

Program

Fundamentals and Applications of Microplasmas

March 1- 6, 2009
Catamaran Resort Hotel, San Diego, California
Tel: 1-858-488-1081

Conference Co-chairs:

J. Gary Eden
University of Illinois, USA

Sung-Jin Park
University of Illinois, USA

Kunihide Tachibana
Kyoto University, Japan

Jörg Winter
Ruhr Universität Bochum, Germany



Engineering Conferences International
32 Broadway, Suite 314
New York, NY 10004, USA
Phone: 1-212-514-6760, Fax: 1-212-514-6030
www.engconfintl.org – info@engconfintl.org

Conference Sponsors

Air Force Office of Scientific Research

National Science Foundation

Engineering Conferences International (ECI) is a not-for-profit global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

ECI BOARD MEMBERS

Barry C. Buckland, President

Peter Gray

Allen I. Laskin

Raymond McCabe

David Robinson

Jules Routbort

William Sachs

Eugene Schaefer

P. Somasundaran

Chair of ECI Conferences Committee: William Sachs

ECI Technical Liaison for this conference: Jules Routbort

ECI Director: Barbara K. Hickernell

ECI Associate Director: Kevin M. Korpics

SUNDAY, MARCH 1, 2009

16:00 - 18:00	Registration (Kon Tiki Foyer)
18:00 – 19:00	Welcome Reception (Aviary Foyer)
19:00 – 21:00	Dinner (Aviary Ballroom)

NOTES

- **Conference participants taking part in all conference meals will have a special sticker placed on their badges. Participants who have opted out of meals will only have access to coffee breaks and social hours.**
- Technical sessions will be held in the Kon Tiki Ballroom.
- Posters may be hung in the Rousseau Suite.
- Breakfasts locations will change during the conference – please refer to the daily reader board in the main lobby for the location.
- Lunches – at Beach North (outdoor area). Please bring sunglasses and a light jacket.
- Dinners – at Beach North (outdoor area). Please bring a jacket.
- Audiotaping, videotaping and photography of presentations are strictly prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected copy will be sent to all participants after the conference.

MONDAY, MARCH 2, 2009

- 07:30 – 08:30 Breakfast
- 08:30 – 08:40 Welcome and Introduction
J.G. Eden, Conference Co-Chair
J. Routbort, ECI Technical Liaison
- 08:40 – 09:20 Plenary Speaker
Ulrich Kogelschatz
“Microplasmas: Fundamental Aspects and Future Prospects”
- 09:25 – 12:25 ***SESSION I: THEORY AND DIAGNOSTICS OF MICROPLASMAS***
Session Chair: K. Tachibana
- 09:25 – 09:55 Tsuyohito Ito
Osaka University, Japan
“Electric Field Measurement in High Pressure Hydrogen Microdischarges”
- 09:55 – 10:25 Volker Schulz-von der Gathen
Ruhr-Universität Bochum, Germany
“Spectroscopy Based Investigation of Heating Mechanisms in Microscale Atmospheric Pressure Plasma Discharges”
- 10:25 – 10:55 Coffee Break
- 10:55 – 11:25 Jae Koo Lee
Pohang University of Science and Technology, Korea
“Atmospheric Pressure Microplasmas: Modeling and Experiments”
- 11:25 – 11:55 Zoran Lj. Petrovic
Institute of Physics, Serbia
“Volt-Ampere Characteristics And Diagnostics Of Micro Discharges”
- 11:55 - 12:25 Yi-Kang Pu
Tsinghua University, China
“Comparison Between Atmospheric Pressure Microdischarges and Low Pressure Discharges from an OES Perspective”
- 12:25 – 13:30 Lunch
- 13:30 – 16:30 *Ad hoc* sessions and/or free time
- 16:30 – 17:00 Coffee Break
- 17:00 – 19:30 ***SESSION II: NOVEL PHENOMENA AND APPLICATIONS***
Session Chair: S.-O. Kim
- 17:00 – 17:30 Kay Niemax
ISAS – Institute for Analytical Sciences, Dortmund, Germany
“Laser-Induced Microplasmas”
- 17:30 – 18:00 Yuri Noma
University of Tokyo, Japan
“Gas Temperature Dependent Generation and Diagnosis of Cryoplasma Using Dielectric Barrier Discharge (DBD) Microplasma”

MONDAY, MARCH 2, 2009 (continued)

- 18:00 – 18:30 Axel Mellinger
Central Michigan University, USA
“Microplasma Discharges in Polymer Foams: A New Road to Flexible Piezoelectric Polymer Films”
- 18:30 – 19:00 Leanne Pitchford
Université Paul Sabatier, France
“Microdischarges And The Generation Of Stable, Larger-Volume, High-Pressure DC Plasmas”
- 19:00 – 19:30 Kyung Cheol Choi
KAIST, Korea
“Applications of Microplasmas for Flexible Display Devices”
- 19:30 – 21:30 Dinner

TUESDAY, MARCH 3, 2008

- 07:30 – 08:30 Breakfast
- 08:30 – 08:35 Announcements / Session Overview
- 08:35 – 12:35 **SESSION III: MICROPLASMA JETS AND TORCHES**
Session Chair: J. Winter
- 08:35 – 09:05 Wei-Dong Zhu
Saint Peter's College, USA
"Atmospheric Pressure Plasma Micro Jet"
- 09:05 – 09:35 Han S. Uhm
Ajou University, Korea
"Various Microplasma Jets and Their Application to Sterilization"
- 09:35 – 10:05 Katsuhisa Kitano
Osaka University, Japan
"Low Frequency Microplasma Jet and its Application to Plasma Induced Chemical Processes in Liquids"
- 10:05 – 10:35 Coffee Break
- 10:35 – 11:05 Jan Benedikt
Ruhr – Universität Bochum, Germany
"Analysis of Microplasma Jets by Means of Molecular Beam Mass Spectrometry"
- 11:05 – 11:35 Timothy Grotjohn
Michigan State University, USA
"Design of a Miniature Microwave Plasma Torch and its Operation in Plasma-Assisted Combustion and Microwave – Powered, Discharge – Only Modes"
- 11:35 – 12:05 Juergen Kolb
Old Dominion University, USA
"Microplasma Jet for Medical Applications"
- 12:05 – 12:35 Albrecht Brockhaus
Bergische Universität Wuppertal, Germany
"Plasma Bullets in Cylindrical DBDs and Piezo-Electric Surface Discharges"
- 12:35 – 14:00 Lunch
- 14:00 – 16:00 *Ad hoc* sessions and/or free time
- 16:00 – 18:00 **SESSION IV:** Poster Session with Afternoon Coffee
- 18:15 – 20:15 Dinner on William D. Evans (steamship)
Be prompt as ship will leave at 18:45

WEDNESDAY, MARCH 4, 2009

- 07:30 – 08:30 Breakfast
- 08:30 – 08:35 Announcements / Session Overview
- 08:35 – 12:35 **SESSION V: SURFACE ENGINEERING AND MATERIALS SYNTHESIS**
Session Chair: S.-J. Park
- 08:35 – 09:05 Michael Thomas
Fraunhofer Institute for Surface Engineering and Thin Films, Germany
“Applications of DBD-Type Cavity Microplasmas for Patterned Surface Treatment or Coating”
- 09:05 – 09:35 Paul Bryant
University of Liverpool, UK
“Atmospheric Pressure Micro-Cavity Discharge Array Treatment of Hydrophobic Polymers to Generate Hydrophilic Surfaces”
- 09:35 – 10:05 Yoshiki Shimizu
National Institute of Industrial Science and Technology, Japan
“Application of Atmospheric Pressure, Ultra-High Frequency Microplasma Jet to Preparation and Deposition of Inorganic Nanoparticles”
- 10:05 – 10:35 Break
- 10:35 – 11:05 Mohan Sankaran
Case Western Reserve University, USA
“Nanotechnological Applications of Microplasmas”
- 11:05 – 11:35 Ying-Yi Lin
National Cheng Kung University, Taiwan
“Non-Lithographic Fabrication of Surface Enhanced Raman Scattering Substrates Combining Atmospheric Pressure Micro-Plasma Source and Au Nanoparticles”
- 11:35 – 12:05 Hiroyuki Miyazoe
University of Tokyo, Japan
“Microplasma Assisted Focused Electron Beam Direct Patterning”
- 12:05 – 12:35 Andrew Marchesseault
Technical University Braunschweig, Germany
“Scale-Up of Dielectric Barrier Discharge Micro-Plasma Stamps for Area Selective Surface Treatment in Biological and Chemical Applications”
- 12:35 – 13:30 Lunch
- 13:30 – 16:30 *Ad hoc* sessions and/or free time
- 16:30 – 17:00 Coffee Break
- 17:00 – 18:30 **SESSION VI: PHOTONIC DEVICES AND APPLICATIONS**
Session Chair: V. Schulz-von der Gathen
- 17:00 – 17:30 Osamu Sakai
Kyoto University, Japan
“Metamaterials Activated by Microplasmas”

WEDNESDAY, MARCH 4, 2009 (continued)

- 17:30 – 18:00 Sung-Jin Park
Eden Park Illumination, Inc., USA
“Microplasma Lighting: Innovative and Green Solutions for Future Lighting Applications”
- 18:00 – 18:30 Yong Seog Kim
Hongik University, Korea
“Recent Advances In AC-PDPs”
- 18:30 – 20:00 Sponsored Reception with ***SESSION VII: Poster Session***
- 20:00 – 22:00 Dinner

THURSDAY, MARCH 5, 2009

- 07:30 – 08:30 Breakfast
- 08:30 – 08:35 Announcements / Session Overview
- 08:30 - 12:05 **SESSION VIII: BIOMEDICAL AND ENVIRONMENTAL APPLICATIONS**
Session Chair: M. J. Kushner
- 08:35 – 09:05 Michael Kong
Loughborough University, UK
“Cold Atmospheric Plasma Jet Arrays: Fundamental Characterization and Treatment of 3D Surgical Instruments”
- 09:05 – 09:35 Jeffrey Hopwood
Tufts University
“Frequency Scaling of Microplasmas from 450 MHz to 1.9 GHz”
- 09:35 – 10:05 Graciela Brelles-Mariño
California State Polytechnic University, USA
“Is Gas Discharge Plasma a New Solution to the Old Problem of Biofilm Inactivation?”
- 10:05 – 10:35 Coffee Break
- 10:35 – 11:05 Alena Hinze
Technical University Braunschweig, Germany
“Microplasma-Based Patterned Amination of Polypropylene-Carbon Composites for the Spot Synthesis of Peptide Libraries”
- 11:05 – 11:35 Moo-Been Chang
National Central University, Taiwan
“Removal of PFCs from Gas Streams Via Plasma Catalysis”
- 12:15 – 13:30 Lunch
- 13:30 – 16:30 *Ad hoc* sessions and/or free time
- 16:30 – 17:00 Coffee Break
- 17:00 – 19:00 **SESSION IX: MICROPLASMA CONSORTIA – OVERVIEW AND FUTURE PROSPECTS**
Session Chair: M. Kong
- 17:00 – 17:30 Mark J. Kushner
University of Michigan, USA
“Microplasmas and Physics 2010”
- 17:30 – 18:00 Jörg Winter
Ruhr – Universität Bochum, Germany
“The Research Group ‘Physics of Microplasmas’ at Ruhr – Universität Bochum”
- 18:00 – 18:30 Kunihide Tachibana
Kyoto University, Japan
“Report on the MEXT Consortium on Microplasmas in Japan from 2003 to 2008”

THURSDAY, MARCH 5, 2009 (continued)

- | | |
|---------------|---|
| 18:30 – 19:00 | James Bradley
University of Liverpool, UK
<i>“Micro-Plasma Science and Technology in the UK: Towards a New Consortium”</i> |
| 19:00 – 19:45 | Social Hour |
| 19:45 | Conference Dinner |

FRIDAY, MARCH 6, 2009

- 07:30 – 08:30 Breakfast
- 08:30 – 08:35 Announcements / Session Overview
- 08:35 – 12:05 **SESSION X: MICROPLASMAS IN LIQUIDS**
Session Chair: O. Sakai
- 08:35 – 09:05 Koichi Yasuoka
Tokyo Institute of Technology, Japan
“Plasma-Water Processes and Electrohydrodynamic Gas Flow Generation Using Micro Plasmas”
- 09:05 – 09:35 Mark Kushner
University of Michigan, USA
“Self-Contained Multiphase Microplasmas: Bubbles in High Pressure Gases and Liquids”
- 09:35 – 10:05 Takaaki Tomai
University of Tokyo, Japan
“Atmospheric Pressure Plasma Generation in Microbubbles Formed in Saline Solution”
- 10:05 – 10:35 Break
- 10:35 – 11:05 Toshiro Kaneko
Tohoku University, Japan
“Novel Nano-Bio Material Formation Using Gas-Liquid Interfacial Microplasmas”
- 11:05 – 11:35 Naoki Shirai
Tokyo Institute of Technology, Japan
“Atmospheric DC Glow Microdischarges Using Electrolyte Electrodes and Axial Miniature Helium Flows”
- 11:35 – 12:05 Closing Remarks and Future Plans
- 12:05 Pick up boxed lunch

POSTER SESSION I

1. "Modeling of Atmospheric Pressure Plasmas"
H. W. Lee, Pohang University of Science and Technology
2. "Self-Consistent Simulation of Plasma and Gas Dynamics in Microplasmas"
M. Jugroot, Royal Military College of Canada
3. "Modeling Cathode Boundary Layer Discharges"
E. Munoz-Serrano, University of Cordoba
4. "Fluid Modeling of Microwave Micro-Plasmas at Atmospheric Pressure"
J. Gregorio, Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Laboratoire de Physique des Gaz et des Plasmas, Université Paris Sud
5. "Study of a Microwave Micro-Plasma Reactor at Atmospheric Pressure"
J. Gregorio, J. Gregorio, Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Laboratoire de Physique des Gaz et des Plasmas, Université Paris Sud
6. "Impedance of a Microwave Atmospheric Plasma During Ignition"
S. Kühn, Gerdinand-Braun-Institut für Höchsthfrequenztechnik
7. "Spatial and Temporal Resolved Surface Charge Measurement in a Dielectric Barrier Discharge"
L. Stollenwerk, Institut für Plasmaforschung
8. "Investigation of Discharge Mechanisms in Microplasma Jet by Laser Spectroscopic Measurements"
K. Urabe, Kyoto University
9. "Electric Field Measurements in Near-Atmospheric Pressure Nitrogen and Air Based on a Four-Wave Mixing Scheme"
S. Mueller, Ruhr-University Bochum
10. "Coupling of Imaging and Emission Spectroscopy for Microplasma Studies"
C. Lazzaroni, Ecole Polytechnique
11. "Absolute Atomic Oxygen Density Measurements Inside the Core and Effluent of a Micro-Scaled Atmospheric Pressure Plasma Jet"
N. Knake, Ruhr-University Bochum
12. "Breakdown Voltage in Radio-Frequency Helium Microdischarges"
M. Radmilovic-Radjenovic, Institute of Physics, Belgrade

13. "Theoretical Study of the Water Vapors Breakdown Voltage in Microgaps"
M. Radmilovic-Radjenovic, Institute of Physics, Belgrade
14. "Power Deposition Scaling in an Atmospheric Pressure Capillary Dielectric Barrier Discharge"
B. Sands, UES, Inc.
15. "Properties of Dielectric-Barrier-Free Atmospheric Pressure Micro Plasma Driven by Sub-Micro Second DC Pulse Voltage"
H. -J. Lee, Pusan National University
16. "Self-Pulsing of a Micro Hollow Cathode Discharge"
B. Du, Ruhr University Bochum
17. "Study of the Operational Properties of the Capillary Plasma Electrode (CPE) Discharge"
J. Lopez, Saint Peter's College
18. "Time-Resolved Investigations of a Fast-Pulsed Dielectric Barrier Discharge"
J. Lopez, Saint Peter's College
19. "A Comparison Study of Atmospheric Plasma Jets"
Q. Nie, Loughborough University
20. "Kinetic Alfvén Waves in the Presence of Ion Beam in Plasma Sheet Boundary Layer-Particle Aspect Analysis"
J. Shrivastava, Invertis Institute of Engineering & Technology
21. "Direct Current Cathode Boundary Layer Xenon Discharges"
W. Zhu, Saint Peter's College
22. "High Energy Density Electrons Controlled By Ultra-Intense Laser Coupled With A Micro-Pulse Power Discharged Fiber"
A. Nishida, Osaka University

POSTER SESSION II

1. "Cold Atmospheric Plasma Jets Arranged in a Honeycomb Array"
Z. Cao, Loughborough University
2. "Independently Addressable, Parabolic Cross-Sectional Al/Al₂O₃ Microcavity Devices: Improved Luminous and Luminance Efficacy by Controlling Cavity Geometries"
K. S. Kim, University of Illinois
3. "Hybrid Microcavity and Microchannel Plasma Arrays Fabricated in Aluminum Foil: Large Scale Array Fabrication and Discharge Characteristics"
K. S. Kim, University of Illinois
4. "Transparent, Flexible Microplasma Arrays Fabricated by a Replica Molding Process"
J. Ma, University of Illinois
5. "Formation of Microplasma in Small Capillaries"
S. Panowitz, University of Stuttgart
6. "Glass Microchannel and Microcavity Arrays: Dependence of Plasma Properties on Device Structure and Electrode Geometry"
S. H. Sung, University of Illinois
7. "Silicon Microplasma Arrays: Investigating Microplasma Operating Characteristics and Collective Phenomena"
Paul Tchertchian, University of Illinois
8. "One Chip, Al/Al₂O₃ Mesh Microplasma Devices: Formation of Micro-Tip Arrays and Discharge Characteristics"
Je Kwon Yoon, University of Illinois
9. "Degradation Study of Lead Zirconate Titanate for Use in a Ferroelectric Plasma Source"
B. C. Masters, University of Illinois
10. "Plasma Diagnostics of Underwater Electrical Diaphragm Discharges for Textiles Treatment"
A. Brablec, Masaryk University
11. "Recent Progress in Applications of Coplanar Surface Barrier Discharges for Low-Cost High-Speed Material Processing"
M. Cernak, Comenius University
12. "Localized Surface Treatment Using a Microwave Generated Surface Wave Microplasma"
J. J. Narendra, Michigan State University

13. "Reduction of Gaseous Dimethyl Sulfide (DMS) Using Coaxial Dielectric-Barrier Discharge at Atmospheric Pressure"
H. – H. Chen, National Cheng Kung University
14. "The Fundamentals of Microplasma Source for the Analysis of Gases by the Method of Collision Electron Spectroscopy (CES)"
A. Kudryavtsev, St. Petersburg State University
15. "Time Resolved Spectroscopic Measurement of High-Power Pulsed Microplasma for Elemental Analysis"
Y. Nagata, Tokyo Institute of Technology
16. "Deposition of Diamond-Like-Carbon Films using Transient Glow Microdischarges Powered by Fast Pulse-Train Voltages at Atmospheric Pressure"
S. Ibuka, Tokyo Institute of Technology
17. "Characterization of Arc Extinction using Pulsed Micro-Arc Discharge with CO₂ Gas Blasting"
M. Kanemaru, Tokyo Institute of Technology
18. "New Sustain Waveform for Improving the Luminous Efficacy in a Wide Gap Plasma Display"
J. -H. Seo, University of Incheon
19. "Non-Thermal Plasma Devices at Atmospheric Pressure for Biomedical Applications"
Y. S. Seo, Pohang University of Science and Technology
20. "The Effect of Atmospheric Pressure Micro Plasma on the Degradation of Integrins and Focal Adhesion Kinase in G361 Melanoma Cells"
H. J. Lee, Pusan National University
21. "Influence of Plasma Chemistry on the Plasma Needle-Biomaterial Interaction"
Y. Sakiyama, University of California at Berkeley
22. "Microplasmas At The Tip Of Al/Al₂O₃ Microscopic Electrodes In Water Or Saline Solutions"
Y. Sakiyama, University of California at Berkeley
23. "Microplasma Production of Singlet Oxygen at Atmospheric Pressure for DNA Oxidation"
J. Santos Sousa, LPGP, CNRS-UPS and IPFN IST
24. "Inactivation of Bacteria in Aqueous Environment by Atmospheric Pressure Non-Thermal Plasma"
P. Sun, Peking University