

2019 IEEE Wireless Power Transfer Conference (WPTC 2019)

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PROGRAM: WIRELESS POWER WEEK 2019

Tuesday 18 June

Registration and Opening

- 08:00 Registration & Coffee
- 08:25 Welcome Talk
Paul Mitcheson, Hubregt Visser

Plenary Talk I

Kelvin Lecture Theatre
Chairs: Bart Smolders, Grant Covic

- 08:55 [Wireless Charging: Driving EV Adoption and the Autonomous Future](#) N/A
Alex Gruzen
WiTricity, United States of America

- 09:40 [Transit](#)

WPTC Session I – Systems for Power and Data Transfer

Kelvin Lecture Theatre
Chairs: Bruno Clerckx, Luca Roselli

- 09:45 [Experimental Analysis of Harvested Energy and Throughput Trade-Off in a Realistic SWIPT System](#) I
Junghoon Kim¹, Bruno Clerckx¹, Paul D. Mitcheson¹
¹Imperial College London, United Kingdom
- 10:00 [Experimental Characterization of Narrowband Power Optimized Waveforms](#) 6
Takashi Ikeuchi¹, Yoshihiro Kawahara¹, Joshua R. Smith²
¹University of Tokyo, Japan, ²University of Washington, United States of America
- 10:15 [Power Allocation Method Using Pilot Signal for Simultaneous Transmission of Power and Information](#) 12
Nam-I Kim¹, Dae geun Yang¹, Ju Yong Lee¹, Dong-Ho Cho¹
¹KAIST, South Korea
- 10:30 [A New Wireless Power and Data Transmission Circuit for Cochlear Implants](#) 16
Iman Abdali Mashhadi¹, Behzad Poorali¹, Majid Pahlevani¹
¹University of Calgary, Canada
- 10:45 [Receiving ASK-OFDM in Low Power SWIPT Nodes without Local Oscillators](#) 20
Steven Claessens¹, Ya Ting Chang¹, Dominique Schreurs¹, Sofie Pollin¹
¹University of Leuven, Belgium
- 11:00 [A Wideband Efficient Rectifier Design for SWIPT](#) 26
Ya Ting Chang¹, Steven Claessens¹, Sofie Pollin¹, Dominique Schreurs¹
¹University of Leuven, Belgium

WoW Session I – Magnetic Designs

Turing Lecture Theatre

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Chairs: Jürgen Meins, Christopher Kwan

- 09:45 [Optimising Ferrite-Less Pad Reflection Winding with a Multi-Objective Genetic Algorithm](#) N/A
Matthew G.S. Pearce¹, Michael J. O'Sullivan¹, Claudio Carretero², Grant A. Covic¹, John T. Boys¹
¹University of Auckland, New Zealand, ²University of Zaragoza, Spain
- 10:00 [Evaluation of Soft Magnetic Composites for Inductive Wireless Power Transfer](#) N/A
Daniel Barth¹, Giuseppe Cortese², Thomas Leibfried¹
¹Karlsruhe Institute of Technology, Germany, ²Daimler AG, Germany
- 10:15 [Avoiding Null Power Point in DD coils](#) N/A
Manuele Bertoluzzo¹, Giuseppe Buja¹, Hemant Dashora¹
¹University of Padova, Italy
- 10:30 [A Dead-Angle-Free Omnidirectional Wireless Power Transfer](#) N/A
Bowen Zhang¹, Zhen Zhang¹, Hongliang Pang¹, Cong Xie¹, Xingyu Li¹, Lin Yang¹
¹Tianjin University, China
- 10:45 [Misalignment Influence on Resonance Shielding in Wireless Power Transfer for Electric Vehicles](#) N/A
Myrel Alsayegh¹, Markus Clemens¹, Benedikt Schmuelling¹
¹University of Wuppertal, Germany
- 11:00 [Reduction of the Shielding Effect on the Coupling Factor of an EV WPT System](#) N/A
Karim Kadem¹, Yann Le Bihan¹, Mohamed Bensetti¹, Éric Laboure¹, Antoine Diet¹, Mustapha Debbou²
¹Sorbonne Université, France, ²Vedecom, France

Coffee Break

11:15 Coffee Break

Plenary Talk 2 N/A

Kelvin Lecture Theatre

Chairs: Alessandra Costanzo, David Yates

11:40 [Market & Future of Global Wireless Power Transfer Industry](#) N/A

Alexander Gerfer

Würth Elektronik, Germany

Lunch

12:25 Lunch

Joint Invited Talk I N/A

Kelvin Lecture Theatre

Chairs: Ron Hui, Nuno Carvalho

13:45 [Moving to a World without Wires](#) N/A

Paul Wiener

GaN Systems, United States of America

14:10 [Transit](#)

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WPTC Session 2 – Novel Rectifier Solutions

Kelvin Lecture Theatre

Chairs: Nuno Carvalho, Pedram Mousawi

- 14:15 [Input Impedance Calculation of a Multi-Stage Rectifier Circuit](#) 30
Hubregt Visser¹, Hans Pflug², Shady Keyrouz³
¹imec, Netherlands, ²GTX Medical, Netherlands, ³Antenna Company, Netherlands
- 14:30 [GaN Schottky Barrier Diode for Sub-Terahertz Rectenna](#) 36
Sei Mizojiri¹, Kengo Takagi¹, Kohei Shimamura¹, Shigeru Yokota¹, Masafunari Fukunari², Yoshinori Tatematsu², Teruo Saito²
¹University of Tsukuba, Japan, ²University of Fukui, Japan
- 14:45 [Design of High Voltage Output for CMOS Voltage Rectifier for Energy Harvesting Design](#) 40
Jefferson A. Hora¹, Eryk Dutkiewicz¹, Xi Zhu¹
¹University of Technology Sydney, Australia
- 15:00 [Wide Dynamic Range Rectifier Circuit with Varactor Tuning Technique](#) 45
Ayako Suzuki¹, Koshi Hamano¹, Hayato Shimizu¹, Hiroshi Okazaki², Yasunori Suzuki², Kunihiro Kawai², Atushi Fukuda², Kenjiro Nishikawa¹
¹Kagoshima University, Japan, ²NTT Docomo, Inc., Japan
- 15:15 [2.4 GHz CMOS Design RF-to-DC Energy harvesting with Charge Control System for WSN Application](#) 49
Jefferson A. Hora¹, Eryk Dutkiewicz¹, Xi Zhu¹
¹University of Technology Sydney, Australia

WoW Session 2 – System Characterisation

Turing Lecture Theatre

Chairs: Ron Hui, Patrick Hu

- 14:15 [Optimal Excitation of Multi-transmitter Wireless Power Transfer System without Receiver Sensors](#) N/A
Prasad Jayathurathnage¹, Fu Liu¹
¹Aalto University, Finland
- 14:30 [Loss Shifted Design of Transcutaneous Energy Transfer Systems](#) N/A
Alexander Enssle¹, Lukas Elbracht¹, Nejila Parspour¹, Marco Zimmer¹, Joerg Heinrich¹
¹University of Stuttgart, Germany
- 14:45 [Measuring the Q-factor of IPT Magnetic Couplers](#) N/A
Gaurav R. Kalra¹, Matthew G. S. Pearce¹, Seho Kim¹, Duleepa J. Thrimawithana¹, Grant A. Covic¹
¹University of Auckland, New Zealand
- 15:00 [Impedance Measurement on Inductive Power Transfer Systems](#) N/A
Marius Hassler¹, Oguz Atasoy², Morris Kesler², Karl Twelker², Tobias Achatz³, Markus Jetz³, Josef Krammer¹
¹BMW Group, Germany, ²WiTricity Corporation, United States of America, ³Zollner Elektronik AG, Germany
- 15:15 [A Reflected Impedance Estimation Technique for Inductive Power Transfer](#) N/A
Lingxin Lan¹, Juan M. Arteaga¹, David C. Yates¹, Paul D. Mitcheson¹
¹Imperial College London, United Kingdom

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Poster Session I and Coffee Break

15:30 – 17:00 Poster Session I – WPTC

Chair: Diego Masotti

WPTC-PI- Near-Field Links

Maxwell Library

- WPP1 [Design of Coil Turn Ratios to Achieve Extensive Load Range and High Efficiency in Wireless Power Transfer System](#) N/A
Heng-Ming Hsu¹, Yu-Fu Liu¹, Jian-Kai Liao¹, Pang Yu Liu¹
¹National Chung Hsing University, Taiwan
- WPP2 [Using Metallic Coil to Optimize the Heating Efficiency for Tumor Hyperthermia](#) 55
Guoxiong Chen¹, Chenxi Wang¹, Yuhua Cheng¹, Gaofeng Wang¹
¹Hangzhou Dianzi University, China
- WPP3 [Virtual Impedance Control for Efficient Power Transfer in Electromagnetic Levitation Melting System](#) 59
Moria Elkayam¹, Yotam Frechter¹, Idan Sassonker¹, Alon Kuperman¹
¹Ben-Gurion University of the Negev, Israel
- WPP4 [High Q-factor Coil with Transistorized Negative Impedance Converter for Mobile Applications](#) 63
Tae-Hyung Kim¹, Gi-Ho Yun², Jong-Gwan Yook¹
¹Yonsei University, South Korea, ²Sungkyul University, South Korea
- WPP5 [Global Optimization Design of Inductively Coupled Power Transfer System Parameter](#) 67
Qiang Bo^{1,2}, Lifang Wang^{1,3}, Tao Chengxuan¹
¹Institute of Electrical Engineering Chinese Academy of Sciences, China, ²University of Chinese Academy of Sciences, China, ³Beijing Co-Innovation Center for Electric Vehicles, China
- WPP6 [Modeling of Magnetic Coupled Coil for Wireless Power Transfer in Conductive Medium](#) 72
Jongwook Kim¹, Haerim Kim¹, Dongwook Kim¹, Yujun Shin¹, Chanjun Park¹, Seungyoung Ahn¹
¹KAIST, South Korea
- WPP7 [A Design Procedure for CPT System with LCL Resonant Network](#) 76
Hongfei Xia¹, Huanhuan Wu¹, Yuhua Cheng¹, Gaofeng Wang¹
¹Hangzhou Dianzi University, China
- WPP8 [85-kHz band 450-W Inductive Power Transfer for Unmanned Aerial Vehicle Wireless Charging Port](#) 80
Shuichi Obayashi¹, Yasuhiro Kanekiyo¹, Kouju Nishizawa², Hiroaki Kusada²
¹Toshiba Corporation, Japan, ²Tepco Research Institute, Japan
- WPP9 [Design of Free-Positioning Wireless Power Transfer using A Half-Rectangular Prism Transmitting Coil](#) 85
Nam Ha-Van¹, Hoang Le-Huu¹, Chulhun Seo¹
¹Soongsil University, South Korea
- WPP10 [Wireless Power Transfer System Using Sub-Wavelength Toroidal Magnetic Metamaterials](#) 89
Yuqian Wang¹, Xu Chen¹, Yewen Zhang¹, Kai Fang¹, Yong Sun¹, Yunhui Li¹, Hong Chen¹
¹Tongji University, China

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Heqi Xu¹, Houji Li¹, Chunfang Wang¹
¹Qingdao University, China
- WPP12 [Study on Series Printed-Circuit-Board Coil Matrix for Misalignment-Insensitive Wireless Charging](#) 98
Jianchao Li¹, Liming Wang¹, Fanghui Yin¹
¹Tsinghua University, China
- WPP13 [An Efficiency Optimization Strategy in a Wireless Power Transfer Device Under Seawater](#) 102
Wei Gao¹, Jingjing Jiang², Jianxin Gao¹, Da Li¹
¹Naval University of Engineering, China, ²Central Hospital in Wuhan, China
- WPP14 [Optimal Coil Design for Wireless powering of Biomedical Implants Considering Safety Constraints](#) 106
Erik Andersen¹, Binh Duc Truong¹, Shad Roundy¹
¹University of Utah, United States of America
- WPP15 [Wireless Power Transfer System whose Input / Output Ratio is Determined Only by Self-Inductance](#) 111
Kenji Nara¹, Naofumi Madoiwa², Yasuyoshi Kaneko¹
¹Saitama University, Japan, ²Tokyo Institute of Technology, Japan
- WPP16 [Alternative Configuration of Open-Bifilar Coil for Self-Resonant Wireless Power Transfer System](#) 116
Caio M. de Miranda¹, Sérgio F. Pichorim¹
¹Federal University of Technology, Brazil
- WPP17 [AC Loss Behavior of Wireless Power Transfer Coils](#) 120
Christoph Utschick¹, Christian Merz¹, Cem Som¹
¹Würth Elektronik eiSos GmbH & Co. KG, Germany
- WPP18 [Investigation of Magnetic Field Shielding by Mesh Aluminum Sheet in Wireless Power Transfer System](#) 126
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¹Huazhong University of Science and Technology, China
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¹University of Stuttgart, Germany
- WPP20 [Current Distribution Analysis for Automatic Resonator Design in Wireless Power Transfer](#) 136
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¹University of Tokyo, Japan
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¹Tianjin Polytechnic University, China
- WPP22 [Research on Shield Structure of Inductively Coupled Power Transfer System](#) 146
Houji Li¹, Heqi Xu¹, Chunfang Wang¹
¹Qingdao University, China

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¹Universidad de la República, Uruguay
- WPP24 [Omni-directional Inductive Wireless Power Transfer with 3D MID inductors](#) 154
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¹Smart Plastic Products (S2P), France, ²Université de Lyon, France
- WPP25 [Maximising Inductive Power Transmission using a Novel Analytical Coil Design Approach](#) 158
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¹Robert Gordon University, United Kingdom
- WPP26 [Novel Calculation Model for Bunched Litz Wires](#) 162
Christian Roth¹, Dieter Gerling¹
¹Universitaet der Bundeswehr Muenchen, Germany
- WPP27 [Efficiency Improvement for Three-coil Cooperative Inductive Power Transfer Systems](#) 166
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¹Nara Institute of Science and Technology, Japan
- WPP28 [Multiple-Receiver Wireless Power Transfer System Using a Cubic Transmitter](#) 170
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¹Soongsil University, South Korea
- WPP29 [Capacitively Coupled Resonators for Misalignment-Tolerant Wireless Charging through Metallic Cases](#) 174
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¹University of Alberta, Canada
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¹University of Tokyo, Japan
- WPP31 [Parallel Resonant Inductive Wireless Power Transfer](#) 182
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¹GTX Medical BV, The Netherlands, ²Eindhoven University of Technology, The Netherlands, ³imec / Holst Centre, The Netherlands

WPTC-P2 -Materials

Siemens Board Room

- WPP32 [A Novel Dual Band Defected Ground Structure for Short Range Wireless Power Transfer Applications](#) 188
Shalin Verma¹, Dinesh Rano¹, Mohammad Hashmi^{1,2}
¹IIT Delhi, India, ²Nazarbajev University, Kazakhstan
- WPP33 [Wireless Power Transfer through Low-e Glass](#) 192
Shengming Shan¹, Vincent Hsiao¹, Ruey-Bing Hwang²
¹SWR Technology Inc., United States of America, ²National Chiao Tung University, Taiwan

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Guo Li¹, Lifang Lang¹, Jie Ren¹, Kai Fang¹, Yong Sun¹, Yewen Zhang¹, Yunhui Li¹, Hong Chen¹
¹Tongji University, China
- WPP35 [An Efficient Metamaterial Based Design of Wireless Power Transfer System](#) N/A
Pratim Dasmahapatra¹, Tarakeswar Shaw¹, Soumyadeep Kal¹, Debasis Mitra¹
¹Indian Institute of Engineering Science and Technology, India
- WPP36 [Qi Compliant Wireless Charger with PCB Integrated Magnetic Material](#) 203
Gerald Weis¹, Ivan Salkovic¹, Gerald Weidinger¹, Mario Schober¹, Johannes Stahr¹, Ronald Sekavcnik¹
¹AT & S Austria Technologie & Systemtechnik Aktiengesellschaft, Austria
- [WPTC-P3 -Data and Energy Transmission](#)
Siemens Board Room
- WPP37 [Multiple FSK Data and Power Transmission System using Magnetic Resonance Wireless Power Transfer](#) 208
Masaki Ishii¹, Kosuke Yamanaka¹, Masahiro Sasaki¹
¹Shibaura Institute of Technology, Japan
- WPP38 [A Novel Simultaneous Wireless Information and Power Transfer System](#) 212
Xin Liu¹, Xijun Yang¹, Dianguang Ma¹, Nan Jin², Xiaoyang Lai¹, Houjun Tang¹
¹Shanghai Jia Tong University, China, ²Zhengzhou University of Light Industry, China
- WPP39 [125 kHz Wireless Energy and 25 kbps Data Transfer for Wearable Device](#) 216
Diyang Gao¹, Rongpeng Zhai¹, Peter Baltus¹, Huib Visser¹, Hao Gao¹
¹Eindhoven University of Technology, The Netherlands
- WPP40 [Data Communication over a Novel Capacitive Resonant Wireless Power Transmission System](#) 220
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¹University of Alberta, Canada
- WPP41 [Impact of 5G Waveforms on Energy Harvesting Rectifier Performance](#) 224
Oludotun Olukoya¹, Boris Malcic², Djuradj Budimir¹, Djuradj Budimir³
¹Westminster University, United Kingdom, ²University of Banja Luka, Bosnia and Herzegovina, ³University of Belgrade, Serbia
- WPP42 [Mixed-Time Scale Based Adaptive Mode Switching for Dual Mode SWIPT](#) 228
Jong Jin Park¹, Jong Ho Moon¹, Kang-Yoon Lee¹, Dong In Kim¹
¹Sungkyunkwan University, Korea

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15:15 – 17:00 Poster Session I – WoW

Chair: Christopher Kwan

WoW-P1 - Optimisation/Economics

Maxwell Library

- WoP1 [Parameter Optimization of Modern Tram Wireless Power Transfer Power Supply System](#) N/A
Geng Yuyu¹, Wang Yi¹, Yang Zhongping¹, Lin Fei¹
¹Beijing Jiaotong University, China
- WoP2 [Inductive Power Transfer Charging Infrastructure for Electric Vehicles: A New Zealand Case Study](#) N/A
Mingyue (Selena) Sheng¹, Ajith Viswanath Sreenivasan¹, Grant A. Covic¹, Douglas Wilson¹, Basil Sharp¹
¹University of Auckland, New Zealand
- WoP3 [Data-Driven Design and Assessment of Dynamic Wireless Charging Systems](#) N/A
Diala Haddad¹, Theodora Konstantinou¹, Akhil Prasad¹, Zhanxiang Hua¹, Dionysios Aliprantis¹, Konstantina Gkritza¹, Steven Pekarek¹
¹Purdue University, United States of America

WoW-P2 - Magnetic Design

Maxwell Library

- WoP4 [Investigation of the Influence of Split Ferrite Tiles in an Inductive Charging System with FEM-Simulation](#) N/A
Timo Lämmle¹, Nejila Parspour², Christian Fuchs²
¹MAHLE International GmbH, Germany, ²University of Stuttgart, Germany
- WoP5 [Statistical Model of Foreign Object Detection for Wireless EV Charger](#) N/A
Kaiwen Gan¹, Huan Zhang¹, Chen Yao¹, Xiaoyang Lai¹, Nan Jin², Houjun Tang¹
¹Shanghai Jiao Tong University, China, ²Zhengzhou University of Light Industry, China

WoW-P3 – System Characterisation

Maxwell Library

- WoP6 [Analysis of Bifurcation in Series-Series and Series-Parallel Compensated Inductive Power Transfer](#) N/A
Michal Košík¹, Jiří Lettl¹
¹Czech Technical University in Prague, Czech Republic
- WoP7 [Quadrature Demodulator based Output Voltage and Load Estimation of a Resonant Inductive WPT Link](#) N/A
O. Trachtenberg¹, A. Shoihet¹, E. Beer¹, E. Fux², N. Tiktin², S. Kolesnik², A. Kuperman²
¹Nuclear Research Center of the Negev, Israel, ²Ben-Gurion University of the Negev, Israel
- WoP8 [Maximum Efficiency Control of a Wireless EV Charger with On-Line Parameter Calculation](#) N/A
Ali Zakerian¹, Sadegh Vaez-Zadeh¹, Amir Babaki¹
¹University of Tehran, Iran

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- WoP9 [Power Transfer Profile Boosting in DWC Systems by Two-Element Compensation Network](#) N/A
Manuele Bertoluzzo¹, Rupesh Jha², Giuseppe Buja¹
¹University of Padova, Italy, ²Zeal College of Engineering and Research, India
- WoP10 [Analysis of Electromagnetic Force on Metal Objects in Vertical Direction of Wireless Power Transfer](#) N/A
Xian Zhang¹, Xuejing Ni¹, Qingxin Yang¹, Bin Wei², Songcen Wang²
¹Tianjin Polytechnic University, China, ²China Electric Power Research Institute, China
- WoP11 [Wireless Power At-A-Distance Technology – A Strategy for Nurturing Ecosystem Development](#) N/A
Philip Swan¹
¹Ossia Inc, United States of America
- WoW-P4 – Industrial Design and Applications*
Siemens Boardroom
- WoP12 [MPPT Control for PV based Wireless Power Transfer System in Lunar Rover by Secondary Side Converter](#) N/A
Bingcheng Ji¹, Katsuhiro Hata¹, Takehiro Imura¹, Yoichi Hori¹, Shuhei Shimada², Osamu Kawasaki²
¹University of Tokyo, Japan, ²Japan Aerospace Exploration Agency, Japan
- WoP13 [Strategy for Design of Misalignment Tolerant Inductive Powering System for Medical Implants](#) N/A
Arseny Danilov¹, Eduard Mindubaev¹, Rafael Aubakirov¹, Konstantin Gurov¹, Oleg Surkov¹, Sergey Selishchev¹
¹IJC ZITC, Russia
- WoP14 [A Wide-Range IPT System for Body Worn Sensors](#) N/A
Stephen G. Burrow¹, Lindsay R. Clare¹
¹University of Bristol, United Kingdom
- WoP15 [Approaching the Power Limit of an Electrodynamic WPTS with Nearly Coupling-Independent Operation](#) N/A
Binh Duc Truong¹, Shad Roundy¹
¹University of Utah, United States of America
- WoP16 [Wireless Motor Drives with a Single Inverter in Primary Side of Power Transfer Systems](#) N/A
Amir Babaki¹, Sadegh Vaez-Zadeh¹, Mohammad Jahanpour-Dehkordi¹, Ali Zakerian¹
¹University of Tehran, Iran
- WoP17 [Design of a 30 kW-85 kHz Wireless Power Transfer System for Charging Electric Vehicles](#) N/A
Leyla Arioua¹, Hadi Alawieh¹, Salim Guerroudj¹
¹VEDECOM institute, France

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Wednesday 19 June

Registration

08:00 Registration & Coffee

WPTC Session 3 – Wearable and Biomedical Systems

Kelvin Lecture Theatre

Chairs: Alessandra Costanzo, Alexandru Takacs

- 08:25 [An Octave Bandwidth RF Harvesting Tee-Shirt](#) 232
José Antonio Estrada¹, Eric Kwiatkowski¹, Ana López-Yela², Mónica Borgoños-García², Daniel Segovia-Vargas², Taylor Barton, and Zoya Popović¹
¹University of Colorado, United States of America, ²Universidad Carlos III de Madrid, Spain
- 08:40 [A Wearable Passive Microwave Fluid Sensor Wirelessly Activated](#) 236
Francesca Benassi¹, Nicola Zincarelli¹, Diego Masotti¹, Alessandra Costanzo¹
¹University of Bologna, Italy
- 08:55 [Wireless Power Receiver with Wide Dynamic Range for Biomedical Implants](#) 241
Hankyu Lee¹, Seungchul Jung¹, Yeunhee Huh¹, Sang Joon Kim¹
¹Samsung Advanced Institute of Technology, South Korea
- 09:10 [Millimeter-Wave Textile Antenna for On-Body RF Energy Harvesting in Future 5G Networks](#) 245
Mahmoud Wagih¹, Alex S. Weddell¹, Steve Beeby¹
¹University of Southampton, United Kingdom
- 09:25 [Energy Harvesting of a NFC Flexible Patch for Medical Applications](#) 249
Madjda Bouklachi¹, Marc Biancheri-Astier¹, Antoine Diet¹, Yann Le Bihan¹
¹Sorbonne Université, France
- 09:40 [Feasibility Study of a Wireless Power Transfer System Applied to a Left Ventricular Assist Device](#) 253
T. Campi¹, S. Cruciani¹, F. Orlando¹, F. Maradei², M. Feliziani¹
¹University of L'Aquila, Italy

WoW Session 3 – Multicoil Design

Turing Lecture Theatre

Chairs: David Yates, Jackman Lin

- 08:25 [Investigation of a DD2Q Pad Structure for High Power Inductive Power Transfer](#) N/A
Benny J. Varghese¹, Abhilash Kamineni¹, Regan A. Zane¹
¹Utah State University, United States of America
- 08:40 [Analysis of Intermediate Resonant Couplers for High Displacement Inductive Power Transfer](#) N/A
Ahmad Bilal¹, Grant Covic¹, John Boys¹, Seho Kim¹
¹University of Auckland, New Zealand

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- 08:55 [Magnetic Design of a Q-Coil for a 10 kW DDQ System for Inductive Power Transfer](#) N/A
Denis Kraus¹, Hans-Georg Herzog¹
¹Technical University of Munich, Germany
- 09:10 [Reduced Switch Operation of the Tripolar for Interoperability in Inductive Power Transfer](#) N/A
Kaiquan Sun¹, Grant A. Covic¹, Duleepa Thrimawithana¹, Seho Kim¹
¹University of Auckland, New Zealand
- 09:25 [A Three-Phase Inductive Power Transfer Coil with SAE J2954 WPT3 Magnetic Interoperability](#) N/A
Thorsten Kurpat¹, Lutz Eckstein¹
¹RWTH Aachen University, Germany
- 09:40 [Power Transferability Analysis of I-SS-Buck Dynamic Wireless Charging System](#) N/A
Shuangcheng Song¹, Zhihao He¹, Chao Cui¹, Qianfan Zhang¹
¹Harbin Institute of Technology, China
- 09:55 [Transit](#)

Plenary Talk 3 N/A
Kelvin Lecture Theatre
Chairs: Grant Covic, Alessandra Costanzo

- 10:00 [Advances in Wireless Power Transfer Technology & Implanted Medical Devices](#) N/A
Mirko de Melis
Medtronic, United States of America

Coffee Break

- 10:45 Coffee Break

WPTC Session 4 – Microwave Power Converters
Kelvin Lecture Theatre
Chairs: Djuradj Budimir, Kenjiro Nishikawa

- 11:15 [Time Trajectory Rectifier Impedance Analysis](#) 257
Hans W. Pflug¹, Hubregt J. Visser²
¹GTX Medical BV, The Netherlands, ²imec / Holst Centre, The Netherlands
- 11:30 [Investigation of a GaN-Based Bidirectional Wireless Power Converter Using Resonant Inductive Coupling](#) 263
Haimeng Wu¹, Xiang Wang¹, Bowen Gu¹, Volker Pickert¹
¹Newcastle University, United Kingdom
- 11:45 [Comparisons of MOSFET and Relay Switches in Impedance Matching Networks for Wireless Power Transfer](#) 269
Cristina A. Alexandru¹, Dibin Zhu¹
¹University of Exeter, United Kingdom
- 12:00 [A Comparison of Tunnel Diode and Schottky Diode in Rectifier at 2.4 GHz for Low Input Power Region](#) 274
Veselin Manev¹, Huib Visser¹, Peter Baltus¹, Hao Gao¹
¹Eindhoven University of Technology, The Netherlands

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- 12:15 [High Sensitive 2.4 GHz Band Rectenna with Direct Matching Topology](#) 278
Shunya Tsuchimoto¹, Kenji Itoh¹, Keisuke Noguchi¹, Jiro Ida¹
¹Kanazawa Institute of Technology, Japan

WoW Session 4 – Auxiliary Systems and Emissions

Turing Lecture Theatre

Chairs: Ahn Seungyoung, Jae Lee

- 11:15 [Effect of Fields Generated Through Wireless Power Transfer on Implantable Biomedical Devices](#) N/A
Nunzio Pucci¹, Paul D. Mitcheson¹, Christopher H. Kwan¹, David C. Yates¹
¹Imperial College London, United Kingdom
- 11:30 [Conducted Emission in an 85 kHz, 50 kW WPT System with Opposite-Phase Transfer and Spread Spectrum](#)
Masatoshi Suzuki¹, Kenichirou Ogawa¹, Tetsu Shijo¹, Yasuhiro Kanekiyo¹, Kazuhiro Inoue¹, Koji Ogura¹, Shuichi Obayashi¹, Masaaki Ishida¹
¹Toshiba Corporation, Japan
- 11:45 [Omnidirectional Vehicle Sensing for Wireless Power Transfer Applications](#) N/A
Charles A. Robinson¹, Hao Lu¹, C. W. Van Neste¹
¹Tennessee Technological University, United States of America
- 12:00 [Wireless Charging in Electric Vehicles: EMI/EMC Risk Mitigation in Pacemakers by Active Coils](#) N/A
S. Cruciani¹, T. Campi¹, F. Maradei², M. Feliziani¹
¹University of L'Aquila, Italy, ²Sapienza University of Rome, Italy
- 12:15 [Eigenvector Lookup Position Detection Method for Wireless Power Transfer of Electric Vehicles](#) N/A
Shihui Xu¹, Huan Zhang¹, Chen Yao¹, Dianguang Ma¹, Nan Jin², Houjun Tang¹
¹Shanghai Jiao Tong University, China, ²Zhengzhou University of Light Industry, China

Lunch

- 12:30 Lunch

WPTC Session 5 – Unconventional WPT Links

Kelvin Lecture Theatre

Chairs: Naoki Shinohara, Ke Wu

- 13:45 **Invited Talk**
[Millimeter Wave Wireless Power Transmission-Technologies and Applications](#) 282
Hooman Kazemi
Raytheon, United States of America
- 14:10 [Harvesting for Scattering Modulated RF-Signals Receivable by Mobile Telephones](#) 287
Matthias Schütz¹
¹IDP Invent AG, Switzerland

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- 14:25 [Study on Antennas for Wireless Power Transfer to In-Line Inspection Robots](#) 292
Isami Sato¹, Naoki Shinohara¹
¹Kyoto University, Japan
- 14:40 [A New Circularly Polarized Antenna Suppressing Surface Wave for Microwave Power Transmission](#) 297
Seishiro Kojima¹, Naoki Shinohara¹
¹Kyoto University, Japan
- 14:55 [An RF-Powered IoT Node for Environment Sensoring](#) 301
John Nicot¹, Ludvine Fadel¹, Thierry Taris¹
¹University of Bordeaux, France
- 15:10 [Compact Dual-Band Rectenna on a New Paper Substrate Based on Air-Filled Technology](#) 307
E. Vandelle¹, G. Ardila¹, S. Hemour², K. Wu³, T.P. Vuong¹
¹Université Grenoble Alpes, France, ²Université de Bordeaux, France, ³Polytechnique Montréal, Canada

WoW Session 5 – Industrial Design and Applications

Turing Lecture Theatre

Chairs: Richard McMahon, Abhilash Kamineni

- 13:45 **Invited Talk**
[Solution for simplified wireless Inductive Power Transfer](#) N/A
Jürgen Meins
University of Braunschweig, Germany
- 14:10 [Thermal Characterisation of a Double-D Pad](#) N/A
Seho Kim¹, Maedeh Amirpour¹, Grant Covic¹, Simon Bickerton¹
¹University of Auckland, New Zealand
- 14:25 [Design and Construction of a 100 W Wireless Charger for an E-Scooter at 6.78 MHz](#) N/A
Christopher H. Kwan¹, Juan M. Arteaga¹, David C. Yates¹, Paul D. Mitcheson¹
¹Imperial College London, United Kingdom
- 14:40 [Contactless Energy Transfer for Inductive Electrically Excited Synchronous Machines](#) N/A
David Maier¹, Nejila Paspour¹, Jonas Kurz¹
¹University of Stuttgart, Germany
- 14:55 [Performance of Inductive Power Transfer-based Pavements of Electrified Roads](#) N/A
Ahmed Marghani¹, Douglas Wilson¹, Tam Larkin¹
¹University of Auckland, New Zealand
- 15:10 [Inductive Power Delivery with Acoustic Distribution to Wireless Sensors](#) N/A
David E. Boyle¹, Steven W. Wright¹, Michail E. Kiziroglou¹, Akshayaa Pandiyan¹, Eric M. Yeatman¹
¹Imperial College London, United Kingdom

Coffee Break

15:25 Coffee Break

15:50 – 17:00 Panel Session – The future of WBG devices in power processing and wireless power

Kelvin Lecture Theatre

Chaired by: Compound Semiconductor Applications Catapult

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Thursday 20 June

Registration

08:00 Registration & Coffee

WPTC Session 6 – Antenna and Systems for WPT

Kelvin Lecture Theatre

Chairs: Bart Smolders, Pedram Mousavi

- 08:25 [Energy Focusing Through Layout-Based Frequency-Diverse Arrays](#) 312
Diego Masotti¹, Mazen Shanawani¹, Alessandra Costanzo¹
¹University of Bologna, Italy
- 08:40 [Implementation of a High-Efficient and Simple CPW Rectenna at the 2.45 GHz ISM Radio Band](#) 316
Mohamed Mansour¹, Haruichi Kanaya¹
¹Kyushu University, Japan
- 08:55 [An Efficient RF Power Transfer Scheme using Location-based Phase-controlled Array Antenna](#) 325
Eui Bum Lee¹, Wonshil Kang¹, Hyunchul Ku¹
¹Konkuk University, South Korea
- 09:10 [Study on Multipath Retrodirective for Efficient and Safe Indoor Microwave Power Transmission](#) 329
Taichi Sasaki¹, Naoki Shinohara¹
¹Kyoto University, Japan
- 09:25 [Efficiency of Wireless Power transfer with a Multi-sine Source Optimized for the Propagation Channel](#) 334
Regis Rousseau¹, Guillaume Villemaud¹, Florin Hutu¹
¹University of Lyon, France
- 09:40 [Beaming Efficiency of 1-D Frequency-Scanned Based Radiative WPT System for Wireless Sensor Networks](#) 338
Miguel Poveda-García¹, José Luis Gómez-Tornero¹
¹Technical University of Cartagena, Spain, ²University of Aveiro, Portugal

WoW Session 6 – Dynamic IPT

Turing Lecture Theatre

Chairs: Regan Zane, Seho Kim

- 08:25 [Charging Infrastructure Design for In-motion WPT Based on Sensorless Vehicle Detection System](#) N/A
Katsuhiro Hata¹, Takehiro Imura¹, Hiroshi Fujimoto¹, Yoichi Hori¹, Daisuke Gunji²
¹University of Tokyo, Japan, ²NSK Ltd., Japan
- 08:40 [Push-pull driven Low-cost Coupler Array for Dynamic IPT systems](#) N/A
Vahid Zahiri Barsari¹, Duleepa J Thrimawithana¹, Grant A. Covic¹
¹University of Auckland, New Zealand

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- 08:88 [Sensorless Automatic Stop Control of Electric Vehicle in Semi-dynamic Wireless Charging System](#) N/A
Jirawat Sithinamsuwan¹, Kensuke Hanajiri¹, Katsuhiro Hata¹, Takehiro Imura¹, Hiroshi Fujimoto¹, Yoichi Hori¹
¹University of Tokyo, Japan
- 09:10 [Comparison of Single and Three phase Dynamic Charging Systems for Electric Vehicles](#) N/A
Van-Binh Vu¹, Mohamed Dahidah¹, Volker Pickert¹, Van-Tung Phan¹
¹Newcastle University, United Kingdom
- 09:25 [One-Sided Magnetic Field Halbach Pad for EV Wireless Charging](#) N/A
Mei Su^{1,2}, Tao Ling^{1,2}, Qi Zhu^{1,2}, and Pengcheng Wang^{1,2}
¹Central South University, China, ²Human Provincial Key Laboratory of Power Electronics Equipment and Grid, China
- 09:40 [A Concept of Multiphase Dynamic Charging System with Constant Output Power for Electric Vehicles](#) N/A
Van-Binh Vu¹, Mohamed Dahidah¹, Volker Pickert¹, Van-Tung Phan¹
¹Newcastle University, United Kingdom

Coffee Break

09:55 Coffee Break

WPTC Session 7 – Capacitive and Inductive WPT

Kelvin Lecture Theatre

Chairs: Pablo Pérez-Nicoli, Giuseppina Monti

- 10:25 [High Efficient Wireless Power Transfer System for AUV with Multiple Coils and Ferrite under Sea](#) 343
Ryosuke Hasaba¹, Katsuya Okamoto¹, Tatsuo Yagi¹, Souichi Kawata¹, Kazuhiro Eguchi¹, Yoshio Koyanagi¹
¹Panasonic Corporation, Japan
- 10:40 [Capacitive Resonant System to Charge Devices with Metallic Embodiments](#) 347
Susanna Vital de Campos de Freitas¹, Fabiano Cezar Domingos¹, Rashid Mirzavand¹, Pedram Mousavi¹
¹University of Alberta, Canada
- 10:55 [Optimizing the Power Output for a Capacitive Wireless Power Transfer System with N receivers](#) 351
Ben Minnaert¹, Franco Mastri², Alessandra Costanzo², Mauro Mongiardo³ and Nobby Stevens⁴
¹Odisee University College of Applied Sciences, Belgium, ²University of Bologna, Italy, ³University of Perugia, Italy, ⁴KU Leuven, Belgium
- 11:10 [Multifactorial Rig for Study of Inductive Powering Systems with Arbitrary Orientation of the Coils](#) 355
Arseny A. Danilov¹, Eduard A. Mindubaev¹, Konstantin O. Gurov¹
¹JSC ZITC, Russia

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- 11:25 [Determination of the Optimal Resonant Condition for Multi-receiver Wireless Power Transfer Systems](#) 361
Seung Beop Lee¹, Mingi Kim², In Gwun Jang²
¹Chonbuk National University, South Korea, ²KAIST, South Korea
- 11:40 [A Wireless Charging Coil in Printed Circuit Board with Partially Split Conductors for Low Resistance](#) 366
Yujun Shin¹, Jaehyoung Park¹, Haerim Kim¹, Bumjin Park¹, Jongwook Kim¹, Chanjun Park¹,
Seungyoung Ahn¹
¹KAIST, South Korea

WoW Session 7 – High Frequency WPT

Turing Lecture Theatre

Chairs: Burak Ozpineci, Juan Arteaga

- 10:25 [Quarter Wavelength Surface Structures for Improved Operation in Unipolar Capacitive Power Transfer](#) N/A
Donald Chaney¹, Charles A. Robinson¹, C. W. Van Neste¹
¹Tennessee Technological University, United States of America
- 10:40 [A Phase-controlled Stacked-transmitter Wireless Power Transfer System for Magnetic Field Beamforming](#) N/A
Ning Kang¹, Ming Liu², Chengbin Ma¹
¹Shanghai Jiao Tong University, China, ²Princeton University, United States of America
- 10:55 [High Power Density Stacked-Coils Based Power Receiver for MHz Wireless Power Transfer](#) N/A
Jibin Song¹, Ming Liu², Minfan Fu³, Chengbin Ma¹
¹Shanghai Jiao Tong University, China, ²Princeton University, United States of America, ³ShanghaiTech University, China
- 11:10 [Design of a Switchable Driving Coil for Magnetic Resonance Wireless Power Transfer](#) N/A
Yelzhas Zhaksylyk¹, Ulrik Hanke¹, Mehdi Azadmehr¹
¹University of South-Eastern Norway, Norway
- 11:25 [E-Field Analysis of a 3D Capacitive Power Transfer Configuration with Single Source Excitation](#) N/A
Qi Zhu^{1,2}, Lixiang Jackie Zou³, Mei Su^{1,2}, Aiguo Patrick Hu³
¹Central South University, China, ²Human Provincial Key laboratory of power Electronics Equipment and Grid, China, ³University of Auckland, New Zealand
- 11:40 [Compactly Assembled Transmitting and Receiving Modules with Shield for Capacitive Coupling Power Transfer System](#) N/A
Aam Muharam^{1,3}, Mitsuru Masuda², Reiji Hattori¹, Abdul Hapid³
¹Kyushu University, Japan, ²Furukawa Electric Co., Japan, ³Indonesian Institute of Sciences, Indonesia

Lunch

- 11:55 Lunch

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WPTC Session 8 – Novel Transmitter Architectures

Kelvin Lecture Theatre

Chairs: Bart Smolders, Simon Hemour

- 13:20 **Invited Talk**
[WPT: from \$\mu\text{W}/\text{cm}^2\$ harvesting to kW capacitive powering](#) N/A
Zoya Popovic
University of Colorado, United States of America
- 13:45 [2.45-GHz Wireless Power Transmitter with Dual-Polarization-Switching Cantenna for LED Accessories](#) 371
Kosuke Yoshida¹, Norifumi Kashiya¹, Miho Kanemoto¹, Shogo Umemoto¹, Hisashi Nishikawa¹, Ami Tanaka¹, Takakuni Douseki¹
¹Ritsumeikan University, Japan
- 14:00 [Thermal Performance of Class-FF Converter Used for Wireless Power Transfer in Retinal Implants](#) 375
Iman Abdali Mashhadi¹, Behzad Poorali¹, Majid Pahlevani¹
¹University of Calgary, Canada
- 14:15 [Development of an Automatic Bidirectional Wireless Charging System for Mobile Devices](#) 380
James Washak¹, Cristina Alexandru¹, Dabin Zhu¹
¹University of Exeter, United Kingdom
- 14:30 [Implementation of Constant Current Performance of 13.56MHz Wireless Power Transfer System](#) 385
Heng-Ming Hsu¹, Yan-Kai Huang¹, Tung-Lin Wu¹
¹National Chung Hsing University, Taiwan
- 14:45 [A Distributed, Phase-locked, Class-E, RF Generator with Automatic Zero-Voltage Switching](#) 390
Robert A. Moffatt¹, Trevor Howarth¹, Connor Gafner¹, Jeffrey J. Yen¹, Feng-Kai Chen¹, Josh Yu¹
¹Etherdyne Technologies Inc., United States of America

WoW Session 8 – Converter Design & Control

Turing Lecture Theatre

Chairs: Volker Pickert, Duleepa Thrimawithana

- 13:20 **Invited Talk**
[Progress Towards Extreme Fast Wireless Static and Dynamic Charging](#) N/A
Burak Ozpineci
Oak Ridge National Laboratory, United States of America
- 13:45 [500W 13.56MHz Class EF Push-pull Inverter for Advanced Dynamic Wireless Power Applications](#) N/A
Samer Aldhafer¹, Paul D. Mitcheson¹
¹Imperial College London, United Kingdom
- 14:00 [Design Method for Resonant Inductive Power Transfer Systems Using a Resistor Ladder Prototype](#) N/A
Aaron D. Scher¹, Bogdan Z. Savic¹, Kalena L. Ching¹, Irvin H. Nguyen¹, William Garibo¹, Mohamud Hussein¹
¹Oregon Institute of Technology, United States of America

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- 14:15 [Misalignment Tolerant Control of an Inductive Charger for Electric Vehicles with V2G Possibilities](#) N/A
Wiljan Vermeer¹, Soumya Bandyopadhyay¹, Pavol Bauer¹
¹Delft University of Technology, The Netherlands
- 14:30 [Design of the Primary Side LCC Compensation Network Based on ZVS for Wireless Power Transfer Systems](#) N/A
Yuwang Zhang^{1,2}, Yanjie Guo^{1,3}, Lifang Wang^{1,3}
¹Key Laboratory of Power Electronics and Electric Drives Institute of Electrical Engineering Chinese Academy of Sciences, China, ²University of Chinese Academy of Sciences, China, ³Beijing Co-Innovation Center for Electric Vehicles
- 14:45 [A Wireless Power Transfer System with a Primary-Side Process Variable for Maximum Efficiency Control](#) N/A
Aaron D. Scher¹
¹Oregon Institute of Technology, United States of America

Poster Session II and Coffee Break

15:00 – 17:00 Poster Session II – WPTC

Chair: Ben Minnaert

WPTC-P4– WPT Architectures

Maxwell Library

- WPP43 [Improving Conversion Loss Performance of Fully Passive Harmonic Transponder at Low Temperature](#) 395
Xiaoqiang Gu¹, Simon Hemour², Ke Wu¹
¹Polytechnique Montreal, Canada, ²University of Bordeaux, France
- WPP44 [DIY Electromagnetic Phantoms for Biomedical Wireless Power Transfer Experiments](#) 399
Tom van Nunen¹, Esmee Huismans¹, Rob Mestrom¹, Mark Bentum¹, Hubregt Visser¹
¹Eindhoven University of Technology, The Netherlands
- WPP45 [Voltage Multiplier Rectifier with Second Harmonic Resonance for Wireless Power Transfer System](#) 405
Juwan Kim¹, Wonshil Kang¹, Hyunchul Ku¹
¹Konkuk University, South Korea
- WPP46 [Demonstration of Sub-Terahertz Coplanar Rectenna using 265 GHz Gyrotron](#) 409
Sei Mizojiri¹, Kengo Takagi¹, Kohei Shimamura¹, Shigeru Yokota¹, Masafumi Fukunari², Yoshinori Tatematsu², Teruo Saito²
¹University of Tsukuba, Japan, ²University of Fukui, Japan
- WPP47 [The Logistics System by Rotary Wing Unmanned Aerial Vehicle with 28GHz Microwave Power Transmission](#) 413
Satoru Suganuma¹, Duc Hung Nguyen², Yuma Nishioka¹, Kohei Shimamura¹, Koichi Mori², Shigeru Yokota¹
¹University of Tsukuba, Japan, ²Nagoya University, Japan

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- WPP48 [Design of Rectifiers for High Power Wireless Power Transmission System](#) 417
Ce Wang¹, Bo Yang¹, Naoki Shinohara¹
¹Kyoto University, Japan
- WPP49 [A Rectenna Using Copper Foil on Glass to Reduce Cost of Space Solar Power](#) 421
Evan Shi¹, Erik Centeno¹, Rafael Figueroa¹, Cheng Qi¹, Gregory Durgin¹
¹Georgia Tech, United States of America
- WPP50 [Photonic-Assisted Field-Probing Receiver for kW Peak-Power Wideband Radiative Wireless Transmitter](#) 426
Young-Pyo Hong¹, Jung-Il Park¹, No-Weon Kang¹, Dong-Joon Lee¹
¹Korea Research Institute of Standards and Science, South Korea
- WPP51 [An RF-Powered Self-Locating Flexible Building Environment Sensor System](#) 430
David Schwartz¹, Shabnam Ladan¹, Vijay Karthik Venkatasubramanian¹, Joseph Lee¹, Ping Mei¹, Brent Krusor¹, Clinton Smith¹, Shakthi Gowri¹
¹Palo Alto Research Center, United States of America
- WPP52 [We've Got the Power: Overcoming the Distance Enlargement Fraud with Wireless Power Transfer](#) 434
Leo Botler¹, Konrad Diwold¹, Kay Römer¹
¹Graz University of technology, Austria
- WPP53 [An Improved Rectenna Design for Battery-free Wireless Sensors and Structural Health Monitoring](#) 440
A. Sidibe¹, A. Tacaks¹, A. Okba¹, G. Loubet¹
¹Université de Toulouse, France
- WPP54 [Chipless Backscatter for Vital e-Health Sensing](#) 446
Felisberto Pereira¹, Ricardo Correia¹, Nuno B. Carvalho¹
¹Universidade de Aveiro, Portugal
- WPP55 [Pacemaker Recharge Through Inductive Resonant Wireless Power Transfer](#) 450
Giuseppina Monti¹, Laura Corchia¹, Luciano Tarricone¹
¹University of Salento, Italy
- WPP56 [Implantable Rectenna System for Biomedical Wireless Applications](#) 454
Shuoliang Ding¹, Stavros Koulouridis², Lionel Pichon¹
¹Université Paris-Sud, France, ²University of Patras, Greece
- WPP57 [A Study on Dynamic Charging Using Off-Resonant Coil Array With Receiver-side Compensation](#) 458
Tatsuya Ohashi¹, Quang-Thang Duong¹, Minoru Okada¹
¹Nara Institute of Science and Technology, Japan
- WPP58 [A Reconfigurable Antenna for Enhancing the Magnetic Coupling in WPT](#) 462
Jaafar Al Sinayyid¹, Hakim Takhedmit¹, Patrick Poulichet¹, Marjorie Grzeskowiak², Antoine Diet³, Gaelle Lissorgues¹
¹Université Paris-Est, France, ²Deos Isae Supaero, France, ³Université Paris-Sud, France
- WPP59 [13.56 MHz Near Field Magnetic Coupling Efficiency Evaluation for IMDs Powering](#) 466
Antoine Diet¹, Marc Biancheri-Astier¹, Yann Le Bihan¹, Pablo Pérez-Nicoli², Madjda Bouklachi¹, Olivier Meyer¹, Fernando Silveiro², Lionel Pichon¹
¹Université Paris-Sud, France, ²Universidad de la República, Uruguay

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- WPP60 [Research on Wireless Power Transfer in Modular Spacecraft](#) 470
Longlong Zhang¹, Lei Wang¹, Haidi Yu¹, Yan Zong¹, Yucai Zhang¹, Xudong Ming¹, Zhenyu Zhang¹
¹Shandong Institute of Space Electronics Technology, China
- WPP61 [Charging Base Stations Deployment Algorithms for Wireless Rechargeable Sensor Networks](#) 475
Peng Wan¹, Baoyu Wu¹, Yuhua Cheng¹, Gaofeng Wang¹
¹Hangzhou Dianzi University, China
- WPP62 [Coupled Magnetic Field-Circuit Analysis of Inductive Power Transfer in High-Potential Transformers](#) 479
Alex Pokryvailo¹, Hiren Dave¹
¹Spellman High Voltage Electronics Corp., United States of America
- WPP63 [Charging Area Extensible Wireless power Transfer System with an Orthogonal Structure](#) 484
Chen Xu¹, Yuan Zhuang¹, Anqi Chen¹, Yi Huang¹, Jiafeng Zhou¹
¹University of Liverpool, United Kingdom
- WPP64 [Innovative Technique for HPA Characteristics Extraction and Accurate Predistorsion Function Modeling](#) 488
Blaise Mulliez¹, Emmanuel Moutaye¹, H       Tap¹
¹Universit   de Toulouse, France
- WPP65 [MSA with Stacked Metal Rings for Rectenna System using Narrow Beam](#) 493
Seiya Mizuno¹, Ryosuke Kashimura^{1, 2}, Tomohiro Seki¹, Yasunori Suzuki³, Hiroshi Okazaki³
¹Nihon University, Japan, ²Japan Radio Co., Ltd., Japan, ³NTT Docomo Inc., Japan
- WPP66 [Free-Positioning Magnetic Resonance Wireless Power Transfer System for Biomedical Devices](#) 497
Kyungmin Na¹, Jieun Kim¹, Young-Jin Park¹
¹Korea Electrotechnology Research Institute, South Korea
- WPP67 [Analysis of the Efficiency of Wireless Power Transfer to Multiple Receivers](#) N/A
Wanberton Gabriel de Souza¹, Luciano Coutinho Gomes¹, Darizon Alves de Andrade¹, Lucas Rocha Lobo Lannes¹, Josemar Alves dos Santos Jr.¹, Eust      o Fernandes J      r¹
¹University Federal of Uberl      dia, Brasil
- WPP68 [Geometric Quantities Characterizing Wireless Power Transfer Between a Resonator and Resonant Dipoles](#) 502
Robert A. Moffatt¹
¹Etherdyne Technologies, Inc., United States of America
- WPP69 [Rectenna for Bluetooth Low Energy Applications](#) 508
Boules A. Mouris¹, Wael Elshennawy², Panagiotis Petridis³, Yuan Ding³, Spyridon N. Daskalakis³
¹KHT Royal Institute of Technology, Sweden, ²Orange Business Services, Egypt, ³Heriot-Watt University, United Kingdom
- WPP70 [Temperature Induced Degradation of RF Energy Harvesters Efficiency: Experiments and Interpretation](#) 512
Massimo Merenda¹, Riccardo Carotenuto¹, Francesco G. Della Corte¹
¹Mediterranea University Reggio Calabria, Italy

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- WPP71 [Analysis of Transmission Distance and Transmission Efficiency of Wireless Power Transfer System](#) N/A
Rongge Yan¹, Zexun Wu¹, Xiaoting Guo¹, Shaoqing Cao¹
¹Hebei University of Technology
- WPP72 [Traveling-Wave Fed Two-Dimensional Phased-Array Antenna for Microwave-Power Transfer](#) 516
Naoki Hasegawa¹, Yuki Takagi¹, Yoshichika Ohta¹
¹Softbank Corp., Japan
- WPP73 [Energy Harvesting Cooperative Wireless Systems: Probabilistic Modeling and Statistical Analysis](#) 520
M. Aparna¹, Bitragunta Sainath¹
¹BITS Pilani, India
- WPP74 [A Study of Improve Efficiency of Broad-Angle Rectenna Using Hybrid Coupler](#) 526
Yuki Tanaka¹, Kazuki Kanai¹, Ryosuke Hasaba¹, Hiroshi Sato¹, Yoshio Koyanagi¹, Takuma Ikeda¹, Hiroyuki Tani¹, Shoichi Kajiwara¹ and Naoki Shinohara²
¹Panasonic Corporation, Japan, ²Kyoto University, Japan
- WPP75 [Influences of Magnetic Couplings in Transmitter Array of MIMO Wireless Power Transfer System](#) 531
Kyungtae Kim¹, Ji-Woong Choi¹
¹Daegu Gyeongbuk Institute of Science and Technology, South Korea
- WPP76 [Development of Wireless Power Supply Implantable Device Based on LED](#) N/A
Li Yamin¹, Tang Jun¹, Liu Kun¹
¹Chinese Academy of Sciences, China
- WPP77 [Visualization of Energy Flow in Wireless Power Transfer Systems](#) 536
Hanwei Wang¹, Cheng Zhang², Shu Yuan Ron Hui³
¹Tsinghua University, China, ²University of Manchester, United Kingdom, ³University of Hong Kong, China
- WPP78 [Proposal of Simplified Transfer Function Model for Dynamic Rectified DC Voltage in DWPT](#) 542
Kodai Takeda¹, Wataru Ohnishi¹, Takefumi Koseki¹
¹University of Tokyo, Japan
- WPP79 [Voltage Control and Current Distribution for Multiple-Coil Wireless Power Transfer System](#) 548
Weikun Cai¹, Houjun Tang¹, Dianguang Ma¹, Xin Liu¹
¹Shanghai Jiao Tong University, China
- WPP80 [A Self-Synchronous Rectifier for Application of W-level Input Power](#) 553
Ying Wang¹, Gao Wei¹, Fei You², Xumin Yu³, Yazhou Dong³, Xiaojun Li³
¹Northwestern Polytechnical University, China, ²University of Electronic Science and Technology of China, China, ³China Academy of Space Technology, China
- WPP81 [Experimental Evaluation of Coupling Coils for Underwater Wireless Power Transfer](#) 557
Cândido Duarte¹, Francisco Gonçalves¹, Miguel Silva¹, Vasco Correia¹, Luis M. Pessoa¹
¹INESC TEC and FEUP, Portugal

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- WPP82 [Hybrid Mode Wireless Power Transfer for Wireless Sensor Network](#) 561
Shi-Wei Dong¹, Xiaojun Li¹, Xumin Yu¹, Yazhou Dong¹, Hao Cui¹, Tao Cui¹, Ying Wang¹, Shuo Liu¹
¹China Academy of Space, China
- WPP83 [EMI Suppression of MEMS Honeycomb-Shaped Inductor on Oscillators for Wireless-Powered IC Design](#) 565
Hao-Jiun Wu¹, Po-Ming Wang¹, Tzuen-Hsi Huang¹, Sheng-Fan Yang²
¹National Cheng Kung University, Taiwan, ²Global Unichip Corp., Taiwan
- WPTC-P5– Rectifiers and Converters*
Siemens Board Room
- WPP84 [A Comparative Study of Conventional Rectifier Topologies for Low Power RF Energy Harvesting](#) 569
Jérôme Tissier¹, Mohsen Koohestani¹, Mohamed Latrach¹
¹ESEO-IETR, France
- WPP85 [Modified Log Periodic Spiral Antenna for Multi-Band RF Energy Harvesting Applications](#) 573
Kapil Gangwar¹, Jérôme Tissier²
¹Indian Institute of Technology, India, ²ESEO-IETR, France
- WPP86 [Theoretical Analysis of Single Shunt Rectifiers](#) 578
Takashi Hirakawa¹, Naoki Shinohara¹
¹Kyoto University, Japan
- WPP87 [Design of Buck Converter with Dead-time Control and Automatic Power-Down System for WSN Application](#) 582
Jefferson A. Hora¹, Aileen Chris Arellano², Eryk Dutkiewicz¹, Xi Zhu¹
¹University of Technology Sydney, Australia, ²MSU-Iligan Institute of Technology, Philippines
- WPP88 [A 19.6 dB Input Power Range 403 MHz Rectifier Based on Quality Factor in Matching Technique](#) 587
NgocDuc Au¹, Chulhun Seo¹
¹Soongsil University, South Korea
- WPP89 [Voltage-Double RF Rectifier using Inductive Matching Network](#) 591
Muh-Dey Wei¹, Renato Negra¹
¹RWTH Aachen University, Germany
- WPP90 [10W Class High Power C-Band Rectifier Using GaN HEMT](#) 595
Satoshi Yoshida¹, Kenjiro Nishikawa¹, Shigeo Kawasaki²
¹Kagoshima University, Japan, ²Japan Aerospace Exploration Agency (JAXA), Japan
- WPP91 [Automated Design Optimization for CMOS Rectifier Using Deep Neural Network \(DNN\)](#) 599
Heng Wah Ho¹, Wendy W.Y. Lau²
¹GLOBALFOUNDRIES Singapore Pte. Ltd., Singapore, ²Nanyang Technological University, Singapore
- WPP92 [2x2 Circularly Polarized Antenna Array with Equal Phases for RF Energy Harvesting in IoT System](#) 604
Osama M. Dardeer¹, Hala A. Elsadek², Esmat A. Abdallah², Hadia M. Elhennawy¹
¹Ain Shams University, Egypt, ²Electronics Research Institute, Egypt

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- WPP93 [1 MHz band rectenna with several rectifier devices in nW operation](#) 608
Nobuhiko Yasumaru¹, Kanto Nakanishi¹, Kenji Itoh¹, Shunya Tsuchimoto¹, Takuya Yamada¹,
Takayuki Mori¹, Jiro Ida¹
¹Kanazawa Institute of Technology, Japan

15:05 – 17:00 Poster Session II – WoW

Chair: Sam Aldhafer

WoW-P5 – Dynamic IPT

Maxwell Libaray

- WoPI8 [Coupling Coefficient Estimation for Wireless Power Transfer System at Constant Input Power Operation](#) N/A
Haruko Nawada¹, Yoshiaki Takahashi¹, Katsuhiro Hata¹, Takehiro Imura¹, Hiroshi Fujimoto¹,
Yoichi Hori¹, Takuya Yabumoto²
¹University of Tokyo, Japan, ²Mitsubishi Electric Corporation, Japan
- WoPI9 [A Dynamic Wireless Charging System with a Robust Output Voltage Respect To Misalignment](#) N/A
Ali Ramezani¹, Mehdi Narimani¹
¹McMaster University, Canada
- WoP20 [A Dynamic Model for Contactless Energy Transfer Systems](#) N/A
Jannis Noeren¹, Nejila Parspour¹
¹University of Stuttgart, Germany
- WoP21 [Feasibility Study on In-motion Wireless Power Transfer System Before Traffic Lights Section](#) N/A
Dasiuke Gunji¹, Katsuhiro Hata², Osamu Shimizu², Takehiro Imura², Hiroshi Fujimoto²
¹NSK Ltd., Japan, ²University of Tokyo, Japan
- WoP22 [Dual-phase IPT Track Primary Evaluation Using Normalized Coupling Factor](#) N/A
Weitong Chen¹, Feiyang Lin¹, Grant Covic¹, John Boys¹
¹Auckland University, New Zealand
- WoP23 [An Alternate Arrangement of Active and Repeater Coils for Quasi-Constant Power Wireless EV Charging](#) N/A
Chunsheng Wang^{1,2}, Pengcheng Wang^{1,2}, Qi Zhu^{1,2}, Mei Su^{1,2}
¹Central South University, China, ²Human Provincial Key Laboratory of Power Electronics Equipment and Grid, China
- WoP24 [A Modular and Distributed Grid Interface for Transformer-less Power Supply to Road-side Coil Sections of Dynamic Inductive Charging Systems](#) N/A
Giuseppe Guidi¹, Salvatore D'Arco¹, Jon Are Suul^{1,2}
¹SINTEF Energy Research, Norway, ²Norwegian University of Science and Technology, Norway

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WoW-P6 – High Frequency WPT

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- WoP25 [Load Adaptation of Capacitive Power Transfer System with a Four-Plate Compact Capacitive Coupler](#) N/A
Xueying Wu¹, Yugang Su¹, Xinyu Hou¹, Xiaodong Qing¹, Wanting Zhu¹
¹Chongqing University, China
- WoP26 [Impacts of Coupling Plates on Single-Switch Capacitive-Coupled WPT Systems](#) N/A
Yashwanth Bezawada¹, Ruiyun Fu², Yucheng Zhang¹
¹Old Dominion University, United States of America, ²Mercer University, United States of America
- WoP27 [A 13.56 MHz Inductive Power Transfer System Operating with Corroded Coils](#) N/A
Epameinondas Skountzos¹, Juan M. Arteaga¹, Eftychios Hadjittofis¹, David C. Yates¹
Kyra L. Sedransk-Campbell¹, Paul D. Mitcheson¹
¹Imperial College London, United Kingdom
- WoP28 [A High-Performance Double-Sided LC Compensated CPT System with Load-Independent Constant Current Output](#) N/A
Jing Lian¹, Xiaohui Qu¹
¹Southeast University, China
- WoP29 [A High Power WPT System for Through the Wall Applications](#) 321
Tiefeng Shi¹, Paul Wiener¹
¹GaN Systems Inc., Canada

WoW-P7 – Converter Design & Control

Siemens Boardroom

- WoP30 [Triple Subdivision Cell-to-Cell Mapping Method for Global Analysis of WPT System](#) N/A
Chunsen Tang¹, Chunyan Yang¹, Yingjun Fei¹, Zhihui Wang¹, Zhiping Zuo¹, Zhenpeng Zhang²
¹Chongqing University, China, ²China Electronic Power Research Institute, China
- WoP31 [Full Duplex Communication Based on Partial Power Coil in Inductive Coupling Power Transfer System](#) N/A
Cheng Li¹, Zhi-Hui Wang¹, Yue Sun¹, Xin Dai¹
¹Chongqing University, China
- WoP32 [High-Power WPT Systems: Step-up Transformer vs. Partial-Series Tuning](#) N/A
Wenwei Victor Wang¹, Duleepa J. Thrimawithana¹
¹University of Auckland, New Zealand
- WoP33 [Efficiency Maximization in Wireless Power Transfer Systems for Resonance Frequency Mismatch](#) N/A
Helanka Weerasekara¹, Katsuhiko Hata¹, Takehiro Imura¹, Hiroshi Fujimoto¹, Yoichi Hori¹
¹University of Tokyo, Japan
- WoP34 [Advantages and Tuning of Zero Voltage Switching in a Wireless Power Transfer System](#) N/A
Francesca Grazian¹, Peter van Duijsen¹, Thiago B. Soeiro¹, Pavol Bauer¹
¹Delft University of Technology, The Netherlands

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- WoP35 [Surge Current Analysis of EV Wireless Charging System during Short-circuit Decoupling Process](#) N/A
Ke Shi¹, Chunsen Tang¹, Zhihui Wang¹, Zhiping Zuo¹
¹Chongqing University, China
- WoP36 [Multiple-Receiver Wireless Power Transfer with Efficient Power Control Strategy](#) N/A
Weikun Cai¹, Houjun Tang¹, Xiaoyang Lai¹, Longzhao Sun¹
¹Shanghai Jiao Tong University, China
- WoP37 [Inductive Power Transfer System with Automatic Control](#) N/A
Chenlei Liu¹, Xin Liu²
¹Shanghai Electric Power Research Institute, China, ²Shanghai Jiao Tong University, China
- WoP38 [Output Voltage Range of a Resonant Inductive WPT Link Operating in Load Independent Regime](#) N/A
Yotam Frechter¹, Yegal Darhovsky¹, Alon Kuerman¹
¹Ben-Gurion University of the Negev, Israel
- WoP39 [Dynamic Modeling and Analysis of Multi-Receiver Wireless Power Transfer System](#) N/A
Tian Tan¹, Kainan Chen¹, Ye Jiang¹, Zhengming Zhao¹, Liqiang Yuan¹
¹Tsinghua University, China
- WoP40 [Adaptive Capacitance Impedance Matching \(ACIM\) of WPT Systems by Voltage Controlled Capacitors](#) N/A
Stanislav Tishechkin¹, Shmuel (Sam) Ben-Yaakov¹
¹Ben-Gurion University, Israel
- WoP41 [A Wireless Power Transfer System Powering Multiple Gate Drivers in a Modular Multilevel Converter](#) N/A
Zhe Zhou¹, Weiguo Li^{1,2}, Chenweng Cheng³, Chao Wang², Zhanfeng Deng¹, Chris Mi³
¹Global Energy Interconnection Research Institute, China, ²State Grid Corporation of China, China, ³San Diego State University, United States of America

18:00 – 22:00 Banquet

“Tesla’s Secret London Laboratory”

PROGRAM: WIRELESS POWER WEEK 2019

Friday 21 June

Registration

08:00 Registration & Coffee

WPTC & WoW Joint Session I – High Power and Ultrasonic WPT

Kelvin Lecture Theatre

Chairs: Grant Covic, Mario Ferreira

- 08:25 [Development of a 10 kW Wireless Power Transfer System](#) N/A
Alex Ridge¹, Ku Ku Ahamad¹, Richard McMahon¹, John Miles²
¹University of Warwick, United Kingdom, ²University of Cambridge, United Kingdom
- 08:40 [Thin, Light & Flexible Magnetic Materials for 7.7 kW Wireless Power Transfer System](#) 612
Zohaib Hameed¹, Milo Oien-Rochat¹, Charles Bruzzone¹, Ian Cummings¹, Jeff Keeney¹, Michael Benson¹
¹3M Company, United States of America
- 08:55 [High Efficiency Wireless Power Transfer System using a Two-stack Hybrid Metamaterial Slab](#) 616
Seongsoo Lee¹, Yeonje Cho², Seungtaek Jeong¹, Seokwoo Hong¹, Boogyo Sim¹, Hongseok Kim³, Joungho Kim¹
¹Korea Advanced Institute of Science and Technology (KAIST), South Korea, ²Samsung, South Korea, ³Missouri University of Science and Technology(MST), United States of America
- 09:10 [Resistive Matching using an AC Boost Converter for Efficient Ultrasonic Wireless Power Transfer](#) 620
Marc Bisschop¹, Wouter A. Serdijn¹
¹Delft University of Technology, The Netherlands
- 09:25 [Mutual Inductance Modeling of In-wheel Arc-shaped Coil for In-motion WPT](#) 624
Osamu Shimizu¹, Takehiro Imura¹, Hiroshi Fujimoto¹, Daisuke Gunji², Keizo Akutagawa³, Giuseppe Guidi⁴
¹University of Tokyo, Japan, ²NSK Ltd., Japan, ³Bridgestone Corporation, Japan, ⁴Sintef Energy, Norway
- 09:40 [Transit](#)

Plenary Talk 4 N/A

Kelvin Lecture Theatre

Chairs: Udaya Madawala, Huib Visser

- 09:45 [Large-area Wireless Charging Enabled by Metamaterials](#) N/A
Irina Khromova
Metaboards, United Kingdom

Coffee Break

10:30 Coffee Break

PROGRAM: WIRELESS POWER WEEK 2019

WPTC & WoW Joint Session 2 – Moving WPT Systems

Kelvin Lecture Theatre

Chairs: David Yates, Djuradj Budimir

11:00 **Joint Invited Talk 2**

[Wireless power market set to evolve beyond mobile phones – Market overview](#) N/A

Dinesh Kithany

IHS Markit, United Kingdom

11:25 [ID-MV Position Detection Method for Wireless Power Transfer System of Electric Vehicle](#) 629

Huan Zhang¹, Shihui Xu¹, Chen Yao¹, Houjun Tang¹

¹Shanghai Jiao Tong University, China

11:40 [Separated Circular Capacitive Couplers for Rotational Misalignment of Drones](#) 635

Chanjun Park¹, Jaehyoung Park¹, Yujun Shin¹, Sungryul Huh¹, Jongwook Kim¹, Seungyoung Ahn¹

¹KAIST, South Korea

11:55 [Coil Design for High Coupling Performance for Two-phase Receiver of Dynamic Wireless Charging System](#) 639

Zhiyuan Wang¹, Jiantao Zhang¹, Tianhao Huang¹, Shumei Cui¹

¹Harbin Institute of Technology, China

12:10 – 12:45 [WPW 2020 Announcement and Closing Ceremony](#)

Kelvin Lecture Theatre