mapping from high-resolution LIDAR	
1:24,000 geologic mapping from high resolution LIDAR	
1:100,000 geologic map database development and compilation	
<b>Exploration Geologist work</b> , Elkhorn Mountains, Baker County, Oregon	2021-2022
Mapped 1:5,000 along orogenic gold deposit	
Detailed vein measurements and vein database development	
Regional digital geologic mapping of gold deserts across several districts	
<b>NMT Field Camp instruction</b> , Socorro Country, New Mexico	2021
Mapped 1:10,000 faulted anticline of Pennsylvanian-Permian strata	
Mapped 1:10,000 pre-, syn- and post-caldera volcanic rocks (mostly Eocene)	
Mapped 1:12,000 Quaternary alluvial terraces and fans with fault scarps	
<b>PhD Volunteer work</b> , Quebradas, New Mexico Tech	2018, 2019
Mapped 1:12,000 at Arroyo del Tajo west and east	
Basement exposure with overlying Pennsylvanian-Permian	
3 unconformities, normal fault, fault-propagation fold	
<b>PhD Dissertation work</b> , N Funeral Mountains, California, New Mexico Tech	2019
Mapped 1:12,000 along 20 km-trace of detachment fault	
Outcrop mapping and hillside-photo mapping	
Structural data collection and fault-rock sampling	
<b>MS Thesis work</b> , SE Funeral Mountains, California, The University of Alabama	2011
Mapped 1:12,000 thrust duplex and reactivating normal faults	
Cenozoic unconformity and Quaternary fans	
<b>Alabama Field Camp instruction</b> , north-central New Mexico	2011, 2012
Mapped Permian-Cretaceous section at Ghost Ranch; White Mesa	
Mapped Cerro de Marquenas Formation near Dixon, NM	
Mapped reactivated Laramide structure at Ranchos de Taos, NM (Tierra Azul)	
Outcrop mapping and structural analysis of amphibolite in Taos Ski Valley	
Outcrop mapping in the Valles Caldera	
<b>Undergraduate Field Camp</b> , Death Valley area, Ohio University	2009
Mapped complexly faulted Proterozoic-lower Paleozoic section	
Multiple unconformities and Miocene volcanic rocks	

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## Field Trips

Catalina-Rincon Metamorphic Core Complex	George Davis	Tucson, AZ	2019
Friends of the Pleistocene, Owens Valley	Fred Phillips	Bishop, CA	2017
Geology of the Ouray-Silverton Area	Karl Karlstrom	Ouray, CO	2017
Death Valley crash course	Terry Pavlis, Brandon Lutz	Tecopa, CA	2017
GeoPrisms Rio Grande Rift	Karl Karlstrom	Albuquerque, NM	2017