

## Contact Information

CAVS CESM Group Lead  
Sergio D. Felicelli  
sergio@cavs.msstate.edu  
(662) 325-1201

CAVS Director  
Roger King  
rking@cavs.msstate.edu  
(662) 325-2189

# CAVS



MISSISSIPPI STATE  
UNIVERSITY

Mississippi State University is a comprehensive, doctoral-degree-granting university offering to a diverse and capable student body a wide range of opportunities and challenges for learning and growth; to the world of knowledge, vigorous and expanding contributions in research, discovery, and application; and to the State and its people in every region, a variety of expert services. Mississippi State University is designated as a Doctoral/Extensive institution by the Carnegie Foundation for the Advancement of Teaching.

# CAVS

CAVS is an interdisciplinary center. It provides engineering, research, development, and technology transfer teams focused on complex problems.



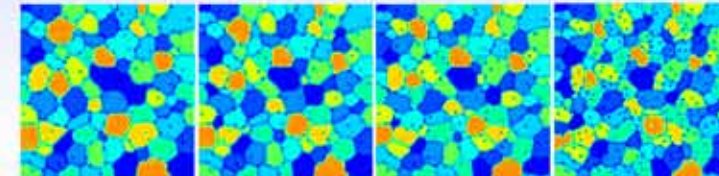
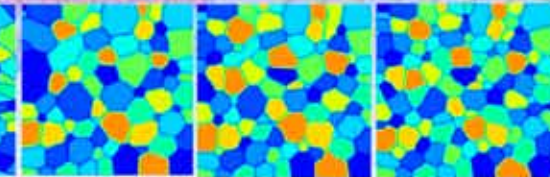
## Computational Engineering Program

Computational Engineering (CmE) is a unique interdisciplinary program offering MS and PhD degrees through the Bagley College of Engineering at Mississippi State University (MSU). The CmE program accepts students with undergraduate and graduate degrees in engineering, mathematics, computer science, or the physical sciences.



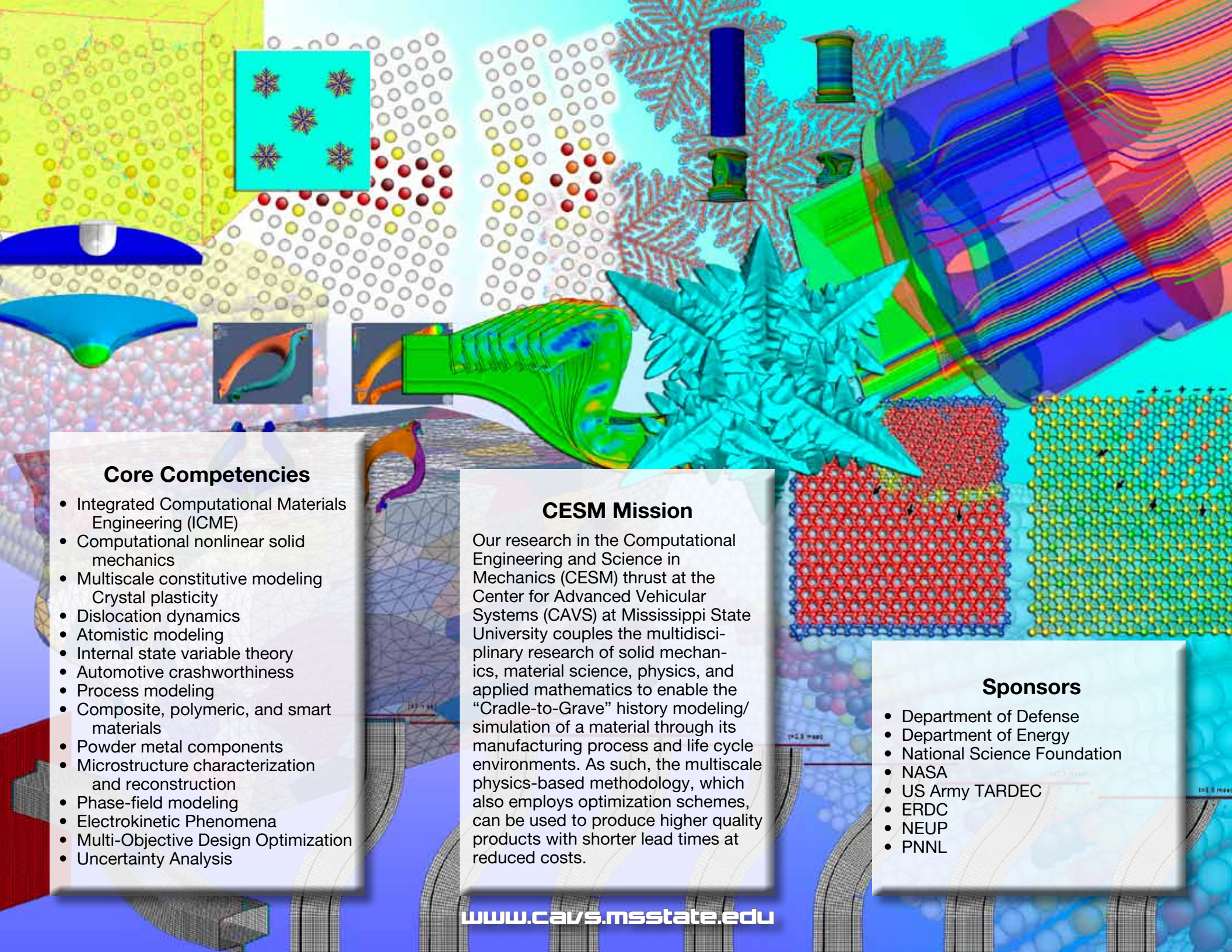
The High Performance Computing Collaboratory is a coalition of member centers and institutes that share a common core objective of advancing the state-of-the-art in computational science and engineering using high performance computing; a common approach to research that embraces a multi-disciplinary, team-oriented concept; and a commitment to a full partnership between education, research, and service.

# Computational Engineering and Science in Mechanics at CAVS



# CAVS

[www.cavs.msstate.edu](http://www.cavs.msstate.edu)



## Core Competencies

- Integrated Computational Materials Engineering (ICME)
- Computational nonlinear solid mechanics
- Multiscale constitutive modeling
  - Crystal plasticity
- Dislocation dynamics
- Atomistic modeling
- Internal state variable theory
- Automotive crashworthiness
- Process modeling
- Composite, polymeric, and smart materials
- Powder metal components
- Microstructure characterization and reconstruction
- Phase-field modeling
- Electrokinetic Phenomena
- Multi-Objective Design Optimization
- Uncertainty Analysis

## CESM Mission

Our research in the Computational Engineering and Science in Mechanics (CESM) thrust at the Center for Advanced Vehicular Systems (CAVS) at Mississippi State University couples the multidisciplinary research of solid mechanics, material science, physics, and applied mathematics to enable the “Cradle-to-Grave” history modeling/simulation of a material through its manufacturing process and life cycle environments. As such, the multiscale physics-based methodology, which also employs optimization schemes, can be used to produce higher quality products with shorter lead times at reduced costs.

## Sponsors

- Department of Defense
- Department of Energy
- National Science Foundation
- NASA
- US Army TARDEC
- ERDC
- NEUP
- PNNL