



Celebrating the Diversity of Research in the Mammoth Cave Region

**11th Research Symposium
at Mammoth Cave National Park**

Schedule of Events

April 18-20, 2016

Mammoth Cave National Park Training Center

MONDAY, APRIL 18

- 8:00 Informal meet and greet, registration, load talks
- 8:30 Welcome, Special Opening Event
- 9:00 Ethnographic Overview and Assessment of Mammoth Cave National Park: A Progress Report
~ Michael Ann Williams, Kristen Clark, Eleanor Hasken, and Rachel Haberman
- 9:45 Break
- 9:55 Where Did They Go? An Analysis of Out-Migration from Mammoth Cave National Park During Creation
~ Collins Eke
- 10:20 Flint Ridge Cave History and Legends
~ Norman L. Warnell and Stanley D. Sides
- 10:45 Research and Resources in WKU Special Collections
~ Nancy Richey
- 11:10 Announcements
- 11:15 Lunch - on your own
- 12:45 Civilian and Soldier Graffiti of Hundred Dome (Coach) Cave, Kentucky, 1859 -1862
~ Marion O. Smith and Joseph C. Douglas
- 1:10 Archeological Excavations in Advance of the Historic Tour Trail Rehabilitation
~ Steven Ahler and Rebecca L. Hummel
- 1:35 Documentation and Conservation of the 1812-Era Saltpeter Works in Mammoth Cave, Kentucky
~ George M. Crothers and Christina A. Pappas
- 2:05 Break
- 2:15 Recent Investigations at 15Ed23: Historic and Cultural Resources in a Disturbed Cave Environment
~ Joseph C. Douglas, Alan Cressler, George Crothers, Marion O. Smith, Kristen Bobo, and Justin Carlson
- 2:40 1852 Journey to Mammoth Cave StoryMap
~ Katie Algeo
- 3:05 Announcements
- 3:10 Break, Poster setup
- 3:25 - 5:00 Poster session
- 7:00 Mammoth Cave: A Place Called Home (Held at the Cave City Convention Center)
~ Cheryl Beckley, WKU PBS

POSTER SESSION

Archeology / History

- Evaluation of an Early Nineteenth Century Brick Kiln at the Gardner House in Hart County, Kentucky
~ Lauren Kenney and Darlene Applegate
- New Discovery Cultural Artifact Inventory and Analysis Project Update
~ David Kime, Jillian Goins, Robert Jensen, Clayton Johnson, Alessa Rulli, and Victoria Voss

Biology / Ecology

- Oak Regeneration in Mammoth Cave National Park
~ Bill Moore and Carl Nordman
- Surveys for the Diamond Darter (*Crystallaria cincotta*), an Endangered Species Known Historically from the Green River in Kentucky
~ Matthew R. Thomas and Stephanie L. Brandt
- 12 Years Conducting MAPS at Mammoth Cave National Park: What Have We Learned?
~ Brice Leech
- Recent Winter Bat Numbers at Mammoth Cave National Park: Pre/Post White-Nose Syndrome Arrival
~ Steven Thomas
- The Effects of the Fungus *Beauvaria sp.* on the cave cricket, *Hadenoeus subterraneus*
~ Christina Walker, Derrick Jent, and Claire Fuller

Education / Interpretation

- Chronicling Mammoth Cave Data Visualization
~ Matthew Beckerich, Jared Koshiol, Noah Love, Greta Lowe, Celeste Shearer, and David Kime
- Youth Engagement in Public Health at Mammoth Cave National Park: A Pilot Alternative Spring Break Program
~ Laura Shultz, David Wong, Amy E. Thomas, Rick Toomey, and Shannon Trimboli
- Six Americas: Where Do Teachers Stand
~ Jeanine Huss and Cheryl Messenger

Geology / Hydrology

- Drainage to Mammoth Cave National Park
~ Chris Groves, Katie Algeo, and Laura Myers
- Clastic Sediments in Karst as a Vehicle for Contaminant Transport: Lithofacies and Transport Mechanisms
~ Rachel Bosch and William B. White
- Green River Alluvial Terraces at Mammoth Cave and Glacial Valley Trains on the Ohio River: Genetic Correlation Revisited
~ Joseph A. Ray
- Spatial Distribution Map of Small Caves within Mammoth Cave National Park
~ Bill Copeland

Resource Management

- Meta-Analysis of Research Conducted at Mammoth Cave National Park, 1980-2013
~ Andrea Bachman, Nicole Erb, Ellen McPhillips, Matthew Rice, Tawni Riker, and David Kime
- Exploration of Mammoth Cave Pools with Submersible Remotely Operated Vehicles
~ S. Altenstadter, O. Hennis, C. Johnson, A. Willett, S. Hammer, and E. Wong
- Redevelopment of Historic Tour Cave Trails
~ Rickard S. Toomey III and Steve Kovar
- Continuing Measures in Response to White-nose Syndrome at Mammoth Cave National Park
~ Gina Zanmarini, Natalie Anderson, Chris Clark, Laura Shultz, Rickard Toomey, and Shannon Trimboli

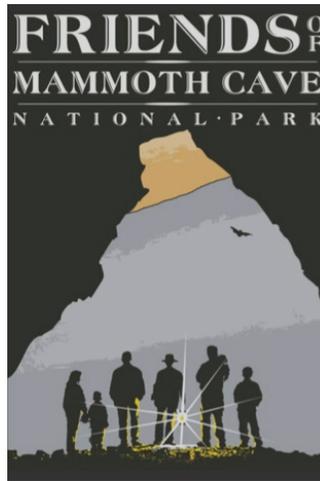
TUESDAY, APRIL 19

- 8:00 Informal meet and greet, registration, load talks
- 8:30 Welcome
- 8:40 The Freshwater Mussels and the Green River: Conservation, Protection, and Management of a Vital Resource in North America
~ Monte McGregor, Bobby Carson, and Ken Kern
- 9:05 In Situ Survival and Performance of Juvenile Mussels in Streams and Correlations with Water and Sediment Quality Factors
~ Wendell Haag, Jacob Culp, Monte McGregor, James Stoeckel, and Robert Bringolf
- 9:30 Potential Evidence for Arsenic Mineralization in Mussel Shells in the Upper Green River Basin, Kentucky
~ Autumn Turner, Chris Groves, Aaron Celestian, and Albert Meier
- 9:55 Break
- 10:10 Host-Parasite Associations of Small Mammal Communities: Implications for the Spread of Lyme Disease
~ Matthew Buchholz and Carl Dick
- 10:35 Amphibians and Reptiles of Mammoth Cave National Park: What Have We Learned After 13 Years of Monitoring
~ John MacGregor
- 11:00 Over Half a Century of Mammoth Cave National Park Mid-winter Bird Count Data
~ Blaine Ferrell
- 11:25 Announcements
- 11:30 Lunch - on your own
- 1:00 The Effects of Rainfall on Vernal Herbs
~ Janis LeMaster and Albert Meier
- 1:25 Conducting a Biological Inventory of Sloan's Crossing Pond
~ Miranda Thompson, Jason A. Matthews, and Christy Soldo
- 1:50 Video Presentation: Monitoring Cave Organisms, Cumberland Piedmont Inventory and Monitoring Network
~ Kurt Helf, Steven Thomas, and Michael Durham
- 2:15 Break
- 2:25 The Activity of *Myotis sodalis* and *Myotis septentrionalis* Changes on the Landscape of Mammoth Cave National Park Following the Arrival of White-nose Syndrome
~ Rachael Griffiths, Luke E. Dodd, and Michael J. Lacki
- 2:50 Summary of 2015 Winter Bat Monitoring at Mammoth Cave National Park
~ Laura Shultz, Chris Clark, Rick Toomey, and Shannon Trimboli
- 3:15 Evaluating the Energetic Value of Lepidoptera Using Bomb Calorimetry
~ Shelby A. Fulton, Luke E. Dodd, and Lynne K. Rieske
- 3:40 Break
- 3:50 Organization and Development of the Eyes of *Ptomaphagus hirtus*, the troglobitic small carrion beetle of Mammoth Cave
~ Markus Friedrich, Jasmina Kulacic, and Elke Buschbeck
- 4:15 Strip Adaptive Cluster Sampling with Application to Cave Crickets
~ Kurt Lewis Helf, Tom Philippi, Bill Moore, and Lillian Scoggins
- 4:40 Cave Research Activities in and around Mammoth Cave National Park
~ Pat Kambesis and Bob Osburn
- 5:05 Announcements
- 7:30 CRF map salon and social (Held at Hamilton Valley Research Facility)

WEDNESDAY, APRIL 20

- 8:00 Informal meet and greet, registration, load talks
- 8:30 Welcome
- 8:40 Tracing Carbon in Karst Environments in South-central Kentucky to Identify Changes in Groundwater Dynamic Under Varying Landuses
~ Chelsea Ballard, Jason Polk, and Kegan McClanahan
- 9:05 Measurement of Inorganic Carbon Fluxes from Large River Basins in South Central Kentucky Karst
~ Connor Salley and Chris Groves
- 9:30 An Overview of the Reverse Flow Patterns of River Styx in Mammoth Cave, Kentucky: 2009-2012
~ Shannon R. Trimboli, Rickard S. Toomey, III, Kim Weber, and Susan Ryan
- 9:55 Break
- 10:10 The Effect of Faulting on Past and Present Hydrogeology in Long Cave, Mammoth Cave National Park
~ Rickard A. Olson and Rickard S. Toomey
- 10:35 Use of Multiphysics Simulation to Model Environmental Conditions Associated with Bat Hibernacula including Preliminary Indication of Impacts on Saltpeter Vats in Mammoth Cave
~ Aaron Bird, Rick Olson, Rick Toomey, Aaron Addison, and Rachel Bosch
- 11:00 What Data Analytics Can do for You!
~ Leyla Zhuhadar, J. Kirk Atkinson, Albert Meier, and Ouida Meier
- 11:25 Announcements
- 11:30 Lunch - on your own
- 1:00 The Max Kämper Map of Mammoth Cave - A Centennial Restoration
~Tres Seymour
- 1:25 Natural Resource Condition Assessment for Mammoth Cave National Park
~ Cate Webb, Chris Goves, and Katie Algeo
- 1:50 Quantitative Dye Studies to Evaluate the Spill Response System for Mammoth Cave National Park
~ JeTara Brown, Thomas Byl, Rickard S. Toomey, III, and Lonnie Sharpe, Jr.
- 2:15 Break
- 2:25 Modeling Activity of the Indiana Bat (*Myotis sodalis*) at Mammoth Cave National Park using Remotely-sensed Descriptors of Forest Canopy Conditions
~ L. E. Dodd, N. S. Skowronski, M. B. Dickinson, L. K. Rieske, and M. J. Lacki
- 2:50 Citizen Science at Mammoth Cave National Park: Integrating Research and Education
~ Shannon R. Trimboli
- 3:15 Undergraduate Research Projects Help Promote Diversity in the Geosciences
~ De'Etra Young, Shannon R. Trimboli, Rickard S. Toomey, III, and Thomas Byl
- 3:40 Announcements and Closings

Thank You to Our Sponsors!



Cover art:

McCoy Blue Hole, WKU Green River Preserve

Cover art contributed by:

Matt McClintock

Symposium organized and hosted by:

The WKU branch of The Mammoth Cave International Center for Science and Learning



Symposium organized and hosted by: The WKU branch of the Mammoth Cave International Center for Science and Learning

Symposium sponsored by: WKU's Ogden College of Science and Engineering, the Cave Research Foundation, Northern Kentucky University's Honors Program, the Cave City Convention Center, and the Friends of Mammoth Cave National Park

Editors of Proceedings: Shannon R. Trimboli, Luke E. Dodd, and De'Etra Young

Cover photograph provided by: Matt McClintock

Lantern artwork provided by: John Yakel

Cover photograph: McCoy Blue Hole, WKU Green River Preserve



The Mammoth Cave International Center for Science and Learning is one of a network of nineteen **Research Learning Centers** based in the national parks, where science and education come together to preserve and protect areas of national significance. **Western Kentucky University** has been a valued partner of the National Park Service in this endeavor, supporting research and education at Mammoth Cave.