



Dr. Tara Selly
X-ray Microanalysis Core Assistant Director / Assistant Research Professor
Department of Geological Sciences
University of Missouri
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EDUCATION:

- 2018 **Ph.D. in Geologic Sciences with a minor in College Teaching**, Department of Geological Sciences, University of Missouri, College of Arts and Sciences
- 2015 **M.S. in Geologic Sciences**, Department of Geological Sciences, University of Missouri, College of Arts and Sciences
- 2013 **B.A. in Geology and Biology**, Geology Department, Gustavus Adolphus College

EMPLOYMENT HISTORY:

- 2019–Current **Assistant Director**, X-ray Microanalysis Core Facility; Department of Geological Sciences, University of Missouri
- 2019–Current **Assistant Research Professor**, Department of Geological Sciences, University of Missouri
- 2018–2019 **Postdoctoral Researcher**, Lab Manager of the X-ray Microanalysis Core Facility; Department of Geological Sciences, University of Missouri

RESEARCH INTERESTS:

- Implementing advanced microscopy techniques for data analysis
- Taphonomy, actualistic studies, and experimental laboratory decay to analyze fossil preservation
- Ediacaran and Cambrian taxonomy

PUBLICATIONS, ABSTRACTS, AND PRESENTATIONS

PUBLISHED ARTICLES:

9. Yang, B., Steiner, M., Schiffbauer, J.D., **Selly**, T., Wu, X., and Liu, P. [2020] Ultrastructure of Ediacaran cloudinids suggests diverse taphonomic histories and affinities with non-biomineralized annelids. *Scientific Reports*, 10: 1–12. doi: 10.1038/s41598-019-56317-x
8. Schiffbauer, J.D., **Selly**, T., Jacquet, S.M., Nelson, L.L., Strange, M.A., Cai, Y., and Smith, E.F. (2020). Discovery of bilaterian-type through-guts in cloudinomorphs from the terminal Ediacaran Period. *Nature Communications*, 11: 1–12. doi: 10.1038/s41467-019-13882-z
7. Lekakh, S., Zhang, X., Tucker, W., Lee, H., **Selly**, T., and Schiffbauer, J.D. (2019). 3D Characterization of Structure and Micro-porosity in Two Cast Irons with Spherical Graphite. *Materials Characterization*, 158: 1–8. doi:10.1016/j.matchar.2019.109991
6. **Selly**, T., Schiffbauer, J.D., Jacquet, S.M., Smith, E.F., Nelson, L.L., Andreasen, B.D., Huntley, J.W., Strange, M.A., O’Neil, G.R., Thater, C.A., Steiner, M., Yang, B., and Cai, Y. (2019). A new cloudinid fossil assemblage from the terminal Ediacaran of Nevada, USA. *Journal of Systematic Palaeontology*, 1–23. doi:10.1080/14772019.2019.1623333
5. Lekakh, S.N., Xueliang, Z., Wesley, T., Lee, H.K., **Selly**, T., and Schiffbauer, J.D. (2019). Micro-CT Quantitative Evaluation of Graphite Nodules in SGI. *International Journal of Metalcasting*, 1–10. doi:10.1007/s40962-019-00354-9
4. Nordén, K.K., Faber, J., Babarović, F., Stubbs, T.L., **Selly**, T., Schiffbauer, J.D., Štefanić, P.P., Mayr, G., and Vinther, J. (2019). Melanosome diversity and convergence in the evolution of



- iridescent avian feathers—implications for palaeocolor reconstruction. *Evolution*, 73: 15–27. doi:10.1111/evo.13641
3. Selly, T., Hale, K.E., Schiffbauer, J.D., Clapp, D.A., and Huntley, J.W. (2018). The influence of environmental gradients on molluscan diversity, community structure, body size, and predation in a carbonate tidal creek, San Salvador (The Bahamas). *American Journal of Science*, 318: 246–273. doi:10.2475/02.2018.03
 2. Huntley, J.W., Selly, T., Shelton, K.L., and Schiffbauer, J.D. (2017). Trilobite predation. In AccessScience. McGraw-Hill Education. doi:10.1036/1097-8542.YB170022
 1. Selly, T., Huntley, J.W., Shelton, K.L., and Schiffbauer, J.D. (2016) Ichnofossil record of selective predation by Cambrian trilobites. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 444: 28–38. doi:10.1016/j.palaeo.2015.11.033

ARTICLES IN PREPARATION/SUBMITTED/IN REVIEW:

2. Nolan, M.R., Walker, S.E., Sharma, A., Selly, T., Schiffbauer, J.D. [in preparation]. Reconsidering *Brooksella alternata* of The Conasauga Formation, Southeastern USA.
1. Smithwick, F., Sánchez, L., Field, D.J., Schiffbauer, J.D., Selly, T., Mayr, G., and Vinther, J. [in revision] Melanosome morphology correlates with colour in extant Upupiformes and close relatives and can predict palaeocolour patterns in the Eocene stem group upupiform bird *Messelirrisor*. *Proceedings of the Royal Society of London B*.

TECHNICAL REPORTS:

1. Smith, E.F, Nelson, L.L., Darroch, S.A.F., Hodgins, E.B., Mehra, A.K., Rodewald, B., Schiffbauer, J.D., Selly, T., and Tarhan, L.G. 2018. Ediacaran-Cambrian stratigraphy of the Great Basin, southwest USA Mt. Dunfee, Montgomery Hills, Nopah Range, and Kingston Range April 26th - May 2nd, 2018.

ABSTRACTS AND PRESENTATIONS:

Invited Colloquia

3. Selly, T. 2019. Addressing ancient questions through modern visualization techniques using μ CT. Department of Geological Sciences, University of Missouri – Columbia.
2. Selly, T., Schiffbauer, J.D., Jacquet, S.M., Cai, Y., Strange, M.A., Nelson, L.L., and Smith, E.F. 2019. The oldest fossilized gut: Using micro-computed tomography to unravel early eumetazoan phylogeny. 3rd Annual ZEISS XRM User Meeting.
1. Selly, T. 2016. Predatory-prey interactions: Rare glimpses captured in the fossil record. Department of Geology, Gustavus Adolphus College.

Professional Meeting Presentations

36. Herbst, T., Whittington, A.G., and Selly, T. 2019. Room to grow, room to blow! The influence of crystals on bubble-driven inflammation and outgassing of dacitic magmas. American Geophysical Union Annual Meeting, San Francisco, Ca.
35. Selly, T., Anderson, E.P., and Schiffbauer, J.D. 2019. Utilizing x-ray tomographic microscopy to systematically track decay in taphonomic studies. Geological Society of America Abstracts with Programs. Vol 51, No. 5.
34. Jacobs, G., Schiffbauer, J.D., Selly, T., and Huntley, J.W. 2019. Residues versus radiograms: Biases in diagenesis and preparation of silicified fossils in limestone. Geological Society of America Abstracts with Programs. Vol. 51, No. 5.
33. Selly, T., Anderson, E.P., and Schiffbauer, J.D. 2019. Establishing a new protocol for decay experimentation using x-ray tomographic microscopy. North American Paleontological Convention, Riverside, California.



32. Jacquet, S.M. and **Selly**, T. 2019. Augmenting traditional methods of teaching carbonate sedimentology with micro-CT and 3D segmentation. North American Paleontological Convention, Riverside, California.
31. Schiffbauer, J.D., **Selly**, T., Jacquet, S.M., Strange, M.A., Andreasen, B.D., Cai, Y., Nelson, L.L., and Smith, E.F. 2019. Soft-tissue preservation in cloudinomorpha from the terminal Ediacaran of Nevada may provide clues onto phylogenetic position. North American Paleontological Convention, Riverside, California.
30. Pellicciotti, V., Paton, T., **Selly**, T., Schiffbauer, J.D., and Sumrall, C.D. 2019. A new genus of belemnocystitid solute (Echinodermata) from the Lebanon Limestone (upper Ordovician, Sandbian) of central Tennessee: Reconstruction using phase-contrast x-ray microtomography
29. **Selly**, T., Schiffbauer, J.D., Jacquet, S.M., Andreasen, B.D., Nelson, L.L., and Smith, E.F. 2018. Micro-computed tomographic analysis of terminal Ediacaran tubicolous taxa provides insight into possible early eumetazoan phylogeny. Central States Microscopy and Microanalysis Society.
28. **Selly**, T., Schiffbauer, J.D., Jacquet, S.M., Strange, M.A., O'Neil, G.R., Andreasen, B.D., Cai, Y., Huntley, J.W., Thater, C.A., Nelson, L.L., and Smith, E.F. 2018. Taxonomic evaluation of a tubular assemblage from the terminal Ediacaran of Nevada. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, p. 202.
27. Schiffbauer, J.D., **Selly**, T., Jacquet, S.M., Strange, M.A., Andreasen, B.D., Cai, Y., Nelson, L.L., and Smith, E.F. 2018. 2018. New data on cloudinids from the terminal Ediacaran of Nevada: Possible soft-tissue preservation may provide clues onto phylogenetic position. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, p. 214.
26. Jacquet, S.M., Brock, G.A., **Selly**, T. and Schiffbauer J.D. 2018. X-ray microscopy of armored worms: the plate assembly and protective system of early Devonian articulated macharidians from Australia. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, p. 264.
25. Herbst, T., Whittington, A.G., Pistone, M., Schiffbauer, J.D., and **Selly**, T. 2018. Experimental Vesiculation and Outgassing of Crystal-Bearing Dacite. Geological Society of America Abstracts with Programs. Vol. 50, No. 6, p. 268.
24. Whittington, A.G. Herbst, T., Pistone, M., Schiffbauer, J.D., and **Selly**, T. 2018. Experimental Vesiculation and Outgassing of Crystal-Bearing Dacite. Cities on Volcanoes, Naples, Italy.
23. **Selly**, T., Schiffbauer, J.D., Jacquet, S.M., Strange, M.A., O'Neil, G.R., Andreasen, B.D., Cai, Y., Huntley, J.W., Thater, C.A., Nelson, L.L., and Smith, E.F. 2018. New data on a tubular assemblage from the terminal Ediacaran of Nevada: Taxonomic evaluation indicates a new species of Conotubus and a new cloudinid genus. International Conference on Ediacaran and Cambrian Sciences, Xi'an, China.
22. Schiffbauer, J.D., **Selly**, T., Jacquet, S.M., Strange, M.A., Andreasen, B.D., Cai, Y., Nelson, L.L., and Smith, E.F. 2018. New data on a tubular assemblage from the terminal Ediacaran of Nevada: Possible soft-tissue preservation may yield phylogenetic position. International Conference on Ediacaran and Cambrian Sciences, Xi'an, China.
21. Jacquet, S.M., Betts, M.J., **Selly**, T., Schiffbauer, J.D. and Brock, G.A. 2018. Shell ultrastructure of the organophosphatic brachiopod Eodicellomus from the Lower Cambrian of South Australia. International Conference on Ediacaran and Cambrian Sciences, Xi'an, China.
20. Rosbach, S.A., **Selly**, T., and Schiffbauer, J.D. 2018. The preservation potential of the black-backed land crab, Gecarcinus lateralis, assessed through field-based decay experiments: Implications for the preservation of arthropods. International Conference on Ediacaran and Cambrian Sciences, Xi'an, China.



19. Jacquet, S.M., Brock, G.A., **Selly**, T.A. and Schiffbauer, J.D. 2018. X-ray microscopy of plate assembly in early Devonian articulated machaeridians from Australia. International Palaeontology Commission, Paris, France. Abstract Volume.
18. **Selly**, T., Smith, E.F., Nelson, L.L., Thater, C.A., and Schiffbauer, J.D. 2017. Taxonomy of the terminal Ediacaran vermiform biota, Wood Canyon and Deep Spring Formations, Nevada. Geological Society of America Abstracts with Programs. Vol. 49, No. 6, p. 177.
17. Rosbach, S.A., **Selly**, T., and Schiffbauer, J.D. 2017. Influence of ionic strength on the preservation potential of the blackbacked land crab, *Gevarvinus lateralis*, San Salvador, Bahamas. Geological Society of America Abstracts with Programs. Vol. 49, No. 6, p. 198.
16. Schiffbauer, J.D. and **Selly**, T. 2017. Prospects in microanalytical paleontology: Applications of scanning electron microscopy in the study of ancient life. Geological Society of America Abstracts with Programs. Vol. 49, No. 6, p. 201.
15. **Selly**, T., Hale, K.E., Schiffbauer, J.D., Clapp, D.A. and Huntley, J.W. 2017. The influence of environmental gradients on molluscan diversity, community structure, body size, and predation in a carbonate tidal creek, San Salvador (The Bahamas). Humboldt Colloquium, "Global Research in the 21st Century: Perspectives of the U.S. Humboldt Network".
14. **Selly**, T., Rosbach, S.A., Schiffbauer, J.D. and Wittmer, J.M. 2016. Comparing preservation of different histologies: Mazon Creek-type fossils of the Sun Spot Mine, Illinois, USA. Geological Society of America Abstracts with Programs. Vol. 48, No. 7, p. 253.
13. Huntley, J.W., **Selly**, T., Hale, K.E., Clapp, D.A. and Schiffbauer, J.D. 2016. Environmental gradients in a tidal carbonate lagoon (Pigeon Creek, San Salvador Island, Bahamas) and their relationship to molluscan diversity, body size, and predator-prey interactions. Geological Society of America Abstracts with Programs. Vol. 48, No. 7, p. 197.
12. Meyer, M., Broce, J.S., **Selly**, T. and Schiffbauer, J.D. 2016. Insights into vendotaenid taphonomy and structure: New data on an old fossil. Geological Society of America Abstracts with Programs. Vol. 48, No. 7, p. 236.
11. **Selly**, T., Schiffbauer, J.D. and Huntley, J.W. 2016. Drilling predation and taphonomy of gastropods along environmental gradients, San Salvador, Bahamas. Geological Society of America: Northcentral Section. Vol 48, No. 5.
10. **Selly**, T., Huntley, J.W., Shelton, K.L. and Schiffbauer, J.D. 2015. Caught in the act: Ichnofossil record of selective predation by Cambrian trilobites. Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p.69.
9. **Selly**, T., Schiffbauer, J.D. and Huntley, J.W. 2015. Quantitative taphonomic assessment of *Anomalocaris* from Middle Cambrian shales of the Southwestern United States. Central States Microscopy and Microanalysis Society.
8. Schiffbauer, J.D., **Selly**, T., Huntley, J.W., Broce, J.S. and Shelton, K.L. 2015. Trilobite hunting(?) grounds of the Cambrian Davis Formation, southeastern Missouri. Geological Society of America: Southeastern Section. Vol 47, No. 2, p.2.
7. **Selly**, T., Schiffbauer, J.D. and Huntley, J.W. 2014. Quantitative taphonomic assessment of *Anomalocaris* from Middle Cambrian shales of the Southwestern United States. Geological Society of America Abstracts with Programs. Vol. 46, No. 6, p.578.
6. Broce, J.S., Schiffbauer, J.D., **Selly**, T. and Loduca, S.T. 2014. Soft-bodied taphonomy and mineral association in Cambrian Lagerstätten from the House Range embayment. Geological Society of America Abstracts with Programs. Vol. 46, No. 6, p.578.
5. **Selly**, T. and Schiffbauer, J.D. 2014. Taphonomy of *Anomalocaris* from Middle Cambrian shales of the Southwestern United States. The Paleontological Society Special Publications. Vol. 13, p.149.



4. Bartley, J.K., Selly, T., Manning-Berg, A.R. and Cole, P.M. 2014. Experimental taphonomy as a tool for deciphering biological affinities of microfossils. The Paleontological Society Special Publications. Vol. 13, p.136.
3. Broce, J., Selly, T., Schiffbauer, J.D. and LoDuca, S.T. 2014. Comparative Burgess Shale-Type taphonomy across variable tissue biochemistries: analysis of mineral associations in Lower-Middle Cambrian fossils of Western North America. The Paleontological Society Special Publications. Vol. 13, p.156.
2. Selly, T. 2013. Identifying Precambrian microfossils through decay patterns in modern algae and cyanobacteria. Scholars at the Capitol, St. Paul, MN.
1. Selly, T., Bartley, J.K. and Porter, S.M. 2012. Qualitative and quantitative assessment of taphonomic patterns in modern algae and cyanobacteria: implications for identifying Precambrian microfossils. Geological Society of America Abstracts with Programs. Vol. 44, No. 7, p.246.7.

GRANTS AND AWARDS

GRANTS

Awarded (Professional grants)

NSF EAR Sedimentary Geology and Paleontology (SGP) Division. PI: S.M. Jacquet, co-PI: T. Selly (2019) Plugging the preservational pipeline: An integrated approach to tracking the taphonomic histories of Cambrian skeletal fossil assemblages. NSF 1917031; \$343,878

Pending

Paleontological Society Norman Newell Early Career Grant Program 2020

Declined

Mizzou Women Give 2019

Paleontological Society Norman Newell Early Career Grant Program 2019

Awarded (Student grants)

Paleontological Society Stephen Jay Gould Award (2016); \$800

Paleontological Society Scholarship (2015) Research funding; \$900

Clay Mineral Society Research Grant (2014); \$1,500

Geological Society of America Student Travel Grant

UNIVERSITY/DEPARTMENTAL AWARDS:

University of Missouri Awards

2018 – Outstanding Graduate Student Award

2017 – Wallace Howe Fellowship

2016 – James H. Stitt Memorial Fellowship

2015 – Mehl Fund; \$2,500

2014 – Ernest J Palmer Memorial Scholarship

2013 – Raymond Ethington Student Scholarship

2013 – John W. Tlapek Geology Student Scholarship

Gustavus Adolphus College Awards

Presidential Faculty-Student Collaboration Grant – Awarded to Dr. Julie Bartley

RESEARCH EXPERIENCE



July 2019 – Sample collection of Bristlecone National Forest, CA, Deep Spring Formation, Gold Point, NV, and Wood Canyon Formation, Johnnie, NV for further Ediacaran tubicolous taxonomy.
 August 2018 – Collection from Precambrian-Cambrian transition in the northern margin of S. China.
 March 2018 – Ediacaran-Cambrian Subcommission, southern Nevada.
 November 2015 – Further collection from the Esmeralda Group Deep Spring Formation, NV.
 Summer 2015 – Led sample collection and actualistic decay experiment at the Gerace Research Center, San Salvador, Bahamas.
 May 2014 – Fossil excavation from the Esmeralda Group Deep Spring Formation, NV.
 November 2013 – Field collection of the Davis Shale unit in Southeastern Missouri.
 Summer Research 2012 – Taphonomic decay experiment of eukaryotic microbes.
 Worked alongside Julie K. Bartley to develop and conduct an experiment testing decay rates of microbes. This project was funded by the Presidential Faculty-Student Collaboration Grant and later expanded into an undergraduate senior thesis.
 Summer 2012 - Field research assistant aiding in soil sample and data collection, Platt River, NE.
 Summer Research 2011; Geology of Nicollet County – Developed two exhibits, an informational brochure, and a self-guided tour of the geology of Nicollet County, Minnesota. Funded through the Gustavus Adolphus Sesquicentennial Grant under Julie K. Bartley.

TEACHING AND MENTORING

COURSES TAUGHT:

Oceanography: Past and Present; GEOL 1400 (Spring 2018)
 Oceanography at Duke University Marine Lab – Duke TIP (Summer 2017)
 Historical Geology (with laboratory); GEOL 2350-2360 (Spring 2016)

LABRATORY COURSES TAUGHT:

Microanalysis for Geology; GEOL 4750/7750 (Fall 2017 and Fall 2018)
 Historical Geology; GEOL 2360 (Spring 2014 and 2017)
 Environmental Geology; GEOL 1200 (Fall 2013)

STUDENT TEACHING APPOINTMENTS:

Graduate Teaching Assistant (2013–2014 and 2016–2017; Department of Geological Sciences, University of Missouri)

STUDENT MENTORING:

Undergraduate

Morgan Gremminger – Independent Research and Summer Research (funded through Frey Fund)
 Payton Hubbard – Independent Research
 Mackenzie Bowman – Independent Research

Committee Member

Stephanie Rosbach – PhD (MU; Primary advisor: J. D. Schiffbauer)

SERVICE AND OUTREACH

PROFESSIONAL SERVICE:

2020 – Grad School Fellowship Applications Review Board



RESEARCH SERVICE:

I have reviewed manuscripts for *PALAIOS*, *Precambrian Research*, and *Geobiology*
2019 – Co-chaired a session for the North American Paleontological Convention, Riverside, California conference entitled *Taphonomy* in collaboration with Dr. Adam Tomašových
2018 – Co-chaired a session for the Geological Society of America’s annual conference entitled *Paleontology, Taphonomy, and Biostratigraphy* in collaboration with Dr. Simon Darroch

SYNERGISTIC ACTIVITIES:

10-29-2019 – Invited speaker for the Core Facilities Panel Discussion; presented by ACES
02-01-2019 – Invited speaker for the first campus-wide Postdoctoral Orientation on the Postdoc Panel: Surviving and Thriving at MU
2019 – Present – Mizzou Mentoring Alumni Mentor
2018 – Present – MU Extension Summit; CT Lab Demonstration
2018 – 2019 – University of Missouri Alternative Career Exploration in the Sciences (ACES); Executive Committee

EDUCATIONAL OUTREACH:

2019 – Columbia Young Scientists’ Expo
2018 – Present – Active participant in Skype a Scientist Program
2018 – Career Day at Logan-Rogersville High School, Springfield, MO; Presenter
2017 – 2019 – Scientific Outreach Event for South Callaway Elementary; Event Coordinator
2017 – 2018 – Dinosaurs and Cavemen: (NSF outreach with Dr. Casey Holliday; MU); Event Coordinator
2015 – 2016 – Dinosaurs and Cavemen: Our Changing Planet demonstration (NSF outreach with Dr. Casey Holliday; MU); Presenter

ADDITIONAL INFORMATION

ADDITIONAL EDUCATION AND FIELD COURSES:

Taphonomy Summer Field Course (2015; University of the Bahamas, Gerace Research Center)
Graduate Courses in Electron Microscopy (2013–2014; Dept. of Geological Sciences, University of Missouri)
Teaching Practicum (2016; Dept. of Geological Sciences, University of Missouri)

STUDENT RESEARCH APPOINTMENTS:

Lab Manager of the X-ray Microanalysis Core Facility (2017–2018); Department of Geological Sciences, University of Missouri)
Paleobiology Laboratory Technician (2015–2017; Department of Geological Sciences, University of Missouri)
Graduate Research Assistant (2014–2017; Department of Geological Sciences, University of Missouri)

