

**POWER MEMS 2017  
PRELIMINARY PROGRAM**

**ORAL**

**Wednesday, November 15**

**Opening Session  
8:30-8:45**

**Invited Talk 1** NOVEL MATERIALS AND PROCESSES TO DEVELOP VIABLE  
**8:45-9:30** THERMOELECTRICS  
Takao Mori  
National Institute for Materials Science (NIMS), Japan

**W1A Wearable Device  
10:00-11:20**

- W1A.1 DEVELOPMENT OF A BATTERYLESS VHF-BEACON AND TRACKER FOR MAMMALS  
Eiko Baumker, Florian Schüle, Peter Woias  
University of Freiburg - IMTEK, Germany  
(This paper will be presented in Wednesday Power MEMS in Action session)
- W1A.2 A DYNAMIC MODEL OF ARM-EQUIPPED ROTATIONAL ENERGY HARVESTER DURING HUMAN LOCOMOTION  
Yuki Tanaka, Tomoya Miyoshi, Yuji Suzuki  
University of Tokyo, Japan
- W1A.3 A RAPIDLY ASSEMBLED FERROELECTRET FOR HUMAN BODY ENERGY HARVESTING  
Junjie Shi, Sheng Yong, Steve Beeby  
University of Southampton, United Kingdom
- W1A.4 BATTERYLESS NEURAL INTERFACE USING TRIBOELECTRIC NANOGENERATORS (TENGS) TO ENABLE A SELF-SUSTAINABLE PLATFORM FOR NEUROMODULATION  
Sanghoon Lee, Hao Wang, Nitish V. Thakor, Shih-Cheng Yen, Chengkuo Lee  
National University of Singapore, Singapore

**W1B Tailored Thermoelectric Nanomaterials & Devices 1  
10:00-11:20**

- W1B.1 ORGANIC-INORGANIC THERMOELECTRIC MATERIAL FOR A PRINTED GENERATOR  
Kunihisa Kato, Kou Kuriyama, Tomohide Yabuki, Koji Miyazaki  
Kyushu Institute of Technology, Japan
- W1B.2 DEVELOPMENT AND OPTIMIZATION OF HIGH POWER DENSITY MICRO-THERMOELECTRIC GENERATORS  
Wenhua Zhang, Juekuan Yang, Dongyan Xu  
The Chinese University of Hong Kong, Hong Kong
- W1B.3 MULTI-SCALE PHONON ENGINEERING FOR NANO-STRUCTURED SI MEMBRANE THERMOELECTRIC MATERIAL  
Ryoto Yanagisawa, Naohito Tsujii, Oliver Paul, Takao Mori, Masahiro Nomura  
Institute of Industrial Science, The University of Tokyo, Japan

W1B.4            TRANSPARENT THIN FILM FOR ENERGY HARVESTING  
Mutsunori Uenuma, Jenichi Clairvaux Felizco, Daiki Senaha, Yukiharu Uraoka  
NAIST, Japan

### **W2A Battery & Photovoltaic**

**11:30-12:30**

W2A.1            PULSED DISCHARGE OF PRINTED SECONDARY ZN-MNO<sub>2</sub> BATTERIES FOR  
IOT AND WEARABLE DEVICES  
Bernard J. Kim, James W. Evans, Paul K. Wright  
University of California, Berkeley, United States

W2A.2            HIGH RECYCLABILITY AND POWER PERFORMANCE OF A THIN MICRO  
LITHIUM-ION BATTERY ANODE  
Xuanlin Kuang, Xiangjiang Feng, Xiaohong Wang  
Tsinghua University, China

W2A.3            PHOTOVOLTAIC MODULES ACTIVE SELF-CLEANING SURFACE USING  
ANISOTROPIC RATCHET CONVEYORS FABRICATED WITH PARYLENE-C STENCIL  
Di Sun, Karl F. Böhringer  
University of Washington, United States

### **W2B Tailored Thermoelectric Nanomaterials & Devices 2**

**11:30-12:30**

W2B.1            AMORPHOUS THIN FILM FOR THERMOELECTRIC APPLICATION  
Kenta Umeda, Jenichi Clairvaux Felizco, Daiki Senaha, Mutsunori Uenuma,  
Yukiharu Uraoka, Hideaki Adachi  
Nara Institute of Science and Technology, Japan

W2B.2            THERMOELECTRIC CHARACTERISTICS OF NANOCRYSTALLINE ZNO  
GROWN ON FABRICS FOR WEARABLE POWER GENERATOR  
Hiroya Ikeda, Faizan Khan, Pandiyarasan Veluswamy, Shota Sakamoto, Mani  
Navaneethan, Masaru Shimomura, Kenji Murakami, Yasuhiro Hayakawa  
Shizuoka University, Japan

W2B.3            A T-SHAPED, PLATE-TYPE THERMOELECTRIC POWER GENERATOR FOR  
REALIZING THE HIGHER POWER DENSITY AT A SMALL TEMPERATURE  
DIFFERENCE  
Hironori Tohmyoh, Toshinori Daimon, Naoto Ohgi  
Tohoku University, Japan

### **W3A Piezoelectric Materials & PiezoMEMS 1**

**16:25-17:45**

W3A.1            HIGH FIGURE OF MERIT (MGHF)XAL1-XN THIN FILMS FOR MINIATURALIZING  
VIBRATIONAL ENERGY HARVESTERS  
Hung H Nguyen, Minh V Le, Hiroyuki Oguchi, Hiroki Kuwano  
Tohoku University, Japan

W3A.2            MULTILAYER PIEZOELECTRIC MEMS ENERGY HARVESTER BASED ON  
LONGITUDINAL EFFECT  
Ryosuke Nakanishi, Kensuke Kanda, Takayauki Fujita, Isaku Kanno, Kazusuke  
Maenaka  
University of Hyogo, Japan

W3A.3            DIRECT PIEZOELECTRIC PROPERTIES OF BIFEO<sub>3</sub> EPITAXIAL FILMS  
GROWN BY COMBINATORIAL SPUTTERING.  
Takeshi Yoshimura, Kento Kariya, Naoki Okamoto, Masaaki Aramaki, Norifumi Fujimura  
Osaka Prefecture University, Japan

W3A.4            BIMORPH VIBRATION ENERGY HARVESTER WITH FLEXIBLE 3D MESH STRUCTURE  
Takuya Tsukamoto, Yohei Umino, Sachie Shiomi, Kou Yamada, Takaaki Suzuki  
Gunma University, Japan

**W3B Power Management Circuit**  
**16:25-17:45**

W3B.1            EFFECTIVE PIEZOELECTRIC ENERGY HARVESTING USING BEAM PLUCKING AND SSHI INTERFACE CIRCUIT  
Hailing Fu, Eric M. Yeatman  
Imperial College London, United Kingdom

W3B.2            SELF-POWERED SSHI FOR ELECTRET ENERGY HARVESTER  
Yiran Liu, Yuji Suzuki  
The University of Tokyo, Japan

W3B.3            N-SECE STRATEGY FOR ENHANCED ENERGY HARVESTING ON HIGHLY COUPLED PIEZOELECTRIC GENERATORS  
Adrien Morel, Adrien Badel, Yohan Wanderoild, Gaël Pillonnet  
CEA-LETI, France

W3B.4            CONTACTLESS 4-TERMINAL VARIABLE CAPACITANCE FOR CAPACITIVE ADIABATIC LOGIC  
Ayrat Galisultanov, Yann Perrin, Adrien Morel, Herve Fanet, Gael Pillonnet  
CEA, LETI, France

**Thursday, November 16**

**Invited Talk 2**        PIEZOELECTRIC ENERGY HARVESTING SYSTEMS  
**8:30-9:45**            Kenji Uchino  
The Penn State University, USA

**T1A Energy Harvesting System**  
**10:00-11:20**

T1A.1            EXTENDING THE RANGE OF WIRELESS POWER TRANSMISSION FOR BIO-IMPLANTS AND WEARABLES  
Nicolas Garraud, Daniel Alabi, John D Varela, David P Arnold, Alexandra Garraud  
University of Florida, United States  
(This paper will be presented in Thursday Power MEMS in Action session )

T1A.2            AN ULTRA-LOW-POWER WAKE-UP RECEIVER FOR ENERGY-AUTONOMOUS EMBEDDED SYSTEMS  
Peter Woias, Simon Heller, Uwe Pelz  
University of Freiburg - IMTEK, Germany

T1A.3            CONTINUOUS MACHINE HEALTH MONITORING ENABLED THROUGH SELF-POWERED EMBEDDED INTELLIGENCE AND COMMUNICATION  
Jane Cornett, Albert O'Grady, Aurelien Vouaillat, Julien Michaud, William Weatherholtz, Jiawen Bai, Marc Dunham, Baoxing Chen, Michelle Farrington, Tzeno Galchev  
Analog Devices Inc., United States  
(This paper will be presented in Thursday Power MEMS in Action session)

T1A.4            SPEED VS EFFICIENCY AND STORAGE TYPE IN PORTABLE ENERGY SYSTEMS  
Michail E. Kiziroglou, Martin Cowell, Balasaravanan T. Kumaravel, David E. Boyle, James W. Evans, Paul K. Wright, Eric M. Yeatman  
Imperial College London, United Kingdom

**T1B Triboelectric**  
**10:00-11:20**

- T1B.1 BENNET'S CHARGE DOUBLER BOOSTING TRIBOELECTRIC KINETIC ENERGY HARVESTERS  
Ali Ghaffarinejad, Yingxian Lu, Ronan Hinchet, Dimitry Galayko, Javad Yavand Hasani, Philippe Basset  
Iran University of Science and Technology, Iran
- T1B.2 ZINC OXIDE NANOWIRE-PARYLENE NANOCOMPOSITE BASED STRETCHABLE PIEZOELECTRIC NANOGENERATORS FOR SELF-POWERED WEARABLE ELECTRONICS  
Abhishek S. Dahiya, Francois Morini, Sarah Boubenia, Camille Justeau, Kiron P. Rajeev, Kevin Nadaud, Daniel Alquier, Guylaine Poulin-Vittrant  
GREMAN, University of Tours, France
- T1B.3 A SELF-POWERED TRIBOELECTRIC SENSOR FOR WIDE-RANGE PRESSURE DETECTION IN WEARABLE APPLICATION  
Mohammad S. Rasel, Hyun O. Cho, Jae W. Kim, Jae Y. Park  
Kwangwoon University, Republic of Korea
- T1B.4 SELF-POWERED TRIBOELECTRIC INERTIAL SENSOR BALL FOR IOT AND WEARABLE APPLICATIONS  
Qiongfeng Shi, Han Wu, Hao Wang, Tianyiyi He, Chengkuo Lee  
National University of Singapore, Singapore

**T2A Thermoelectric Device & System**  
**11:30-12:30**

- T2A.1 AUTONOMOUS POWER SUPPLY FOR AERONAUTICAL HEALTH MONITORING SENSORS  
Marise S. Baffleur, Vincent Boitier, Didier Bramban, Jean-Marie R. Dilhac, Xavier Dollat, Julien Feau, Sylvain Juge  
LAAS-CNRS, France
- T2A.2 FABRICATION OF COPPER/COPPER-NICKEL THIN-FILM THERMOELECTRIC GENERATORS WITH ENERGY STORAGE DEVICES  
Yuki Shimizu, Mizue Mizosiri, Masashi Mikami, Junpei Sakurai, Seiichi Hata  
Nagoya University, Japan
- T2A.3 ELECTROSTATIC UNSTEADY THERMAL ENERGY HARVESTING USING NEMATIC LIQUID CRYSTAL  
Hong Xie, Kenichi Morimoto, Yuji Suzuki  
University of Tokyo, Japan

**T2B Actuator**  
**11:30-12:30**

- T2B.1 LESS GIVES MORE: ON THE OPTIMAL FILLING FRACTION OF PIEZOELECTRIC ACOUSTIC POWER RECEIVERS  
Mikel Gorostiaga, Matthias C. Wapler, Ulrike Wallrabe  
University of Freiburg - IMTEK, Germany
- T2B.2 PULL-IN ACTUATION IN HYBRID MICRO-MACHINED CONTACTLESS SUSPENSION  
Kirill V. Poletkin, Rohi Shalati, Jan G. Korvink, Vlad Badilita  
Karlsruhe Institute of Technology, Germany

T2B.3 MICROFABRICATION , DYNAMIC CHARACTERIZATIONS AND SIMULATION OF SILICONE ELASTOMER BASED HYBRID MEMBRANES  
Alpha D. Diallo, Ravinder Chutani, Magali Barthes, Sylvie Begot, Souha Khadraoui, Michel De Labacherie, François Lanzetta  
Femto-st institute, University of Bourgogne Franche-comté, France

**Invited Talk 3**  
**14:00-14:45** AUTONOMOUS POWER SYSTEM USING SMALL SCALE VORTEX COMBUSTOR  
Daisuke Shimokuri  
Hiroshima University, Japan

**T3A Piezoelectric Materials & PiezoMEMS 2**  
**16:40-17:40**

T3A.1 HIGH FLEXIBLE PIEZOELECTRIC PZT THIN FILMS DEPOSITED ON STAINLESS STEEL MESH  
Takahito Nishi, Takashi Ito, Toshihito Umegaki, Isaku Kanno  
Kobe university, Japan

T3A.2 A HIGH PERFORMANCE PIEZOELECTRIC MICRO ENERGY HARVESTER BASED ON STAINLESS-STEEL SUBSTRATES  
Wei-Hao Tang, Ting-Kai Lin, Chao-Ting Chen, Yung-Hsing Fu, Wen-Jong Wu  
National Taiwan University, Taiwan

T3A.3 FABRICATION AND CHARACTERIZATION OF MICROMACHINED PIEZOELECTRIC ENERGY HARVESTERS EXPLOITING FLEXIBLE PB(NB,ZR,TI)O<sub>3</sub>/SUS  
T. Takahashi, L. Van Minh, K. Umeda, T. Fujii, H. Kuwano, H. Kuwano  
Tohoku University, Japan

**T3B Microscale Combustion**  
**16:40-17:40**

T3B.1 H-TALIF MEASUREMENT FOR WALL RADICAL QUENCHING MODELING IN MICROSCALE COMBUSTION  
Yong Fan, Yu Saiki, Sangeeth Sanal, Yuji Suzuki  
The University of Tokyo, Japan

T3B.2 TOWARDS A PORTABLE MESOSCALE THERMOPHOTOVOLTAIC GENERATOR  
Walker R. Chan, Veronika Stelmakh, Sunny Karnani, Christopher M. Waits, Marin Soljagic, John D. Joannopoulos, Ivan Celanovic  
Massachusetts Institute of Technology, United States

T3B.3 DEVELOPMENT OF POWERFUL MINIATURE SYSTEM WITH HEAT TRANSFER CONTROLLED VORTEX COMBUSTOR AND THERMO ELECTRIC DEVICE  
Daisuke Shimokuri, Yuuki Taomoto, Hiroyuki Satou, Naoki Yokoo  
Hiroshima university, Japan

**Friday, November 17**

**Invited Talk 4**  
**8:30-9:15** ELECTROSTATIC ENERGY HARVESTERS AND FUNDAMENTAL LIMITS TO POWER  
Einar Halvorsen  
University College of Southeast Norway, Norway

**F1A Electrostatic****9:25-10:45**

- F1A.1 MEMS ELECTRET ENERGY HARVESTER WITH EMBEDDED BISTABLE ELECTROSTATIC SPRING FOR BROADBAND RESPONSE  
Kazuya Murotani, Yuji Suzuki  
The University of Tokyo, Japan
- F1A.2 NONLINEAR ELECTROSTATIC ENERGY HARVESTER WITH TUNABLE SENSIBILITY IN GRAVITY FIELD  
Bogdan Vysotskyi, Denis Aubry, Philippe Gaucher, Xavier Le Roux, Fabien Parrain, Elie Lefeuvre  
University of Paris-Sud, France
- F1A.3 IMPROVEMENT OF EFFECTIVENESS AND OUTPUT OF ELECTRET ENERGY HARVESTER BY SYMMETRIC COMB-DRIVE STRUCTURES  
Hiroaki Honma, Hiroyuki Mitsuya, Gen Hashiguchi, Hiroyuki Fujita, Hiroshi Toshiyoshi  
The University of Tokyo, Japan
- F1A.4 CHARACTERIZATION OF FLUORINATED NEMATIC LIQUID CRYSTAL FOR HIGH-POWER ELECTROSTATIC ENERGY HARVESTER  
Kasidis Kittipaisalsilpa, Yuji Suzuki  
The University of Tokyo, Japan

**F1B Magnetic Device****9:25-10:45**

- F1B.1 BATCH-FABRICATION AND CHARACTERIZATION OF MINIATURIZED AXISYMMETRIC ELECTROPERMANENT MAGNETS  
Camilo Velez, Lars P. Tatum, Caitlyn P. Becker, David P. Arnold  
University of Florida, United States
- F1B.2 HIGH-TEMPERATURE COMPATIBLE, MONOLITHIC, 3D-PRINTED MAGNETIC ACTUATORS  
Anthony P. Taylor, Luis F. Velásquez-García  
Edwards Vacuum LLC, United States
- F1B.3 NOVEL CONCEPT OF A SERIES LINEAR ELECTROMAGNETIC ARRAY ARTIFICIAL MUSCLE  
Rohi Shalati, Kirill V. Poletkin, Jan G. Korvink, Vlad Badilita  
Karlsruhe Institute of Technology, Germany
- F1B.4 ENERGY AWARE 3D MICRO-MACHINED INDUCTIVE SUSPENSIONS WITH POLYMER MAGNETIC COMPOSITE CORE  
Kirill V. Poletkin, Zhiqiu Lu, Ali Moazenzadeh, Saravana G. Mariappan, Jan G. Korvink, Ulrike Wallrabe, Vlad Badilita  
Karlsruhe Institute of Technology, Germany

**F2A Piezoelectric****10:55-12:35**

- F2A.1 FEASIBILITY OF VIBRATION ENERGY HARVESTING POWERED WIRELESS TRACKING OF FALCONS IN FLIGHT  
Maisie M. Snowdon, James Horne, Buck Gyr, Graham Sparey-Taylor, Yu Jia  
University of Chester, United Kingdom
- F2A.2 EXPERIMENTAL VALIDATION OF WIDEBAND PIEZOELECTRIC ENERGY HARVESTING BASED ON FREQUENCY-TUNING SYNCHRONIZED CHARGE EXTRACTION

Alexis Brenes, Elie Lefevre, Chan-Sei Yoo  
Université Paris Sud, France

F2A.3 A HYBRID PIEZOELECTRIC AND ELECTROMAGNETIC ENERGY HARVESTER FOR SCAVENGING LOW FREQUENCY AMBIENT VIBRATIONS  
Muhammad T. Rahman, Jae W. Kim, Jae Y. Park  
Kwangwoon University, Republic of Korea

F2A.4 OPTIMIZING DIMENSIONS OF UNIPOLAR TEFLON-FEP PIEZOELECTRETS WITH MICRO-SYSTEM-TECHNOLOGY  
Florian Emmerich, Christiane Thielemann  
University of Applied Sciences Aschaffenburg, Germany

F2A.5 ON THE DESIGN GUIDELINES FOR MINIATURIZING THERMO-MAGNETICALLY ACTIVATED PIEZOELECTRIC ENERGY GENERATOR  
Adrian A. Rendon-Hernandez, Skandar Basrour  
Université Grenoble Alpes - Laboratoire TIMA, France

**F2B Fuel Cell & Thermal Device**  
**10:55-12:35**

F2B.1 PAPER-BASED WATER MANAGEMENT SYSTEM FOR MICROFABRICATED PACKAGELESS FUEL CELL  
Simon Hamel, Luc G. Frechette  
Université de Sherbrooke, Canada

F2B.2 HIGHLY INTEGRATED SOLAR MICRO-REACTOR FOR CHEAP HYDROGEN SYNTHESIS VIA STEAM METHANE REFORMING  
Jean-Francois Dufault, Ines Esmâ Achouri, Nicolas Abatzoglou, Nadi Braïdy, Luc G. Fréchet, Mathieu Picard  
Mr., Canada

F2B.3 A DYNAMIC METHOD FOR THE MEASUREMENT OF PYROELECTRIC PROPERTIES OF MATERIALS  
Rayhaneh Ghanemotlagh, Michael Kroener, habil. Andreas N. Danilewsky, Peter Woias  
University of Freiburg-IMTEK, Germany

F2B.4 IMPROVED OMNIDIRECTIONAL 2D PHOTONIC CRYSTAL SELECTIVE EMITTER FOR THERMOPHOTOVOLTAICS  
Reyu Sakakibara, Veronika Stelmakh, Walker R. Chan, Michael Ghebrebrhan, John D. Joannopoulos, Marin Soljačić, Ivan Čelanović  
Massachusetts Institute of Technology, United States

F2B.5 UREASE AS ANODIC CATALYST IN A MICROFLUIDIC FUEL CELL  
J. Galindo-de-la-Rosa, R. Balam-Vera, A. Álvarez, E. Ortiz-Ortega, N. Arjona, L.G. Arriaga, J. Ledesma-García  
Centro de investigación y Desarrollo Tecnológico en Electroquímica, Mexico

**Closing Session**  
**12:35-12:55**

# POSTERS

**Poster Session and Power MEMS in Action Demo 1 Wednesday, November 15, 14:40-16:25**

**Poster Session and Power MEMS in Action Demo 2 Thursday, November 16, 14:55-16:40**

**Posters id with "W" to be presented Wednesday, and "T" to be presented Thursday**

## **Power MEMS in Action**

Power MEMS in Action Short Presentation on Wednesday, November 15, 14:00-14:30.

- PMIA.T.1 DEVELOPMENT OF PORTABLE POWER UNIT WITH CATALYTIC MICROCOMBUSTOR  
Kanji Higuchi, Takafumi Nakano, Shuhei Takahashi  
Gifu University, Japan
- PMIA.W. 2 3 CHANNEL HIGH DYNAMIC CURRENT MEASUREMENT SYSTEM FOR LOW POWER SYSTEMS  
Simon Heller, Iman Nematollahi, Soeren Koebele, Peter Woias  
University of Freiburg - IMTEK, Germany
- PMIA.W.3 DEVELOPMENT OF PIEZOELECTRIC VIBRATION ENERGY HARVESTERS FOR BATTERY-LESS SMART SHOES  
Hidenori Katsumura, Toshihiro Konishi, Hidenori Okumura, Takafumi Fukui, Makoto Katsu, Tsutomu Terada, Toshihito Umegaki, Isaku Kanno  
Kobe University, Japan
- PMIA.W.4 HEATING AND COOLING THE HUMAN BODY WITH WIRELESSLY-POWERED DEVICES  
Payton J Payton J Goodrich, Gabe Fierro, Vy Liu, Hui Zhang, Edward Arens  
UC Berkeley, United States
- PMIA.T.5 DEVELOPMENT OF ROTATIONAL ELECTRET ENERGY HARVESTER USING PRINT CIRCUIT BOARD  
Mitsuru Adachi, Kuniko Suzuki, Yuji Suzuki  
University of Tokyo, Japan

## **Microfluidic / Fuel Cell / Combustion**

- PW.1 HIGH FLOW RATE OSMOTIC PUMPING EMPLOYING 3D PRINTED MACROPOROUS STRUCTURE  
Ling-Ying Liu, Yu-Chuan Su  
National Tsing Hua University, Taiwan
- PT.2 CHARACTERIZATION OF GLUCOSE BIOFUEL CELL BASED ON ELECTRODES MODIFIED BY CARBON NANO HORNS  
Takuma Ishida, Kenta Kuroishi, Toshinari doi, Yudai Fukushi, Yasuhiro Nishioka, Satomitu imai  
Nihon University, Japan
- PW.3 ALCOHOL DEHYDROGENASE AS BIOANODE FOR METHANOL AND ETHANOL OXIDATION IN A MICROFLUIDIC FUEL CELL  
J. Galindo-de-la-Rosa, D. Vite-González, J.A. Díaz-Real, N. Vázquez-Maya, A. Álvarez, L.G. Arriaga, J. Ledesma-García  
Centro de investigación y Desarrollo Tecnológico en Electroquímica, Mexico
- PT.4 MICRO METHANE-OXYGEN COUNTERFLOW DIFFUSION FLAMES: EFFECTS OF GRAVITY ON FLAME STRUCTURES  
Satoshi Kadowaki, Yusuke Hashimoto, Toshiyuki Katsumi, Thwe Thwe Aung , Tsuneyoshi Matsuoka, Yuji Nakamura  
Nagaoka University of Technology, Japan



PW.5 PREPARATION OF CONDUCTIVE CARBON PAPER BASED ON CARBON NANOFIBERS AND POLYPYRROLE FOR BIOFUEL CELL APPLICATION  
Ricardo A. Escalona-Villalpando, Luis G. Arriaga, Shelley D. Minter, Janet Ledesma-García  
Centro de investigación y Desarrollo Tecnológico en Electroquímica, Mexico

#### **Photovoltaic / Battery**

PT.6 FRICTION-INDUCED FABRICATION OF FLEXIBLE SUPERCAPACITIVE MICROELECTRODES  
Shulan Jiang, Feng Wang, Hongbo Wang, Linmao Qian  
Southwest Jiaotong University, China

PW.7 SOLAR CELL EFFICIENCY IMPROVEMENT BY PHOTON ABSORPTION ENHANCEMENT EMPLOYING RARE EARTH DOPED FILMS  
Rosendo Lopez-Delgado, Julio C. Melendres-Sanchez, Mario E. Alvarez-Ramos, Arturo Ayon  
University of Texas at San Antonio, United States

PT.8 ENERGY NEUTRAL SENSOR SYSTEM WITH MICRO-SCALE PHOTOVOLTAIC AND THERMOELECTRIC ENERGY HARVESTING  
Anand Savanth, Matthieu Bellanger, Alex Weddell, James Myers, Matthias Kauer  
University of Southampton, United Kingdom

#### **Circuit**

PW.9 AN AUTONOMOUS POWER MANAGEMENT SYSTEM WITH EVENT-DRIVEN ENERGY HARVESTER SWITCH  
Shunsuke Yamada, Hiroshi Toshiyoshi  
The University of Tokyo, Japan

PT.10 PERFORMANCE ENHANCEMENT BY AN IMPROVED COMPACT DESIGN FOR SELF-POWERED SYNCHRONOUS SWITCHING HARVESTING CIRCUITS  
Wei-qun Liu, Shuang Zhang, Adrien Badel, Fabien Formosa, Guangdi Hu  
Southwest Jiaotong University, China

PW.11 AUTOPARAMETRIC EXCITATION AND SELF-POWERED SSHI FOR POWER ENHANCEMENT IN PIEZOELECTRIC VIBRATION ENERGY HARVESTER  
Haruhiko Asanuma, Toshihiko Komatsuzaki, Yoshio Iwata  
Kanazawa University, Japan

PT.12 NUMERICAL INVESTIGATION OF MECHANICALLY AND ELECTRICALLY SWITCHING SSHI IN HIGHLY COUPLED PIEZOELECTRIC VIBRATION ENERGY HARVESTER  
Kazuhiro Sakamoto, Haruhiko Asanuma, Toshihiko Komatsuzaki, Yoshio Iwata  
Kanazawa University, Japan

PW.13 ADVANCED TOPOLOGY OF POWER ELECTRONIC INTERFACE FOR MEMS ENERGY HARVESTING WITH MULTIPLE TRANSDUCERS  
Binh D. Truong, Cuong P. Le, Einar Halvorsen, Shad J. Roundy  
University College of Southeast Norway, Norway

#### **Magnetic Generator**

PT.14 MAGNETOSTRICTIVE VIBRATION POWER GENERATOR FOR LOW COST AND HIGH PERFORMANCE  
Toshiyuki Ueno  
Kanazawa University, Japan

- PW.15 ENERGY HARVESTING DEVICES FOR CONDITION MONITORING APPLICATIONS OF PNEUMATIC COMBINED CLUTCH-BRAKES  
Daniel Hoffmann, Klevis Ylli, Alexander Willmann, Daniel Stojakov, Yiannos Manoli, Maria Tijero, Manuel Mondragon  
Hahn-Schickard, Germany
- PT.16 FLEXIBLE WIRELESS POWER TRANSFER SYSTEM BASED ON CLOSED-LOOP MAGNETOINDUCTIVE WAVEGUIDES: SOLUTION TO MISALIGNED AND ROTATIONAL SYSTEMS  
Fralett Suárez Sandoval, Saraí M. Torres Delgado, Ali Moazenzadeh, Ulrike Wallrabe  
IMTEK - University of Freiburg, Germany
- PW.17 ELECTROMEGNETIC ENERGY HARVESTER WITH EMBEDDED FERROFLUID IN PCB TECHNOLOGY  
Yi Chiu, Hao-Chiao Hong  
National Chiao Tung University, Taiwan
- PT.18 ENERGY HARVESTING FLEX-COIL SYSTEM FOR PNEUMATIC PISTONS  
Klevis Ylli, Jonas Esch, Alexander Willmann, Daniel Stoyakov, Daniel Hoffmann, Yiannos Manoli  
Hahn-Schickard-Gesellschaft für angewandte Forschung e.V., Germany
- PW.19 AN ELECTROMAGNETIC ENERGY HARVESTER CAPABLE OF FREQUENCY UP-CONVERSION AND AMPLITUDE AMPLIFICATION UNDER PULSE EXCITATION  
Dibin Zhu, Lawrence Evans  
University of Exeter, United Kingdom
- PT.20 ELECTROMAGNETIC ENERGY HARVESTER FOR ATMOSPHERIC SENSORS ON OVERHEAD POWER DISTRIBUTION LINES  
Zhiwei Wu, Richard White, Duy Son Nguyen, Paul Wright  
University of California, Berkeley, United States
- PW.21 A MEMS MAGNETIC-BASED VIBRATION ENERGY HARVESTER  
Abraham Shin, Ujwal Radhakrishna, Qian-A Zhang, Lei Guo, Patrick Riehl, Anantha Chandrakasan, Jeffrey Lang  
Massachusetts Institute of Technology, United States
- PT.22 A BROADBAND ENERGY HARVESTER USING LEAF SPRINGS AND STOPPERS WITH RESPONSE STABILIZATION CONTROL.  
Shingo Kato, Sou Ushiki, Arata Masuda  
Kyoto Institution of Technology, Japan
- PW.23 SOUND POWER GENERATION USING MAGNETOSTRICTIVE POWER GENERATOR  
Masaya Aoki, Toshiyuki Ueno  
Kanazawa university, Japan
- PT.24 DEVELOPMENT OF A MINIATURE WATER TURBINE POWERED BY HUMAN WEIGHT DURING WALKING  
Klevis Ylli, Daniel Hoffmann, Alexander Willmann, Yiannos Manoli  
Hahn-Schickard-Gesellschaft, Germany
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