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

## **Bio-Mechatronics: From Insects to In-Vivo Mechatronics**

**Dr Ravi Vaidyanathan**

*Department of Mechanical Engineering  
Imperial College*

**Wednesday, 25<sup>th</sup> September 2013 at 14:00**

LT02, Sir Henry Stephenson Building

### **Abstract**

Mechatronics is the synergistic combination of precision engineering, electronic control, and systems thinking in the design of products and manufacturing processes. Bio-Mechatronics may be viewed as its extension fused with influence from biological systems; i.e. mechatronic systems designed based on inspiration from neural and physiological systems. In animals, for example, intrinsic properties of the musculoskeletal system augment the neural stabilization of the organism for an array of critical of functions. Modeling this hierarchical coupling for implementation in robotic systems has spurred innovation in medicine, cybernetics, and mobile robots.

The talk will review methodologies for the enhancement of engineering (robotic) design based upon biological studies with emphasis on subsystem coupling and systems thinking. Architectures founded upon biological inspiration will be summarized with specific examples from the speaker's work, including recent research that has been featured in *New Scientist*, *Flight Global*, and *The Engineer* magazines and on television specials produced by the BBC, Tokyo Broadcasting Systems, and the Discovery Channel. Applications highlighted will include medical and mobile robotic systems including: insect-inspired mobile robots, cybernetic robot exoskeletons, and brain-implant and robot interface systems.

## Biography

**Ravi Vaidyanathan** is a Senior Lecturer in Bio-Mechatronics at Imperial College London, UK and a Research Professor in Systems Engineering at the US Naval Postgraduate School. He completed his Ph.D. in biologically inspired systems at Case Western Reserve University and subsequently worked in industry, holding directorships in control systems and medical engineering. Dr. Vaidyanathan has led more than 20 separate research programs supported in USA, Singapore, and UK, authored over 100 refereed publications, and is a named inventor two pending patents. His research in biorobotics has been recognized internationally with awards from SAGE journals, the Institute of Electrical and Electronics Engineers (IEEE), American Institute of Aeronautics and Astronautics (AIAA), and the Robotics Society of Japan (RSJ), including: SAGE Best Paper (Journal of Systems and Control Engineering), the Hyper-Human Tech Research Award (presented by the Robotics Society of Japan), 'Best Paper' at the IEEE International Conference on Intelligent Robots and Systems (IROS), and being a finalist for the New Technology Foundation Research Award on Entertainment Robots and Systems (2007) awarded by the IEEE and the RSJ in recognition of the most innovative research in robotics from 1987-2007. Revolutionary aspects of his research have also been featured by several news groups including: the BBC, New Scientist Magazine, The Engineer Magazine, Inc. Magazine, IEEE Institute, Yahoo News, Flight Global Magazine, The Times of India, The Hindu, The Discovery Channel, and the Tokyo Broadcasting Company and have been invited for presentation at to the US Pentagon and the UK Parliament. Dr. Vaidyanathan holds honorary academic posts at the University of Bristol (UK), the US Naval Postgraduate School (USA), Case Western Reserve University (USA) and Anna University (India), and is currently co-chair of the IEEE Robotics and Automation Society Technical Advisory Committee on Biorobotics. His current research interests include biomechatronics, neural interface, and micro electro-mechanical sensing systems.