INTELLIGENT SYSTEMS CENTER (ISC)

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The Intelligent Systems Center (ISC) mission is to provide an interdisciplinary research environment in which faculty from various departments can cooperate and conduct research on sponsored projects involving real physical systems with special emphasis on an intelligent (smart) system approach. ISC has integrated its primary research mission with Missouri S&T’s commitment to develop internationally recognized graduate research programs focused on key technologies.

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The approaches for accomplishing ISC’s objectives consist of:

- Developing interdisciplinary research programs to match the emphasis areas of sponsoring agencies with the expertise of Missouri S&T faculty
- Obtaining long-term federal research grants and industrial contracts
- Developing multidisciplinary research facilities

ISC considers the education of graduate students as one of its major activities and provides graduate research assistantships through the Center’s investigators. The students supported by research grants choose their thesis topics to be closely related to the grant. The interdisciplinary nature of research provides an excellent opportunity for the students to interact with students from other disciplines. The students also gain valuable experience in working as a team and acquire communication and project organization skills. The interaction between graduate students and program managers from industries and federal agencies is very helpful in the application of their research to real-world problems.

Multidisciplinary research teams consisting of faculty members and graduate students from the departments of computer science, electrical and computer engineering, engineering management and systems engineering, mechanical and aerospace engineering, and material sciences and engineering have been established to conduct research in emerging technologies. The ISC has also developed state-of-the-art laboratories to conduct research on virtual reality, smart structures, neural networks, energy systems, agile manufacturing and automatic inspection, MEMS, robotics, and structural health monitoring. The Center provides computing facilities to its research investigators and graduate students working on research projects. Active research is in progress in the following interdisciplinary research thrust areas:

1. Intelligent Manufacturing Processes, Equipment and Systems
   - 1.1 Virtual Reality and Prototyping
   - 1.2 Additive/Rapid/Direct Digital Manufacturing
   - 1.3 Laser Micromachining
   - 1.4 Friction Stir Processing
   - 1.5 Composite Manufacturing
   - 1.6 Liquid Metal Processing

2. Intelligent Cyber Physical Systems
   - 2.1 Energy Generation Systems
   - 2.2 Power Distribution Systems
   - 2.3 Fuel Cells and Batteries
   - 2.4 Transportation Systems

3. Sensing, Control, and Communication
   - 3.1 Sensors and Sensor Networks
   - 3.2 Intelligent and Adaptive Control
   - 3.3 Communication Systems and Networks

4. Computational Intelligence and Embedded Systems
   - 4.1 Data Processing, Fusion and Management
   - 4.2 Design and System Support
   - 4.3 Trustworthy and Embedded Hybrid Systems

5. Smart Grid and Information Management