

1st International Workshop on Plasma Agriculture

May 15th–20th 2016, A.J. Drexel Plasma Institute
200 Federal Street, Suite 100, Camden, NJ 08103

www.iwopa.org

Scientific program

Sunday, May 15th, 2016

4:00–8:00 pm	<p data-bbox="358 480 789 512">Registration and welcome reception</p> <p data-bbox="358 518 1203 548">Welcome reception will take place on Drexel University's main campus.</p> <p data-bbox="358 590 1105 653">Main Building, (Building - 1 on the University City Campus map) MEM seminar room (Curtis 162).</p> <p data-bbox="358 695 639 758">3141 Chestnut Street Philadelphia, PA 19104.</p> <p data-bbox="358 800 1036 829">You will be greeted by the entrance to the Main building.</p> <p data-bbox="358 835 721 865">Directions using Google Maps:</p> <p data-bbox="358 871 1349 934">https://www.google.com/maps/place/Drexel+University/@39.953438,-75.183907,12z/data=!4m2!3m1!1s0x89c6c64e4847c029:0xef32de4043c30f0?hl=en</p> <p data-bbox="358 940 607 970">Contact Information:</p> <p data-bbox="358 976 743 1005">Dr. Greg Fridman: 312-371-7947</p> <p data-bbox="358 1012 732 1041">Ryan Robinson: 1-717-9031716</p> <p data-bbox="358 1083 721 1113">From the Philadelphia Airport</p> <ul data-bbox="407 1119 1523 1255" style="list-style-type: none">• Take I-95 North to I-676 West (Exit 22 - on the left-hand side).• Follow I-676 West to I-76 East exit (Philadelphia Int'l Airport).• Follow I-76 East to Exit 345 (University City/30th Street Station). Merge right and continue up the ramp. <p data-bbox="358 1297 553 1327">Parking Options</p> <p data-bbox="358 1333 1365 1396">There are several options available to you. <i>Please note that parking expenses are not reimbursable.</i></p> <ul data-bbox="407 1402 1511 1749" style="list-style-type: none">• Drexel University Parking Garage, 34th Street between Chestnut and Market Streets, Philadelphia, PA 19104 - After taking Exit 345, at the top of the ramp make a right-hand turn and continue to Market Street. Turn right onto Market Street. Continue along Market Street and turn left onto 34th Street. Turn left onto Ludlow Street and enter the Drexel University Parking Garage on your left. The charge for this garage is \$13.00 (please have exact change or credit card). After parking your car in the garage (Please note your space number), payment can be made at the kiosk in the Parking Garage Building's lobby. Please make this payment before walking to the Main Building. Walk south on 34th Street, then turn left to walk east on Chestnut Street. Proceed along Chestnut Street for two blocks. Drexel's Main Building will be on your left.
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Monday, May 16th, 2016

8:30–9:00 am	Opening Ceremony
9:00–9:30 am Abstract #1.	Plasma induced multigeneration effects on plant growth and crop yield Masaharu Shiratani, siratani@ed.kyushu-u.ac.jp <i>Kyushu Univeristy</i> Authors: Masaharu Shiratani, Kazunori Koga, Nobuya Hayashi
9:30–10:00 am Abstract #2.	Development of Plasma Sources and Applications to Plant Growth, Microbial Activation, Agriculture and Food Treatment Eun Ha Choi, ehchoi@kw.ac.kr <i>Plasma Bioscience Research Center, Kwangwoon University, Seoul, Republic of Korea</i> Authors: Sang Hye Ji, Young June Hong, Gyung Soon Park, Yun Ji Kim, Seok Jae Yoo, and Eun Ha Choi
10:00–10:30 am Abstract #3.	Decontamination and Preservation of Perishable Food with Atmospheric Pressure Plasmas K.D. Weltmann, weltmann@inp-greifswald.de <i>Leibniz Institute for Plasma Science and Technology, Greifswald, Germany</i> Authors: K.-D. Weltmann, J. Ehlbeck, O. Schlüter, U. Schnabel, N. Stolz, M. Andrasch, Th. von Woedtke, J.F. Kolb
10:30–11:00 am	Coffee break
11:00–11:30 am Abstract #4.	Overview of Agricultural Activities With Potential for Plasma Technology Applications Jack Rabin, rabin.njaes.rutgers@me.com ; and Raul Cabrera, cabrera@aesop.rutgers.edu <i>Rutgers University, New Jersey, USA</i>
11:30–12:00 noon Abstract #5.	Growth control of budding yeast cells through atomic oxygen dose Masafumi Ito, ito@meijo-u.ac.jp <i>Meijo University</i> Authors: Masafumi Ito, Jun Kobayashi, Hiroshi Hashizume, Takayuki Ohta, Masaru Hori
12:00–12:30 pm Abstract #6.	R&D Status of Plasma Applications to Agriculture in National Fusion Research Institute (NFRI) Suk Jae Yoo, sjyoo@nfri.re.kr <i>National Fusion Research Institute, Daejeon, Korea</i> Authors: Suk Jae Yoo and Seong Bong Kim
12:30–2:00 pm	Lunch
2:00–2:30 pm Abstract #7.	Plasma-liquid interactions and implications for biological applications David Graves, gravesdav@gmail.com <i>University of California at Berkeley</i>
2:30–3:00 pm Abstract #8.	Atmospheric pressure plasma treatment of seeds: evaluation of plasma component effects Jean-Michele Pouvesle, jean-michel.pouvesle@univ-orleans.fr <i>University of Orleans</i> Authors: Eric Robert, Sébastien Dozias, Jean-Michel Pouvesle
3:00–3:30 pm	Coffee break
3:30–4:00 pm Abstract #9.	Microwave and low-frequency plasmas applied to enhanced sterilization, residual-pesticide treatments, and germination control in agricultural products Jae Koo Lee, jkl@postech.ac.kr <i>POSTECH and Korea Food Research Inst.</i> Authors: JK Lee, GS Yun, IH Won, Y-J Kim
4:00–4:30 pm Abstract #10.	In-Package Inactivation of Human Pathogenic Bacteria and Viruses On Leafy Greens Using Atmospheric Cold Plasma As A Terminal Processing Step Brendan Niemira, Brendan.Niemira@ars.usda.gov <i>Food Safety & Intervention Technologies Research Unit, USDA-ARS Eastern Regional Research Center</i> Authors: Brendan A. Niemira, Sea Cheol Min, Si Hyeon Roh, Glenn Boyd, Joseph E. Sites, Joseph Uknalis

4:30–5:00 pm Abstract #11.	Non-Equilibrium Gliding Arc Discharge Plasma-Activated Water in Plasma Agriculture: Pathogen Control, Plant Growth Enhancement, and Reduction of Irrigation Water Consumption Greg Fridman, gregfridman@gmail.com <i>AJ Drexel Plasma Institute, Philadelphia, USA</i> Authors: G Fridman, V Miller, A Lin, D Dobrynin, A Rabinovich, A Fridman
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Tuesday, May 17th, 2016

9:00–9:30 am Abstract #12.	Plasma treatment of seeds and plant calli Zoran Lj. Petrović, zoran@ipb.ac.rs <i>Institute of Physics, University of Belgrade, Serbia</i> Authors: Zoran Lj. Petrović, Kosta Spasić, Suzana Živković, Gordana Malović, Nevena Puač
9:30–10:00 am Abstract #13.	Nitrogen fixation by plasma – new technology for future Dr. Qi Wang, Q.Wang1@tue.nl <i>Eindhoven University of Technology</i> Authors: Q Wang, B. Patil, A. Anastasopoulou, V. Hessel, J. Lang
10:00–10:30 am Abstract #14.	Fungal disease control and plant development by plasma Gyungsoon Park, gyungp@kw.ac.kr <i>Plasma Bioscience Research Center, Kwangwoon University, Seoul, Republic of Korea</i> Authors: Gyungsoon Park, Sang Hye Ji, Min Ho Kang, Anchalee Pengkit, Kihong Choi, Seong Sil Jeon, Han Sup Uhm, Eun Ha Choi
10:30–11:00 am	Coffee break
11:00–11:30 am Abstract #15.	Non-thermal Plasma and Pulsed Electric Fields for the Extraction of Valuable Substances from Plant Cells J.F. Kolb, juergen.kolb@inp-greifswald.de <i>Leibniz Institute for Plasma Science and Technology, Greifswald, Germany</i> Authors: J.F. Kolb, J. Ehlbeck, K. Zocher, A. Steuer, J. Winter, Th. von Woedtke, K.-D. Weltmann
11:30–12:00 noon Abstract #16.	Improved growth of garlic by plasma treatment of Cloves Miran Mozetič, miran.mozetic@guest.arnes.si <i>Jozef Stefan Institute, Ljubljana, Slovenia</i> Authors: I. Junkar, J. Iskra, P. Titan, G. Primc, M. Mozetič
12:00–12:30 pm Abstract #17.	The effect of pre-sowing plasma seeds treatment on germination, plants resistance to pathogens and crop capacity. Irina Filatova, filatova@dragon.bas-net.by <i>B.I. Stepanov Institute of Physics, the National Academy of Sciences of Belarus</i> Authors: Filatova, V. Azharonok, V. Lyushkevich, A. Zhukovsky, V. Mildažienė, G. Pauzaite, R. Zukiene, A. Malakauskiene
12:30–2:00 pm	Lunch
2:00–2:30 pm Abstract #18.	Interaction of Nitrogen-Containing MHz Atmospheric Pressure Plasma Jet (APPJ) and Surface Microdischarge (SMD) with Surfaces of Biomolecules and Model Polymers: The Influence of Discharge Composition on Nitrogen Uptake Gottlieb S. Oehrlein, oehrlein@umd.edu <i>Department of Materials Science and Engineering, Institute for Research in Electronics and Applied Physics, University of Maryland, USA</i> Authors: P. Luan, A. J. Knoll, and G. S. Oehrlein
2:30–3:00 pm Abstract #19.	Non-Thermal Plasma (NTP) Reduces Water Consumption while Accelerating <i>Arabidopsis thaliana</i> Growth and Fecundity Bela Peethambaran, b.peethambaran@uscience.edu <i>University of the Sciences, Philadelphia, USA</i> Authors: B, Peethambaran, Han, J., K, Kermalli, Jiaying, J., Fridman, G., Balsamo, R., A. Fridman and V. Miller
3:00–3:30 pm	Coffee break

3:30–4:00 pm Abstract #20.	DBD plasma effect on the physical - chemical properties of the seed coat and seed germination Umbu (Spondias tuberosa Arr Camara.) Clodomiro Alves Junior, clodomiro.jr@hotmail.com <i>Federal Rural University of Semiárid - Mossoró - RN - Brazil</i> Authors: Clodomiro Alves Junior, Jussier de Oliveira Vitoriano, Dinnara Layza Souza da Silva, Mikelly de Lima Farias
4:00–4:30 pm Abstract #21.	Plasma Treatment of Seeds – from Laboratory Experiments to Harvest Yield enhancement Petr Špatenka, Petr.spatenka@fs.cvut.cz SurfaceTreat Inc., Czech Republic and the Czech Technical University in Prague, Czech Republic Authors: Petr Špatenka, Vladimír Čurn, Andrea Bohatá, Petr Bartoš
4:30–5:00 pm Abstract #22.	Stimulation of Metabolite Production in Medical Fungi by Atmospheric Pressure Plasmas K. Wende, kristianwende@gmail.com <i>Leibniz Institute for Plasma Science and Technology, Greifswald, Germany</i> Authors: K. Wende, F. Naeser, C. Bäcker, K.-D. Weltmann, U. Lindequist, Th. von Woedtke, B. Haertel

Wednesday, May 18th, 2016

9:00–9:30 am Abstract #23.	Photodynamic processes to improve the safety of wash water used in the fresh produce industry Dr. Rohan V. Tikekar, rtikekar@umd.edu <i>University of Maryland-College Park</i>
9:30–10:00 am Abstract #24.	Plasma decontamination of natural toxins Uroš Cvelbar and Nataša Hojnik, hojniknatasa@gmail.com <i>Jozef Stefan Institute, Ljubljana, Slovenia</i>
10:00–10:30 am Abstract #25.	Plasma based degradation of mycotoxins L. ten Bosch, lars.bosch@hawk-hhg.de <i>University of Applied Sciences and Arts, Göttingen, Germany</i> Authors: L. ten Bosch, G. Avramidis, K. Pfohl, S. Wieneke, P. Karlovsky, W. Viöl
10:30–11:00 am	Coffee break
11:00–11:30 am Abstract #26.	Effects of Chemical Species in Atmospheric Pressure Wet-Air Plasma Effluent on Strawberry Pathogen Conidia Keisuke Takashima, takashima@ecei.tohoku.ac.jp <i>Department of Electronic Engineering, Tohoku University</i> Authors: Keisuke Takashima, Hideaki Konishi, Keisuke Shimada, Toshiro Kaneko
11:30–12:00 noon Abstract #27.	Investigation of plasma-water discharges and their agricultural applications Ying Song, songying@dlnu.edu.cn <i>Dalian Nationalities University, China</i> Authors: Ying Song, Dongping Liu, Zichao Zong, Renwu Zhou, Xianhui Zhang
12:00–1:30 pm	Lunch
1:30–8:00 pm	Half-day excursion

Thursday, May 19th, 2016

9:00–9:30 am Abstract #28.	Assisted synthesis of Essential Oil extracts Gerald Buonopane and Jose L. Lopez, jose.lopez1@shu.edu <i>Seton Hall University</i> Authors: Gerald Buonopane, Cosimo Antonacci, & Jose L. Lopez
9:30–10:00 am Abstract #29.	Measurement of reactive species in various gas plasma bubbled-up water for hydroponic culture Hiroaki Kawano, kawano@plasma.es.titech.ac.jp <i>Tokyo Institute of Technology, Yokohama, Japan</i>

	Authors: Hiroaki Kawano, Toshihiro Takamatsu, Yuriko Matsumura, Hidekazu Miyahara, Atsuo Iwasawa, Takeshi Azuma, Akitoshi Okino
10:00–10:30 am Abstract #30.	Influence of diferent plasma treatments in the germination process of Indian cress (<i>Tropaeolum majus</i>) seeds Ricardo Malina, ricardo.molina@iqac.csic.es <i>Institute of Advanced Chemistry of Catalonia (IQAC-CSIC)</i> Authors: Ricardo Molina, Carmen López-Santos, Petar Jovancic, Ana Gómez-Ramírez, Alberto Vílchez
10:30–11:00 am	Coffee break
11:00–11:30 am Abstract #31.	Investigation of Hydroponic Culture using Plasma Bubbling Toshihiro Takamatsu, tplasma@med.kobe-u.ac.jp <i>Kobe University</i> Authors: Toshihiro Takamatsu, Hiroaki Kawano, Hidekazu Miyahara, Takeshi Azuma, Akitoshi Okino
11:30–12:00 noon Abstract #32.	Effect of gliding arc plasma on plant nutrient content and enzyme activity Mohamed El Shaer , melshaer@link.net <i>Zagazig University, Zagazig, Egypt</i> Authors: Mohamed El Shaer, Mona Mobasher, Amira AbdelGhani
12:00–12:30 pm Abstract #33.	Plant growth enhancement of Komatsuna (<i>Brassica rapa var. perviridis</i>) by ozonated water supplied intermittently to the underground roots Satoru Iizuka, iizuka@ecei.tohoku.ac.jp <i>Tohoku University, Japan</i> Authors: Satoru Iizuka, Hideyuki Saito
12:30–2:00 pm	Lunch
2:00–2:20 pm Abstract #34.	Atmospheric Pressure Double Dielectric Barrier Discharge Treatment of Water and Seeds for Stimulation of Germination and Plants Growth Ahmed Khacef, ahmed.khacef@univ-orleans.fr <i>University of Orleans, France</i> Authors: Ahmed Khacef, Sivachandiran Loganathan
2:20–2:40 pm Abstract #35.	Agricultural applications of atmospheric-pressure plasma using pulsed power technology Koichi Takaki, takaki@iwate-u.ac.jp <i>Iwate University</i>
2:40–3:00 pm Abstract #36.	Plasma-induced germination of Arabidopsis thaliana using 3 low temperature plasma devices Mohammed Yousfi, yousfi@laplace.univ-tlse.fr <i>Université de Toulouse, France</i> Authors: A.M. Jemmat, C. Dunand, M. Yousfi, J.P. Sarrette, G. Wattieaux, N. Merbahi, O. Eichwald
3:00–3:20 pm	Coffee break
3:20–3:40 pm Abstract #37.	Performance two different DBD plasma atmospheres in inactivating fungi Aspergillus Clodomiro Alves Junior, clodomiro.jr@hotmail.com <i>Federal Rural University of Semiárid - Mossoró - RN - Brazil</i> Authors: Francisco Esio Porto, Jussier de Oliveira Vitoriano, Salvador Barros Torres, Selma Rogéria de Carvalho Nascimento, Clodomiro Alves Junior
3:40–4:00 pm Abstract #38.	Effect of cold plasma on the enzymatic activity in germinating mung beans (<i>Vigna radiate</i>) Rohit Thirumdas, ft12rr.thirumdas@pg.ictmumbai.edu.in <i>Institute of Chemical Technology, Mumbai, India</i> Authors: Rohit Thirumdas, Subham Sadhu
4:00–4:20 pm Abstract #39.	Inactivation mechanism of <i>P. digitatum</i> spores using an atmospheric pressure oxygen radical source Hiroshi Hashizume, hashizume@plasma.engg.nagoya-u.ac.jp <i>Nagoya University</i> Authors: Masaru Hori, Hiroshi Hashizume, Takayuki Ohta, Keigo Takeda, Kenji Ishikawa, Masafumi Ito

4:20–4:40 pm Abstract #40.	Compact electrodeless HID source for plant growth Douglas A Doughty, doug@syn2.net <i>D2D Scientific</i>
4:40–5:00 pm Abstract #41.	Effect of Surface Roughness on Microbial Inactivation Using Cold Atmospheric Pressure Plasma (CAPP) and Plasma Activated Water (PAW) Mukund Karwe, karwe@aesop.rutgers.edu <i>Rutgers University, New Jersey, USA</i> Authors: Isha G. Joshi, Siddharth Bhide, Donald W. Schaffner, Deepti A. Salvi, Mukund Karwe
7:00–11:00 pm	Banquet

Friday, May 20th, 2016

9:00–9:20 am Abstract #42.	Plasma Decontamination of Sprout Seeds in an Atmospheric Pressure Dielectric Barrier Discharge Denis Butscher, butscher@ipe.mavt.ethz.ch Institute of Process Engineering, Zurich, Switzerland Authors: D. Butscher, P. Rudolf von Rohr, H. Van Loon, A. Waskow, M. Schuppler
9:20–9:40 am Abstract #43.	Improvement of functionality of water by plasma discharge Takehiko Sato, sato@ifs.tohoku.ac.jp <i>Tohoku University, Japan</i> Authors: Takehiko Sato, Takashi Miyahara, Masanobu Oizumi, Tatsuyuki Nakatani
9:40–10:00 am Abstract #44.	Spark Plasma Processing of Anaerobic Digestion Effluent for Improved Processing Condition Management Thomas Nunnally, tnunnally@advplasmamol.com <i>Advanced Plasma Solutions, Malvern, USA</i> Authors: JE Han, T Nunnally, J Frank
10:00–10:20 am Abstract #45.	Nitrogen Plasma-Enhanced Biomass Gasification Char for Advanced Nano-Fertilizer Applications Gary J. Hanus, GaryHanus@phoenixsolutionsco.com <i>Phoenix Solutions Co</i> Authors: Gary J. Hanus and John K. Williams
10:20–10:40 am	Coffee break
10:40–11:00 am Abstract #46.	Food Safety Challenges in the Food Industry - Perspective for 2016 Suzanne Tortorelli, suzanne_tortorelli@campbellsoup.com <i>Campbell Soup Company - Director Global Food Safety</i>
11:00–11:20 am Abstract #47.	Improving Organic Fertilizer and Nitrogen Use Efficiency via Air Plasma and Distributed Renewable Energy Rune Ingels, rune.ingels@n2applied.no <i>N2 Applied</i> Authors: Rune Ingels & David Graves
11:20–11:40 am Abstract #48.	Plasma Chemistries in the Aqueous Solutions Haifeng (Frank) Ji, hj56@drexel.edu <i>Chemistry Department, Drexel University, Philadelphia, USA</i> Authors: Yingying Li, Arben Kojtari, Utku K Ercan, Josh Smith, Gary Friedman, Alex Fridman, Richard B Sensenig, Somedev Tyagi, Suresh G. Joshi, Hai-Feng Ji, and Ari D Brooks
11:40–12:00 noon Abstract #49.	Delivery of Non-Thermal Plasma Activated Mist and its Applications Charles C. Bailey III, shicktopher@gmail.com <i>Drexel University</i>
12:00–12:20 pm Abstract #50.	Transitional Plasma Interaction with Water Solutions for Pathogen Control, Plant Growth Enhancement, and Reduction of Irrigation Water Consumption Pietro Ranieri, pranieri3@gmail.com <i>AJ Drexel Plasma Institute, Philadelphia, USA</i> Authors: P Ranieri, G Fridman, V Miller, A Lin, D Dobrynin, A Rabinovich, A Fridman

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