



Topic: *Architecting Cyber Physical Systems*

Presenter: *Dr.Cihan H. Dagli, PhD, Professor at Missouri S&T*

Date: Thursday, October 20, 2016

**Agenda: 6:00-6:30 p.m. CT – Dinner & Networking
6:30-6:45 p.m. CT – Introductions & Announcements
6:45-8:00 p.m. CT – Presentation and Q&A**

Locations:

- 1. Schaumburg, IL – IBM, 10 N Martingale Rd, Schaumburg, IL 60193 (3rd Floor Conference Room)**
- 2. Madison, WI – bb7, 7 Fen Oak Ct., Madison, WI 53718 (Mendota Conference Room)**
- 3. Glendale, WI – Johnson Controls Inc., 5757 N. Green Bay Avenue, Glendale, WI 53209 (MPR Conference Room)**

Abstract

Multi-faceted systems of the future will entail complex logic and reasoning with many levels of reasoning in intricate arrangement. The organization of these systems involves a web of connections and demonstrates self-driven adaptability. They are designed for autonomy and may exhibit emergent behavior that can be visualized. Our quest continues to handle complexities, to design and operate these systems. The challenge in Complex Adaptive Systems design is to create an organized complexity that will allow a system to achieve its goals. These complex adaptive systems have dynamically changing meta-architectures. Finding an optimal architecture for these systems is a multi-criteria decision making problem often involving many objectives in the order of 20 or more. This creates "Pareto Breakdown" which prevents ordinary multi-objective optimization approaches from effectively searching for an optimal solution; saturating the decision maker with large set of solutions that may not be representative for a compromise architecture selection from the solution space. Possible approaches that can be adapted in overcoming this difficulty in architecting cyber physical systems will be discussed.

About Our Speaker

Dr. Cihan H. Dagli is a Professor of Engineering Management and Systems Engineering (EMSE) at Missouri S&T. He is the Director of the EMSE Smart Engineering System Laboratory, and is the founder and current Director of the Systems Engineering MS and PhD programs at Missouri S&T. His research interests are in systems engineering and systems architecting, cyber physical systems, and computational intelligence: neural networks, fuzzy logic, and evolutionary programming. Dr. Dagli has been a PI, co-PI, or director of 56 research projects and grants totaling over \$25 million from federal, state, industrial funding agencies, and distance tuition revenue. Approximately \$21 million of this total has been generated through the Systems Engineering Graduate Program during his tenure as program director (2000-Present). This number does not include a \$10 million grant from the Department of Defense that was approved in September 2008 for the establishment of the Systems Engineering Research Center - University Affiliated Research Center (UARC) at Steven's Institute of Technology with the aid of Missouri S&T, the University of Southern California, the Massachusetts Institute of Technology, and other participating universities. Dr. Dagli has published over 400 research publications, including 71 archival journal articles and edited (or co-edited) 29 books. His research publications have been cited on Google Scholar 2,800 times, with an h-index of 25 and i-index of 74. His new edited book Complex Adaptive Systems Volume 6, "Engineering Cyber Physical Systems: Applying Theory to Practice" will be published on November 2, 2016 by Elsevier, SciVerse ScienceDirect (www.sciencedirect.com) in Procedia Computer Sciences.

Questions?: For more information, go to <http://www.incose.org/Chicagoland/>.