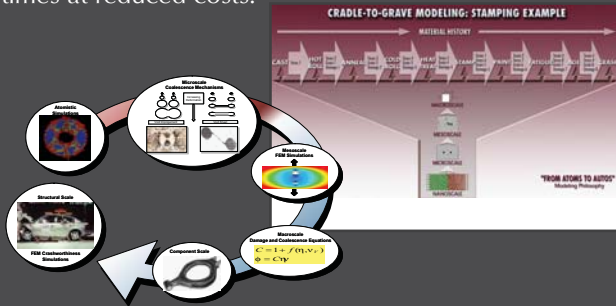


Mission

Our research in the Computational Manufacturing and Design 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, this multiscale research methodology, which also employs optimization schemes, can be used to produce higher quality products with shorter lead times at reduced costs.

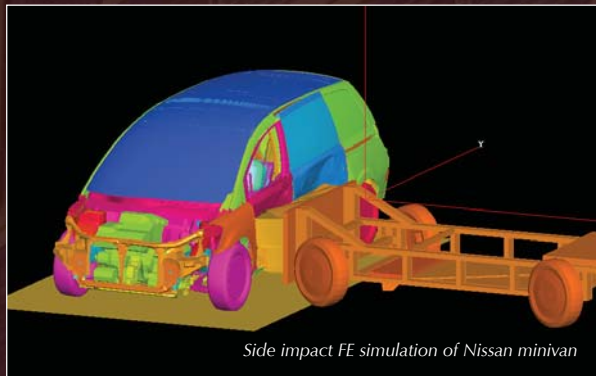


Research

Our multiscale methodology comprises a synergism of theoretical modeling, experimentation, materials characterization and large scale parallel computational simulation/analysis at each of the scales: structural scale (systems and subsystems), component scales, macroscale (where the internal state variable history model is developed), mesoscale (polycrystal plasticity), microscale (crystal plasticity), and nanoscale (atomistic). These scales are currently related to solid state physics, damage mechanics, fracture mechanics, biomechanics, polymer mechanics, chemomechanics, and fatigue and life analyses.



- ♦ **Theoretical modeling** - we develop and employ techniques that capture structure-property relations from the quantum scale to the structural scale.
- ♦ **Experimentation** - our state-of-the-art facilities emphasize exploratory, correlation, and validation experiments to support model development. Our current manufacturing capabilities include casting, welding, forming, rolling, and powder metallurgy.
- ♦ **Materials characterization** - we have a broad collection of instruments capable of investigating surface metrology, bulk properties, microstructural morphology, stereology, and defect states at the different size scales.
- ♦ **Large scale parallel computing** - we employ high performance computing hardware and web-based portals for remote computing.

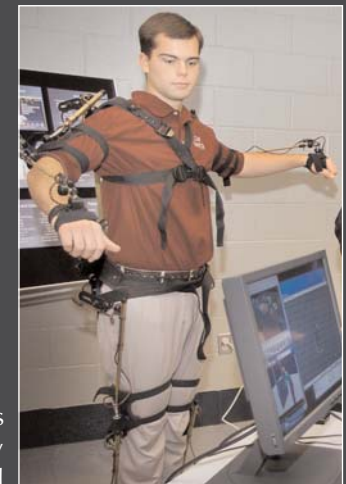


Side impact FE simulation of Nissan minivan

Education

Students with an interest in manufacturing and design and a background in mechanical, aerospace, civil, computational, agricultural and biological engineering, materials science, physics or applied mathematics are encouraged to apply for admission to the Bagley College of Engineering's graduate program. Through the Computational Manufacturing and Design Thrust graduate students have the opportunity to work on innovative research that is changing the automotive industry.

The Bagley College of Engineering offers graduate degrees in the following fields: Aerospace, Biological, Biomedical, Chemical, Civil, Computational, Computer, Computer Science, Electrical, Industrial, and Mechanical Engineering.



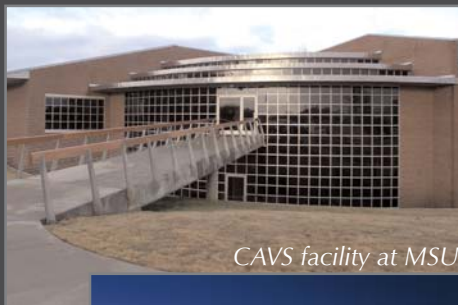
Our passion for education is to focus on scientific inquiry related to practical industrial problems. Our goal is to produce the next generation designers, analysts, manufacturing engineers, and other researchers with the paradigm of multiscale modeling in which we support students from various academic disciplines at the undergraduate, graduate, and post-doctoral levels. We also offer sabbaticals for academic and research staff from industry and government labs. Finally, we have outreach programs to our community colleges, high schools and industrial partners.



www.bagley.msstate.edu

THE CENTER FOR ADVANCED VEHICULAR SYSTEMS

The Center for Advanced Vehicular Systems was established in 2001 by the state of Mississippi to assist in the research and development efforts of the automotive industry in the state and region. The initial purpose of CAVS was to collaborate with the Nissan plant in Canton, Miss. The CAVS facility on the MSU campus is a 58,000 square foot state-of-the-art research facility. The CAVS Extension Center is located near the Nissan plant in Canton. There are three major thrust areas within the Center. These include: Alternative Power Systems, Computational Manufacturing and Design, Human and Systems Engineering.



CAVS facility at MSU



CAVS Extension Center in Canton

DEADLINES FOR ADMISSION TO GRADUATE PROGRAMS

To be considered for admission, all supporting material must be submitted to the MSU Office of Admissions according before the deadlines below. Application forms may be downloaded from: www.msstate.edu/dept/grad

Fall Semester	July 1
Spring Semester	November 1
Summer I	April 1
Summer II	May 1



Computational Manufacturing and Design

CONTACT INFORMATION

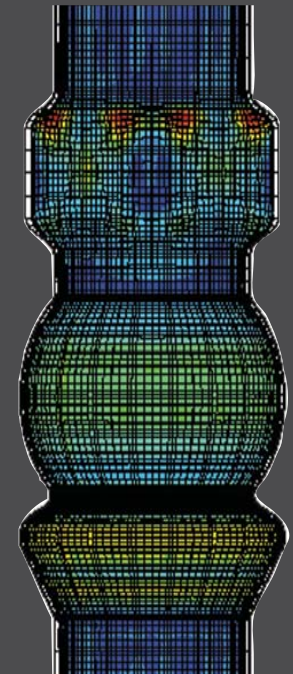
Mark F. Horstemeyer, Ph.D.
*CAVS Chair Professor in Mechanical Engineering
Center for Advanced Vehicular Systems*

200 Research Blvd.
Starkville, MS 39759
Phone: 662-325-5449
Fax: 662-325-5433
Email: mfhorst@cavs.msstate.edu
<http://www.cavs.msstate.edu>

Mississippi State
UNIVERSITY

Mississippi State University complies with all applicable laws regarding affirmative action and equal opportunity in all its activities and programs and does not discriminate against anyone protected by law because of age, color, disability, national origin, race, religion, sex, handicap, or status as a veteran or disabled veteran.

COMPUTATIONAL MANUFACTURING & DESIGN



MISSISSIPPI STATE UNIVERSITY



CAVS

Center for Advanced Vehicular Systems