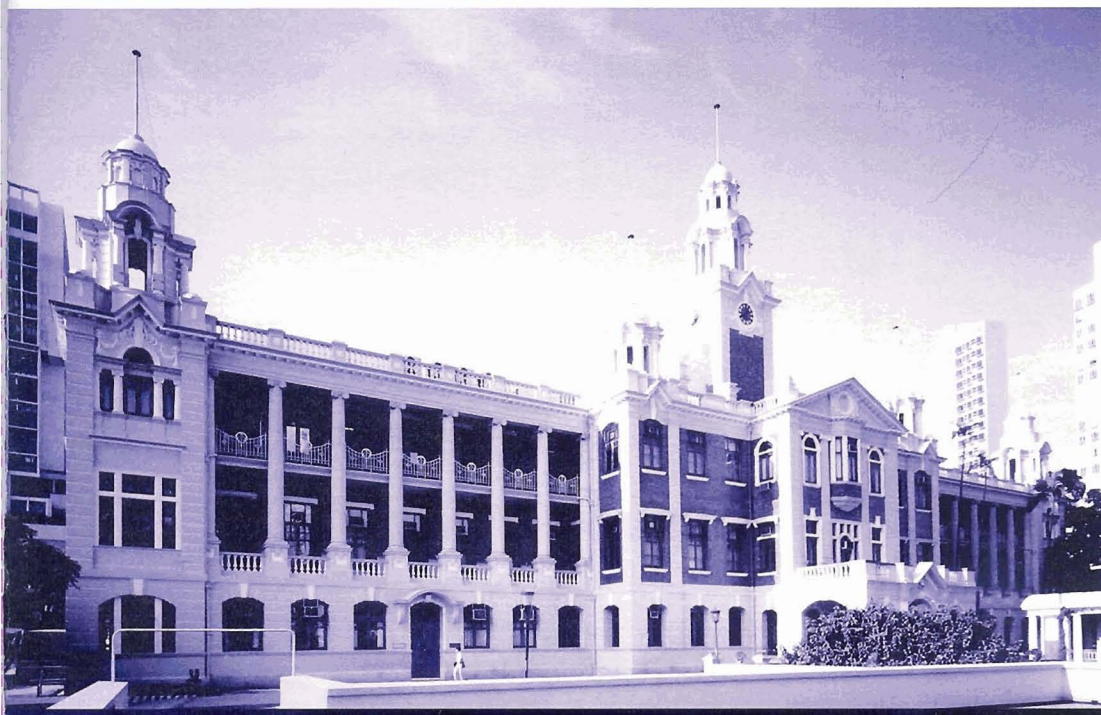
Workshop on Biomedical Engineering



Programme and Abstracts

Date: *April 28 & 29, 2006*

Venue: *LT 1, Cheung Kung Hai Conference Centre,*
G/F, William MW Mong Block,
Faculty of Medicine Building,
The University of Hong Kong
21 Sassoon Road, Pokfulam
Hong Kong

Organised by the

Biomedical Engineering Research Group

A joint effort of the Faculties of Engineering, Dentistry, Medicine & Science
The University of Hong Kong

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Prof Chu received his BS in mathematics from The Ohio State University in 1977 and MS and PhD in chemistry from Cornell University in 1979 and 1982, respectively. He joined Charles Evans & Associates in California after graduation and later founded Evans Asia. He joined City University of Hong Kong in 1996 and is currently Professor (Chair) of Materials Engineering in the Department of Physics & Materials Science. He has concurrent professorship in nine universities in China including Peking University, Nanjing University, Fudan University, and Shanghai Jiaotong University. Paul's research activities are quite diverse encompassing plasma surface engineering and various types of materials and nanotechnology. Paul is editor of two books on plasma surface engineering and biomaterials as well as author/co-author of more than 15 book chapters, 450 journal papers, and 500 conference papers. He has been granted 8 US and 3 Chinese patents. He is Fellow of IEEE and HKIE and a member of the editorial board of Materials Science & Engineering Reports and Nuclear Instruments and Methods in Physics Research B. He is also guest editor of IEEE Transactions on Plasma Science and Surface and Coatings Technology. He founded Plasma Technology, Ltd. in Hong Kong and co-founded Chengdu Pulsetech Electrical Company in Chengdu, China to commercialize the technologies developed in his laboratory.

Abstract

Biomaterials Modification Using Plasma Technologies

Plasma modification is an effective and economical surface treatment technique for many biomaterials. The technique offers the unique advantage that the surface properties and biocompatibility can be enhanced selectively while the favorable bulk characteristics of the materials remain unchanged. For instance, mechanically sturdy materials with good wear and corrosion resistance can be modified to improve the surface bioactivity in biomedical applications. Existing materials can thus be used and needs for new classes of materials may be obviated thereby shortening the time to develop novel and better biomedical implants. Recent work conducted in our laboratory pertaining to the improvement of surface bioactivity and properties of various types of biomaterials will be presented. We have fabricated bioactive TiO_2 coatings using nano-particle plasma spraying in conjunction with plasma immersion ion implantation. These nano-structured ceramic coatings can also be made bioactive using ultra-violet light irradiation. Recent results on plasma-treated biomaterials used in blood-contacting applications such as artificial heart valves will be described. Materials discussed include diamond-like carbon, titanium oxide, and rare-earth oxide. The biocompatibility of and impediment of nickel from orthopedic NiTi shape memory alloys will also be discussed.