

Editorial

THIS Editorial is intended to serve as an introduction to a new series of Special Issues in the IEEE TRANSACTIONS ON PLASMA SCIENCE. Beginning with this Special Issue of Selected Contributed Oral Papers from the International Conference on Plasma Science (ICOPS) 2003, the TRANSACTIONS will be running these Special Issues annually. There were many motivations to provide such a special opportunity for a select group of contributions to the annual ICOPS run under the auspices of the IEEE Nuclear and Plasma Sciences Society's Technical Committee on Plasma Science and Applications. These motivations included the following:

- 1) capturing from ICOPS excellent research papers of a relatively finished character;
- 2) providing the opportunity for certain meeting attendees to publish their work in a timely fashion, in a single issue of the TRANSACTIONS;
- 3) ensuring an archival record of excellent peer reviewed research papers, not previously gathered in any other single volume.

It was decided that the candidate papers for the Special Issue would be limited to a subset of all the papers actually presented at the ICOPS. Nominations from oral contributed papers for the selection process for this Special Issue were received from ICOPS Session Organizers and Session Chairs. Those authors of nominated papers, were informed of this nomination, and asked to submit a complete manuscript using our Manuscript Central submission, and reviewing system (see <http://tps-ieee.manuscriptcentral.com>).

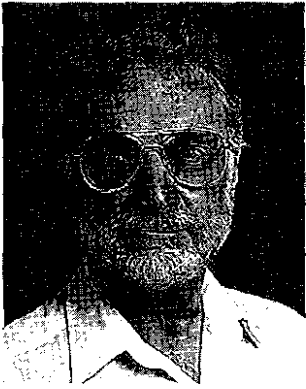
An excellent group of Guest Editors was gathered to effectively cover the many disciplines represented by the selected papers. These individuals contributed greatly to making this Special Issue a success. Their job was to manage the many details of the review process, gather all the final materials from the accepted papers, and send these materials to the Editor. The Guest Editors for this Special Issue deserve much appreciation for their work, done under severe time pressure, very capably and professionally. The following are the international group of ten Co-Guest Editors (their photographs and biosketches are listed at the end of this editorial):

- 1) Dr. Ian Brown (Lawrence Berkeley National Laboratory, Berkeley, CA USA);
- 2) Prof. Jin Joo Choi (Kwangwoon University, Kwangwoon, Korea);
- 3) Prof. Paul K. Chu (City University of Hong Kong, Hong Kong);
- 4) Prof. Hiroshi Fujiyama (Nagasaki University Common Wealth Technology, Inc., Nagasaki, Japan);
- 5) Dr. Frank Hegeler (Naval Research Laboratory/Commonwealth Technology, Inc., Washington, DC USA);
- 6) Prof. Yong Seok Hwang (Seoul National University, Seoul, Korea);
- 7) Prof. Mark Kushner (University of Illinois, Urbana-Champaign, IL USA);
- 8) Prof. Wes Lawson (University of Maryland, College Park, MD USA);
- 9) Prof. Shigeru Sudo (National Institute of Fusion Studies, Toki, Gifu, Japan);
- 10) Prof. Han-Sup Uhm (*Lead Guest Editor*, Ajou University, Ajou, Korea).

The manuscripts represented in this Special Issue are drawn from all the disciplines of plasma science represented at ICOPS. From among the 140 presented contributed oral papers, 81 papers were selected and first authors were asked to submit; a total of 47 papers were actually submitted. Of these, 33 papers were accepted for publication. This issue captures 28 of the accepted papers, with the remaining papers to appear in subsequent regular issues.

I want to express my personal appreciation for the efforts of all those individuals who have contributed to the success of this Special Issue: the IEEE NPSS Plasma Science and Applications Executive Committee; the ICOPS 2003 Conference Chairman, Professor Kyu-Sun Chung; the ICOPS 2003 Session Organizers and Session Chairs; the Co-Guest Editors; the authors; and all the referees. I look forward to future Special Issues in this series to be as successful as the one offered here.

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Ian G. Brown (SM'83–F'96) is a Senior Physicist (retired 2001) with the Lawrence Berkeley National Laboratory. His research interests include the development of plasma and ion beam sources and their application for materials synthesis and modification. He has held research and teaching positions at Sydney University, Princeton University, Princeton, NJ, the University of California, Berkeley, and the Max-Planck Institute for Plasma Physics, Garching, Germany.

Dr. Brown has won two R&D-100 awards. He is a Fellow of the American Physical Society, the Institute of Physics (U.K.), and the Australian Institute of Physics as well as a Member of the American Vacuum Society, the Materials Research Society, the Society for Biomaterials, and the Bohmische Physical Society.



Jin Joo Choi received the B.S. degree in physics from Seoul National University, Seoul, South Korea, in 1983, the M.S. degree in physics from Georgia State University, Atlanta, in 1985, and the Ph.D. degree in nuclear engineering from the University of Michigan, Ann Arbor, in 1991.

In 1991, he joined the Vacuum Electronics Branch, Electronic Science and Technology Division, U.S. Naval Research Laboratory (NRL), Washington, D.C. His work at NRL was on the development of high-power millimeter wave gyro-amplifiers for EW and radar applications. In 1997, he joined Kwangwoon University, Seoul, South Korea where he is currently an Associate Professor with the School of Electronics Engineering. His research interests include high-power vacuum electronics and passive and active solid state devices.

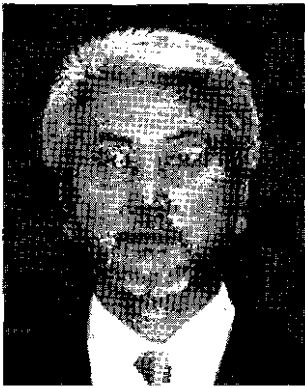


Paul K. Chu (M'97–SM'99–F'03) received the B.S. degree in mathematics from The Ohio State University, Columbus, in 1977, and the M.S. and Ph.D. degrees in chemistry from Cornell University, Ithaca, NY, in 1979 and 1982, respectively.

He joined Charles Evans and Associates, Redwood City, CA, in 1982, and started his own business in 1990. He is currently Professor (Chair) of materials engineering with the Department of Physics and Materials Science, City University of Hong Kong, Hong Kong. He also holds concurrent Professorships at Fudan University, Peking University, Shanghai Jiaotong University, Southwest Jiaotong University, and the Southwestern Institute of Physics, in China. His research activities include plasma-processing technology, microelectronics processing, and materials characterization. He is the author/co-author of 650 publications, has eight U.S. and one Chinese patent, and serves on the Editorial Board of *Nuclear Instruments and Methods in Physics Research B*.

Dr. Chu is a Fellow of the Hong Kong Institute of Engineers (HKIE) and an executive member of the International Plasma-Based Ion Implantation Committee. He also serves on the Engineering

Panel of the Hong Kong Research Grants Council (RGC). He was the winner of the 2004 Applied Research Certificate of Merits in Hong Kong.



Hiroshi Fujiyama received the B.S. degree in electrical engineering from Yamaguchi University, Yamaguchi, Japan, in 1973, and the M.S. and Ph.D. degrees in electrical engineering from Kyushu University, Kyushu, Japan, in 1975 and 1981, respectively.

He became a Research Associate with Kyushu University in 1977. In 1982, he became an Associate Professor with Nagasaki University, Nagasaki, Japan. He is currently a Professor of Electrical Engineering and Electronics with the Graduate School of Science and Technology, Nagasaki University. In 2004, he became the Secretary for the Second International School of Advanced Plasma Technology, Varenna, Italy. He is the author/coauthor of 250 publications and has 22 Japanese patents. He has been a Guest Editor for *Thin Solid Films* since 2002. He was a Co-Chair for 5th ICRP and ESCAMPIG in 2002. He currently serves now as the Program Chairman for 7th APCPST and the 17th SPSM in 2004. His research activities include plasma sources, plasma-processing technology, microelectronics processing, and plasma displays.

Dr. Fujiyama was a Guest Editor for the IEEE TRANSACTIONS ON PLASMA SCIENCE from 2003 to 2004. He was the Chairman of the Plasma Electronics Division, Japanese Society of Applied Physics, from 2000 to 2002, and was also the Inspector of the Japanese Society of Plasma Science and Nuclear Fusion Research.



Frank Hegeler (S'91–M'95–SM'01) was born in Oldenburg, Germany, in 1965. He received the Dipl.-Ing. degree in electrical engineering from Fachhochschule Wilhelmshaven, Wilhelmshaven, Germany, in 1989, and the M.S.E.E. and Ph.D. degrees from Texas Tech University, Lubbock, in 1991 and 1995, respectively.

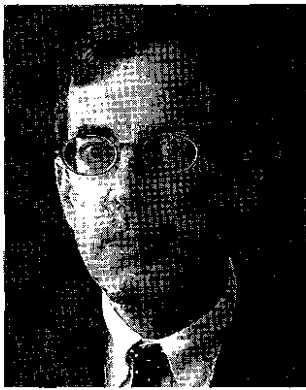
He worked as a Visiting Associate Professor with the Department of Electrical and Computer Engineering, Kumamoto University, Kumamoto City, Japan, from 1995 to 1997. He then joined the Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, as a Postdoctoral Researcher and later as a Research Assistant Professor. Since 2000, he has been a Senior Scientist with Commonwealth Technology, Inc, Alexandria, VA, where he works as a Contractor in the Plasma Physics Division, Naval Research Laboratory in Washington, D.C. He has authored or coauthored more than 50 refereed journal and conference papers. His current interests include high-power electron beam pumped KrF lasers, diagnostics, and basic and applied pulsed power.

Dr. Hegeler is a member of the American Physical Society and Sigma Xi.



Yong Seok Hwang was born in Gyeongnam, Korea. He received the B.S. and M.S. degrees in nuclear engineering from Seoul National University, Seoul, Korea, and the Ph.D degree in plasma physics from Princeton University, Princeton, NJ, in 1992.

He was with the Princeton Plasma Physics Laboratory, Princeton University, from 1992 to 1996. From 1996 to 1998, he was an Assistant Professor with the Korea Advanced Institute of Science and Technology, Daejeon, Korea. He joined Seoul National University in 1998, where he is currently an Associate Professor. His research interests include fusion plasma experiments, development of various plasma and ion sources, and their related applications.

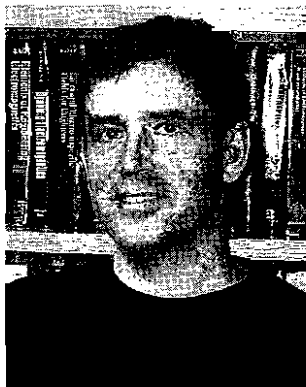


Mark J. Kushner (F'91) received the B.A. degree in astronomy and the B.S. degree in engineering from the University of California, Los Angeles, in 1976., and the M.S. and Ph.D. degrees in applied physics from the California Institute of Technology, Pasadena, in 1977 and 1979, where he was also the Chaim Weizmann Postdoctoral Research Fellow.

He served on the Technical Staffs of Sandia National Laboratory and Lawrence Livermore National Laboratory before joining Spectra Technology, where he was a Director of Electron, Atomic, and Molecular Physics. In 1986, He joined the University of Illinois at Urbana-Champaign, where he is now the Founder Professor of Engineering in the Department of Electrical and Computer Engineering. He has served as Assistant Dean of Academic Programs and Associate Dean of Administrative Affairs in the College of Engineering, Interim Head of the Department of Electrical and Computer Engineering, and Interim Head of the Department of Chemical and Biomolecular Engineering. In his present work, his group develops computer simulations for low temperature plasmas, plasma chemistry, industrial plasma equipment and plasma surface interactions.

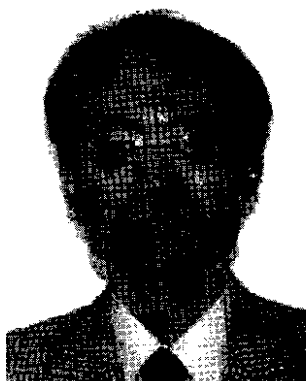
He has published more than 200 journal articles on topics related to plasma materials processing, plasma surface interactions, gas lasers, pulse power plasmas, chemical lasers, and laser spectroscopy.

Dr. Kushner is on the editorial boards of TRANSACTIONS ON PLASMA SCIENCE, *Plasma Sources Science and Technology*, *Journal of Physics D*, and *Plasma Processing and Polymers*. He has recently chaired the Gaseous Electronics Conference, the AVS Plasma Science and Technology Division, the AVS Manufacturing Science and Technology Group and now chairs the Gordon Research Conference on Plasma Processing Science. He has received the Semiconductor Research Corporation Technical Excellence Award, the Tegal Thinker Award for Plasma Etch Technology, the AVS Plasma Science and Technology Award and the IEEE Plasma Science and Applications Award. He is a Fellow of the American Physical Society, Optical Society of America, the American Vacuum Society and the Institute of Physics.



Wes Lawson (S'84-M'85-SM'97) received B.S. degrees in mathematics and electrical engineering, and the M.S. and Ph.D. degrees in electrical engineering from the University of Maryland, College Park, in 1980, 1981, and 1985, respectively. His dissertation work involved theoretical and experimental studies of microwave generation in various large-orbit gyrotron configurations.

He was with the Electronic Systems Branch, Harry Diamond Laboratories, from 1978 to 1982. He has been with the Institute for Plasma Research, University of Maryland, for the past 20 years and is currently a Professor in the Department of Electrical and Computer Engineering. His research interests include novel fast-wave microwave sources and his recent efforts have been directed toward high-power fast-wave and hybrid amplifiers and associated high-power microwave components.



Shigeru Sudo received the Dr.Sci. degree in plasma physics from Tokyo University, Tokyo, Japan, in 1977.

After postdoctoral work with the Institute of Plasma Physics, Nagoya University, Nagoya, Japan, he joined the Institute of Plasma Physics, Max-Planck-Institute (IPP-MPI), Garching, Germany, in 1977, and was a Junior Staff Member from 1979 to 1980. In 1980, he joined Kyoto University, Kyoto, Japan, and he engaged in the Thomson scattering diagnostics and pellet injection for the Heliotron E project. Since 1992, he has been with the Large Helical Device Project at the National Institute for Fusion Science, Toki, Japan, where he is currently developing the tracer-encapsulated pellet diagnostics method.

Dr. Sudo is the Deputy Director-General of the National Institute for Fusion Science.



Han S. Uhm was born November 3, 1942 in Chonju, Korea. He received the Ph.D. degree from University of Maryland, College Park, in 1976.

From 1978 to 1999, he was with the Naval Surface Warfare Center. He is currently a Professor at Ajou University, Paldal-ku Suwon, South Korea. His research interests include: charged particle beams (charged particle-beam propagation in air, beam properties in particle accelerators, collective ion acceleration and high-power electrical pulse system); high-power microwave generations (gyrotron, magnetron, free electron laser and klystron); plasma material processing (large-volume plasma generations for plasma processing, focused ion-beam generation, and plasma ion implantation for wear and corrosion resistance materials); neutron transport physics (neutron radiography and shallow-water mine detection); plasma chemistry (plasma-assisted chemical vapor elimination and air purification).