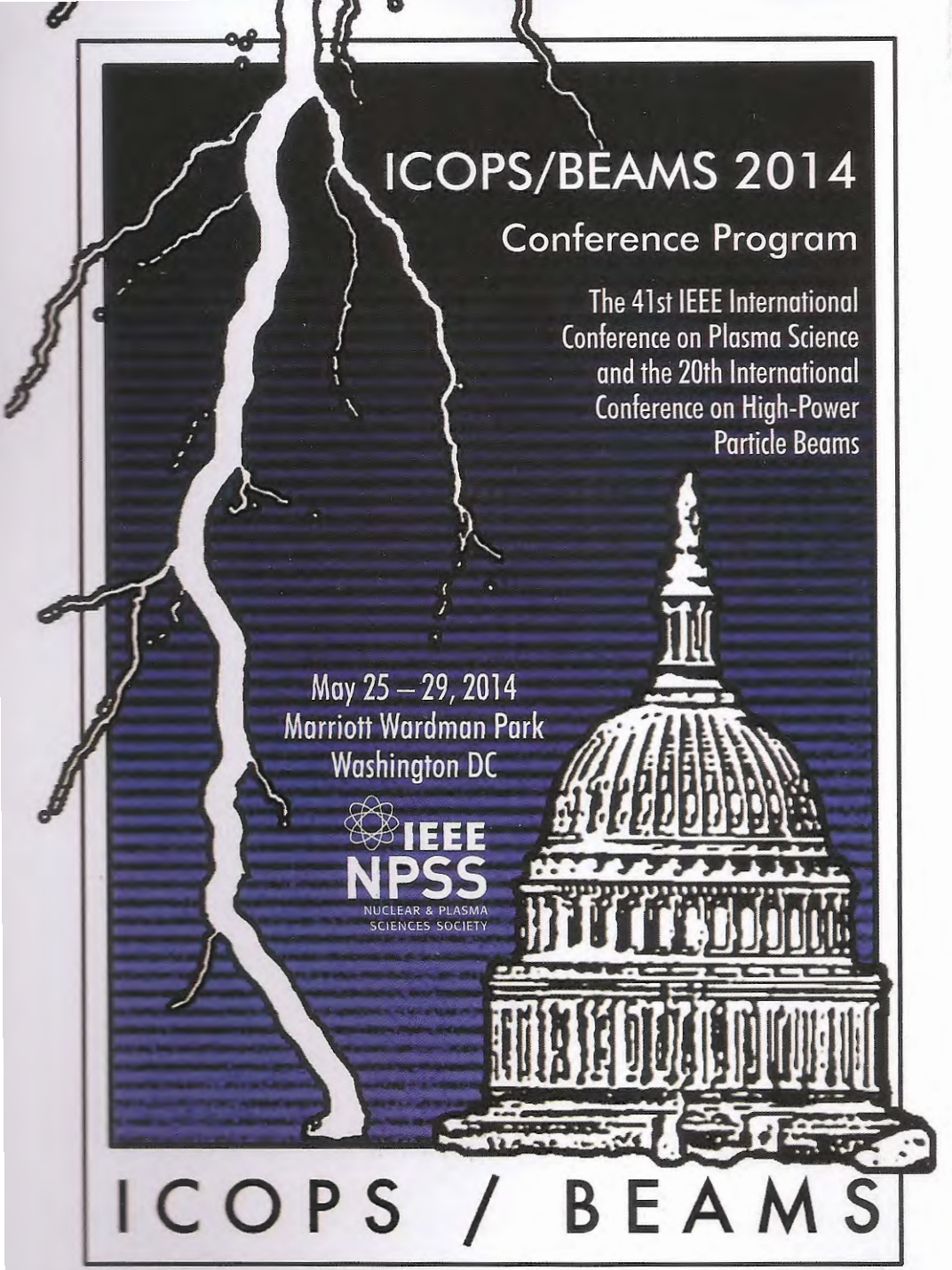

WASHINGTON, DC - 2014

Plenary 7: "Plasma Surface Engineering of Biomaterials"

Prof. Paul Chu
City University of Hong Kong

Prof. Paul K 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 founded his first company, Evans Asia, in 1990. He joined City University of Hong Kong in 1996 and established the Plasma Laboratory. He is currently Chair Professor of Materials Engineering in the Department of Physics and Materials Science in City University of Hong Kong and holds 14 honorary professorships in China including Peking University, Fudan University, Shanghai Jiaotong University, Nanjing University, and Chinese Academy of Sciences.

He is Chairman of the International Plasma-Based Ion Implantation and Deposition (PBII&D) International Committee and a member of the IEEE NPSS Fellow Evaluation Committee and Ion Implantation Technology (IIT) International Committee. He is guiding senior editor of IEEE Transactions on Plasma Science (after serving as senior editor from 2006 to 2013), associate editor of Materials Science and Engineering Reports, and an editorial board member of 8 international journals including Biomaterials, Advanced Materials Interfaces, and Surface & Coatings Technology.

His research activities are quite diverse spanning plasma science and engineering, surface science and engineering, as well as functional materials. His works have been cited 20,000 times and he is one of the top 100 materials scientists in the world according to Thomson Reuters Essential Science Indicators. He has won many research awards, for example, the IEEE NPSS Merit Award (2007), MRS JW Mayer Lectureship (2008), and Shanghai Natural Science 1st Class Award (2011). He is Fellow of the APS, AVS, IEEE, MRS, and HKIE.

He is also active in industrial applications having founded two other companies, Plasma Technology Ltd. in Hong Kong in 1998 and Chengdu PulseTech Electrical Co. Ltd. in China in 2001. The former company specializes in the design and manufacturing of low-pressure plasma and coatings equipment, whereas the latter produces various types of power supplies for industrial equipment. Plasma Technology Ltd. won the Hong Kong Awards for Industry in 2004 and again in 2011.

Thursday, May 29

Session PL7: Plenary 7

Thursday, May 29 08:00-09:00 Thurgood Marshall East-South
Session Chair: *Chunqi Jiang, Old Dominion University*

8:00 PL7-1 (invited) PLASMA SURFACE ENGINEERING OF BIOMATERIALS
P. K. Chu
Department of Physics and Materials Science, City University of Hong Kong, Kowloon, Hong Kong

Session 7A: Environmental and Industrial Applications

Thursday, May 29 9:30 - 12:00 Thurgood Marshall North
Session Chair: *Paul Chu, City University of Hong Kong*

9:30 7A-1 (invited) DEGRADATION OF SELECTED PHARMACEUTICALS WITH PULSED CORONA DISCHARGES GENERATED IN WATER
R. Banaschik[1], P. Lukes[2], K. -D. Weltmann[1], J. F. Kolb[1]
[1]Leibniz Institute for Plasma Science and Technology, Greifswald, Germany [2]Department of Pulse Plasma Systems, Institute of Plasma Physics, Prague, Czech Republic

10:00 7A-2 REMOVAL OF DYES FROM SYNTHETIC WASTEWATER BY PLASMACHEMICAL COAGULATION
S. Nzali[1], S. Laminsi[2], D. Njopouwo[2]
[1]School of Wood, Water and Natural Resources, Faculty of Agronomy and Agricultural Sciences, University of Dschang/Ebalawa Campus, Ebalowa, Cameroon[2]Inorganic Chemistry, University of Yaounde I, Yaounde, Cameroon

10:15 7A-3 ORGANIC SYNTHESIS WITH CONTINUOUS FLOW WATER FILM PULSED PLASMA DISCHARGE
R. J. Wandell[1], S. Bresch[2], I. V. Alabugin[2], B. R. Locke[1]
[1]Department of Chemical ond Biomedical Engineering, Flarida Stote University, Tallahassee, FL, United States[2]Department of Chemistry and Biochemistry, Florida State University, Tallahassee, FL, United States

10:30 7A-4 STUDY OF WATER TREATMENT BY USING UNDERWATER PULSED DISCHARGE PLASMA
T. Sakugawa, H. Akiyama
Institute of Pulsed Power Science, Kumamoto University, Kumamoto, Japan

10:45 7A-5 SHOCK WAVES GENERATED BY UNDERWATER PULSE DISCHARGE WITH CU WIRE OF DIFFERENT PARAMETER
H. 8. Zhou[1], R. Y. Han[1], Q. J. Liu[1], Y. M. Zhang[1], Y. Z. Zhao[2], M. J. Liu[2]
[1]State Key Laboratory of Electrical Insulation for Power Equipment, Xi'an Jiaotong University, Xi'an, Shaanxi, China[2]Xian GuanTong Energy technalogy co., LTD, Xi'an, Shaanxi, China

11:00 7A-6 MODULAR MICROPLASMA OZONE GENERATORS FOR WATER TREATMENT SYSTEM
J. H. Cho[1,2], M. H. Kim[2], C. M. Herring[2], S. -J. Park[1,2], J. G. Eden[1,2]
[1]Department of Electrical and Computer Engineering, University of Illinois, Urbana, IL, United States[2]EP Purification, Inc., Champaign, IL, United States

11:15 7A-7 IN-SITU EMISSION SPECTROSCOPY AND PLASMACHEMICAL ANALYSIS OF CARBON DIOXIDE DISSOCIATION IN ATMOSPHERIC PRESSURE MICROCHANNEL PLASMA
C. Shin, Z. Dai, S. -J. Park, J. G. Eden
Department af Electrical and Computer Engineering, University of Illinois, Urbana, IL, United States

PLASMA SURFACE ENGINEERING OF BIOMATERIALS

P. K. Chu

Department of Physics and Materials Science,
City University of Hong Kong, Kowloon, Hong

The chemical and biological interactions between biomaterials and the outside environment such as tissues and body fluids depend on the surface properties. Low-pressure plasma-based and related technology offers the unique capabilities of modifying selected surface properties and enabling surface functionalization and fabrication of special surface structures to cater to clinical requirements such as mechanical strength, cyto-compatibility, nontoxicity, bacteria resistance, and so on. By using plasma-based techniques, the inherent favorable bulk properties of the materials and biomedical devices can be preserved while selective surface properties such as mechanical strength, hydrophilicity / hydrophobitcity, and chemical reactivity can be enhanced. In particular, plasma immersion ion implantation and deposition (PIII&D) is very useful to biomedical devices such as surgical implants because it is a non-line-of-technique and suitable for biomedical components with a complex shape such as bone fixators, scoliosis correction devices, cardiovascular stents, and artificial heart valves. In this plenary talk, recent research work performed in the Plasma Laboratory of City University of Hong Kong on plasma treatment of biomaterials is described. Examples will include bio-conductive coatings, biodegradable metals and polymers, antibacterial surfaces, and nanostructured biomaterials with favorable delivery and imaging properties.