

Guest Editorial: Special Issue on Plenary and Invited Papers from ICOPS 2011

THE 38th IEEE International Conference on Plasma Science (ICOPS) and the 24th Symposium on Fusion Engineering (SOFE) were jointly held in Chicago, IL, from June 26 to June 30, 2011. The ICOPS and SOFE had several joint plenary papers but otherwise separate technical programs, providing an excellent opportunity to combine the typically diverse topics of ICOPS with the focus on fusion systems and engineering of SOFE. The ICOPS technical program included three joint ICOPS/SOFE plenary talks and two ICOPS plenary talks. In addition, ICOPS had 208 oral presentations, including 24 invited presentations, and 326 poster presentations. The three joint plenary talks were given by Dr. Donald Cook (NNSA), Dr. Bryan Rice (SEMATECH, Inc.), and Dr. Jiangang Li (Chinese Academy of Sciences), while the two ICOPS plenary talks were given by Dr. Thomas Katsouleas (Duke University) and Dr. Paul Bernhardt (Naval Research Laboratory). The research presented at ICOPS highlighted the latest progress in seven broad areas of plasma science and applications. These included the following: 1) *basic processes in fully and partially ionized plasmas*; 2) *microwave generation and plasma interactions*; 3) *charged particle beams and sources*; 4) *high-energy-density plasma applications*; 5) *industrial, commercial, and medical plasma applications*; 6) *plasma diagnostics*; and 7) *pulsed-power and other plasma applications*. Collectively, they represent a vast diversity from intriguing nanoscale plasmas formed at the tip of a nanostructure, through very large scale fusion systems including ITER, to space plasmas. Applications of these diverse plasma systems are also wide ranging,

including energy, coherent light sources, flat-panel displays, coatings, surface modification, microscopic fabrication, medicine, and biology. This special issue represents a small collection of some of the most exciting works presented at ICOPS.

As Guest Editors, we would like to thank all the authors who submitted their papers to this issue. We would also like to thank the referees of this issue for their timely, meticulous, and constructive reports that helped improve the papers. Our special appreciation goes to Editor-in-Chief Dr. S. Gitomer and Assistant Publication Peer Review Support Specialist S. Gillespie of the IEEE TRANSACTIONS ON PLASMA SCIENCE for their guidance, assistance, and patience.

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Ahmed Hassanein (M'07–SM'10–F'11) received the B.Sc. and M.Sc. degrees in nuclear engineering from Alexandria University, Alexandria, Egypt, the M.Sc. degree in physics, and the M.Sc. and Ph.D. degrees in nuclear engineering from the University of Wisconsin, Madison.

He is currently the Head of the School of Nuclear Engineering, Purdue University, West Lafayette, IN, which is one of the prime nuclear engineering schools in the U.S., where he is also the Director of the Center for Materials Under Extreme Environment, with extensive research activities in several areas of plasma physics applications including magnetic and inertial fusion, laser- and discharge-produced plasmas, nuclear detection, directed energy lethality, surface modification of materials, and next generation nanolithography. Before joining Purdue Faculty in 2007, he served as the Director of Argonne National Laboratory Fusion Power Program, from 2000 to 2007. He holds the Endowed Chair Professorship of Paul L. Wattelet. He has implemented the world's leading computer package HEIGHTS for transient plasma interaction with materials and has developed various models and laboratory experiments to predict material

behavior, hydrodynamic evolution, plasma formation, and lifetime issues under various irradiation conditions. He has more than 30 years of experience in research and development in the fields of nuclear physics, engineering, and material science. He has authored more than 400 journal publications and technical reports in more than 30 different national and international journals and is the holder of four patents in nanolithography and nanotechnology.

Dr. Hassanein is several times a recipient of Argonne National Laboratory's Exceptional Performance Awards; he was also a recipient of the Argonne's Pace Setter Award 2002 and a NATO grant to compose and chair an international conference on nuclear energy in 2001. He chaired numerous conferences/sessions, workshops, and panel discussions for diverse professional-society-sponsored meetings and was the General Chair of ICOPS held in 2011 in Chicago. He is a Fellow of SPIE and AAAS.



Steven H. Gold (M'86–SM'88–F'96) received the Ph.D. degree in physics from the University of Maryland, College Park, in 1978.

He is the Senior Scientist for radiation generation physics with the Beam Physics Branch, Naval Research Laboratory, Washington, DC. His research interests include high-power microwave generation, fast-wave microwave devices, and applications of high-power microwave sources to accelerators and industrial processes. He currently directs a program to study accelerator-related microwave technologies, including active microwave pulse compressors and dielectric-loaded accelerators, and, most recently, has been carrying out a study of thermionic injectors for high-current electron linacs. He has published more than 60 journal articles and 100 proceeding papers and is the holder of five U.S. patents and two statutory invention registrations.

Dr. Gold is currently a member of the IEEE Nuclear and Plasma Sciences Society (NPSS) Administrative Committee and a Secretary of the NPSS Plasma Science and Applications Committee and served as Technical Program Chair of the 2011 IEEE International Conference on Plasma Science. He was also a past member of the IEEE Fellow Committee and served for 20 years as an Associate Editor of the IEEE TRANSACTIONS ON PLASMA SCIENCE. He is a Fellow of the American Physical Society and was a recipient of the 2008 NPSS Richard F. Shea Distinguished Member Award "for outstanding contributions to the IEEE Nuclear and Plasma Sciences Society and its Plasma Science and Applications Technical Committee."



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Dr. Harilal was a recipient of numerous awards, including the Paul Zmola Young Scholar Award and the Alexander von Humboldt Fellowship Award.