

LIZZY TROWER – CURRICULUM VITAE

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PROFESSIONAL EXPERIENCE

2018 – present **Assistant Professor of Geological Sciences**, University of Colorado Boulder
2015 – 2017 **Agouon Geobiology Postdoctoral Research Fellow**, California Institute of Technology
2011 – 2014 **Doctoral Candidate**, Stanford University
2009 – 2012 **NSF Graduate Research Fellow**, Stanford University
2007 **Summer Undergraduate Research Fellow**, California Institute of Technology

EDUCATION

2014 **Ph.D. Geological and Environmental Sciences**, Stanford University
Advisor: Don Lowe
Dissertation: Chemical, physical, and biological depositional processes in the ~3.3 Ga upper Mendon Formation, Barberton Greenstone Belt, South Africa

2013 **International Geobiology Course**, Wrigley Institute for the Environment, University of Southern California

2009 **B.S. Geology**, California Institute of Technology
Advisor: John Grotzinger
Thesis: Sedimentology, diagenesis, and stratigraphic occurrence of giant ooids in the Ediacaran Rainstorm Member, Johnnie Formation, Death Valley region, California

PEER-REVIEWED PUBLICATIONS (*student mentee, postdoc mentee*)

11. **Trower, E. J.** and Fischer, W. W. (2019) Precambrian Si isotope mass balance, weathering, and the significance of the authigenic clay silica sink. *Sedimentary Geology* 384, 1-11.
10. **Trower, E. J.**, Lamb, M. P., and Fischer, W. W. (2019) The origin of carbonate mud. *Geophysical Research Letters* 46(5), 2696-2703.
9. **Trower, E. J.**, Cantine, M., Gomes, M., Lingappa, U. F., O'Reilly, S., Present, T. M., Stein, N., Strauss, J. V., Lamb, M. P., Grotzinger, J. P., Knoll, A. H., and Fischer, W. W. (2018). Active ooid growth driven by sediment transport in a high energy shoal, Little Ambergris Cay, Turks and Caicos Islands. *Journal of Sedimentary Research* 88 (9), 1132-1151.
8. **Trower, E. J.**, Ganti, V., Fischer, W. W., and Lamb, M. P. (2018). Erosional surfaces in the Upper Cretaceous Castlegate Sandstone (Utah, USA): Sequence boundaries or autogenic scour from backwater hydrodynamics? *Geology* 46 (8), 707-710.
7. **Trower, E. J.**, Lamb, M. P., and Fischer, W. W. (2017). Experimental evidence that ooid size reflects a dynamic equilibrium between rapid precipitation and abrasion rates. *Earth and Planetary Science Letters* 468, 112-118.
6. **Trower, E. J.**, and Lowe, D. R. (2016). Sedimentology of the ~3.3 Ga upper Mendon Formation, Barberton Greenstone Belt, South Africa. *Precambrian Research* 281, 473-494.
5. **Stefurak, E. J. T.**, Lowe, D. R., Zentner, D., and Fischer, W. W. (2015). Sedimentology and geochemistry of Archean silica granules. *GSA Bulletin* 127 (7-8), 1090-1107.
4. Decker, N. B., Byerly, G. R., Thompson Stiegler, M., Lowe, D. R., and **Stefurak, E.** (2015). High resolution tephra and U/Pb chronology of the 3.33-3.26 Ga Mendon Formation, Barberton Greenstone Belt, South Africa. *Precambrian Research* 261, 54-74.

3. **Stefurak, E. J. T.**, Fischer, W. W., and Lowe, D. R. (2015). Texture-specific Si isotope variations in Barberton Greenstone Belt cherts record low temperature fractionations in early Archean seawater. *Geochimica et Cosmochimica Acta* 150, 26-52.
2. **Stefurak, E. J. T.**, Lowe, D. R., Zentner, D., and Fischer, W. W. (2014). Primary silica granules – A new mode of early Archean sedimentation. *Geology* 42 (4), 283-286.
1. **Trower, E.** and Grotzinger, J. (2010). Sedimentology, diagenesis, and stratigraphic occurrence of giant ooids in the Ediacaran Rainstorm Member, Johnnie Formation, Death Valley region, California. *Precambrian Research* 180, 113-124.

PATENTS

Trower, E. J., Lingappa, U. F., Grotzinger, J. P., and Fischer, W. W. "Microabrasive Compositions Containing Ooids." U.S. Patent 10,407,601, issued September 10, 2019.

CONFERENCE ABSTRACTS (* = presenting author, *student mentee*, postdoc mentee)

2019

- Li, X.*, **Trower, E.**, Lehrmann, D., Minzoni, M., Kelley, B., Schaal, E., Yu, M., and Payne, J. L. "Implications of Giant Ooids for the Carbonate Chemistry of Early Triassic Oceans." Poster presentation. AGU Annual Meeting. December 2019, San Francisco, CA, USA.
- Lingappa, U. F.*, Fischer, W. W., and **Trower, L.** "Ecophysiology of Ooid Microborings Excavated by Endolithic Cyanobacteria." Poster presentation. AGU Annual Meeting. December 2019, San Francisco, CA, USA.
- Phillips, A. A.*, Speth, D. R., Miller, L. G., Wu, F., Wang, X. T., Potocek, D., Medeiros, P. M., Osburn, M. R., Johnson, H., **Trower, L.**, Berelson, W., West, A. J., Fischer, W. W., Orphan, V. J., Betts, H., Sessions, A. L., and Geobiology Course 2017 & 2018. "Microbial Succession in Hypersaline, Alkaline Mono Lake, CA." Poster presentation. AGU Annual Meeting. December 2019, San Francisco, CA, USA.
- **Trower, L.***, Mahseredjian, T., Overeem, I., Gomes, M., Howard, C., Lingappa, U. F., Present, T., and Sibert, E. C. "Grain-Trapping by Microbial Mats—A Key Mechanism of Sediment Accumulation in Mangroves? (Invited)" Oral presentation. AGU Annual Meeting. December 2019, San Francisco, CA, USA.
- **Trower, L.***, Bridgers, S. L., Lamb, M. P., and Fischer, W. W. "Cortical Stratigraphy of Ooids from Great Salt Lake, UT." Poster presentation. AGU Annual Meeting. December 2019, San Francisco, CA, USA.
- Li, X.*, **Trower, E.**, Lehrmann, D., Minzoni, M., Kelley, B., Schaal, E., Yu, M., and Payne, J. L. "Formation of Early Triassic giant ooids: A window revealing coeval tropical ocean chemistry." Poster presentation. IAS Annual Meeting. September 2019, Rome, Italy.

2018

- Yager, J. A.*, West, A. J., **Trower, L.**, Corsetti, F. A., Bottjer, D. J., Berelson, W., and Fischer, W. W. "A change in silicic acid concentrations across the Triassic-Jurassic boundary? A look from $\delta^{30}\text{Si}$ of sponge spicules via SIMS." Poster presentation. AGU Annual Meeting. December 2018, Washington, DC, USA.
- *Jamison-Todd, S. K.**, Stein, N., and **Trower, L.** "Sedimentology of Hurricane Irma Deposits on a Modern Carbonate Platform." Poster presentation. AGU Annual Meeting. December 2018, Washington, DC, USA.
- *Chan, A. M.**, *Ingalls, M.*, Snell, K., and **Trower, L.** "Variations in Stable Isotope Composition of Great Salt Lake Carbonate: Is there a Microbial Impact on the Sedimentary Record?" Poster presentation. AGU Annual Meeting. December 2018, Washington, DC, USA.
- **Trower, E. J.***, *Bridgers, S.*, Lamb, M. P., and Fischer, W. W. "Ooid Cortical Stratigraphy: The Topology of Concentric Laminations in Carbonate Sand Grains Record Grain-Scale Environmental Histories (Invited Presentation)". Oral presentation. GSA Annual Meeting. November 2018, Indianapolis, IN, USA.
- **Trower, E. J.***, Cantine, M., Bergmann, K., Lamb, M. P., and Fischer, W. W. "Revisiting Precambrian Carbonate Mud Production: Evidence that Abrasion Played a Key Role (Invited Presentation)". Oral presentation. GSA Annual Meeting. November 2018, Indianapolis, IN, USA.

- Brengman, L. A., Johnson, K.*, and **Trower, E. J.** "Grain Size Distributions and Mineralogy of Coated Grains, Detrital Sand and Silt Within the ~1.9 Ga Mesabi Iron Range, Minnesota." Poster presentation. GSA Annual Meeting. November 2018, Indianapolis, IN, USA.
- Ingalls, M.*, **Trower, E.**, Frantz, C., and Snell, K. "Spatial stable isotope variability in modern lacustrine carbonate: How do local processes translate to the sedimentary record?" Oral presentation. Goldschmidt Conference. August 2018, Boston, MA, USA.
- **Trower, E.***, Cantine, M., Gomes, M., Lingappa, U. F., O'Reilly, S., Present, T. M., Stein, N., Strauss, J. V., Lamb, M. P., Grotzinger, J. P., Knoll, A. H., Fischer, W. W. "Physical, Chemical, and Microbial Controls on Growth and Degradation of Ooids on Ambergris Shoal, Little Ambergris Cay, Turks and Caicos Islands, British Overseas Territories." Oral presentation. AAPG Annual Meeting. May 2018, Salt Lake City, UT, USA.
- Grotzinger, J.*, Gomes, M., Lingappa, U., Stein, N., **Trower, E.**, Alleon, J., Bahniuk, A. M., Cantine, M., Grotzinger, H., Metcalfe, K., Morris, D. K., O'Reilly, S., Orzechowski, E., Quinn, D., Sanders, C., Sibert, E., Strauss, J., *Tarika, M.*, Thorpe, M., Fischer, W., Knoll, A. "Diverse and Spatially Extensive Microbial Mat and Ooid Sand Depositional System, Little Ambergris Cay, Turks and Caicos Islands." Oral presentation. AAPG Annual Meeting. May 2018, Salt Lake City, UT, USA.
- Present, T. M.*, **Trower, E.**, Gomes, M., Lingappa, U., Stein, N., Thorpe, M., *Tarika, M.*, Alleon, J., Bahniuk, A. M., Morris, D. K., Orzechowski, E., Sanders, C., Sibert, E., Fischer, W., Knoll, A., Grotzinger, J. "Sedimentology and Geochemistry of Ooid Sands Buried Beneath Microbial Mats, Little Ambergris Cay, Turks and Caicos Islands." Oral presentation. AAPG Annual Meeting. May 2018, Salt Lake City, UT, USA.
- Stein, N.*, Quinn, D., Grotzinger, J., Fischer, W., Ehlmann, B., Gomes, M., Hayden, A., Lingappa, U., Knoll, A., **Trower, E.** "Distribution of and Environmental Impacts on Microbial Mat Ecosystems of Little Ambergris Cay, Turks and Caicos." Poster presentation. AAPG Annual Meeting. May 2018, Salt Lake City, UT, USA.
- Lingappa, U.*, Gomes, M., Metcalfe, K., Riedman, L., O'Reilly, S., Stein, N., **Trower, E.**, Present, T. M., Fischer, W., Knoll, A., Grotzinger, J. "Ecology and Biogeochemistry of Microbial Mats on Little Ambergris Cay." Poster presentation. AAPG Annual Meeting. May 2018, Salt Lake City, UT, USA.
- Ingalls, M.*, **Trower, E.**, Frantz, C., and Snell, K. "Microbial overprinting of primary stable isotopic signatures in modern lacustrine carbonate." Poster presentation. Rocky Mountain Geobiology Symposium. April 2018, Golden, CO, USA.

2017

- **Trower, L.***, *Kivrak, L.*, Lamb, M. P., Fischer, W. W. "Experimental Evidence that Abrasion of Carbonate Sand is a Significant Source of Carbonate Mud." Oral presentation. AGU Fall Meeting. December 2017, New Orleans, LA, USA.
- Present, T. M.*, **Trower, L.**, Stein, N., Alleon, J., Bahniuk, A., Gomes, M. L., Lingappa, U., Metcalfe, K., Orzechowski, E. A., Riedman, L. A., Sanders, C. B., Morris, D. K., O'Reilly, S., Sibert, E. S., Thorpe, M., *Tarika, M.*, Fischer, W. W., Knoll, A. H., Grotzinger, J. P. "Context, Biogeochemistry, and Morphology of Diverse and Spatially Extensive Microbial Mats, Little Ambergris Cay, Turks and Caicos Islands, B.W.I." Poster presentation. AGU Fall Meeting. December 2017, New Orleans, LA, USA.
- Meixnerova, J.*, Betts, M., Westacott, S., Ingalls, M., Miller, L. G., Sessions, A. L., **Trower, L.**, Agouron Geobiology Course. "Mono Lake sediments preserve a record of recent environmental change." Poster presentation. AGU Fall Meeting. December 2017, New Orleans, LA, USA.
- Westacott, S.*, Ingalls, M., Meixnerova, J., Betts, M., Lloyd, M. K., Miller, L. G., Sessions, A. L., **Trower, L.**, Agouron Geobiology Course. " $\delta^{18}\text{O}$ and Carbonate Clumped Isotopes as Proxies of Lake Level Change: Mono Lake Modern Sediments Inform Pleistocene Interpretations." Poster presentation. AGU Fall Meeting. December 2017, New Orleans, LA, USA.
- **Trower, E. J.***, Fischer, W. W. "The Role of Silica as a Chemical Sediment Prior to the Advent of Metazoan Biomineralization (Invited Presentation)." Oral presentation. GSA Fall Meeting. October 2017, Seattle, WA, USA.
- Betts, M. N.*, Meixnerova, J., Ingalls, M., Westacott, S., Miller, L. G., Sessions, A. L., **Trower, E. J.**, Agouron Geobiology Course 2017. "Mono Lake Sediments: A Record of Recent Environmental Change." Poster presentation. GSA Fall Meeting. October 2017, Seattle, WA, USA.
- Ingalls, M.*, Westacott, S., Betts, M. N., Meixnerova, J., Lloyd, M., Miller, L. G., Sessions, A. L., **Trower, E. J.**, Agouron Geobiology Course 2017. "Sources of Carbonate Precipitation in Mono Lake Sediments: $\delta^{18}\text{O}$

and Carbonate Clumped Isotopes as Lake Level Proxies." Poster presentation. GSA Fall Meeting. October 2017, Seattle, WA, USA.

- **Trower, E.***, Lamb, M. P., Cantine, M., O'Reilly, S., Stein, N., Gomes, M., Strauss, J. V., Grotzinger, J. P., Knoll, A. H., and Fischer, W. W. "Sediment transport controls ooid growth." Poster presentation. Southern California Geobiology Symposium. April 2016, Los Angeles, CA, USA.
- **Trower, E.***, Lamb, M. P., Grotzinger, J. P., Cantine, M., O'Reilly, S., and Fischer, W. W. "Sediment Transport Controls Ooid Growth." Poster presentation. AAPG Annual Meeting. April 2017, Houston, TX, USA.

2016

- **Trower, E. J.***, Cantine, M., O'Reilly, S.S., Strauss, J. V., Gomes, M. L., Grotzinger, H. M., Grotzinger, J. P., Knoll, A. H., Lamb, M. P., Lingappa, U., Metcalfe, K., Orzechowski, E. A., Quinn, D. P., Reidman, L. A., Stein, N., Fischer, W. W. "Evidence of Active Ooid Growth from Little Ambergris Cay, Turks and Caicos Islands, B. W. I." Oral presentation. AGU. December 2016, San Francisco, CA, USA.
- Gomes, M. L.*, Lingappa, U., Metcalfe, K., O'Reilly, S. S., Riedman, L. A., Cantine, M., Ireland, B., Phillips, R., Stein, N., Orzechowski, E. A., Strauss, J. V., Grotzinger, H. M., Quinn, D. P., **Trower, L.**, Fischer, W. W., Grotzinger, J. P., Knoll, A. H., Fike, D. A. "Linking the modern to the ancient with a comprehensive geobiological understanding of biosignature preservation in microbial mats." Poster presentation. AGU. December 2016, San Francisco, CA, USA.
- Grotzinger, J. P.*, Knoll, A. H., Fischer, W. W., Cantine, M., Gomes, M. L., Grotzinger, H. M., Lingappa, U., Metcalfe, K., O'Reilly, S. S., Orzechowski, E. A., Quinn, D. P., Reidman, L. A., Stein, N., Strauss, J. V., **Trower, L.** "Context, Biogeochemistry, and Morphology of Diverse and Spatially Extensive Microbial Mats, Little Ambergris Cay, Turks and Caicos Islands, BWI." Oral presentation. AGU. December 2016, San Francisco, CA, USA.
- Stein, N.*, Quinn, D. P., Grotzinger, J. P., Knoll, A. H., Fischer, W. W., Cantine, M., Gomes, M. L., Grotzinger, H. M., Lingappa, U., Metcalfe, K., O'Reilly, S. S., Orzechowski, E. A., Reidman, L. A., Strauss, J. V., **Trower, L.** "UAV, DGPS, and Laser Transit Mapping of Microbial Mat Ecosystems on Little Ambergris Cay, BWI." Poster presentation. AGU. December 2016, San Francisco, CA, USA.
- Orzechowski, E. A.*, Strauss, J. V., Knoll, A. H., Fischer, W. W., Cantine, M., Gomes, M. L., Grotzinger, H. M., Lingappa, U., Metcalfe, K., O'Reilly, S. S., Quinn, D. P., Reidman, L. A., Stein, N., **Trower, L.**, Grotzinger, J. P. "Age and Construction of Little Ambergris Cay Bedrock Rim, Southeastern Caicos Platform, British West Indies." Poster presentation. AGU. December 2016, San Francisco, CA, USA.
- Ganti, V.*, Chadwick, A. J., Lamb, M. P., Fischer, W. W., **Trower, L.** "Autogenic erosional surfaces on backwater-mediated deltas from floods and avulsions." Oral presentation. AGU. December 2016, San Francisco, CA, USA.
- **Trower, E. J.***, Lamb, M. P., and Fischer, W. W. "Why Do Ooids Grow So Slowly?" Oral presentation. GSA Fall Meeting. September 2016, Denver, CO, USA.
- **Trower, E. J.***, Lamb, M. P., and Fischer, W. W. "Controls on ooid size: An experimental approach." Oral presentation. Southern California Geobiology Symposium. May 2016, Pasadena, CA, USA.

2015

- **Trower, E. J.***, Lamb, M. P., and Fischer, W. W. "What Controls Ooid Grain Size?" Oral presentation. AGU. December 2015, San Francisco, CA, USA.

2014

- **Stefurak, E. J. T.***, Lowe, D. R., Zentner, D., and Fischer, W. W. "Primary silica granules – Insights into silica precipitation mechanisms in early Archean seawater." Oral presentation. GSA Fall Meeting. October 2014, Vancouver, BC, Canada.

2013

- **Stefurak, E. J. T.***, Lowe, D. R., Zentner, D., and Fischer, W. W. "The formation and deposition of primary silica granules – A new model of early Archean silica deposition." Oral presentation. AGU. December 2013, San Francisco, CA, USA.

- Bird, J.*, **Stefurak, E.**, Anderson, R., Menekse, M., Berelson, W., Sessions, A., Osburn, M., Spear, J., Stamps, B., Stevenson, B., Shapiro, R., Torres, M., and Corsetti, F. "Evaluating the biological influences on ooid formation in the Great Salt Lake, Utah." Poster presentation. AGU. December 2013, San Francisco, CA, USA.
- Anderson, R. P.*, Bird, J. T., Menekse, M., **Stefurak, E. J. T.**, Berelson, W., Petryshyn, V. A., Shapiro, R. S., Sessions, A. L., Tripathi, A., and Corsetti, F. A. "Ooid formation in the Great Salt Lake, Utah: insights from clumped isotope paleothermometry." Poster presentation. AGU. December 2013, San Francisco, CA, USA.
- **Stefurak, E. J. T.***, Fischer, W. W., and Lowe, D. R. " $\delta^{30}\text{Si}$ in early Archean cherts and implications for the silica cycle." Oral presentation. Goldschmidt. August 2013, Florence, Italy.

2012

- **Stefurak, E. J. T.***, Fischer, W. W., and Lowe, D. R. "Evidence of low temperature fractionation of silicon in Archean cherts: SIMS Si and O isotope measurements of 3.42-3.26 Ga banded carbonaceous cherts from the Onverwacht Group, Barberton Greenstone Belt, South Africa." Oral presentation. AGU. December 2012, San Francisco, CA, USA.
- Decker, N. B.*, **Stefurak, E. J. T.**, Thompson, M. E., Lowe, D. R., and Byerly, G. R. "High resolution tephra and U/Pb chronology of the 3.33-3.26 Ga Mendon Formation, Barberton Greenstone Belt, South Africa." Poster presentation. AGU. December 2012, San Francisco, CA, USA.

2010

- **Trower, E.***, and Grotzinger, J. "Investigating the origin of the Rainstorm giant ooids in the Ediacaran Johnnie Formation, Death Valley region, California." Poster presentation. Southern California Geobiology Symposium. April 2010, Pasadena, CA, USA.

INVITED SEMINARS

2019	Denver Museum of Nature and Science
2018	USGS Denver, Massachusetts Institute of Technology, University of New Mexico
2017	University of Arkansas, Pennsylvania State University, University of Colorado Boulder, University of California Los Angeles, California Institute of Technology, University of California Riverside
2016	University of Southern California
2015	University of Washington, University of Southern California
2014	California Institute of Technology

TEACHING

2019	Instructor, Carbonate Seminar (GEOL 5704)
2019	Instructor, Field Methods in Sedimentology (GEOL 4725-003)
2019	Instructor, History of a Habitable Planet (GEOL 1020)
2018	Instructor, Sedimentology and Geobiology of Carbonates (GEOL 5700-015)
2017	Head TA, International Geobiology Course (directors: Sessions, Fischer, Johnson)
2017	Guest Lecturer, Introduction to Geobiology – Caltech (instructors: Fischer and Kirschvink)
2013	TA, Sandstone Petrography – Stanford University (instructor: Lowe)
2013	Lab TA, Introduction to Sedimentation – Stanford University (instructors: Graham and Lowe)
2012	TA, What Makes a Planet Habitable? – Stanford University (instructors: Lissauer, Marley, Zahnle)
2011	Lab TA, Introduction to Sedimentation – Stanford University (instructors: Graham and Lowe)
2008	TA, Introduction to Earth and Planetary Sciences – Caltech (instructor: Eiler)
2007	TA, Introduction to Earth and Planetary Sciences – Caltech (instructor: Eiler)

AWARDS AND GRANTS

2019	Agouon Institute Small Grant-in-Aid (\$9,000 total award)
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- 2018 NASA ROSES Grant (\$49,973 total award), NSF SedPaleo Collaborative Research Grant (co-PI; \$317,750 total award)
- 2016 American Chemical Society Petroleum Research Fund New Directions Grant (to PI Fischer, \$110,00 total award)
- 2015 – 2017 Agouron Geobiology Postdoctoral Fellowship, California Institute of Technology
- 2011 Shell Grant, Stanford University
- 2010 McGee Grant, Stanford University
- 2009 – 2012 NSF Graduate Research Fellowship, Stanford University
- 2007 James Michelin Fellowship, California Institute of Technology

OUTREACH AND SERVICE ACTIVITIES

- 2018 – 2020 SEPM Pettijohn Award Committee
- 2018 – present Pen Pal for the Letters to A Prescientist Program
- 2017 – present Grant reviewer for American Chemical Society PRF Grant program
- 2014 – present Reviewer for *Science*, *Nature Geoscience*, *Geobiology*, *Sedimentology*, *Terra Nova*, *Geochimica et Cosmochimica Acta*, *Astrobiology*, *Sedimentary Geology*, *Open Geoscience*, and the *South Africa Journal of Geology*
- 2017-2019 Session convener, AGU Fall Meeting: Carbonate Sediments Through Time: Processes of Deposition and Diagenesis
- 2016 Collaboratively created and co-taught earth science lessons to 4th grade students at Synergy Academy, shared this lesson plan with other local teachers as part of the Caltech Community Science Event program
- 2015 – 2016 Volunteer geology guide, ARTA River Trips
- 2013 Committee member on the Department of Geological and Environmental Sciences (Stanford University) TA Handbook Committee. Collaborated on writing a handbook on teaching practices and practical advice tailored for students in the department.
- 2011 Volunteer science mentor with The Girls' Middle School. Worked with a small group of middle school students on a field research project with an ecological/environmental focus.