UTC INSTITUTE FOR ADVANCED SYSTEMS ENGINEERING (UTC-IASE)

INNOVATION PARTNERSHIP BUILDING AT UCONN TECH PARK

About

The UTC Institute for Advanced Systems Engineering (UTC-IASE) is a coordinated effort by the United Technologies Corporation and the University of Connecticut focused on enhancing the capability and capacity of engineers with "systems thinking" in the nation and worldwide. The UTC-IASE serves as a hub for world-class research, project-based learning by globally-distributed teams of students and industrial outreach activities focused on model-based systems engineering of complex systems that are built from, and depend upon the synergy of computational and physical components.

Through transformative research, education, and workforce development, the UTC-IASE has the mission to produce disseminate and commercialize new science and technology in the field of cyber-physical systems engineering. Our vision is to revolutionize the design of a safe, reliable, functionally-superior, easy-to-use and maintain systems that are built from-and depend upon-the synergy control, actuation, communication, and physical components.

Areas of Expertise

The Institute builds on its research and educational programs in the foundational scientific areas of:

- Requirements formalization and systems engineering
- Physics and data driven modeling
- Advanced system control and optimization
- System diagnostics, prognostics, and health management
- Uncertainty and big data
- Systems engineering principles of cybersecurity

The UTC-IASE focuses on three technology areas drawing on its fundamental knowledge base:

- Platform-based requirements formalization
- Hybrid and heterogeneous acausal modeling of cyber and physical systems
- Information and big data management and stewardship

These technologies enable progress in the areas of embedded, autonomous and modular systems, which depending on the application domains of interest (e.g. smart buildings and cities, aerospace systems, manufacturing and energy industries, robotics and cybersecurity) are infeasible with today's discipline-based structure of research and education.

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Center Characteristics

Overview

The convergence of computation, communications, and control enable cyber-physical systems (CPS) to have learning and predictive capabilities to adapt to changing situations and uncertain environments. Motivated by the increasing complexity of advanced products and the digital revolution, the UTC-IASE trains engineers in urgently needed CPS-related disciplines that are pivotal to innovation and product enhancement in the globally competitive economy. With its industrial base and focus and excellent faculty, the UTC-IASE is positioned to advance the science base of CPS and to accelerate its technological translation into sustained industrial growth.

Workforce Training

The future CPS workforce needs to understand the principles that define the integration of physical and cyber aspects in areas such as communication and networking, real-time operation, distributed and embedded systems, physical properties of hardware and the environment, and human interaction. The Academic Program of the UTC-IASE addresses this need with training programs that cut across the areas of systems engineering, modeling, control, communications, and networking.
The UTC-IASE Academic Program offers professional training through non-research based University Graduate Certificates open to professional engineers interested in obtaining specific skills in the field of Advanced Systems Engineering and a Master of Engineering degree, targeting practicing engineers interested in expanding their skills and academic standing.

Research Programs

The Institute offers and manages research programs sponsored by the United Technologies Corporation and other industry partners, and participates in large-scale federally funded projects. Seed projects sponsored by the Institute have led to UConn's active participation in two large federally sponsored centers, namely the Clean Energy Smart Manufacturing Innovation Institute, funded by the DOE with $70M in total federal funding and the Advanced Robotics for Manufacturing (ARM) Institute, funded by the DOD with $80M in total federal funding. Through these research programs the Institute trains graduate and undergraduate students, while also offering internship opportunities with industry partners. Research results are dissiminated through scientific papers, conference proceedings and patent applications.

Contact

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9/2018-HB