

# Control of Complex Systems

## Lecture Series

# Dr. Christos G. Cassandras

Distinguished Professor of Engineering  
Boston University

## Complexity Made Simple\*

*\*At a Small Price*

There are some fundamental complexity limits that provide a starting point for any effort to solve design, control, and optimization problems that involve complex dynamic systems. Dr. Cassandras will show that there are ways to solve many hard problems by exploiting their specific structure, by asking the "right" questions, and by challenging some conventional approaches. Trial-and-error techniques are often used to systematically learn and predict the behavior of a complex system. These are invariably slow, inefficient, and intrusive. However, this learning can sometimes be accomplished at a fraction of the usual brute-force trial-and-error process through simple "thought experiments" constructed at a "small price." This is particularly true for certain types of systems with either purely event-driven dynamics or with hybrid (both event-driven and time-driven) dynamics. He will present the main element of the underlying theory and show some applications of this approach to transportation systems, specifically focusing on "smart traffic lights" by developing adaptive traffic light controllers that respond to changing traffic conditions in real time.



Tuesday, January 30, 2018, Noon  
EMSL Auditorium

  
Pacific Northwest  
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## About Dr. Cassandras

Christos G. Cassandras, an award-winning scholar, technical expert, author and speaker, serves as Distinguished Professor of Engineering at Boston University and is a co-founder of the



university's Center for Information and Systems Engineering. He also holds a chair professorship at Tsinghua University, China. Dr. Cassandras specializes in discrete event and hybrid systems, cooperative control, stochastic optimization, and computer simulation, with applications to computer and sensor networks, manufacturing systems, and transportation systems. In addition to academics, he has worked extensively with industry on various systems integration projects and the development of decision-support software.

Dr. Cassandras is a Fellow of IEEE and IFAC. He has published approximately 400 refereed papers and six books, has served as Editor-in-Chief of the IEEE Transactions on Automatic Control, and currently is an Automatica editor. He has been a featured speaker at prestigious professional society meetings, including the American Control Conference, IEEE Conference on Decision and Control, and the IFAC World Congress.

Dr. Cassandras holds degrees from Yale University (B.S., 1977), Stanford University (M.S.E.E., 1978), and Harvard University (S.M., 1979; Ph.D., 1982).

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