computer science and engineering

ENGINEERING

AT A GLANCE
2010

MICHIGAN STATE
UNIVERSITY

The Department of Computer Science and Engineering (CSE) at Michigan State University is revolutionizing research in engineering, the natural sciences, and beyond. We pursue research that presses the boundaries of knowledge and gives birth to new fields. We are producing versatile students capable of cross-disciplinary collaboration and forging ever stronger partnerships with industry, the community, and other educational institutions.

The department is home to about 350 undergraduate computer science students, 200 undergraduate computer engineering students, 120 master's and doctoral students, and 26 faculty. Nine additional faculty contribute interdisciplinary expertise to the department's teaching and research programs.

UNDERGRADUATE EDUCATION

Our curriculum equips students with theoretical knowledge and practical skills that enable them to adapt to changing technology and participate in cross-disciplinary collaboration.

- The average starting salary for our 2009 graduates was approximately $55,000.

- Our graduates are recruited aggressively by local and multi-national organizations that range in size from small startups to Fortune 500 companies.

CSE Collaborative Design
CSE 498, Collaborative Design, provides the educational capstone for all students majoring in computer science. During the capstone experience, teams of students design, architect, implement, and deliver a significant software system for corporate clients. Capstone project sponsors include local, regional, and national companies ranging in size from small to very large. Recent clients include Auto-Owners Insurance, Boeing, Chrysler, Ford, GE Aviation, IBM, Medtronic, Meijer, Motorola, TechSmith, Toro, and Urban Science.

Popular Undergraduate Cognates and Specializations
game design • foreign languages • cognitive science • criminal justice • natural science • premedical studies • telecommunications • information technology • math • business • genetics

GRADUATE EDUCATION

The department offers master of science and doctor of philosophy programs in a variety of research areas.

- Our graduate program was ranked 18th in the nation according to an article in *Communications of the ACM*.

- Notable program strengths include software engineering, biometrics, networking and ubiquitous computing, and digital evolution.

- Our research program emphasizes multidisciplinary collaboration and solving current problems in industry, government, medicine, biological sciences, and the humanities.

- Recent graduates are employed in tenure-track faculty positions and with companies such as Google, Microsoft, VMware, IBM, HP Labs, and Siemens.

PROGRAM HIGHLIGHTS

Digital Evolution
Faculty in CSE and the life sciences have gained insights into previously unsolved questions of evolution using high-end computing and a kind of artificial life, or Alife. A virtual petri dish allows experiments requiring analysis of change in species diversity across thousands of generations. This work, which has enabled the study of evolution to go in directions never before thought possible, has been published in *Nature, Science*, and *Discover Magazine*. A $25 million grant from the National Science Foundation will fund this work further; MSU has established BEACON, an NSF Science and Technology Center for the Study of Evolution in Action.

Biometrics

CSE's Pattern Recognition and Image Processing Lab is a world leader in biometric recognition research and technology. "Biometrics" refers to the automatic recognition of individuals based on their physiological (e.g., face, fingerprint, or iris) and/or behavioral (e.g., signature) characteristics. Because of increased concerns about terrorist attacks, security breaches, and financial fraud, many systems now require reliable personal recognition schemes to confirm or deny the identity of an individual.

High-Assurance Systems Initiative

High-assurance computing systems are designed to tolerate failures, and even direct attacks, in order to continue system operation and preserve system integrity. Our project uses a real world problem–driven, multidisciplinary approach to deliver instruction, conduct research, and develop reliable and secure cyber infrastructure. The initiative has received funding from numerous federal agencies (e.g., NSF, ONR, AFRL, DARPA).

Computing for the Humanities

The creative partnership between computer science, the humanities, and the social sciences — the core of what we now call "humanities technology" — is the cornerstone of the digital revolution. MATRIX, The Center for Humane Arts, Letters, and Social Sciences Online, serves as a catalyst for and incubator of the emerging fields and disciplines resulting from the integration of the humanities with information technologies.

Student Organizations

CSE student groups provide opportunities to develop leadership and communication skills and to form lasting friendships.

The Computer Science and Engineering Graduate Student Association (CSEGA) promotes leadership, support, and social fellowship in the CSE graduate community.

The student chapter of the Association for Computing Machinery (ACM) has long sponsored a wide variety of activities, such as video game contests and weekly faculty/student doughnut hours.

MSU Women In Computing (WIC) seeks to promote, recruit, and retain women while providing educational and networking opportunities for all students. Activities this past year included hosting industry speakers and conducting an outreach program for the Girl Scouts of America.

Recent Awards

FACULTY—MSU Distinguished Faculty Awards, MSU Curricular Service-Learning and Civic Engagement Award, King-Sun Fu Prize, W. Wallace McDowell Award, Withrow Teaching Excellence Award, Withrow Distinguished Scholar Award, multiple NSF CAREER awards, and Fellow of the IEEE.

STUDENTS—NSF Graduate Research Fellowship, National Institute of Justice Graduate Research Fellowship, Fitch Beach Outstanding Graduate Research Award, Von Ehr Scholarships, College of Engineering Service Award, Best Paper Awards at international research conferences, and multiple awards from the MSU Society of Women Engineers.
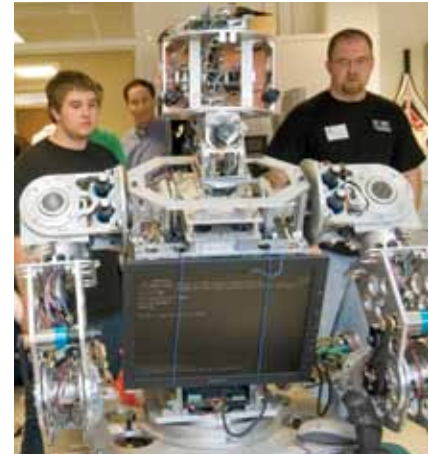
FACULTY

Our faculty are internationally renowned for their teaching, research, and outreach. They are regularly awarded competitive grants from national funding sources, including the National Science Foundation, the Office of Naval Research, the Defense Advanced Research Projects Agency, and the National Institutes of Health. A number of our faculty have authored textbooks and hold patents for computer science inventions.

PARTNERSHIPS

The CSE department engages with a diverse set of strategic and corporate partners on a wide range of issues such as recruitment, curriculum development, internships, partnered learning activities, and research. Our current partners include:

- Auto-Owners Insurance
- Boeing
- Chrysler
- Crowe Horwath, LLP
- Dow Chemical Corporation
- GE Aviation
- Hewlett-Packard
- Information Technology Empowerment Center (ITEC)
- International Business Machines (IBM)
- Medtronic
- Meijer
- Microsoft Corporation
- Motorola, Inc.
- Rose Packing Company
- Sircon
- TechSmith
- The Toro Company
- Urban Science

RESEARCH LABS AND GROUPS

CSE invites you to explore some of our dynamic research activities by visiting www.cse.msu.edu.

- BEACON – an NSF Science and Technology Center for the Study of Evolution in Action
- BIOMETRICS – Biometrics Research Group
- Devolab – Digital Evolution Lab
- EI – Embodied Intelligence Lab
- eLANS – Experimental Laboratory for Advanced Networking and Systems
- GARAGe – Genetic Algorithms Research and Applications Group
- GED – Genomics, Evolution, and Development
- GEL – Games for Entertainment and Learning
- HAS – High Assurance Systems
- LINKS – Language Interaction and Knowledge Discovery Lab
- MATRIX – The Center for Humane Arts, Letters, and Social Sciences Online
- MET – Media and Entertainment Technologies Lab
- PRIP – Pattern Recognition and Image Processing Lab
- SENS – Software Engineering and Network Systems Lab

FOR MORE INFORMATION

Matt Mutka, Chairperson
Department of Computer Science & Engineering
Michigan State University
3115 Engineering Building • East Lansing, MI 48824-1226
Phone: (517) 353-3148 • Fax: (517) 432-1061
E-mail: cse@egr.msu.edu • Web site: www.cse.msu.edu