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The Information Science and Technology Center



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Colorado State University's
Information Science and Technology Center (ISTeC)

presents *two lectures* by

Ed Coyle

Arbutus Chair for the Integration of Research
and Education, Georgia Institute of Technology

ISTeC Distinguished Lecture

In conjunction with the Electrical and Computer Engineering Department
and Computer Science Department

***“The Vertically-Integrated Projects (VIP) Program: Enabling
Everyone to Participate in the Innovation Process”***

Monday, September 29, 2014
Reception with refreshments: 10:30 am
Lecture: 11:00 am – 12:00 noon
Location: Morgan Event Hall



Computer Science Department and Electrical and Computer
Engineering Department Special Seminar Sponsored by ISTE C

***“eStadium: Research on and Development and Deployment of Wireless Networks and
Applications”***

Monday, September 29, 2014
Lecture: 3:00 pm – 4:00 pm
Location: Lory Student Center 224-226

ISTeC (Information Science and Technology Center) is a university-wide organization for promoting, facilitating, and enhancing CSU's research, education, and outreach activities pertaining to the design and innovative application of computer, communication, and information systems. For more information please see ISTeC.ColoState.EDU.

Abstracts

The Vertically-Integrated Projects (VIP) Program: Enabling Everyone to Participate in the Innovation Process

To ensure the world's health and prosperity, we must continue to enhance our ability to innovate within and across all disciplines. The people who will develop and implement the innovations that will be needed in the future are the students currently sitting in our classrooms. And that is a problem – they are *“sitting in our classrooms”*. Despite the fact that they are generally the brightest and most highly motivated people of their generation, we provide them with very few opportunities to be innovative. We only allow them to test their creativity and skills on small-scale tasks or problems that we create, not the complex technical and social problems that they can already see all around them. When we do allow them some freedom to be innovative, we confine their efforts to problems and projects that are constrained to fit within semester boundaries and/or match narrow learning objectives. We rarely allow them to work with their classmates, with people of other disciplines, or with us, the faculty, on anything truly meaningful. In summary, our current approach to educating our students is *“preventing”* them from being innovative.

The goal of the Vertically-Integrated Projects (VIP) program is to solve this problem. Its unique curricular structure overcomes the atomization of education into disciplines, semesters, and courses by enabling the creation and long-term operation of large, multidisciplinary teams consisting of undergraduates, graduate students and faculty. Its unique project selection process results in projects that excite and challenge undergraduates and have sufficient depth to benefit faculty members' research efforts. It thus creates a community of innovation that includes and benefits everyone on campus.

A variety of VIP projects from different universities will be used to illustrate the current breadth and depth of the program. They will demonstrate the many ways that VIP projects and the program itself achieve significant outcomes in: project-based learning; development, deployment and commercialization of research ideas; teaching analytical, technical and professional skills; enabling multidisciplinary education and research; and fostering innovative thinking and behavior throughout the university.

The VIP Consortium is being created to achieve systemic reform of higher education by enabling the rapid implementation and growth of VIP Programs at participating universities. This will be achieved by: Sharing processes, software, and evaluation practices amongst all members in order to achieve significant economies of scale; Creating consortium-wide proposals to foundations and gov't funding organizations to provide resources for each VIP site and the Consortium in general; Enabling project teams with similar interests to find each other and collaborate no matter where they are located; and, Fostering Consortium-wide communities of students and faculty with common interests.

eStadium: Research on and Development and Deployment of Wireless Networks and Applications

The eStadium VIP Team conducts research on and development and deployment of the next generation of wireless communication systems and applications for large-scale events. These events, such as large concerts and football games, involve 10K to 100K spectators who are located in a structure with a limited footprint, typically less than 1 sq.km. The majority of these spectators now carry smartphones that support many communication protocols – 3G/4G cellular, WiFi, Bluetooth, etc. – that operate in both licensed and unlicensed bands. The venue in which they operate often has a number of wireless systems – DAS-based cellular systems, WiFi infrastructure, RF-ID systems, ZigBee-based sensor networks, etc. – to support connectivity with/between spectators and for event operations. These events are thus extreme in both the types and volume of data that can be generated and in the types of communication infrastructure that must coexist and, if possible, cooperate with each other.

The eStadium team has been developing an extensive testbed for wireless systems within Bobby Dodd Stadium, the football stadium at Georgia Tech. This testbed includes:

- Web applications that enable on-demand access for spectators to multimedia content, including video-clips of all plays, visualization of game events, and game stats.
- Social networking applications that enable alumni to find and chat with each other in the stadium.
- A sensor network to monitor structural vibrations of the stadium, audio of the crowd, and spectrum usage throughout the venue.

In this talk, we will quickly review the history and goals of eStadium and then focus on its current activities. These include research on distributed detection algorithms, the development of a sensor network for structural monitoring, and spectrum management in the stadium.

Speaker Biography

Edward J. Coyle received a B.E.E. in Electrical Engineering from the University of Delaware in 1978 and a Ph.D. in Electrical Engineering and Computer Science from Princeton University in 1982. From 1982 through 2007, he was a faculty member at Purdue University, where he served at various times as Assistant Vice Provost for Research, Co-Director of the Center for Wireless Systems and Applications, Co-Founder of the Engineering Projects in Community Service (EPICS) program, and Founder of the Vertically-Integrated Projects (VIP) program. Dr. Coyle joined Georgia Tech in 2008, where he is a Georgia Research Alliance Eminent Scholar, the Arbutus Chair for the Integration of Research and Education, and Director of the VIP Program. He is also fostering the creation of the VIP Consortium, whose membership currently consists of 18 universities that are working together to implement and grow VIP Programs on their campuses. He is a Fellow of the IEEE and has received a variety of awards, including the 1987 Best Paper Award from the IEEE Signal Processing Society and the 2005 Bernard M. Gordon Prize for Innovation in Engineering and Technology Education from the National Academy of Engineering. His research interests include wireless and sensor networks, signal and information processing, and undergraduate education.

To arrange a meeting with the speaker, please contact Edwin Chong, Edwin.Chong@ColoState.EDU.