

Center Specifications

Center for Electromagnetic Compatibility:

This proposed center is currently in the planning stage. The lead and partner institutions are respectively the University of Missouri-Rolla (to be renamed as Missouri University of Science & Technology effective January 1, 2008), the University of Houston, Clemson University and the University of Oklahoma. The principal investigators are Richard DuBroff, Ji Chen, Todd Hubing, Hank Grant (University of Oklahoma-Norman Campus), and Refai Hazem (University of Oklahoma-Tulsa Campus). The mission of the proposed center for electromagnetic compatibility is to provide research and design guidance for electronic products to comply with federal, military, and/or industry standards with respect to reducing the unintentional emission of electromagnetic energy and with respect to increasing the ability of the products to perform reliably in environments containing significant levels of electromagnetic noise.

Overview of Research Activities

The following initial research foci have been proposed:

- Digital/RF Interference: Wireless enabled laptop computers are one example of a system incorporating both digital electronics and deliberate radio frequency transmission and reception. The objective is to minimize the disruption of the digital electronics caused by the radio frequency transmission and also to minimize the interference of the radio frequency reception caused by electromagnetic emission from the digital electronics.
- Materials: One approach to reducing electromagnetic interference is the use of costly (and heavy) metallic shielding. New types of materials (metamaterials and composites) appear to have some potential for providing an alternative to metallic shielding.
- EMC Product Development Design: One example in this focus area would be an expert system designed to provide design guideline checking, and to make rough estimates of the level of unintentional electromagnetic emission based on the layout of high speed digital circuit boards. One such system has been developed, commercialized, and has been marketed.
- Electromagnetic Pulse Effects on Microprocessors: The electromagnetic environment in which many electronic products operate is generally noisy and some component of this noise may consist of electromagnetic pulses having relatively high power densities for relative short periods of time. One objective in this research area will be to develop computer models and simulations to analyze possible causes and remedies for the disruption of a microprocessor. One of the main challenges appears to be one of accurately modeling extremely small and complex geometries associated with the circuitry in the microprocessor.
- EMI and Medical Effects: The effects of long term exposure of individuals to electromagnetic fields are becoming increasingly important with the widespread use of wireless devices, particularly cell phones, and the increasing application of magnetic resonance imaging (MRI) exams.
- EMI and Implantable Medical Devices: Currently pacemaker and defibrillator patients are prohibited from undergoing MRI because of serious concerns for tissue damage, induced arrhythmias and electromagnetic compatibility. The theme of this proposed research is to understand the interaction between implanted medical devices and external electromagnetic fields such as MRI and airport security scanning systems.

Other Areas of Interest for Collaboration

The design, manufacturing, and packaging of high speed digital electronics as related to electromagnetic compatibility, signal integrity, power integrity, and/or susceptibility.

Other Areas of Interest for Collaboration

What research areas interest you for potential collaboration with your fellow Centers that complements your Center's goals?

Directors, these are the specifications for putting together a simple overview of your current or pending research. Please submit the overview to Kate Ryan at kryan@abecker.com by December 10, 2007.

1. The overview should be no more than one page, single- or double-spaced.
2. Text should be understandable to non-specialists in your field.
3. Graphics are acceptable, but they should not substitute for text.

Thank you!