CLAIRE CLEVELAND

282 Whitman Avenue, Pleasant Gap, PA 16823
fossilstories@gmail.com
(435) 592-0393

EDUCATION

Ph.D., The Pennsylvania State University, 2021
Department of Geosciences, paleobiology
Dissertation: Oreodont adaptation, evolution, and extinction in Oligocene-Miocene North America

Second Baccalaureate, Southern Utah University, 2015
B.S. Geology-Professional emphasis and B.S. Biology-Botany emphasis

First Baccalaureate, Smith College, 1993
B.A. Chemistry

FELLOWSHIPS AND SCHOLARSHIPS

National Science Foundation Graduate Research Fellow, 2016 – 2021
Richard Standish Good Graduate Scholarship, 2020 – 2021
Michael Loudin Family Graduate Scholarship, 2020
Hiroshi and Koya Ohmoto Graduate Fellowship, 2018 – 2019

RESEARCH EXPERIENCE

Post-Doctoral Research Associate

Dr. Ellen Currano, Department of Botany, The University of Wyoming 2021 – 2023

- Core team member in all aspects of the Integrative Paleobotany Portal (PBot) research workbench and database development project from inception in 2016 through closeout of its initial $1.2M NSF EarthCube funded project (RISE 2026961) in 2023. See "Service" section of this CV for additional contributions 2016-2021.
- Coordinated and facilitated development of 7 community-driven plant fossil descriptive schemas amongst 31 stakeholders representing more than 230 paleobotanists and students worldwide.
- Co-facilitator of 2 virtual workshops and 1 in-person hack-a-thon including more than 200 members of the international paleobotany community. Workshops combined presentations, breakout groups, and whole group feedback sessions to collaboratively define the scope and goals for PBot development and use. The hack-a-thon served as PBot's final level of alpha testing with input from a small representation of the paleobotany community and initial data entry.
- Assisted development and writing of the NSF Geoinformatics grant proposal, "Collaborative Proposal: Sustained Resources: An advanced data system for using paleobotanical data in Earth Science research and education" submitted December 2023.

NSF Graduate Research Fellow and Ph.D. Candidate

Dr. Mark Patzkowsky, Department of Geosciences, The Pennsylvania State University 2017 – 2021

Oreodonts, even-toed, herbivorous ungulates endemic to North America, were abundant, diverse, and widespread prior to going extinct 7 million years ago. Because grassland expansion was the dominant environmental change in North America during the Miocene, lack of adaptation to grasses became the central explanation for extinction. To explore this and other explanations, quantitative variation in oreodont body forms were investigated. First, traditional methods were used to link functional traits with environmental interpretations. Then I developed novel methods based on mathematical trilateration to create simplified three-dimensional models of the skulls. The resulting spatial models supported the removal of body size, a frequently confounding factor in traditional methods, and the assessment of correlated changes within the skulls. To identify which changes in body form were driving

variation and assess trends in how body forms changed through time, ecological morphospaces were developed using Principal Component Analysis based on the traditional and novel methods. Finally, explanations for extinction were evaluated against changes in body form observed in the ecological morphospaces and against environmental and faunal changes reported in the literature. I proposed it is most likely that oreodont extinction was best explained by increased seasonality and the initiation of winter dormancy with its consequent bottleneck in seasonal resources combined with competition from true-ruminants and geographic isolation.

Graduate Research Assistant

The Pennsylvania State University, advisor: Peter Wilf, 2015 – 2016

Fossil floras from Rió Pichileufú (RP) and Laguna del Hunco (LH) in Patagonia, South America, provide a unique opportunity for comparative analysis of two fossil floras bracketing the Early Eocene Climatic Optimum. Over 1200 specimens in the RP collections at the Museo Paleontologico Egidio Feruglio in Trelew, Argentina were used to establish more than 90 morphotypes. To coordinate research data for morphotyping, I developed a relational database in FileMaker Pro that linked leaf specimen data with images, collection data, curation data, morphological descriptions based on The Manual of Leaf Architecture (Ellis et al., 2009), morphotypes, Linean identifications, publication data, and specimen and morphotype discussion notes between student and advisor.

TEACHING EXPERIENCE

Graduate Teaching Assistant

The Pennsylvania State University, F 2015, S 2017, F 2020, and S 2021

GEOSC 001 Physical Geology – lab instructor including development of lab materials, laboratory preparation, in-person instruction, remote instruction, and grading. Responsible for three to four lab sections including up to 26 students per lab. Three to four field labs per lab section included a cumulative interpretation of Pennsylvania's stratigraphic history and stream channel cross-section analysis. Retooled existing and developed new content for in-person and remote instructional presentations. Updated methods and lab manuals, coordinated field trip transportation, and reorganized lab storage with appropriate supply requisitions.

The Pennsylvania State University, S 2016

GEOSC 204 Geobiology – lab and field assistant including preparation, instruction, and grading for two lab sections up to 26 students per lab. Supported preparations for a five-day trip for 50+ undergraduate students to Denver Colorado and surrounding areas, assisted students with mapping and interpretations in the field for assigned group projects, and supported student groups while developing final projects including videos of their findings.

SYNERGYSTIC EXPERIENCE

Earth and Mineral Sciences Museum & Art Gallery

The Pennsylvania State University

- Advisory board member of The Pennsylvania State University Earth and Mineral Sciences Museum and Art Gallery, Graduate Student Representative, 2016 – 2021
- Co-Founder of the Society for Museum Science Education (SoMuSE) a graduate student organization in association with Earth and Mineral Sciences Museum and Art Gallery, 2019 – 2020

Museum Seminar: The Role of Science Museums in Science Education

The Pennsylvania State University

Gained skills and experience working with a collaborative team to select, plan, develop, and build our student exhibit, "Ocean Acidification and its Effect on Marine Life" for The Pennsylvania State University Earth and Mineral Sciences Museum & Art Gallery including hands-on and interactive components to engage visitors. Skills and experience were supported through additional seminar discussions on topics including the history of natural history museums, collections building and storage, educational programing and exhibits, database management and digitization, collections based research, funding support, and museum design.

Science Outreach and Communication (SC 451)

The Pennsylvania State University

Gained skills and experience designing and presenting outreach activities, communicating science to diverse audiences, developing broader impact statements, practicing live media interviews on camera, writing press releases, and using social media to promote ideas in personal and professional spaces. Skills and experience were supported through a pedagogical understanding of science education and lesson planning through panel discussions with outreach and research professionals from the university.

Technical Writing Fellow

Southern Utah University, advisor: John MacLean, S 2014

Support was provided throughout the semester to a class of 32 students including written editorial reviews of drafts and one-on-one consultations.

MUSEUM AND FIELD EXPERIENCE

Graduate and Postgraduate

Developed skills including data collection and management, prospecting fossil quarries, collecting and preserving fossils, field sketching, field interpretation, field mapping, and stratigraphy.

- Field site prospecting and pollen collection for proof-of-concept research proposal, "Paleobotanical transition to the early Quaternary in the Snake River Headwater's Camp Davis Formation, WY"
- American Museum of Natural History, New York, New York – final oreodont and comparative artiodactyl specimen data collection and photography, January 28 – February 1, 2019
- American Museum of Natural History, New York, New York – oreodont skull and limb data collection for dissertation, August 20 – 24, 2018
- Peabody Museum of Natural History, New Haven, CT – oreodont skull and limb data collection and photography for dissertation, July 30 – August 3, 2018
- Carnegie Museum of Natural History, Pittsburg, PA – oreodont skull and limb data collection and photography for dissertation, July 16 – 20, 2018
- University of Nebraska State Museum, Lincoln, NE – oreodont skull and limb data and photography collection for dissertation, June 11 – 25, 2018
- American Museum of Natural History, New York, New York – oreodont skull and limb data collection for dissertation, August 2-4, 2017, January 29 – February 2, 2018, February 13 – 16, 2018, February 26 – March 2, 2018
- American Museum of Natural History, New York, New York – preliminary oreodont skull and limb metrics preparation for dissertation, July 17-21, 2017
- American Museum of Natural History, New York, New York – dissertation research preparation, June 12 –16, 2017
- Museo Paleontológico Egidio Feruglio, Trelew, Patagonia, Argentina – morphotyped and photographed Río Pichileufu collection of 1200(+) botanical specimens, May 29 – June 26, 2016
- GEOSC 572 Field Stratigraphy: Ancient Carbonates of Guadalupe Mountains – ten-day intensive field investigation (2 credits), field preparation course (1 credit), spring 2016

Undergraduate

Developed skills including field mapping, fossil quarry and collections, stratigraphic columns and cross-sections, field interpretation, and notebook techniques through Southern Utah University.

- GEO 4960 Field Geology – intensive course in geologic mapping (6 credits), summer 2015
- The Geology of Death Valley National Park, California – geologic features (1.5 credits), spring 2014
- Stepping Across the Grand Staircase, Utah – soft sediment deformation (1.5 credits), fall 2013
- Denver Museum of Nature and Science, The Blues, Utah – paleobotany with Ian Miller, fall 2013
- Denver Museum of Nature and Science, Death Ridge, Utah – paleobotany with Ian Miller, fall 2013
- Antelope Island, Great Salt Lake,Utah – evidence of the Lake Bonneville environment, spring 2013
- The Book Cliffs, Utah – sequence stratigraphy with guest lecturer Michael Hofmann, fall 2012
- Valley of Fire, Nevada – structural geology and diagenesis with guest lecturer Gerald Bryant, spring 2012
- Symposium in the Book Cliffs, Utah – sequence stratigraphy with guest lecturer Michael Hofmann, fall 2011

GRANTS AND AWARDS

The Pennsylvania State University Geosciences awards, 2015-2021
Shell awards, 2017 and 2018
Geological Society of America grants, 2016 and 2018
Evolving Earth Foundation grant, 2016
Paleontological Society grant, 2016

HONORS

Penn State Department of Geosciences Teaching Assistant of the Year, 2018
Outstanding Undergraduate Student-Geology, 2015
Outstanding Undergraduate Woman Geologist in Utah, Association for Women Geoscientists, Salt Lake chapter, 2015
Education Designed to Give Experience (EDGE), 2014
Outstanding Service Department of Biology, 2014
Insight Dubai Women's Conference Southern Utah University Student Representative College of Science and Engineering, 2014
Omicron Delta Kappa: The National Leadership Honor Society, inducted 2014
Outstanding Research Department of Physical Science, 2013
Outstanding Underclassman Department of Biology, 2013
Outstanding Underclassman Department of Physical Science, 2012
Certificate of Merit, United States Department of Agriculture, 2012
American Chemical Society Award in Analytical Chemistry, 1992

SERVICE

- Core team member for the Integrative Paleobotany Portal (PBot) prototype, 2016 – 2021
  - Moderator for "The Integrative Paleobotany Portal Design Unveiling and Schema Development Workshop," April 2021
  - Assisted development, organization, facilitation, and summary reporting for the "*Online Database Solution for Paleobotany Workshop"* at the Midcontinent Paleobotanical Colloquium, May 2020
  - Assisted development and drafting of the NSF EarthCube grant proposal, "*Solutions for Paleobotany: a web client hosting novel content and its integration with existing databases"*, RISE 2026961
  - Presented a prototype paleobotanical database using FileMaker Pro software to Ellen Currano and Dori Contreras at GSA 2016 initiating the first conversation about a paleobotany research database and workbench.
- Faculty Committee Graduate, Student Representative, the Department of Geosciences at The Pennsylvania State University, academic year 2020 – 2021
- Faculty Search Committee, Graduate Student Representative, Sedimentary Geologist in the Department of Geosciences, S 2021
- Faculty Search Committee, Graduate Student Representative, Land, Water, and Energy Data Analyst in the Institute of Energy and the Environment, F 2020
- Panel discussion Moderator for "Picture a Scientist: EMS Women Faculty Panel Discussion" presented by The Pennsylvania State University College of Earth and Mineral Sciences Office of Educational Equity and We Are for Science, February 2021
- Association for Women Geoscientists, Penn State Mentorship Program Officer and outreach coordinator for elementary – undergraduate student programs in local communities, 2015 – 2019
- Shake, Rattle, Rocks, 5th grade geoscience education days, graduate student paleobiology workshop instructor, annually 2016 – 2019
- Search Committee Student Representative for selection of SUU Biology-Botany professor, fall 2013
- Annual Washington County Water Fair – United States Forest Service Hydrology Educational Liaison, summer 2012

PUBLICATIONS

- Cleveland C., R. W. Graham, and M. E. Patzkowsky (in revision for resubmission). Oreodont adaptation and extinction in Central High Plains North America. Paleobiology.
- Cleveland C., T. J. Hildebrand, J. S. MacLean, and J. Hargrave. 2015. Insights into the Late Quaternary paleoenvironment of northwestern Arizona. Southwestern Naturalist 60:15-20.
- Cleveland C., R. M. Garrard, R. C. Kidman, D. M. McLemore, J. C. E. Yon, and J. S. MacLean. 2015. Strain accommodation in the footwall of the Rubys Inn thrust fault, Hillsdale Canyon, southern Utah. The Compass: Earth Science Journal of Sigma Gamma Epsilon: Vol. 86:102-117.

PRESENTATIONS

- **Cleveland C**, Contreras D, Currano E, Koll R, Meredith D, Peters S, Uhen M, Zaffos A. 2022. PBot, the Integrative Paleobotany Portal: Breaking barriers to answer big questions in paleobotanical research. EarthCube Annual Meeting, San Diego No. 121 *(poster)*.
- Koll R, **Cleveland C**, Contreras D, Currano E, Meredith D, Peters S, Uhen M, Zaffos A. 2022. The Integrative Paleobotany Portal: a community gateway to fossil plant research and education. The 11th European Palaeobotany and Palynology Conference, Stockholm *(poster)*.
- **Cleveland C**, Contreras D, Currano E, Koll R, Meredith D, Peters S, Uhen M, Zaffos A. 2022. PBot, the Integrative Paleobotany Portal: Breaking barriers to answer big questions in paleobotanical research. The 30th International Workshop on Plant Taphonomy in Dresden, Germany on Thursday, May 19, 2022, 3:05 PM *(talk)*.
- **Cleveland C**, Contreras D, Currano E, Koll R, Meredith D, Peters S, Uhen M, Zaffos A. 2022. PBot, the Integrative Paleobotany Portal—Springing into our First Year. Mid-Continent Paleobotanical Congress at the Oak Spring Garden Foundation, Virginia on Saturday, May 7, 2022, 12:00 PM *(poster)*.
- Currano E, **Cleveland C**, Contreras D, Koll R, Meredith D, Peters S, Uhen M, Zaffos A. 2021 Introducing PBot, the Integrative Paleobotany Portal. Geological Society of America Annual Meeting in Denver, No. 225-1 *(poster)*.
- **Cleveland C**, Patzkowsky M, Graham R. 2019. Oreodont adaptation and extinction in the Central High Plains, Miocene North America. Society of Vertebrate Paleontologists Annual Meeting in Brisbane, Australia, Technical Session III on Wednesday, October 9, 2019, 4:00 PM *(talk)*.
- **Cleveland C**, Patzkowsky M, Graham R. 2019. Oreodonts adapt to expanding grasslands in Miocene North America and then go extinct. American Society of Mammalogists Annual Meeting in Washington D.C., Paper No. 341 *(talk)*.
- **Cleveland C**, Patzkowsky M, Graham R. 2019. Oreodonts adapt to expanding grasslands in Miocene North America. Annual Graduate Student Colloquium in the Department of Geosciences at The Pennsylvania State University *(talk)*.
- **Cleveland C**, Patzkowsky M, Graham R. 2018. Does oreodont morphology and their extinction correlate with grassland expansion in North America's Central-Western Great Plains? Geological Society of America Annual Meeting in Indianapolis, No. 259-11 *(poster)*.
- **Cleveland C**, Patzkowsky M, Graham R. 2018. Why didn't diversity, abundance, and geographic distribution protect oreodonts from extinction in Miocene North America? Annual Graduate Student Colloquium in the Department of Geosciences at The Pennsylvania State University *(talk)*.
- **Cleveland C**. 2016. Does the Middle Eocene Río Pichileufú flora from Patagonia, Argentina record initial floristic response to global cooling and South American isolation? Geological Society of America Annual Meeting in Denver, No. 76-366 *(poster)*.
- **Cleveland C**. 2016. What are early signals of Patagonian paleofloral response to Eocene cooling and initial stages of South America's separation from Antarctica? Botanical Society of America Annual Meeting in Savannah, No. PPB003 *(poster)*.
- **Cleveland C**, Hargrave J, Bancroft B, Ogburn RM. 2014. Leaf proxy complexity and the road to evolutionary paleoecological interpretations in n-dimensions. Southern Utah University College of Science and Engineering Undergraduate Research Symposium No. 005 *(talk)*.
- **Cleveland C**, Hargrave J, Bancroft B, Ogburn RM. 2014. Complexities of modern leaf morphology, climate proxies, and applicability in the fossil record. Geologic Society of America Annual Meeting in Vancouver, No. 130-8 *(poster)*.
- **Cleveland C**, Hargrave J, Bancroft B, Ogburn RM. 2014. Complexities of modern leaf morphology,

climate proxies, and applicability in the fossil record. Presidential Inauguration Southern Utah University Academic Excellence Symposium on Thursday, September 11, 2014, 1:00 PM in the Cedar Breaks room *(talk)*.

- **Cleveland C**, Bancroft B, Hargrave H, and Ogburn RM. 2014. Effect of competition on water-use traits and photosynthetic traits observed in leaf morphology during ancient plant diversity transitions. Ecological Society of America Annual Meeting in Sacramento, No. PS 7-60 *(poster)*.
- **Cleveland C**, MacLean JS, Petersen T, Spruell P. 2013. Connecting College Science Students to Career Success: a holistic approach to return on investment. Southern Utah University College of Science and Engineering Undergraduate Research Symposium No. 063 *(talk)*.
- **Cleveland C**, Hildebrand TJ, MacLean JS, Hargrave J. 2013. Insights into the Late Quaternary paleoenvironment of northwestern Arizona. Botanical Society of America Annual Meeting in New Orleans, No. PPB003 *(poster)*.

PROFESSIONAL ASSOCIATIONS

- Geological Society of America, 2011 – 2023
- Botanical Society of America, 2013 – 2024
- Ecological Society of America, 2014 – 2022
- Society of Vertebrate Paleontologists, 2016 – 2024
- Paleontological Society, 2016 – 2023
- International Organization of Paleobotany, 2020 – 2023

PROFESSIONAL EMPLOYMENT HISTORY

University of Wyoming; Laramie, WY

- Post-Doctoral Research Associate (2021 – 2023)
- Assistant Research Scientist (2021)

Pennsylvania State University; State College, PA

- Graduate Research Assistant and Teaching Assistant (June 2020 – August 2021)
- NSF Graduate Research Fellow (June 2017 — May 2020)
- Graduate Research Assistant and Teaching Assistant (August 2015 – May 2017)

Southern Utah University; Cedar City, UT

- Technical Writing Fellow (January 2014 – April 2014)

United States Forest Service-Dixie National Forest; Cedar City, UT

- Lead Hydrology Technician (May 2013 – August 2013)
- Hydrology Technician (May 2012 – April 2013)

Cedar Breaks Lodge; Brian Head, UT

- Assistant General Manager (June 2007 – August 2011)
- Reservations & Group Sales Manager (October 2006 – June 2007)
- Reservations Manager (January 2006 – October 2006)
- Reservations Supervisor (March 2005 – January 2006)
- Reservations Agent (November 2004 – March 2005)