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# Mammoth Cave International Center for Science and Learning

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# Mammoth Cave International Center for Science and Learning

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## Abstract

The Mammoth Cave International Center for Science and Learning (MCICSL) is a cooperative venture of Mammoth Cave National Park and Western Kentucky University. Funding, logistical support, and governance of MCICSL are shared equally by both entities. MCICSL is part of a national network of research learning centers located within the National Park Service.

The goals of MCICSL and the other research learning centers are to:

- I. Facilitate the use of parks for scientific inquiry.
- II. Support science-informed decision making.
- III. Communicate the relevance of and provide access to knowledge gained through scientific research.
- IV. Promote science literacy and resource stewardship.

MCICSL has been operational since the middle of 2005, so it is still building programs. Current staffing consists of a Research Director (Toomey) and a part-time Education Program Specialist (Trimboli). In spite of the limited staff, MCICSL is meeting its goals and is leading both research and education based programs.

## Introduction

Research learning centers were developed by the National Park Service to facilitate research within the national parks and to provide better communication of research results to managers, partners, and the public. Originally 32 research learning centers were planned, each one serving a network of parks. The first research learning centers were funded in 2001, and in 2003, Mammoth Cave National Park was slated to receive funding to develop a research learning center. However, funding for additional centers was discontinued before Mammoth Cave's funding was received.

When funding for new research learning centers was suspended, Mammoth Cave National Park and Western Kentucky University created a proposal for a cooperatively run and funded center. Funding for the Mammoth Cave International Center for Science and Learning

was provided through two one-year (2004 and 2006) Congressional line item appropriations. In 2005, a full-time research director, Rick Toomey, was hired to run the research learning center. In 2007, he was joined by a part-time education program specialist, Shannon Trimboli.

Despite limited funding and staff, MCICSL is actively involved in numerous natural and cultural research and education projects at Mammoth Cave National Park. The center coordinates scientific research at the park and consults with the park on scientific issues. In addition, MCICSL leads or participates in many educational activities that highlight research at the park. Most of the center's educational activities are focused on learners that are secondary school age or older.

**Meeting our goals and having fun**  
*Facilitate the use of parks for scientific inquiry*  
*(Figures 1 and 2).*

MCICSL coordinates the research for Mammoth Cave National Park, including overseeing the research permit applications process. Through permitted research and research projects managed through agreements and other mechanisms, MCICSL facilitates



Figure 1. Tennessee State University students test the parking lot filter system in preparation for a larger project looking at parking lot runoff around Mammoth Cave.



Figure 2. Wittenberg University geology students use Electrical Resistivity Ground Imaging to look for cave passages near the park.

research by state and federal agencies, non-governmental organizations, private researchers, and numerous universities. MCICSL staff also assists the researchers in obtaining lodging, working with park staff and volunteers, and other logistical needs.

*Support science-informed decision making*  
*(Figures 3 and 4).*

MCICSL staff serves as the primary or co-primary investigator on several research projects involving NPS caves both within Mammoth Cave National Park and at other national parks. These projects include a multi-park lighting research project, research to address on-going E. coli issues in cave waters, and a project to improve monitoring of backcountry caves. MCICSL has also consulted with park management on various resource protection issues and assisted in relighting several areas of the cave to improve visitor experience and reduce exotic plant growth. During the summer of 2008, MCICSL co-hosted an intensive, week-long Cave and Karst resource Management workshop at Sequoia / King Canyon National Park. This workshop was attended by cave resource managers from across the country.



Figure 3. Mammoth Cave ecologist, Rick Olson, sets up an experimental apparatus to measure the amount of algae growth that occurs under different lighting conditions. MCICSL is co-lead on this project, which is also taking place at four other national parks.



Figure 4. Rick Toomey (MCICSL) and Joel Despain (NPS) lead a group of cave resource managers on a trip to review ways of managing cave resources and public access to caves.

***Communicate the relevance of and provide access to knowledge gained through scientific research (Figures 5 and 6).***

MCICSL provides a variety of research-based formal and informal educational and outreach opportunities to diverse internal and external audiences. Each year, numerous professors contact MCICSL to schedule customized research-focused field opportunities for their students. In addition to their work with students, MCICSL hosts, or co-hosts, science and research-based workshops for teachers and the general public. MCICSL also produces written internal and external research summaries and is serving on the exhibit committee for Mammoth Cave’s new Visitor Center.

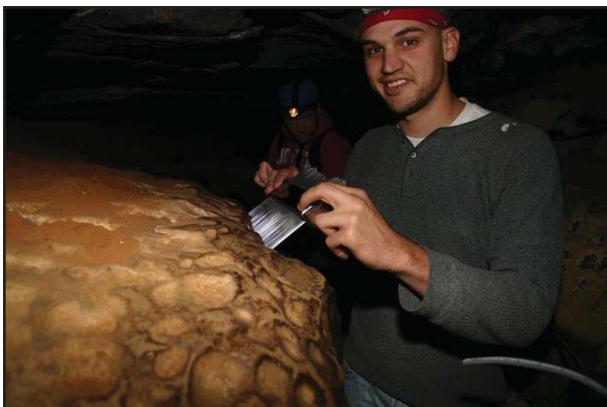


Figure 5. An Ohio State University geology student measures scallops to determine the speed and direction of the ancient cave rivers.



Figure 6. Participants in a weekend workshop visit the grave of William Bransford while learning about the history and contributions of African Americans to the Mammoth Cave area.

***Promote science literacy and resource stewardship (Figures 7 and 8).***

For the past three years, MCICSL has collaborated with Mammoth Cave’s Environmental Education Division and the National Association of Geoscience Teachers to offer summer internships for local teachers. The teachers gain hands-on exposure to the variety



Figure 7. Two Geoscience-Teacher-in-the-Park interns assist park scientists by recording the GPS coordinates of a newly discovered cave entrance.

of resources found at the park while working alongside researchers. Several advanced high school classes have also participated in research-focused outdoor learning experiences with MCICSL staff. In addition, MCICSL and Tennessee State University have partnered on an NSF grant encouraging minorities to pursue science, technology, engineering and math careers. The partnership is using cultural connections to the park as a way to connect the students with the park's geoscience and environmental resources.

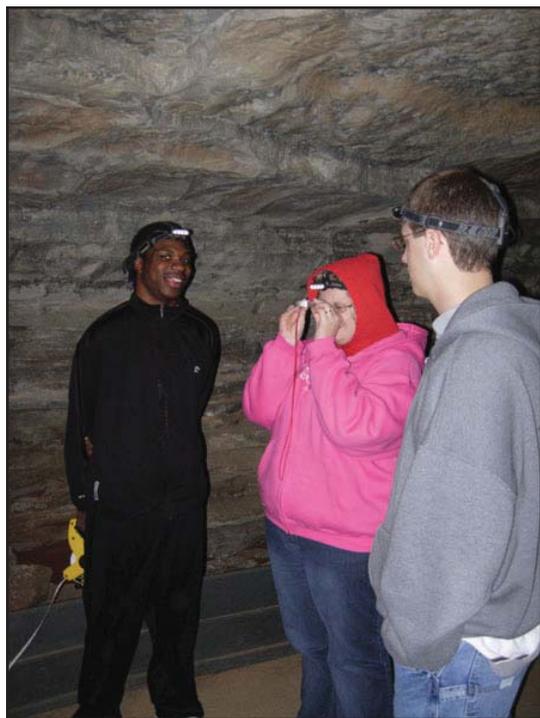


Figure 8. A Special Topics in Biology II high school class learns cave mapping techniques and how cave mapping is used as an important scientific tool in the management of cave resources.

### **What does the future hold?**

With the continued support of park management and Western Kentucky University, MCICSL plans to continue facilitating research and research-based education and outreach within Mammoth Cave National Park. Securing permanent funding for MCICSL is an ongoing need that is being actively pursued by MCICSL and its partners. In addition, opportunities

for additional grant-based funding are being sought until permanent funding can be obtained. MCICSL is also actively involved in the development of a national Research Learning Center network strategic plan and other network activities.

### **Acknowledgements**

Thanks to all those at Western Kentucky University and Mammoth Cave National Park who provide so much support and encouragement. Thanks also to our many partners who make the individual projects in which they are involved possible.

### **Partners**

To learn more about the following partners, please visit their websites.

Mammoth Cave National Park:  
[www.nps.gov/maca](http://www.nps.gov/maca)

Western Kentucky University:  
[www.wku.edu](http://www.wku.edu)

The Research Learning Center Network:  
[www.nature.nps.gov/learningcenters/](http://www.nature.nps.gov/learningcenters/)