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## **Preparing for a Significant Central U.S. Earthquake**



### **Science Needs of the Emergency Response Community**

by

Neil Anderson



**NUTC  
ETT205**

**A National University Transportation Center  
at Missouri University of Science and Technology**

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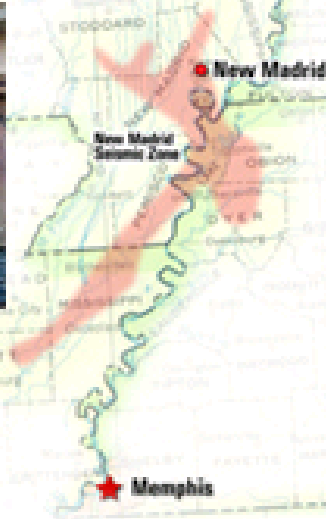
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16. Abstract  The New Madrid and Wabash Valley seismic zones are capable of producing large magnitude earthquakes that could cause significant damage and interrupt the east to west flow of transportation, communication, electricity, natural gas and oil across the central United States. A large magnitude quake also could disrupt the movement of coal, fertilizer, or agricultural products to and from ports along the middle Mississippi and lower Ohio Rivers as well as disrupt the lives of countless residents of the Central U.S. The USGS and the Center for Earthquake Research and Information of the University of Memphis estimate that for a 50-year period, the probability of a repeat of the 1811-1812 earthquake (magnitude 7.5-8.0) is 7-10 percent, and the probability of a magnitude 6.0 or larger is 25-40 percent. Unlike earthquakes that occur in southern California, the causes and effects of earthquakes in the central and eastern United States are just beginning to be understood. In addition, earthquakes in the central and eastern United States tend to affect a much larger area. Consequently, regional collaborations between Federal, State, local and academic partners is essential to coordinate planning and responses.			
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# Preparing for a Significant Central U.S. Earthquake

St. Louis ★  
*Science Needs of the  
Response and Recovery Community*  
★ Rolla  
August 12-14, 2008  
MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY  
Rolla, Missouri



**NUTC Final Report**  
**New Madrid Seismic Zone Conference**  
August 12-14, Rolla Missouri  
<http://conference.mst.edu/newmadridconf/agenda.html>



# New Madrid Seismic Zone Conference

August 12-14, 2008 | Rolla, Missouri



## 1. Conference Vision

Provide a regional forum for the presentation, exchange of ideas, and potential solutions involved with preparing for a significant central U.S. earthquake. The conference will open communication with academia, government, non-government agencies and the private sectors to address the current and forecasted needs of the response and recovery community.

## 2. Conference Objective

To facilitate relevant science in preparation for a significant Central U.S. earthquake similar to the events of 1811-12, the U.S. Geological Survey, Mid-Continent Geographic Science Center, the Missouri University of Science and Technology, and the Geology and Land Survey Division of the Missouri Department of Natural Resources are hosting this three-day conference that will bring together academia, government, non-government agencies and the private sectors to address the current and forecasted needs of the response and recovery community.

## 3. Conference Overview

### *Tuesday, August 12, 2008 - Training Opportunities*

- Structural Assessment and Visual Evaluation Training
- Community Disaster Response Training
- Using Civil Support Teams (CSTs) For Seismic Event Responses
- Central Plains EarthScope Partnership

### *Wednesday, August 13, 2008*

During day one, the conference will specifically address the following topics related to a significant seismic event occurring within the New Madrid and Wabash Valley Seismic zones:

- Consequences of a major earthquake
- Timing, reoccurrence and probability of the next major event
- Engineering effects and stresses
- Socioeconomic impacts
- Mitigation plans for transportation and infrastructure
- Geological and structural monitoring
- Geologic mapping activities

### *Thursday, August 14, 2008*

Day two will be divided into two tracks to facilitate discussion and input into the needs of the response and recovery community. Presentations will focus on federal and state agency mapping activities; and the lessons learned from natural disaster exercises. Both sessions will have a facilitated panel discussion to develop a list of challenges to response

and recovery operations that can be supported through relevant science and engineering activities.

### **Track 1: Science, Maps and Engineering**

- USGS geospatial data coordination within a new mapping discipline
- Age of the current USGS topographic map and what was done following Hurricane Katrina
- Missouri's plan for a new map product
- New data for a new age, LIDAR
- Plans and map needs of the federal, state and department of defense response and recovery community

### **Track 2: Federal and State Response and Recovery**

- An overview of the 2007 Spill of National Significance Exercise
- State Emergency Management Agency statewide exercise lessons learned
- SEMA science needs
- FEMA science needs
- Table top exercise employing tactics, techniques and procedures following a significant seismic event

## **4. Presentations**

The following links will provide downloadable pdfs of presentations from the New Madrid Seismic Zone Conference.

### **Keynote Speakers:**

- Major General King E. Sidwell: [Emergency Response Operations Plan "Cracked Earth"](#)
- SEMA Director Ron Reynolds: [SEMA Presentation](#)

### **August 13, 2008:**

- David Applegate: [USGS Earthquake Hazards Program: Contributing to a More Resilient Nation](#)
- Dave Rogers: [Consequences Resulting from a Major Earthquake in the Central U.S.](#)
- Oliver Boyd: [Earthquake Hazard](#)
- Amr Elnashai: [State and Regional Impact of Central U.S. Earthquakes on the Physical Infrastructure](#)
- Arleen Hill: [Resilience, Response and Recovery; Societal Components of Catastrophe](#)
- Phillip Yen: [State-of-the-Art Earthquake Research for Critical Transportation Systems](#)
- Eileen Rackers: [Missouri Department of Transportation \(MoDOT\) Earthquake Preparedness](#)
- Mitch Withers: [Monitoring by the Science Community](#)
- Genda Chen: [Critical Infrastructure Monitoring: the Bill E. Emerson Bridge](#)

- Bob Bauer: [Products and Capabilities of the Science/Engineering Community for Emergency Response](#)
- Genda Chen: [Lessons Learned from the May 12, 2008, M8.0 Wenchuan Earthquake in China](#)

#### **Thursday, Aug. 14, 2008, Track One: Science, Maps and Engineering**

- Kari Craun: [National Map: Status of National Geospatial Base Data in the Central U.S.](#)
- Larry Moore: [USGS-State Partnerships and the Future of the Standard Quadrangle Maps](#)
- Tim Haithcoat: [Data Sources and Development for the New Madrid Zone in Missouri](#)
- Dean Gesch: [New Data for a New Age](#)
- Paul Hearn: [The Land-Use Portfolio Model: A GIS-Based Decision Support System for Evaluating Seismic Risk Mitigation Policies](#)
- Panel/Discussion: Geospatial Information
  - [Kari Craun](#)
  - [COL Barry Fowler](#)
  - [Dean Gesch](#)
  - [Larry Moore](#)
- Greg Reed: [Missouri's Catastrophic Event Planning](#)
- Terri Alberico: [U.S. Army Corps of Engineers Spatial Data and Capabilities](#)
- COL Barry Fowler: [The Role of USNORTHCOM in Disaster Response](#)
- Dianne Wilson: [FEMA Earthquake Response](#)

#### **Thursday, Aug. 14, 2008, Track Two: Federal and State Response and Recovery**

- Paul Hogue: [SONS07 Overview](#)
- AJ Lehmen: [SEMA '07 Statewide Earthquake Exercise](#)
- COL Mark McCarter: [The Role of Missouri National Guard to Civil Authorities Following a Seismic Event](#)
- Panel/Discussion:
  - [AJ Lehmen](#)
  - [Oliver Boyd](#)
  - [Shannon Marquez](#)

## **5. Poster Sessions**

### **Structures**

- [\*\*Development of Composite Dispersion Curves for the Determination of Shear Wave Velocity Profiles\*\*](#)

*Scott Stovall ([spstovll@memphis.edu](mailto:spstovll@memphis.edu)), Andy Kizzee ([akizzee@memphis.edu](mailto:akizzee@memphis.edu)) and Shahram Pezeshk ([spezeshk@memphis.edu](mailto:spezeshk@memphis.edu)), Department of Civil Engineering, The University of Memphis*

- [\*\*Analytical and Experimental Studies on Seismic Behavior of RC Bridge Columns Subjected to Combined Loadings\*\*](#)

*Abdeljelil Belarbi ([belarbi@mst.edu](mailto:belarbi@mst.edu)), Suriya Prakash Shanmugam ([spsg33@mst.edu](mailto:spsg33@mst.edu)) and Young-min You ([youngmin@mst.edu](mailto:youngmin@mst.edu)), Department of Civil, Environmental and Architectural Engineering, Missouri University of Science and Technology*

## Geotechnical

- **[Geotechnical Earthquake Instrumentation at the Bill Emerson Memorial Bridge, Cape Girardeau, Missouri](#)**

*Scott M. Olson, PhD, PE, ([olsons@illinois.edu](mailto:olsons@illinois.edu)), Youssef M.A. Hashash, PhD, PE ([hashash@illinois.edu](mailto:hashash@illinois.edu)), and Oscar Moreno-Torres ([omoreno2@illinois.edu](mailto:omoreno2@illinois.edu)), Department of Civil & Environmental Engineering, University of Illinois at Urbana-Champaign*

- **[Surface Wave Velocity Measurements in the Deep Sediments of the Mississippi Embayment](#)**

*Brent L. Rosenblad ([rosenbladb@missouri.edu](mailto:rosenbladb@missouri.edu)), Jonathan Bailey, and Jianhua Li, Department of Civil Engineering, University of Missouri-Columbia*

- **[Promises and Challenges Presented by Data Collected From Outside Sources in Assisting With the Geologic Characterization of the Subsurface for the St. Louis Area Earthquake Hazards Mapping Project](#)**

*Conor Watkins ([cwatkins@usgs.gov](mailto:cwatkins@usgs.gov)), U.S. Geological Survey, Mid-Continent Geographic Science Center, Rolla, MO*

## Sociological Impacts

- **[Community and Regional Resilience Initiative: Revealing Resilience in the Memphis Area](#)**

*Arleen A. Hill ([aahill@memphis.edu](mailto:aahill@memphis.edu)), Department of Earth Science, The University of Memphis; Dave Lannom ([lannomwdjr@ornl.gov](mailto:lannomwdjr@ornl.gov)) and Thomas J. Wilbanks ([wilbankstj@ornl.gov](mailto:wilbankstj@ornl.gov)), Oak Ridge National Laboratory; Sarah Walen ([skwalen@merid.org](mailto:skwalen@merid.org)), Meridian Institute*

- **[Determining Social Impacts and Needs Assessments Based Upon HAZUS-MH Damage and Loss Estimates](#)**

*Theresa Jefferson ([tjeff@vt.edu](mailto:tjeff@vt.edu)) and John Harrald ([jharrald@vt.edu](mailto:jharrald@vt.edu)), Center for Technology, Security, and Policy, Virginia Polytechnic Institute and State University; Frank Fiedrich ([fiedrich@gwu.edu](mailto:fiedrich@gwu.edu)), Institute for Crisis, Disaster, and Risk Management, The George Washington University*

- **[Hazards Assessment of St. Charles County – Earthquake and Flood](#)**

*Amy Krauch ([alkdz@mst.edu](mailto:alkdz@mst.edu)) and Ronaldo Luna ([rluna@mst.edu](mailto:rluna@mst.edu)), Department of Civil, Architectural & Environmental Engineering, Missouri University of Science and Technology*

## Federal, State and Local Government Agencies

- **[The U.S. Geological Survey 2008 Update to the National Seismic Hazard Maps for the Central and Eastern United States](#)**

*Oliver S. Boyd ([olboyd@usgs.gov](mailto:olboyd@usgs.gov)), The United States Geological Survey - Memphis, Tenn.; Mark D. Petersen ([mpetersen@usgs.gov](mailto:mpetersen@usgs.gov)), Arthur D. Frankel ([afrankel@usgs.gov](mailto:afrankel@usgs.gov)), Stephen C. Harmsen ([harmsen@usgs.gov](mailto:harmsen@usgs.gov)), Charles S. Mueller ([cmueller@usgs.gov](mailto:cmueller@usgs.gov)), Russell L. Wheeler ([wheeler@usgs.gov](mailto:wheeler@usgs.gov)), The United States Geological Survey - Golden, Colo.*



- **Detailed Surficial Material Geologic Maps Over Existing Columbia Bottoms and Granite City 7.5' Quadrangles Within the St. Louis Area Earthquake Hazard Mapping Project**

*Scott Kaden ([scott.kaden@dnr.mo.gov](mailto:scott.kaden@dnr.mo.gov)), Missouri Division of Geology and Land Survey - Rolla, Mo.*

- **MoDOT Earthquake Preparedness**

*Don Hillis ([Don.Hillis@modot.mo.gov](mailto:Don.Hillis@modot.mo.gov)) and Rick Bennett*

*([Richard.Bennett@modot.mo.gov](mailto:Richard.Bennett@modot.mo.gov)) Missouri Department of Transportation*

- **ARCHER- Airborne Real-time Cueing Hyperspectral Enhanced Reconnaissance**

*Lt Col Carolyn S. Rice ([ricecs@hughes.net](mailto:ricecs@hughes.net)), Civil Air Patrol, House Springs, Mo.*

### **Seismic Hazard, Risk, and Mitigation Policy**

- **Seismic Hazard, Risk, and Mitigation Policy in the New Madrid Seismic Zone**

*Zhenming Wang ([zmwang@uky.edu](mailto:zmwang@uky.edu)), Kentucky Geological Survey*

- **Multi-State Technical Information Clearinghouse**

*Jim Wilkinson ([jwilkinson@cusec.org](mailto:jwilkinson@cusec.org)), and Norman C. Hester ([nhester@cusec.org](mailto:nhester@cusec.org)), Central United States Earthquake Consortium; Theresa Jefferson ([tjeff@vt.edu](mailto:tjeff@vt.edu)), Center for Technology, Security, and Policy Virginia Polytechnic Institute and State University; Stephen Patrick Horton ([shorton@memphis.edu](mailto:shorton@memphis.edu)), Center For Earthquake Research and Information, University of Memphis*

- **The New Madrid Earthquake Scenario**

*Greg Hempen, PhD, PE, RG ([hempen69@sbcglobal.net](mailto:hempen69@sbcglobal.net)), URS Corporation, St. Louis, MO*

- **Communicating Earthquake Mitigation with the Health/Hospital Community: Moving from Information to Action and Closing the Loop**

*Sue L. Evers ([sue.evers@dhs.gov](mailto:sue.evers@dhs.gov)), and Cathleen Carlisle ([cathleen.carlisle@dhs.gov](mailto:cathleen.carlisle@dhs.gov)), Federal Emergency Management Agency HQ & Region VII, Kansas City, MO*

### **Academic Institutions**

- **The Central Plains EarthScope Partnership (CPEP)**

*Tina M. Niemi ([niemit@umkc.edu](mailto:niemit@umkc.edu)), Department of Geosciences, University of Missouri-Kansas City; Stephen S. Gao ([sgao@mst.edu](mailto:sgao@mst.edu)), Department of Geological Sciences and Engineering, Missouri University of Science and Technology; Ross A. Black ([black@ku.edu](mailto:black@ku.edu)), Department of Geology, University of Kansas*

## **5. Number of Registrants**

A total of 257 participants attended, including students, professional and exhibitors.