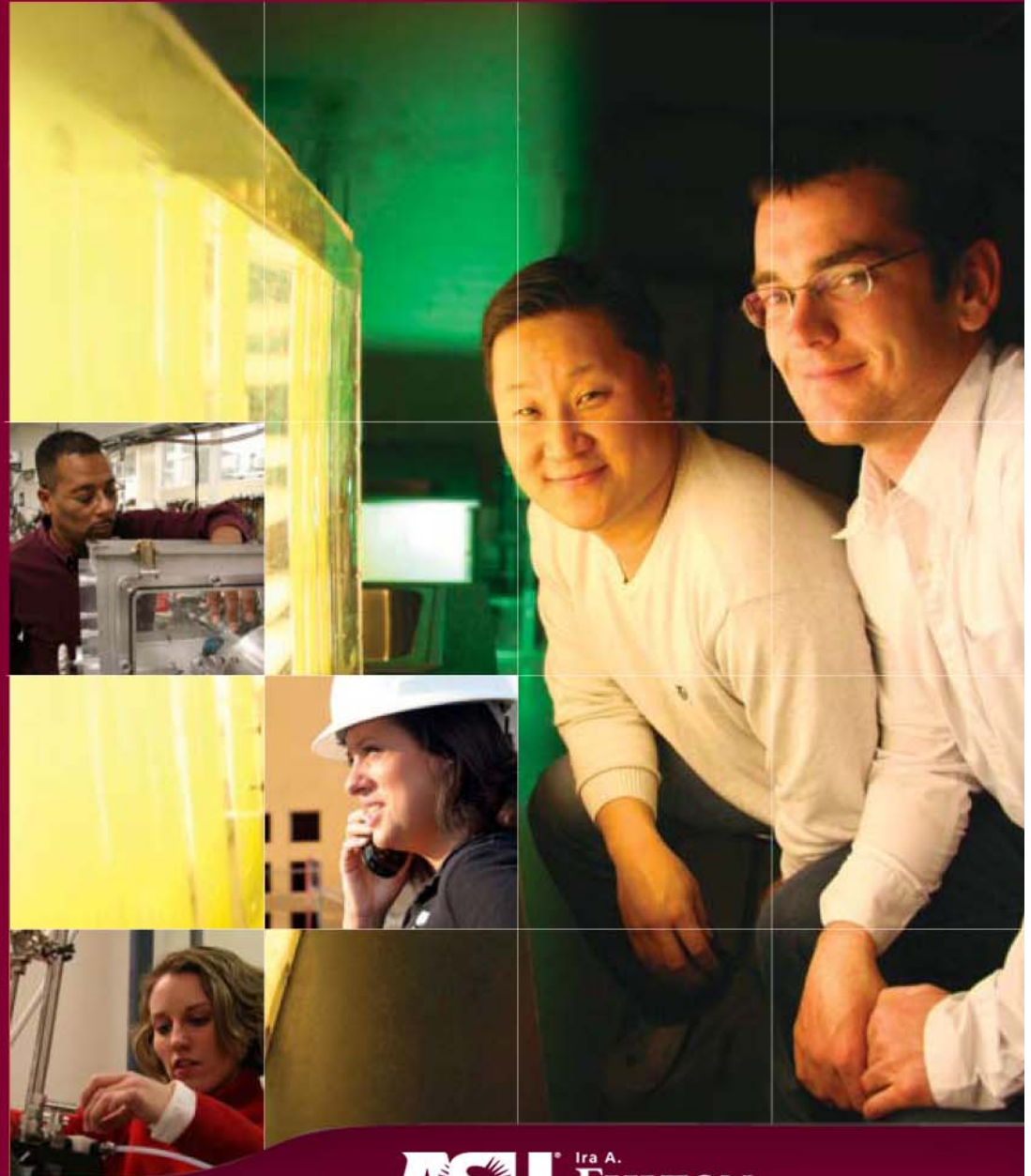


# Ira A. Fulton School of Engineering

**Modeling & Simulation  
Leadership Summit**

**Virginia Beach, VA**

**50** YEARS of  
ENGINEERING  
ARIZONA STATE UNIVERSITY



## ASU in Brief



- Welcomes 63,287 students from all 50 U.S. states and over 120 countries
- ASU Tempe campus has the nation's largest enrollment (51,234 students)
- Offers 134 bachelor's degrees, 119 master's degrees, 52 Ph.D. programs and a J.D.
- ASU Freshmen Scholars: 188 National Merit Scholars, 609 Scholars, 1,006 Provost's President's Scholars, 691 University Scholars and 87 National Hispanic Scholars

## Ira A. Fulton School of Engineering

- Dean Deirdre Meldrum  
Executive Dean Paul Johnson
- NEW: Institute for Engineering Education (\$4M)
  - K-12 Programs
  - Teacher Training in Math/Sciences
- 9 academic departments:
  - Harrington Department of Bioengineering
  - Department of Chemical Engineering
  - Department of Civil and Environmental Engineering
  - School of Computing and Informatics
  - Del E. Webb School of Construction
  - Department of Electrical Engineering
  - Department of Industrial Engineering
  - School of Materials
  - Department of Mechanical and Aerospace Engineering

## Investment in Innovation

- Over \$215M funded research at ASU; Engineering School delivered more than \$50 million in research productivity this year
- Over 1M square feet of new research space added to ASU's capacity since 2003
- **The High Performance Computing Center** (750,000 watts in only 1,200 sq. feet. It totals approximately 1,000 processors, each as fast as or faster than a single top-of-the-line desktop computer. The Saguaro cluster, is capable of sustained performance of more than four trillion computations per second (two teraflops) on 400 processors)

## Infrastructure & Facilities

- MacroTechnology Works (Army Flexible Display)
- Biodesign Institute
- Arizona Biomedical Collaborative-1
- Interdisciplinary Science and Technology Building 1
- Interdisciplinary Science and Technology Building 2
- Brickyard complex on Mill
- Goldwater Center for Science and Engineering
- Engineering Research Center



# Modeling and Simulation

- **Arizona Center for Integrative Modeling and Simulation (ACIMS)**
  - ❑ Collaboration between Arizona State University (Tempe) and University of Arizona (Tucson)
- **Decision Theater**
- **Education Programs**
  - ❑ Industry Seminars
  - ❑ Graduate Program

# Arizona Center for Integrative Modeling and Simulation

## •Co-Directors:

- Dr. Bernard Zeigler (U-Arizona)
- Dr. Hessam Sarjoughian (ASU)

## •Research

- Theory of modeling and simulation concepts, principles and methods
- Development of theory-based tools that enable solving new and evolving classes of complex problems

## •Education (Academic and Professional)

- Online Master of Engineering in Modeling & Simulation
- SCS Technical Council on Education, Training & the Profession
- M&S Professional Certification Commission

## •Outreach and Technology Transfer

- RTSync – transitioning and support modeling and simulation technologies for use in government and corporations
- Short courses and tutorials: e.g., I/ITSEC and Norwegian Defence Research Establishment

## •Collaborators

- Government and corporations: e.g., JITC, DISA, Northrop Grumman, Intel Corporation

# Mechanical and Aerospace Engineering Simulation Activities

## Broad Spectrum of Research under “Simulation Science”

- **Use of High-performance computation to advance complex systems-computation used as a tool for discovery**

- **Diverse Research Applications**

- Flow control induced by dimpling a golf ball
- Liquid jet breakup and atomization
- Complete simulation of the flow around fighter aircraft

- **MAE Leverages ASU High Performance Computing Initiative**

- Wide variety of compute and storage systems, thousands of processing cores
- Applications provide students learning in all aspects of high-performance computing

## Decision Theater's Tools

- Laboratory that offers world-class capabilities combining advanced methodologies in Visualization, Simulation and Cognitive Sciences for advancing Policy Informatics.
- The core component, called the Drum, is a 260-degree faceted screen that can display panoramic computer graphics or 3D video content.
- The Drum accommodates up to 25 people and includes tools for collecting participant input and interaction. This advanced environment enabled individuals to see a detailed 3D representation of the consequences of behavior, decisions and policy in order to examine potential future scenarios in new & exciting ways.
- ACIMS has been one of the early collaborators in Decision Theater.





# Modeling and Simulation Education Strategy

## •Interdisciplinary M&S Master of Engineering

**Professional Graduate Applicants: 20 (Boeing, Army, Honeywell, General Dynamics, Intel)**

**Course Enrollments: 500+**

### **Required Core Courses** (*15 credit hours*)

CSE 561: Modeling and Simulation Theory and Application  
CSE 598: Software Analysis and Design  
CSE 566: Software Project, Process and Quality Management  
IEE 572: Design of Engineering Experiments  
IEE 545: Simulating Stochastic Systems

### **Elective Area Courses** (*students select 15 credit hours*)

CSE 543: Information Assurance and Security  
CSE 563: Software Requirements and Specification  
CSE 565: Software Verification, Validation and Testing  
CSE 591: Parallel and Distributed Simulation  
CSE 598: Distributed Software Development  
IEE 533: Scheduling and Network Analysis Models  
IEE 534: Supply Chain Modeling and Analysis  
IEE 566: Simulation in Manufacturing  
IEE 567: Simulation System Analysis  
CSE/IEE: 593 Applied Project

**CSE:** Computer Science and Engineering

**IEE:** Industrial Engineering

The unique academic focus will enable the design of simulation models, experiments, data analysis, and project management of complex M&S programs.

# "Anytime-Anyplace" Distributed Learning

Ira A. Fulton School of Engineering  
Center for Professional Development  
Distance Learning & Technology

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page: 1 2 3 4 5 6 7 8 9 10 11 Next>

2/19/04  
CSE 591  
S: Real-Time Embedded Systems

PREVIEW SLIDE PLAY FROM SLIDE PREVIEW SLIDE PLAY FROM SLIDE

Playing 00:08/75:01

CSE 591 Real-Time Embedded Systems - 10  
Presenter(s): Yann-Hang Lee  
Date: 3/31/2004 Time: 10:45 AM ET

your time, your place

- High speed internet access
- Alternative modes of delivery/access
- Software requirements

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November 29 - December 6, 2004

Thu, Mar 18, 2004 -- *Welcome to Real-Time Embedded Systems* Posted by Blackboard Administrator

If you are experiencing any difficulty:

for administrative help, e-mail student support at [jmcginnis@asu.edu](mailto:jmcginnis@asu.edu)

for technical help, e-mail: [cpdtechsupport@asu.edu](mailto:cpdtechsupport@asu.edu)

COURSES > CSE 591: REAL-TIME EMBEDDED SYSTEMS > COMMUNICATIONS

Announcements  
Collaboration  
Discussion Board  
Group Pages  
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Release 6) - 6.1.5

# Online Modeling & Simulation Summary and Opportunities

- Instructional infrastructure and dedicated faculty offer professional students a path toward successful and timely degree completion across the globe.
- Graduates are well prepared to tackle complex critical problems and taking part in developing the next generations of simulation-based solutions.
- ACIMS is well positioned to continue helping reach new horizons in modeling and simulation capabilities and practices.

# Examples of Current Related Graduate Education Activities

- **Modeling and Simulation Graduate Program**
- **Modeling and Simulation courses are embedded in traditional graduate programs (EE, CSE, MAE, IE, others) to expose students computational methods and tools**
- **Applied research and applications to simulate and design manufacturing in the Army Flexible Display Center**
- **ASU Nursing Program at the LRC provides a learning environment for students to practice/master nursing skills in a simulation of clinical research in health care settings.**

# Undergraduate Education Activities

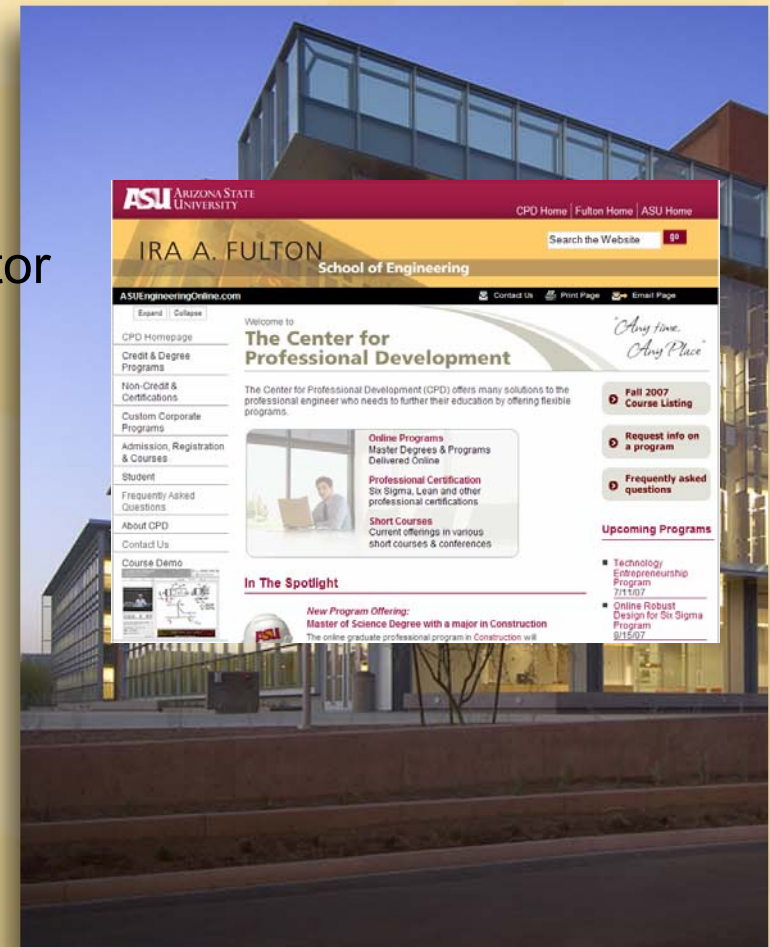
- **BS in Mechanical Engineering with Concentration in Computational and Mathematical Engineering**
  - Expose students to modern tools available for solving large-scale and complex technical problems
  - Prepare students for careers focused on high-performance computing and accurate modeling of large and small scale systems
  - Requires multidisciplinary electives in applied and numerical analysis, scientific computing, computational fluid dynamics, finite element analysis, computer aided design, and others
- **BS in Computer Engineering**
  - Expose students to methods and theory to develop simulation models and tools
- **Global Engineering Design Lab**
  - Senior Capstone Course – Mechanical & Aerospace Eng.
  - Leveraging Modeling and Simulation tools to develop regional private airliner
  - Global Teams linking students in ASU-Mexico-Asia

## Contact Information

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