

Overview of Auburn University



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Auburn RESEARCH

Peaks of Excellence

Seven University Wide Research Thrust Areas

- Transportation
 - Vehicles: Advanced Powertrain, Electronics, Dynamics
 - Highway Infrastructure, Asphalt Material Technology
- Information Technology
 - Hardware: Microelectronic Devices, MEMS, Electronic Packaging
 - Software: Pervasive Computing, Security
- Detection and Food Safety
 - Sensors
 - Food Safety
 - Chemical and Biological Threats
- Others: Fisheries, Forestry, Poultry Science, Biosciences



Sammuel Ginn College of Engineering

- 150 Faculty
- First Wireless Engineering Program in Nation
- 2500 Undergraduates
- 400 Graduate students
- 30 million dollars in research

Mechanical Engineering

- 26 Faculty
 - 20 Mechanical Engineering
 - 6 Materials Engineering
- 500 Undergraduates
- 100 Graduate Students
- 6 million dollars in research expenditures



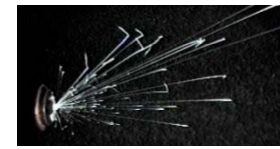
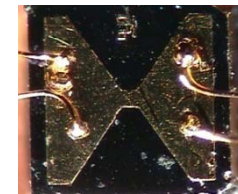
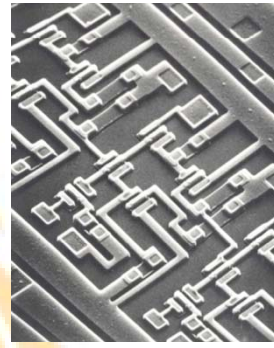
TRANSPORTATION

Research Priority Area

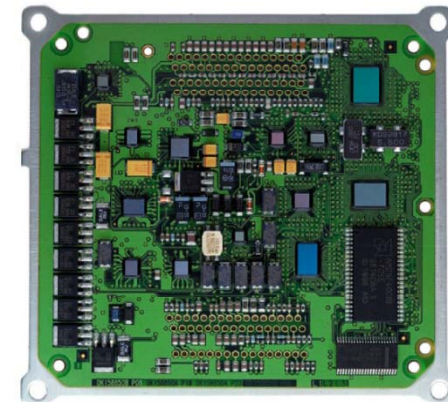
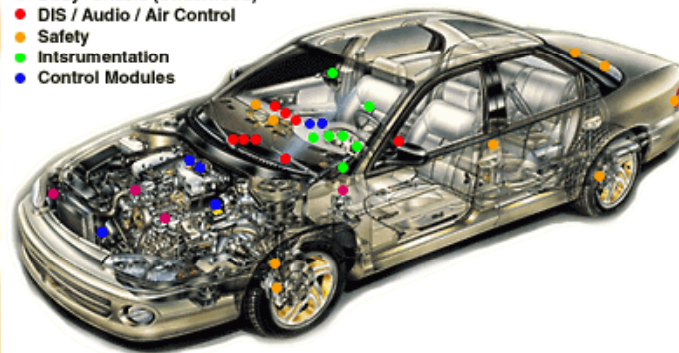


INFORMATION TECHNOLOGY

AU Priority Area



- Body-Chassis (Underhood)
- DIS / Audio / Air Control
- Safety
- Instrumentation
- Control Modules



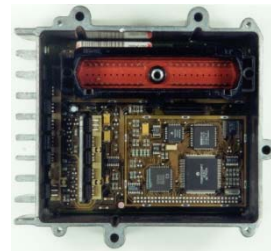
Multi-disciplinary Research and Education Centers (of interest)



- Alabama Microelectronics Science and Technology Center (AMSTC)
- Laboratory for Electronics Assembly and Packaging (LEAP)
- Materials Research and Education Center
- Detection and Food Safety Center
- Wireless Engineering Research and Education Center (WEREC)
- Center for Innovations in Mobile Pervasive Agile Computing Technologies (IMPACT)
- Air Transportation Center of Excellence (CoE) for Airliner Cabin Environment Research (ACER)
- Center for Advanced Vehicle Electronics (CAVE)

Center for Advanced Vehicle Electronics (CAVE)

- ◆ Electronic Packaging
Reliability, Materials, and
Assembly and Processing
- ◆ Harsh Environment
Electronics
 - Extreme High/Low
Temperatures
 - Large Temperature
Excursions
 - Vibration, Shock, Drop
- ◆ High Volume Electronics
Manufacturing
- ◆ Future Vehicle Electronic
Systems



Automotive – Aerospace – Military - Other



Alabama Microelectronics Science and Technology Center (AMSTC)

- Electronic Packaging Facility
- Printed Circuit Board Fabrication
- Assembly and Packaging Facility
- Thick-Film Fabrication/Processing Laboratory
- Micro-Fabrication Facility
- Thin Film and MEMS Processing
- Dynamics Evaluation Laboratories
 - Laser displacement measuring systems
 - Environmental chambers
 - Characterization equipment
 - Vibration (shaker) stands



Wireless Engineering Research & Education Center (WEREC)



- Leverage Expertise from First Wireless Degree Program in the U.S.
- Communication inside the vehicle (between sensors)
 - WPAN IEEE 802.15 (< 10 meters)
 - Bluetooth based
 - Inexpensive, easy to deploy, and short range
- Inter-vehicle communications
 - WLAN IEEE 802.11 (100 meters or greater)
 - UWB based
 - High bandwidth communications and location tracking capabilities (i.e. positioning information)
 - Insensitive to interference
 - DSRC
 - MEMS Tuneable Antennas
 - MEMS Beam Steering Antennas

IMPACT

- Center for Innovations in Mobile Pervasive Agile Computing Technologies (and Information Assurance)



- Leading research center for enabling secure systems, mobile and embedded systems, systems that are wirelessly networked, and systems that interact directly with people, for civilian and military applications.

GPS and Vehicle Dynamics Lab

Currently 21 Students (8 PhD, 5 MS, 8 BS) at \$400K/year

- Vehicle modeling
- Vehicle parameter estimation
- Determination of rollover propensity
- Vehicle sensor fusion/integration
- GPS/INS navigation
 - Using various grade IMUs and receivers
 - Analysis of different aiding techniques
- IMU & laser scanner fusion
- Sensor characterization and modeling
- Development of a software GPS receiver
- High speed control of ground vehicles