

## Invitation

### **CWI Lectures in Mathematics and Computer Science 2011**

#### **Control and System Theory**

**Tuesday 14 June 2011**



As technology is developing, more and more complex tasks are expected to be performed by machines or computers without any human intervention. An example is the control of unmanned straddle carriers on a container terminal without being instructed by a human driver. A challenge for mathematicians is to find control laws for such sophisticated systems.

This year's edition of the CWI Lectures in Mathematics and Computer Science celebrates the appointment of Jan H. van Schuppen as a CWI Fellow. The topic of the lectures is mathematical system and control theory, with a focus on optimal control and control of distributed systems. The latter is one of the most urgent problems of control engineering.

Examples of control of distributed systems include control of autonomous underwater vehicles for environmental purposes, control of automated guided vehicles on a container terminal, and control of communication networks. An example of optimal control is finding the optimal policy for selling and buying stocks in the portfolio management problem by impulse control.

Xi-Ren Cao, Fernando Lobo Pereira, Demosthenis Teneketzis and P.R. Kumar will give lectures about recent research in mathematical system and control theory.



## Speakers



**Xi-Ren Cao** is Professor of Shanghai Jiaotong University, China, and was a professor and director of the Research Center for Networking of the Hong Kong University of Science and Technology. He held several visiting positions at international universities. He is Fellow of IEEE and IFAC. He worked at Digital Equipment Corporation (USA) as engineering manager. His current research areas include discrete event dynamic systems, stochastic learning and optimization, performance analysis of communication systems, signal processing, and financial engineering.



**Fernando Lobo Pereira** is Professor at the Department of Electrical Engineering of Faculdade de Engenharia da Universidade do Porto. His research interests include dynamic optimization – notably optimality conditions, and their applications to the control (such as invariance, stability, and model predictive control) of both impulsive and conventional dynamic systems – mobile robotics, modelling, control and optimization of hybrid systems. Recently, his interests has been shifting towards the control of networked vehicle systems.



**Demosthenis Teneketzis** is Professor of Electrical Engineering and Computer Science at the University of Michigan, Ann Arbor (USA). Previously he worked for Systems Control Inc., Palo Alto and Alphatech Inc., Burlington MA (Massachusetts, USA). He is an IEEE Fellow. His current research interests are in stochastic control, decentralized stochastic systems, communication and queueing networks, stochastic scheduling and resource allocation problems, discrete event systems, and mathematical economics.



**P.R. Kumar** is Professor of Electrical and Computer Engineering at the University of Illinois, Urbana-Champaign (USA), Research Professor in the Coordinated Science Laboratory, Research Professor in the Information Trust Institute, and Affiliate Professor of the Department of Computer Science. He is IEEE Fellow and won several awards, such as the IEEE Field award in Control Systems. His current research interests are in wireless networks, sensor networks, and networked embedded control systems.

The abstracts of these lectures can be found on [www.cwi.nl/lectures2011](http://www.cwi.nl/lectures2011)



# CWI LECTURES

## **Program 14 June 2011**

**Location:** CWI, Science Park 123, Amsterdam, Turing room

Afternoon chair: Barry Koren

13:30 – 13:55 Welcome

13:55 – 14:00 Opening by Jan Karel Lenstra

14:00 – 14:35 Xi-Ren Cao  
Impulse stochastic control and composite Markov processes

14:40 – 15:15 Fernando Lobo Pereira  
Necessary conditions of optimality for constrained control problems – Application to AUV formation coordinated control

15:15 – 15:40 Break

15:45 – 16:20 Demosthenis Teneketzis  
Optimal control strategies in delayed sharing information structures

16:25 – 17:00 P.R. Kumar  
Challenges in cyberphysical systems

17:00 – 17:05 Wrap-up by Barry Koren

17:05 – 18:00 Reception

**You are cordially invited!**

Please register by filling out the online registration form at  
[www.cwi.nl/lectures2011](http://www.cwi.nl/lectures2011)



# CWI

Centrum Wiskunde & Informatica

Founded in 1946, Centrum Wiskunde & Informatica (CWI) is the national research institute for mathematics and computer science in the Netherlands. It is located at the Science Park Amsterdam and is part of the Netherlands Organisation for Scientific Research (NWO). The institute is internationally focused and renowned for its high quality research. Over 150 researchers conduct pioneering research and share their acquired knowledge with society. Thirty-four researchers are also employed as professors at universities. The institute has generated twenty-one spin-off companies.

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