# *Institute of Advanced Study*

# *University of Bologna*

### IN COLLABORATION WITH

### DIPARTIMENTO DI ELETTRONICA, INFORMATICA E SISTEMISTICA

### COLLEGIO SUPERIORE ALMA MATER STUDIORUM DI BOLOGNA

### INSTITUTE LECTURE

# STÈPHANE LAFORTUNE

*Electrical Engineering and Computer Science Professor*

*at the University of Michigan and ISA Visiting Fellow*

## "MONITORING AND DIAGNOSIS OF COMPLEX

## TECHNOLOGICAL SYSTEMS"

## Friday, June 25$^{th}$ 2004, 11.00 p.m.

**C.A.S.Y.** - Center on Complex Automated
Systems "Giuseppe Evangelisti"
Via Pepoli 3/2 - Bologna

# ABSTRACT AND BRIEF CURRICULUM VITAE

Dr. Lafortune is a Professor of Electrical Engineering and Computer Science at the University of Michigan. He joined the faculty at Michigan in 1986 after obtaining his Ph.D. from the University of California at Berkeley. His research interests are in the field of discrete event systems, including modeling, verification, diagnosis, control, and optimization. He co-authored with Christos Cassandras the textbook "Introduction to Discrete Event Systems" (Kluwer, 1999). For further details, please go to www.eecs.umich.edu/umdes.

He will present a technical talk on the application of the theory of discrete event systems to solve monitoring and diagnosis problems for complex technological systems. These results are highly relevant to the implementation of efficient fault detection and isolation strategies in several application areas such as automated manufacturing systems, computer networking, document processing systems, process control, and transportation systems.

Generally stated, the problem of interest is the detection of "significant" events, such as faults, anomalies, or intrusions, in technological systems whose dynamics are modeled in the framework of discrete event systems.
Discrete event systems are dynamic systems with discrete state spaces and event-driven dynamics. They occur in the study of many classes of systems where communication, computing, and sensor technologies are rapidly evolving.

Dr. Lafortune will start by reviewing the salient features of a methodology for monitoring of discrete event sytems termed the "Diagnoser Approach". This approach has been successfully used in several application domains.
Then he will review current research at the University of Michigan and at the University of Bologna regarding extensions of this methodology to enhance its applicability.