

Plasma Biomedicine – from a triggered spark to engineering-enabled therapies

Michael Kong

Batten Endowed Chair in Bioelectronics

Professor of Electrical and Computer Engineering

Frank Reidy Center for Bioelectronics

Old Dominion University, Norfolk, VA

Thursday, December 4th at 3:00 PM

Birck Nanotechnology Center Room 2001

Gas discharges sustained near room temperature are known to be indispensable for many industries including microelectronics fabrication, display and lighting, and surface engineering. Much less known is that their physiochemical environment of reactive oxygen species, charges and light share remarkable similarities to the environment created by the Great Oxygenation Event some 2.4 – 2.7 billion years ago that led to the emergence of single-celled eukaryotes on the earth. Today, the development of low-temperature plasmas for use in healthcare has already led to three FDA approved clinical procedures of tissue ablation and coagulation, considerable advance in plasma disinfection of endoscopic and other medical devices, two successful phase-II clinical trials for plasma-based wound healing, and a rapidly growing interdisciplinary disciplinary known as plasma biomedicine. This presentation provides a perspective of clinical successes of plasma biomedicine, how the interdisciplinary interplay advances both engineering science and biology, and key examples of societal challenges that can be addressed by plasma bioscience. With increasing awareness of the natural link between gas plasmas and aerobic life, the possibility of using plasma chemistry to interact with redox biology to achieve redox homeostasis and hence unlock novel therapies is discussed. New sciences being developed from the interface between plasma and life sciences are expected to drive technological innovations for healthcare.

Biography: Michael Kong is currently a Professor of Electrical and Computer Engineering and the Batten Endowed Chair in Bioelectronics at Old Dominion University in Norfolk, VA. Upon joining ODU towards the end of 2012, he established a Plasma Biomedicine group with an integrated laboratory facility blending plasma physics and chemistry, plasma sources engineering, neuroscience and cell biology, and molecular microbiology. Prior to his move to the US, he held a Chair in Bioelectronics and was an Associate Dean at Loughborough University, UK, where he established a 20-member Plasma and Pulsed Power Group and co-founded a campus-wide Centre for Biological Engineering with a research portfolio in plasma biomedicine, cell therapy and regenerative medicine.

Dr. Kong is a founding director of the International Society for Plasma Medicine, a senior editor of *IEEE Transactions on Plasma Science*, and an editorial member for *Plasma Sources Science and Technology*, *Plasma Chemistry and Plasma Processing*, and *Plasma Medicine Journal*. He served as the general chair for the 2012 IEEE International Conference of Plasma Science in Scotland. He has published some 145 journal papers with an h-index of 39, and given more than 70 plenary/invited talks at international conferences and symposiums. Dr Kong received the inaugural International Society for Plasma Medicine Award in 2010, and is a Fellow of IEEE.