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Automatic
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The Department of Automatic Control & Systems Engineering
is pleased to announce the following seminar:

Roles of balanced positive and negative feedbacks in inflammatory and infectious diseases

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Wednesday, 5 November 2014 at 14:00

LT02, Sir Henry Stephenson Building

Abstract

Homeostasis in biological systems is often attained as a result of a subtle balance between positive and negative feedbacks, and their unbalance may lead to disease conditions. Our group aims to understand essential pathological mechanisms of inflammatory and infectious disease, such as atopic eczema (acute/chronic skin inflammation with defective skin barrier) and bacterial/fungal infection in the respiratory systems, from a viewpoint of control engineering. We developed ODE-based mathematical models to understand the role of epithelial barrier in determining the disease state, identified essential control mechanisms responsible for different pathological symptoms, and evaluated the effects of conventional treatments. Our model analysis suggests the critical roles of the dual controls for barrier homeostasis, which is a key for the onset/remission of disease.

Biography

Dr Tanaka is a lecturer in the Department of Bioengineering, Imperial College London. She is a mathematical modeller of biological and medical systems, with extensive experience in collaborating with experimental biologists and clinicians in the UK and internationally, having established herself in systems and control engineering. After she obtained her PhD from the Department of Mathematical Engineering and Information Physics, University of Tokyo, she was appointed as an Assistant Professor in the Department of Applied Physics and Physico-Informatics, Keio University. She then joined Prof John Doyle's group in California Institute of Technology, where she started her research in the area of systems biology. Before joining Imperial, she was a research scientist at RIKEN, Japan.