

Title: Nonlinear Dynamics of Intermittent Hormone Therapy for Prostate Cancer from a Viewpoint of Hybrid Systems

Speaker:

Professor Kazuyuki Aihara
Institute of Industrial Science,
Collaborative Research Center for Innovative Mathematical Modelling,
Graduate School of Information Science and Technology &
Graduate School of Engineering, University of Tokyo

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Time: 11:00 am

Venue: Room 603, Chow Yei Ching Building

Abstract:

In this talk, I will review our hybrid dynamical systems modelling of prostate cancer and its application to personalized optimal hormone therapy. First, we make mathematical models of population dynamics in prostate cancer with ODEs and PDEs, and consider a possibility to control prostate cancer through a kind of hormone therapy with intermittent androgen suppression. Second, we represent this hormone treatment as hybrid dynamical systems, analyse nonlinear dynamics and bifurcation structure peculiar to such hybrid systems, and explore an application of optimal control based on mathematical modelling to personalized therapy of prostate cancer. Last, we validate our personalized mathematical modelling by its fitting to clinical data of serum prostate-specific antigen.

Biography of the speaker:

Kazuyuki Aihara received the B.E. degree of electrical engineering in 1977 and the Ph.D. degree of electronic engineering 1982 from the University of Tokyo, Japan. Currently, he is Professor of Institute of Industrial Science, the University of Tokyo, Professor of Graduate School of Information Science and Technology, the University of Tokyo, Professor of Graduate School of Engineering, the University of Tokyo, and Director of Collaborative Research Center for Innovative Mathematical Modelling, the University of Tokyo. His research interests include mathematical modeling of

complex systems in this real world, parallel distributed processing with spatio-temporal chaos, and time series analysis of complex data.

Organizer: Dr. G. Chesi