



Preliminary Technical Program

The Executive Committee reserves the right to amend the program, if necessary.

Wednesday, December 5

08:00

Conference Welcome

David P. Arnold, *University of Florida, USA*
Luc Fréchette, *Université de Sherbrooke, CANADA*

08:20

Plenary Presentation I

WPA-01

OPTIMIZING THE ENERGY BALANCE TO ACHIEVE AUTONOMOUS SELF-POWERING FOR VIGILANT HEALTH AND IOT APPLICATIONS

Veena Misra¹, A. Bozkurt¹, B.H. Calhoun², S. Datta³, M. Dickey¹, M. Kiani⁴, J. Lach², B. Lee¹, J. Jur¹, O. Oralkan¹, M. Ozturk¹, R. Rajagopalan⁴, S. Roundy⁵, J. Strohmaier¹, S. Trolrier-McKinstry⁴, D. Vashae¹, D. Wentzloff⁶ and D. Werner⁴

¹North Carolina State University, USA, ²University of Virginia, USA, ³Notre Dame University, USA, ⁴Pennsylvania State University, USA, and ⁵University of Utah, USA, ⁶University of Michigan, USA

09:00

Focus Session I - Wearable Energy Harvesters

09:00 - 09:20

WFA-01

FLEXIBLE TEXTILE POWER MODULE

S. Yong, J. Shi, and S.P. Beeby
University of Southampton, UK

09:20 - 09:40

WFA-02

FABRICATION AND CHARACTERIZATION OF A WRIST-DRIVEN ROTATIONAL ENERGY HARVESTER USING MULTIPLE PLUCKED PIEZOELECTRIC UNIMORPHS

M.A. Halim¹, T. Xue¹, R. Rantz¹, Q. Zhang², L. Gu², K. Yang², and S. Roundy¹
¹University of Utah, USA and ²Analog Devices Inc., USA

09:40 - 10:00

WFA-03

A FULLY-ENCLOSED WRIST-WEARABLE HYBRID NANOGENERATOR FOR SELF-POWERED SENSORS

P. Maharjan and, J.Y. Park
Kwangwoon University, KOREA

10:00

Refreshment Break

SESSION W1A: FUEL CELLS AND REACTORS	SESSION W1B: TUNABLE, BROADBAND, AND NONLINEAR HARVESTERS
Crystal – Tomoka Room	Flagler Room
10:30 – 10:50	
<p style="text-align: center;">W1A-01</p> <p>TESTING OF A 3D-PRINTED SOLAR MICRO-REACTOR FOR HYDROGEN PRODUCTION VIA NATURAL GAS REFORMING</p> <p>P. Camus, J.-F. Dufault, D. Mehanovic, N. Braidy, L.G. Fréchette, and M. Picard <i>Université de Sherbrooke, CANADA</i></p>	<p style="text-align: center;">W1B-01</p> <p>MODELING AND DESIGN OF HIGHLY COUPLED PIEZOELECTRIC ENERGY HARVESTERS FOR BROADBAND APPLICATIONS</p> <p>D. Gibus^{1,2}, P. Gasnier¹, A. Morel^{1,2}, S. Boisseau¹, and A. Badel² <i>¹Université Grenoble Alpes, CEA-Leti, FRANCE and ²Université Savoie Mont Blanc, FRANCE</i></p>
10:50 – 11:10	
<p style="text-align: center;">W1A-02</p> <p>MICRO ALKALINE FUEL CELL SUPPORTED BY MEMS-BASED BACKBONE</p> <p>M. Pilaski¹, S.-H. Sun², G. Dura¹, J. Wartmann¹, F. Letzkus², and A. Heinzel¹ <i>¹Hydrogen and Fuel Cell Center, GERMANY and ²Institut für Mikroelektronik Stuttgart, GERMANY</i></p>	<p style="text-align: center;">W1B-02</p> <p>CO-OPTIMIZATION OF A PIEZOELECTRIC ENERGY HARVESTING SYSTEM FOR BROADBAND OPERATION</p> <p>S. Zhao¹, U. Radhakrishna², S. Hanly³, J. Ma⁴, J.H. Lang², and D. Buss⁵ <i>¹Tianjin University, CHINA, ²Massachusetts Institute of Technology, USA, ³Mide Technology, USA, ⁴Guangdong University of Technology, CHINA, and ⁵Texas Instruments, USA</i></p>
11:10 – 11:30	
<p style="text-align: center;">W1A-03</p> <p>THERMALLY SELF-SUSTAINING TUBULAR SOFC POWER GENERATOR WITH NO MOVING PARTS</p> <p>J. Wongwiwat¹, P. Bhuripanyo¹, T.S. Welles², V.P. DeBiase², J. Ahn², and P.D. Ronney¹ <i>¹University of Southern California, USA and ²Syracuse University, USA</i></p>	<p style="text-align: center;">W1B-03</p> <p>TOWARD SELF-POWERED NONLINEAR WIDEBAND VIBRATION ENERGY HARVESTING WITH HIGH-ENERGY RESPONSE STABILIZATION</p> <p>S. Ushiki and A. Masuda <i>Kyoto Institute of Technology, JAPAN</i></p>
11:30 – 11:50	
<p style="text-align: center;">W1A-04</p> <p>MINIATURE FUEL CELL WITH MONOLITHICALLY FABRICATED SI ELECTRODE -FIRST PROTOTYPE WITH AU-PD-PT MULTILAYER CATALYST</p> <p>T. Kurose¹, R. Shirai¹, N. Vasiljevic², and M. Hayase¹ <i>¹Tokyo University of Science, JAPAN and ²University of Bristol, UK</i></p>	<p style="text-align: center;">W1B-04</p> <p>SELF-TUNABLE VIBRATION ENERGY HARVESTER</p> <p>J. Esch¹, D. Hoffmann¹, D. Stojakov¹, and Y. Manoli² <i>¹Hahn-Schickard, GERMANY and ²University of Freiburg, GERMANY</i></p>

SESSION W2A: THERMOELECTRIC ENERGY HARVESTERS		SESSION W2B: POWER ELECTRONICS AND ENERGY MANAGEMENT CIRCUITS	
Crystal – Tomoka Room		Flagler Room	
13:30 – 13:50			
<p style="text-align: center;">W2A-01</p> <p>POWER ENHANCEMENT OF SILICON MEMBRANE-BASED THERMOELECTRIC ENERGY HARVESTER WITH TAILORED HOLEY NANOSTRUCTURES</p> <p>R. Yanagisawa¹ and M. Nomura^{1,2} ¹<i>University of Tokyo, JAPAN and</i> ²<i>Japan Science and Technology Agency (JST), JAPAN</i></p>		<p style="text-align: center;">W2B-01</p> <p>A SELF-SUSTAINED ENERGY STORAGE SYSTEM WITH AN ELECTROSTATIC AUTOMATIC SWITCH AND A BUCK CONVERTER FOR TRIBOELECTRIC NANOGENERATORS</p> <p>H. Zhang¹, D. Galayko², and P. Basset¹ ¹<i>Université Paris-Est, FRANCE and</i> ²<i>Sorbone Universités, FRANCE</i></p>	
13:50 – 14:10			
<p style="text-align: center;">W2A-02</p> <p>VERTICAL SELF-DEFINED THIN-FILM THERMOELECTRIC THERMOCOUPLES BY ANGLED CO-EVAPORATION FOR USE IN μTEGS</p> <p>Y. Yuan and K. Najafi <i>University of Michigan, USA</i></p>		<p style="text-align: center;">W2B-02</p> <p>DUAL-STAGE ELECTRODE DESIGN OF ROTATIONAL ELECTRET ENERGY HARVESTER FOR EFFICIENT SELF-POWERED SSHI</p> <p>Y. Liu¹, A. Badel², and Y. Suzuki¹ ¹<i>University of Tokyo, JAPAN and</i> ²<i>Université Savoie Mont Blanc, FRANCE</i></p>	
14:10 – 14:30			
<p style="text-align: center;">W2A-03</p> <p>DESIGN AND IMPLEMENTATION OF A SOIL PROFILE PROBE POWERED BY AIR AND SOIL TEMPERATURE DIFFERENCES</p> <p>N. Ikeda, R. Shigeta, J. Shiomi, and Y. Kawahara <i>University of Tokyo, JAPAN</i></p>		<p style="text-align: center;">W2B-03</p> <p>A SIMPLE PASSIVE 390 mV AC/DC RECTIFIER FOR ENERGY HARVESTING APPLICATIONS</p> <p>A. Santiago Rodriguez, N. Garraud, D. Alabi, A. Garraud, and D.P. Arnold <i>University of Florida, USA</i></p>	

SESSION W3A: ION SOURCES AND THERMOIONIC EMITTERS	SESSION W3B: MICROFABRICATED HARVESTERS
Crystal – Tomoka Room	Flagler Room
14:40 – 15:00	
<p style="text-align: center;">W3A-01</p> <p>COMPACT, 3D-PRINTED ELECTRON IMPACT ION SOURCE WITH MICROFABRICATED, NANOSHARP SI FIELD EMITTER ARRAY CATHODE C. Yang and L.F. Velásquez-García <i>Massachusetts Institute of Technology, USA</i></p>	<p style="text-align: center;">W3B-01</p> <p>PUSH-BUTTON KINETIC ENERGY HARVESTER WITH SOFT-X-RAY-CHARGED FOLDED MULTILAYER PIEZOELECTRET J. Lu and Y. Suzuki <i>University of Tokyo, JAPAN</i></p>
15:00 – 15:20	
<p style="text-align: center;">W3A-02</p> <p>GLOW-DISCHARGE ION SOURCE FOR ON-CHIP INTEGRATED MINIATURE MEMS MASS SPECTROMETER T. Grzebyk, P. Szyszka, A. Górecka-Drzazga, and J.A. Dziuban <i>Wrocław University of Science and Technology, POLAND</i></p>	<p style="text-align: center;">W3B-02</p> <p>A SILICON MEMS EM VIBRATION ENERGY HARVESTER Y. Yang, U. Radhakrishna, D. Ward, A.P. Chandrakasan, and J.H. Lang <i>Massachusetts Institute of Technology, USA</i></p>
15:20 – 15:40	
<p style="text-align: center;">W3A-03</p> <p>THERMIONIC ENERGY CONVERTER BASED ON MICRON-GAP NANOSTRUCTURED SPACERS: ACHIEVING RECORD-HIGH SHORT-CIRCUIT CURRENT S.M. Nicaise¹, C. Lin¹, M. Azadi¹, T. Bozorg-Grayeli², P. Adebayo-Ige¹, K. Van Houten³, F. Schmitt³, D.E. Lilley¹, Y. Pfitzer¹, W. Cha¹, N. Melosh², R.T. Howe², J.W. Schwede¹, and I. Bargatin¹ ¹<i>University of Pennsylvania, USA</i>, ²<i>Stanford University, USA</i>, and ³<i>Spark Thermionics, USA</i></p>	<p style="text-align: center;">W3B-03</p> <p>A POWER-DENSITY-ENHANCED MEMS ELECTROSTATIC ENERGY HARVESTER WITH SYMMETRIZED HIGH-ASPECT RATIO COMB ELECTRODES H. Honma¹, H. Mitsuya², G. Hashiguchi³, H. Fujita⁴, and H. Toshiyoshi¹ ¹<i>University of Tokyo, JAPAN</i>, ²<i>Saginomiya Seisakusho, Inc., JAPAN</i>, ³<i>Shizuoka University, JAPAN</i>, and ⁴<i>Tokyo City University, JAPAN</i></p>

15:40

Transition Break

15:50

Poster and PowerMEMS - in - Action Session A

17:50

End of Day

Thursday, December 6

08:00 **Conference Announcements**

08:15 **Exhibitor Table-Top Elevator Pitches**

08:20 **Plenary Presentation II**

TPA-01 **MULTIFERROIC MATERIALS, DEVICES AND SYSTEMS:
P(VDF-TrFE) BASED SPIRAL THERMO-MAGNETO-ELECTRIC
GENERATORS FOR HARVESTING LOW GRADE THERMAL ENERGY**
R.A. Kishore¹, D. Singh¹, P. Kumar¹, R. Sriramdas¹, M. Sanghadasa², and
Shashank Priya³
¹Virginia Polytechnic Institute and State University, USA, ²U.S. Aviation &
Missile Research Development and Engineering Center, USA, and
³Pennsylvania State University, USA

09:00 **Focus Session II - Multiferroic Devices and Systems**

09:00 - 09:20

TFA-01 **ELECTRIC-FIELD CONTROLLED MAGNETIC REORIENTATION IN
EXCHANGE COUPLED COFEB/NI BILAYER MICROSTRUCTURES**
Z. Xiao¹, R. Lo Conte², M. Goiriena^{2,3}, R.V. Chopdekar², X. Li¹, S. Tiwari¹,
C.-H. Lambert², S. Salahuddin², G.P. Carman¹, K. Wang¹, J. Bokor²,
and R.N. Candler^{1,4}
¹University of California, Los Angeles, USA, ²University of California,
Berkeley, USA, ³University of the Basque Country, SPAIN, and
⁴California Nano Systems Institute, USA

09:20 - 09:40

TFA-02 **BAR-SHAPED MAGNETOELECTRIC GYRATOR**
C.M. Leung, X. Zhuang, J. Li, and D. Viehland
Virginia Polytechnic Institute and State University, USA

09:40 - 10:00

TFA-03 **WIDE-BAND MULTIFERROIC QUARTZ MEMS ANTENNAE**
R.L. Kubena¹, X. Pang², K.G. Lee¹, Y.K. Yong², and W.S. Wall¹
¹HRL Laboratories, LLC., USA and ²Rutgers University, USA

10:00 **Refreshment Break**

SESSION T4A: BIOCHEMICAL AND BIO- INSPIRED POWER/ENERGY SYSTEMS		SESSION T4B: ELECTRET MATERIALS AND HARVESTERS	
Crystal – Tomoka Room		Flagler Room	
10:30 – 10:50			
<p style="text-align: center;">T4A-01</p> <p>SUPERCAPACITIVE MICRO-BIO-PHOTOVOLTAICS</p> <p>L. Liu, M. Mohammadifar, and S. Choi <i>State University of New York-Binghamton, USA</i></p>	<p style="text-align: center;">T4B-01</p> <p>DEVELOPMENT OF A HIGH-PERFORMANCE AMORPHOUS FLUORINATED POLYMER ELECTRET BASED ON QUANTUM CHEMICAL ANALYSIS</p> <p>S. Kim, K. Suzuki, and Y. Suzuki <i>University of Tokyo, JAPAN</i></p>		
10:50 – 11:10			
<p style="text-align: center;">T4A-02</p> <p>A COMPLETE TATTOO-BASED WIRELESS BIOFUEL CELL USING LACTATE DIRECTLY FROM SWEAT AS FUEL</p> <p>R.A. Escalona-Villalpando¹, E. Ortiz-Ortega¹, J.P. Bocanegra-Ugalde², S.D. Minter³, L.G. Arriaga¹, and J. Ledesma-García² <i>¹Centro de Investigación y Desarrollo Tecnológico, MEXICO, ²Universidad Autónoma de Queretaro, MEXICO, and ³University of Utah, USA</i></p>	<p style="text-align: center;">T4B-02</p> <p>DEMONSTRATION OF AN ELECTRET GENERATOR FOR ENERGY HARVESTING WITHOUT ANY CHARGING PROCESS: UTILIZATION OF SPONTANEOUS ORIENTATION OF POLAR MOLECULES</p> <p>Y. Tanaka^{1,2}, N. Matsuura¹, and H. Ishii¹ <i>¹Chiba University, JAPAN and ²Japan Science and Technology Agency (JST), JAPAN</i></p>		
11:10 – 11:30			
<p style="text-align: center;">T4A-03</p> <p>VIRUS-ASSEMBLED TECHNOLOGY FOR NEXT GENERATION BIOENERGY HARVESTING DEVICES</p> <p>S. Chu, A.D. Brown, J.N. Culver, and R. Ghodssi <i>University of Maryland, USA</i></p>	<p style="text-align: center;">T4B-03</p> <p>STOCHASTIC MODELING OF HUMAN ARM SWING TOWARD STANDARD TESTING FOR ROTATIONAL ENERGY HARVESTER</p> <p>Y. Tanaka, T. Miyoshi, and Y. Suzuki <i>University of Tokyo, JAPAN</i></p>		
11:30 – 11:50			
<p style="text-align: center;">T4A-04</p> <p>A NOVEL FLEXIBLE CONDUCTIVE SPONGE-LIKE ELECTRODE CAPABLE OF GENERATING ELECTRICAL ENERGY FROM THE DIRECT OXIDATION OF AQUEOUS GLUCOSE</p> <p>D. Desmaële¹, F. La Malfa^{1,2}, F. Rizzi¹, A. Quattieri¹, M. Di Lorenzo³, and M. De Vittorio^{1,2} <i>¹Istituto Italiano di Tecnologia, (IIT), ITALY, ²Università del Salento, ITALY, and ³University of Bath, UK</i></p>	<p style="text-align: center;">T4B-04</p> <p>SELF-RECHARGEABLE ELECTRET BASED ON VIBRATION ENERGY HARVESTER</p> <p>Y. Zhang¹, Y. Hu^{1,2}, M. Wang¹, and F. Wang^{1,2,3} <i>¹Southern University of Science and Technology, CHINA, ²Hong Kong University of Science and Technology, CHINA, and ³Chinese Academy of Sciences, CHINA</i></p>		

11:50

Lunch on Own

SESSION T5A: BATTERY TECHNOLOGIES	SESSION T5B: PYROELECTRIC ENERGY HARVESTERS
Crystal – Tomoka Room	Flagler Room
13:30 – 13:50	
<p style="text-align: center;">T5A-01</p> <p>A LONG-LASTING MICROLITER-SCALE MICROBIAL BIOBATTERY USING SOLID-STATE IONICS M. Mohammadifar and S. Choi <i>State University of New York-Binghamton, USA</i></p>	<p style="text-align: center;">T5B-01</p> <p>HYBRIDIZED THERMAL ENERGY HARVESTING MECHANISM M. Kang and E.M. Yeatman <i>Imperial College London, UK</i></p>
13:50 – 14:10	
<p style="text-align: center;">T5A-02</p> <p>DESIGN, MICROFABRICATION AND CHARACTERIZATION OF FREE FORM FACTOR, LIGHTWEIGHT THIN FILM BATTERY FOR POWERING BIOINSPIRED NANO-DRONES BASED ON MEMS ACTUATION S. Oukassi¹, S. Poncet¹, J.R. Frutos², and R. Salot¹ ¹<i>University Grenoble Alpes, FRANCE</i> and ²<i>Silmach SA, FRANCE</i></p>	<p style="text-align: center;">T5B-02</p> <p>A PYROELECTRIC THIN FILM OF ORIENTED TRIGLYCINE SULFATE NANO-CRYSTALS FOR THERMAL ENERGY Harvesting R. Ghane-Motlagh and P. Woias <i>University of Freiburg, GERMANY</i></p>
14:10 – 14:30	
<p style="text-align: center;">T5A-03</p> <p>DEVELOPMENT OF ALL-SOLID-STATE THIN-FILM SECONDARY BATTERY FOR MEMS AND IOT DEVICE A. Suzuki, S. Sasaki, and T. Jimbo <i>ULVAC, Inc., JAPAN</i></p>	<p style="text-align: center;">T5B-03</p> <p>PIEZOELECTRIC AND PYROELECTRIC ENERGY HARVESTING FROM LITHIUM NIOBATE FILMS G. Clementi, S. Margueron, M.A. Suarez, T. Baron, B. Dulmet, and A. Bartasyte <i>Université de Bourgogne Franche-Comté, FRANCE</i></p>

14:30

Transition Break

SESSION T6A: WIRELESS POWER TRANSFER TECHNOLOGIES		SESSION T6B: PUMPS AND HEAT ENGINES	
Crystal – Tomoka Room		Flagler Room	
14:40 – 15:00			
T6A-01	T6B-01		
FLEXIBLE SCREEN-PRINTED COILS FOR WIRELESS POWER TRANSFER USING LOW-FREQUENCY MAGNETIC FIELDS K. Sondhi, N. Garraud, D. Alabi, D.P. Arnold, A. Garraud, Z.H. Fan, and T. Nishida <i>University of Florida, USA</i>	LOW-COST, MONOLITHICALLY 3D-PRINTED, MINIATURE HIGH-FLOW RATE LIQUID PUMP A.P. Taylor ¹ and L.F. Velásquez–García ² ¹ <i>Edwards Vacuum LLC, USA</i> and ² <i>Massachusetts Institute of Technology, USA</i>		
15:00 – 15:20			
T6A-02	T6B-02		
EXPERIMENTAL STUDY OF THE EFFECT OF DEPTH, ORIENTATION, AND ALIGNMENT FOR A MEMS DIAPHRAGM RECEIVER IN ACOUSTIC POWER TRANSFER SYSTEMS H. Basaeri, Y. Yu, D. Young, and S. Roundy <i>University of Utah, USA</i>	MISTIC - MICRO STIRLING HEAT ENGINES FOR THERMAL ENERGY HARVESTING T. Avetissian ¹ , É. Léveillé ¹ , M.-A. Hachey ¹ , F. Formosa ² , and L.G. Fréchette ¹ ¹ <i>Université de Sherbrooke, CANADA</i> and ² <i>Université Savoie Mont Blanc, FRANCE</i>		

15:20

Transition Break

15:30

Poster & PowerMEMS - in - Action Session B

17:30

End of Day

17:30

Banquet at Kennedy Space Center

22:00

Arrive back at the Hilton Daytona Beach

Friday, December 7

08:00 **Conference Announcements**

08:10 **PowerMEMS 2019 Announcement**

08:20 **Plenary Presentation III**

FPA-01 **ZERO AND NEAR ZERO POWER INTELLIGENT MICROSYSTEMS**

Roy (Troy) H. Olsson III¹, C. Gordon², and R. Bogoslovov³

¹Defense Advanced Research Projects Agency (DARPA), USA,

²Booze Allen Hamilton, USA, and ³Bogoslovov Consulting Ltd., USA

09:00 **Focus Session III – Zero-Power Devices and Systems**

09:00 - 09:20

FFA-01 **AN AUTONOMOUS INTERFACE CIRCUIT BASED ON SELF-INVESTING SYNCHRONOUS ENERGY EXTRACTION FOR LOW POWER PIEZOELECTRIC ENERGY HARVESTERS**

B. Çiftci, S. Chamanian, H. Uluşan, and H. Külah

Middle East Technical University, TURKEY

09:20 - 09:40

FFA-02 **ENERGY HARVESTING PIEZOELECTRIC WIND SPEED SENSOR**

M. Shi, E.M. Yeatman, and A.S. Holmes

Imperial College London, UK

09:40 - 10:00

FFA-03 **EVENT DRIVEN TIME-LOGGING SYSTEM BASED ON CONTINUOUS OPERATION OF REAL TIME CLOCK TOWARDS PERPETUAL ELECTRONICS**

S. Yamada and H. Toshiyoshi

University of Tokyo, JAPAN

10:00 **Refreshment Break**

10:30 **Session F7 - LATE NEWS AND EMERGING TOPICS**

F7A-01 **SYNCHRONOUS CIRCUITS WITH SELF-ADAPTIVE MECHANICAL SWITCHES OF VISCOUS MATERIAL: A PARAMETER STUDY**

Z. Yuan, W. Liu, W. Tian, Y. Huang, and Z. Zhao

Southwest Jiaotong University, CHINA

F7A-02 WEARABLE TRIBOELECTRIC GENERATOR BASED ON A HYBRID MIX OF CARBON NANOTUBE AND POLYMER LAYERS

M. Su¹, J. Brugger², and B.J. Kim¹

¹*University of Tokyo, JAPAN and*

²*École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND*

F7A-03 A PD/AL₂O₃-BASED MICRO-REFORMER UNIT FULLY INTEGRATED IN SILICON TECHNOLOGY FOR H-RICH GAS PRODUCTION

M. Bianchini¹, N. Alayo¹, L. Soler³, M. Salleras², L. Fonseca², J. Llorca³, and A. Tarancon^{1,4}

¹*Catalonia Institute for Energy Research (IREC), SPAIN, ²IMB-CNM (CSIC), SPAIN, ³Universitat Politècnica de Catalunya, SPAIN, and ⁴ICREA, SPAIN*

F7A-04 MAGNETIC PENDULUM ARRAYS FOR EFFICIENT WIRELESS POWER TRANSMISSION

S.P. Mysore Nagaraja¹, R.U. Tok¹, R. Zhu², S. Bland³, A. Propst³, and Y.E. Wang¹

¹*University of California, Los Angeles, USA, ²Axend Inc, USA, and*

³*Nextgen Aeronautics, USA*

11:50

Award Ceremony

12:10

Conference Adjourns

Poster Session A

Wednesday, December 5

15:50 - 17:50

St. John's – Halifax Room

a - APPLICATIONS AND INNOVATIONS IN MICRO ENERGY SYSTEMS

Energy-Autonomous Wireless Sensors for IoT

PW-01a ROBUST SELF-POWERED WIRELESS PLANT-MONITORING SENSOR SYSTEM WITH SAP-ACTIVATED BATTERY

S. Okamoto¹, R. Furumori¹, A. Tanaka¹, F. Utsunomiya², and T. Douseki¹

¹Ritsumeikan University, JAPAN and ²ABLIC Inc., JAPAN

Zero-Power Devices and Systems

PW-02a A MECHANICALLY TUNABLE GHZ PASSIVE VOLTAGE ELEMENT USING MICROSTRIP RESONATOR

D. Ni, A. Ravi, K.B. VinayaKumar, and A. Lal

Cornell University, USA

b - BIOCHEMICAL AND BIO-INSPIRED POWER/ENERGY SYSTEMS

Biochemical and Bio-Inspired Power/Energy Systems

PW-03b A DIATOM INSPIRED NEAR INFRARED METAMATERIAL ABSORBER WITH HIERARCHICAL NANODISK ARRAYS

A. Li¹, X. Zhao¹, S. Anderson², and X. Zhang¹

¹Boston University, USA and ²Boston University Medical Center, USA

PW-04b ANODE BASED ON ALCOHOL DEHYDROGENASE ENZYME AND TITANIUM DIOXIDE NANOTUBES FOR PHOTOCATALYTIC MICROFLUIDIC DEVICE

J. Galindo-de-la-Rosa¹, G. González-Solano², J.A. Díaz-Real³,

J. Ledesma-García², and L.G. Arriaga¹

¹Centro de Investigación y Desarrollo Tecnológico en Electroquímica, MEXICO,

²Universidad Autónoma de Querétaro, MEXICO, and

³University of British Columbia, CANADA

PW-05b IMMOBILIZATION OF GLUCOSE OXIDASE ENZYME ON NIAL-LDHS FOR APPLICATION IN MICROFLUIDIC FUEL CELL AND SEROTONIN DETECTION

J. Galindo-de-la-Rosa¹, M.G. Araiza-Ramírez², A. Hernández-Torres²,

J. Ledesma-García², and L.G. Arriaga¹

¹Centro de Investigación y Desarrollo Tecnológico en Electroquímica, MEXICO

and ²Universidad Autónoma de Querétaro, MEXICO

c - DIRECT THERMAL ENERGY-HARVESTING

Thermoelectric Energy-Harvesting

PW-06c DEVELOPMENT OF THERMOELECTRIC THIN FILMS AND CHARACTERIZATION METHODS

T. Mori^{1,2}, T. Aizawa¹, S. Mitani^{1,2}, N. Tsujii¹, I. Ohkubo¹, T. Tynell¹, Y. Kakefuda¹, T. Baba¹, M. Mitome¹, N. Kawamoto¹, and D. Golberg¹

¹National Institute for Materials Science (NIMS), JAPAN and

²University of Tsukuba, JAPAN

PW-07c METAL-METAL THERMOELECTRIC HARVESTER

E. Köhler and P. Enoksson

Chalmers University of Technology, SWEDEN

PW-08c PRINTED THERMOELECTRIC DEVICE

K. Miyazaki, K. Kuriyama, and T. Yabuki

Kyushu Institute of Technology, JAPAN

Other Energy-Harvesting

PW-09c ELECTRICAL MODELING AND CHARACTERIZATION OF A THERMO-MAGNETICALLY ACTIVATED PIEZOELECTRIC GENERATOR (TMAPG)

A.A. Rendon-Hernandez¹, M. Ferrari², S. Basrour¹, and V. Ferrari²

Université Grenoble Alpes, FRANCE and ²University of Brescia, ITALY

d - ELECTRICAL ENERGY HARVESTING, MANAGEMENT, STORAGE AND TRANSFER

Batteries, Super-Capacitors, and Chemical Energy Storage

PW-10d OPTIMIZATION OF CARBON ELECTRODES FOR SOLID-STATE E-TEXTILE SUPERCAPACITORS

N. Hillier, S. Yong, and S. Beeby

University of Southampton, UK

Power Electronics and Energy Management Circuits

PW-11d A TUNABLE HYBRID SSHI STRATEGY FOR PIEZOELECTRIC ENERGY HARVESTING WITH ENHANCED OFF-RESONANCE PERFORMANCES

A. Morel^{1,2}, G. Pillonnet¹, and A. Badel²

¹University Grenoble Alpes, FRANCE and

²Université Savoie Mont Blanc, FRANCE

PW-12d AN UP-CONVERSION MANAGEMENT CIRCUIT FOR ELECTRICAL FIELD ENERGY HARVESTER

Y.M. Wen, P. Li, T. Han, and X.J. Ji

Shanghai Jiao Tong University, CHINA

PW-13d POWER MANAGEMENT WITH DYNAMIC POWER ADAPTION FOR A ROTATIONAL ENERGY HARVESTER IN A MARITIME GEARBOX

J. Esch¹, D. Schillinger², D. Stojakov¹, D. Hoffmann¹, and Y. Manoli^{1,2}

¹Hahn-Schickard, GERMANY and ²University of Freiburg, GERMANY

RF, Inductive and Acoustic Power Transfer

PW-14d EXPERIMENTS ON A WIRELESS POWER TRANSFER SYSTEM FOR WEARABLE DEVICE WITH SOL-GEL THIN-FILM PZT

B.D. Truong¹, D. Wang², T. Xue¹, S. Trolier-McKinstry², and S. Roundy¹
¹University of Utah, USA and ²Pennsylvania State University, USA

PW-15d REDUCING HUMAN BODY HEATING AND TEMPERATURE RISES DUE TO INDUCTIVELY-POWERED IMPLANTABLE MEDICAL DEVICES

C.H. Kwan, D.C. Yates, and P.D. Mitcheson
Imperial College London, UK

e - ELECTRON, ION, PHOTON AND RADIATION ENERGY CONVERSION

Electron, Ion and Photon Sources

PW-16e MINIATURE, 3D-PRINTED, MONOLITHIC ARRAYS OF CORONA IONIZERS

Z. Sun and L.F. Velásquez-García
Massachusetts Institute of Technology, USA

f - GENERAL

Energy Conversion Physics

PW-17f GENERATION OF ASYMMETRIC INCOMMENSURABLE TORQUE SIGNALS

L. Kurmann¹, and J.L. Duarte²
¹University of Freiburg, GERMANY and ²Eindhoven University of Technology, THE NETHERLANDS

g - MATERIALS FOR ENERGY CONVERSION

Fabrication Technology for Power/Energy Systems

PW-18g HIGH-RATE ETCHING OF SINGLE ORIENTED ALN FILMS BY CHLORINE-BASED INDUCTIVE COUPLED PLASMA FOR VIBRATIONAL ENERGY HARVESTERS

H.H. Nguyen, L.V. Minh, and H. Kuwano
Tohoku University, JAPAN

PW-19g USING GALISTAN TO FABRICATE POROUS GOLD ELECTRODES: TOWARD NON-ENZYMATIC GLUCOSE FUEL CELLS WITH ENHANCED PERFORMANCE FOR DRIVING WEARABLE/BIOELECTRONIC DEVICES

D. Desmaële¹, F. La Malfa^{1,2}, F. Rizzi¹, A. Qualtieri¹, M. Di Lorenzo³, and M. De Vittorio^{1,2}
¹Istituto Italiano de Technologies (IIT), ITALY, ²Universita del Salento, ITALY, and ³University of Bath, UK

Materials for Energy Conversion and Storage

PW-20g GRAPHENE-POROUS SEMICONDUCTOR NANOCOMPOSITES SCALABLE SYNTHESIS FOR ENERGY APPLICATIONS

A. Dupuy, S. Sauze, M. Jellite, R. Arvinte, R. Arés, and A. Boucherif
Université de Sherbrooke, CANADA

PW-21g HYDROGEN EVOLUTION CATALYTIC PERFORMANCE OF METAL DOPED MOS₂

X. Leng¹, Y. Wang¹, and F. Wang^{1,2}

¹*Southern University of Science and Technology, CHINA and*

²*Chinese Academy of Sciences, CHINA*

h - MECHANICAL ENERGY HARVESTING AND ACTUATION

Mechanical Energy-Harvesting – Electromagnetic

PW-22h A CM-SCALE, LOW WIND VELOCITY AND 250° C-COMPLIANT AIRFLOW-DRIVEN HARVESTER FOR AERONAUTIC APPLICATIONS

P. Gasnier, J. Willemain, S. Boisseau, B. Goubault De Brugière, G. Pillonnet, B. Gomez, and I. Neyret

University Grenoble Alpes, CEA-Leti, FRANCE

PW-23h A MAGNETICALLY-SPRUNG NONLINEAR RESONATOR FOR WIDEBAND VIBRATION ENERGY HARVESTING CONSISTING OF MAGNETIC COMPOSITE AND RING MAGNETS

Y. Miyata, A. Masuda, F. Zhao, and S. Ushiki

Kyoto Institute of Technology, JAPAN

PW-24h INDUSTRY 4.0-TYPE WIRELESS SENSOR APPLICATION POWERED BY A SEMI-AUTOMATICALLY DESIGNED MINI-SCALE ELECTROMAGNETIC ENERGY HARVESTER

B. Leistritz, F. Senf, E. Chervakova, S. Engelhardt, and W. Kattaneck

IMMS Institut für Mikroelektronik- und Mechatronik-Systeme gemeinnützige GmbH, GERMANY

PW-25h MEMS POWER GENERATOR OPERATED BY FLUOROCARBON GAS

M. Kaneko, K. Kudo, K. Ebisawa, K. Tanaka, and F. Uchikoba

Nihon University, JAPAN

PW-26h PERFORMANCES OF A CM-SCALE WATER FLOW ENERGY HARVESTER IN REAL ENVIRONMENT FOR AUTONOMOUS FLOWMETERS

E. Saoutieff¹, P. Gasnier¹, S. Boisseau¹, J. Ojer-Aranguren², and I. Rodot³

¹*University Grenoble Alpes, FRANCE, ²NAITEC, SPAIN, and*

³*SERM, FRANCE*

PW-27h WEARABLE GENERATOR WITH ROTATING OSCILLATING MASS

M. Ortiz¹, E. Fenollá², B. Restrepo², A. Espinoza², and E. Romero^{2,3}

¹*University of Puerto Rico, USA, ²Universidad del Turabo, USA, and*

³*Florida Polytechnic University, USA*

Mechanical Energy-Harvesting - Electrostatic

PW-28h DYNAMIC ANALYSIS OF ELECTROSTATIC ENERGY HARVESTING DEVICE WITH MULTI-STEP STRUCTURE

X. Guo¹, Y. Zhang¹, and F. Wang^{1,2}

¹*Southern University of Science and Technology, CHINA and*

²*Chinese Academy of Sciences, CHINA*

PW-29h NEMS ELECTROSTATIC RF WAKEUP SWITCH WITH PT FIB CONTACT
A. Ruyack, L. Pancoast, N. Shalabi, A. Molnar, and A. Lal
Cornell University, USA

Mechanical Energy-Harvesting – Piezoelectric

PW-30h AGING ASSESSMENT OF PIEZOELECTRIC ENERGY HARVESTER USING ELECTRICAL LOADS
T. Hoang, G. Ferin, C. Bantignies, B. Rosinski, P. Vince, and A. Nguyen-Dinh
Vermon S.A., FRANCE

PW-31h EQUIVALENT CIRCUIT MODEL OF PIEZOELECTRIC VIBRATION ENERGY HARVESTERS COMPOSED OF TRAPEZOIDAL UNIMORPH CANTILEVERS
T. Umegaki, T. Ito, G. Tan, and I. Kanno
Kobe University, JAPAN

PW-32h INTEGRATION AND CHARACTERISATION OF PIEZOELECTRIC MACRO-FIBRE COMPOSITE ON CARBON FIBRE COMPOSITE FOR VIBRATION ENERGY HARVESTING
Y. Shi, C. Piao, D. El Fadlaoui, A. Al-Saadi, and Y. Jia
University of Chester, UK

PW-33h MEMS ENERGY HARVESTING BASED ON UNIFORM-STRESS CANTILEVER WITH MULTILAYER PZT THIN FILMS
S. Hirai, K. Kanda, T. Fujita, and K. Maenaka
University of Hyogo, JAPAN

PW-34h OUTPUT POWER OF PIEZOELECTRIC MEMS VIBRATION ENERGY HARVESTERS UNDER RANDOM OSCILLATION
S. Murakami¹, T. Yoshimura², M. Aramaki², Y. Kanaoka¹, K. Tsuda¹, K. Satoh¹, K. Kanda³, and N. Fujimura²
¹*Osaka Research Institute of Industrial Science and Technology, JAPAN,*
²*Osaka Prefecture University, JAPAN, and* ³*University of Hyogo, JAPAN*

PW-35h REACTIVE ION BEAM ETCHING OF PIEZOELECTRIC SCALN FOR BULK ACOUSTIC WAVE DEVICE APPLICATIONS
R. James, Y. Pilloux, and H. Hegde
Plasma Therm, USA

Mechanical Energy-Harvesting - Triboelectric

PW-36h TRIBOELECTRIC EFFECT TO HARNESS FLUID FLOW ENERGY
R.I. Haque, A. Arafat, and D. Briand
École Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND

Mechanical Energy-Harvesting - Other

PW-37h UPPER BOUND FOR THE POWER OUTPUTS OF LINEAR VIBRATIONAL POWER HARVESTERS: TRANSLATIONAL VS. ROTATIONAL GEOMETRIES
A. Ananthakrishnan and I. Bargatin
University of Pennsylvania, USA

Motors/Generators, Pumps and Actuators

PW-38h DETERMINATION OF MECHANICAL FORCE GENERATED BY GROWING SEED IN INKJET 3D PRINTED MICRODEVICE

K. Adamski, B. Kawa, J. Dziuban, and R. Walczak
Wroclaw University of Science and Technology, POLAND

PW-39h STABILITY OF SYMMETRICAL COMB-DRIVE ACTUATOR

A. Galisultanov¹, G. Pillonnet¹, Y. Perrin¹, L. Hutin¹, P. Basset², and H. Fanet¹
¹Université Grenoble Alpes, FRANCE and ²Université Paris-Est, FRANCE

j - THERMAL AND CHEMICAL SCIENCE AND TECHNOLOGIES FOR POWER, PROPULSION, AND COOLING

Fuel Cells, Reactors, and Combustors

PW-40j DYNAMICS OF DIRECT HYDROCARBON POLYMER ELECTROLYTE MEMBRANE FUEL CELLS

E.H. Kong, P.D. Ronney, and G.K. Surya Prakash
University of Southern California, USA

PW-41j IMPROVED SENSITIVITY OF THIN FILM SENSOR FOR HUMIDITY MEASUREMENT INSIDE A OPERATING PEMFC

N. Hasegawa, Y. Otsuki, M. Kurosu, and T. Araki
Yokohama National University, JAPAN

k – Late News

PW-42k A RESONANCE-MAINTAINING CIRCUIT FOR HIGH-EFFICIENCY ELECTRET-BASED MEMS VIBRATIONAL ENERGY HARVESTERS

H. Mitsuya¹, H. Ashizawa¹, M. Morita¹, H. Homma², G. Hashiguchi³, and H. Toshiyoshi²
¹Saginomiya Seisakusho, Inc., JAPAN, ²University of Tokyo, JAPAN, and ³Shizuoka University, JAPAN

PW-43k MICROFABRICATION OF A SILICON TURBOPUMP WITH EMBEDDED THERMAL ISOLATION FOR A RANKINE MEMS HEAT ENGINE

A. Amnache and L.G. Fréchette
Universite de Sherbrooke, CANADA

l – Commercial Posters – Table Top Exhibitors

PW-44l DIRECT WRITE LITHOGRAPHY FOR THE INTERNET OF THINGS

J. Sasserath and J. Drakeford
Rave N.P., USA

PW-45l REACTIVE ION BEAM ETCHING OF PIEZOELECTRIC SCALN FOR BULK ACOUSTIC WAVE DEVICE APPLICATIONS

R. James, Y. Pilloux, and H. Hegde
Plasma-Therm, LLC, USA

PW-46I SUSS MicroTec
E. Edwards
SUSS MicroTec, USA

Poster Session B

Thursday, December 6

15:50 - 17:30

St. John's – Halifax Room

a - APPLICATIONS AND INNOVATIONS IN MICRO ENERGY SYSTEMS

Energy-Autonomous Wireless Sensors for IoT

PT-01a MINIMIZING POWER CONSUMPTION OF LORA® AND LORAWAN FOR LOW-POWER WIRELESS SENSOR NODES

E. Bäumker, A. Miguel Garcia, and P. Woias
University of Freiburg, GERMANY

PT-02a A NARROW-BAND AND ULTRA-LOW-POWER 433 MHZ WAKE-UP RECEIVER

S. Koeble, S. Heller, and P. Woias
University of Freiburg, GERMANY

b - BIOCHEMICAL AND BIO-INSPIRED POWER/ENERGY SYSTEMS

Biochemical and Bio-Inspired Power/Energy Systems

PT-03b A PAPERTRONIC SENSING SYSTEM FOR RAPID VISUAL SCREENING OF BACTERIAL ELECTROGENICITY

M. Tahernia, M. Mohammadifar, and S. Choi
State University of New York-Binghamton, USA

PT-04b GLUCOSE OXIDASE BIOELECTRODES IN DEVICES IMPLANTED IN LIVING PLANTS FOR ENERGY APPLICATIONS

J. Galindo-de-la-Rosa¹, A. Hernández-Torres², M.G. Araiza-González², L.G. Arriaga¹, and J. Ledesma-García²

¹Centro de Investigación y Desarrollo Tecnológico en Electroquímica, MEXICO and ²Universidad Autónoma de Querétaro, MEXICO

PT-05b MICROFLUIDIC BIOFUEL CELL BASED ON CHOLESTEROL OXIDASE/LACCASE ENZYMES

J. Galindo-de-la-Rosa¹, E. Ortiz-Ortega¹, B. López-González¹, L.G. Arriaga¹, and J. Ledesma-García²

¹Centro de Investigación y Desarrollo Tecnológico en Electroquímica, MEXICO and ²Universidad Autónoma de Querétaro, MEXICO

c - DIRECT THERMAL ENERGY-HARVESTING

Thermoelectric Energy-Harvesting

PT-06c IMPROVED MICRONANOGENERATORS BASED ON SILICON COMPATIBLE MATERIALS AND PROCESSING

I. Donmez¹, M. Dolcet¹, A. Stranz¹, M. Salleras¹, L. Fonseca¹, G. Gadea², M. Pacios², A. Morata², and A. Tarancon^{2,3}

¹IMB-CNM (CSIC), SPAIN, ²IREC, SPAIN, ³ICREA, SPAIN

PT-07c MILLIWATT POWER SUPPLY BY DYNAMIC THERMOELECTRIC HARVESTING
M.E. Kiziroglou^{1,2}, S.W. Wright¹, M. Shi¹, D.E. Boyle¹, Th. Becker³, J. Evans⁴,
and E.M. Yeatman¹
¹Imperial College London, UK, ²ATEI Thessaloniki, GREECE,
³Natural Science and Technical Academy Isny, GERMANY, and
⁴University of California, Berkeley, USA

PT-08c THIN-FILM π -TYPE MICRO TEG USING VACUUM/INSULATOR-HYBRID ISOLATION WITH CONVEX-SHAPE HOT-PLATE MODULE STRUCTURE FOR WEARABLE DEVICE APPLICATIONS
Y. Shiotsu, T. Seino, N. Chiwaki, and S. Sugahara
Tokyo Institute of Technology, JAPAN

d - ELECTRICAL ENERGY HARVESTING, MANAGEMENT, STORAGE AND TRANSFER

Batteries, Super-Capacitors, and Chemical Energy Storage

PT-09d DEVELOPMENT OF A FLEXIBLE POLY(ETHER ETHER KETONE) SUPERCAPACITOR AS ELECTROLYTE AND SEPARATOR
R. López Mayo¹, A. Rico¹, L.G. Arriaga¹, M.P. Gurrola^{1,2} and J. Ledesma-García²,
¹Centro de Investigación y Desarrollo Tecnológico en Electroquímica, MEXICO
and ²Universidad Autónoma de Querétaro, MEXICO

Power Electronics and Energy Management Circuits

PT-10d A HIGH-EFFICIENCY MANAGEMENT CIRCUIT FOR PIEZOELECTRIC ENERGY HARVESTER
P. Li, Y.M. Wen, T. Han, and X.J. Ji
Shanghai Jiao Tong University, CHINA

PT-11d A VOLTAGE-BOOST RECTIFIER CIRCUIT FOR ENERGY HARVESTING FROM ENVIRONMENTAL VIBRATIONS
Y. Tohyama¹, H. Honma¹, N. Ishihara², H. Sekiya³, H. Toshiyoshi¹,
and D. Yamane^{2,4}
¹University of Tokyo, JAPAN, ²Tokyo Institute of Technology, JAPAN,
³Tokyo City University, JAPAN, and
⁴Japan Science and Technology Agency (JST), JAPAN

PT-12d DESIGN OF A MEMS RELAY BASED ON SOI FABRICATION TECHNOLOGY
M. Schwarz¹, F. Lambrecht¹, A. Bauer¹, and H. Seidel²
¹Siemens AG, GERMANY and ²Saarland University, GERMANY

PT-13d SECONDARY-SIDE DE-TUNING TO ENABLE WIDE-RANGE INDUCTIVE POWER TRANSFER FOR A WRIST WORN SENSOR
S. Burrow and L. Clare
University of Bristol, UK

RF, Inductive and Acoustic Power Transfer

PT-14d SIMULATION AND MODELLING OF A SPATIALLY-EFFICIENT 3D WIRELESS POWER TRANSFER SYSTEM FOR MULTI-USER CHARGING

H.-W. Wang¹, N.X. Wang², and J.H. Lang²

¹Tsinghua University, CHINA and ²Massachusetts Institute of Technology, USA

f - GENERAL

Energy Conversion Physics

PT-15f FEASIBILITY OF A V-SHAPED MAGNET ROTOR TO CONVERT VIBRATION INTO ROTATION

D.J. Clarkson¹, L. Kurmann², G.N. Moubarak¹, and Y. Jia¹

¹University of Chester, UK and ²University of Freiburg, GERMANY

g - MATERIALS FOR ENERGY CONVERSION

Fabrication Technology for Power/Energy Systems

PT-16g FACILE FABRICATION OF SILICON MICRO/NANOSTRUCTURES FOR MICROELECTRODES BY SILVER-ASSISTED ETCHING USING NANOSPONGE AS A TEMPLATE

Y. Chen, J. Ruan, J. Huang, L. Qian, and S. Jiang

Southwest Jiaotong University, CHINA

PT-17g LASER-BONDING OF FEP/FEP INTERFACES FOR A FLEXIBLE MANUFACTURING PROCESS OF FERROELECTRETS

D. Flachs, F. Emmerich, G.-L. Roth, R. Hellmann, and C. Thielemann

University of Applied Sciences Aschaffenburg, GERMANY

Materials for Energy Conversion and Storage

PT-18g ETHANOL TOLERANT CATALYST BASED IN PLATINUM AND SILVER IN GRAPHENE

M.J. Estrada-Solís¹, B. López-González¹, M. Guerra-Balcázar², and F.M. Cuevas-Muñiz¹

¹Centro de Investigación y Desarrollo Tecnológico en Electroquímica, MEXICO and ²Universidad Autónoma de Querétaro, MEXICO

PT-19g HIGHLY ORIENTED AND STRESS MODIFIED THICK ALN FILMS DEPOSITED ON LOW THERMAL EXPANSION ALLOY SUBSTRATES FOR FLEXIBLE ELECTRONICS IN HARSH ENVIRONMENT

N. Moriwaki^{1,2}, L.V. Minh¹, and H. Kuwano¹

¹Tohoku University, JAPAN and ²Dai Nippon Printing Co., Ltd., JAPAN

PT-20g PLD ELECTRODES IN A COUPLED MICROFLUIDIC FUEL CELL TO A LAB ON A CHIP SYSTEM FOR ENERGY GENERATION

B. López-González¹, J.C. Abrego-Martínez², B.S. Hernández-Sarmiento³,
A. Moreno-Zuria^{1,2}, Y. Wang², M. Mohamedi², L.G. Arriaga¹,
and F.M. Cuevas-Muñiz¹

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³*Instituto Tecnológico de Oaxaca, MEXICO*

h - MECHANICAL ENERGY HARVESTING AND ACTUATION

Mechanical Energy-Harvesting - Electromagnetic

PT-21h A COMPACT ELECTROMAGNETIC VIBRATION ENERGY HARVESTER WITH HIGH OUTPUT VOLTAGE

X. Wang, X. He, K. Li, and S. Jiang
Chongqing University, CHINA

PT-22h HEATING PERFORMANCE BY AN INSOLE ENERGY HARVESTER

M.M. Rahman, S. Noh, K.H. Kim, and H. Kim
University of Utah, USA

PT-23h INFLUENCES OF FE-GA ALLOY CRYSTALLINITY FOR THE APPLICATION TO A MAGNETOSTRICTIVE VIBRATION ENERGY HARVESTER

M. Ito¹, T. Minamitani², and T. Ueno²

¹*Central Research Institute of Electric Power Industry, JAPAN and*

²*Kanazawa University, JAPAN*

PT-24h PENDULUM BASE 3D PRINTED ELECTROMAGNETIC ENERGY HARVESTER

K. Adamski and R. Walczak
Wrocław University of Science and Technology, POLAND

PT-25h SYSTEMATIC COMPARISON OF BASIC STRUCTURES FOR ELECTROMAGNETIC ENERGY HARVESTERS USING AN AUTOMATED DESIGN METHODOLOGY

B. Leistritz and W. Kattanek
*IMMS Institut für Mikroelektronik- und Mechatronik-Systeme
Gemeinnützige GmbH, GERMANY*

Mechanical Energy-Harvesting - Electrostatic

PT-26h DEMONSTRATION OF AN ELECTRET GENERATOR USING SELF-ASSEMBLED ELECTRET FOR ENERGY HARVESTING WITHOUT ANY CHARGING PROCESS

N. Matsuura¹, H. Ishii¹, and Y. Tanaka^{1,2}

¹*Chiba University, JAPAN and*

²*Japan Science and Technology Agency (JST), JAPAN*

PT-27h INVESTIGATION OF PARALLELY CONNECTED MEMS ELECTROSTATIC ENERGY HARVESTERS FOR ENHANCMENT IN POWER OUTPUT AND BANDWIDTH

J. Li, X. Tong, J. Oxaal, Z. Liu, M. Hella, and D.-A. Borca-Tasciuc
Rensselaer Polytechnic Institute, USA

PT-28h TEXTILE BASED FERROELECTRET FOR WEARABLE ENERGY HARVESTING

J. Shi and S.P. Beeby
University of Southampton, UK

Mechanical Energy-Harvesting - Piezoelectric

PT-29h A 120°C 20G-COMPLIANT VIBRATION ENERGY HARVESTER FOR AERONAUTIC ENVIRONMENTS

P. Gasnier¹, M. Boucaud², M. Gallardo¹, J. Willemin¹, S. Boisseau¹, A. Morel¹, D. Gibus¹, and M. Moreau³

¹*University Grenoble Alpes, CEA-Leti, FRANCE*, ²*ABYLSSEN, FRANCE*, and ³*SAFRAN Power Units, FRANCE*

PT-30h AN UMBRELLA-SHAPED TOPOLOGY FOR BROADBAND MEMS PIEZOELECTRIC VIBRATION ENERGY HARVESTING

Y. Jia^{1,2}, S. Du¹, and A.A. Seshia¹

¹*University of Cambridge, UK* and ²*University of Chester, UK*

PT-31h INCREASED PIEZOELECTRIC COUPLING FORCE IN AUTOPARAMETRIC EXCITATION HARVESTER CONNECTING TO SELF-POWERED SERIES AND PARALLEL SYNCHRONIZED SWITCH HARVESTING ON INDUCTOR (SSHI) INTERFACES

H. Asanuma, T. Komatsuzaki, and Y. Iwata
Kanazawa University, JAPAN

PW-32h MEMS MEANDER HARVESTER WITH TUNGSTEN PROOF-MASS

E. Köhler¹, P. Johannisson², D. Kolev², F. Ohlsson², P. Ågren³, J. Liljeholm³, P. Enoksson¹, and C. Rusu²

¹*Chalmers University of Technology, SWEDEN*, ²*RISE Acreo, SWEDEN*, and ³*Silex Microsystems, SWEDEN*

PT-33h OMNIDIRECTIONAL LOW FREQUENCY ENERGY HARVESTER FOR WEARABLE APPLICATIONS

C. Ou, V. Pinrod, B. Davaji, and A. Lal
Cornell University, USA

PT-34h POLYMER-BASED PIEZOELECTRIC ENERGY HARVESTER FOR LOW-FREQUENCY VIBRATION USING FREQUENCY UP-CONVERSION DRIVEN BY COLLISION WITH A FLEXIBLE BEAM

T. Tsukamoto¹, Y. Umino¹, K. Hashikura¹, S. Shiomi¹, K. Yamada¹, and T. Suzuki^{1,2}

¹*Gunma University, JAPAN* and ²*Japan Science and Technology Agency (JST), JAPAN*

PT-35h TEXTILE-BASED FREESTANDING TRIBOELECTRIC-LAYER NANOGENERATOR WITH ALTERNATE POSITIVE AND NEGATIVE GRATING STRUCTURE

W. Paosangthong, R. Torah, and S. Beeby
University of Southampton, UK

Motors/Generators, Pumps and Actuators

- PT-36h** **MACROSCOPIC ACTUATION FOR DEPLOYABLE MICROVALVES:
COUPLING MECHANICALLY WHILE ISOLATING THERMALLY**
C. Kelly, X. Xie, A. Dodge, and C. Livermore
Northeastern University, USA

J - THERMAL AND CHEMICAL SCIENCE AND TECHNOLOGIES FOR POWER, PROPULSION, AND COOLING

Fuel Cells, Reactors, and Combustors

- PT-37j** **EXPERIMENTAL AND NUMERICAL INVESTIGATION OF MICRO CATALYTIC
REACTOR FOR AUTOTHERMAL REFORMING USING METHANOL AND
HYDROGEN PEROXIDE WITH BUILT-IN CHROME SILICIDE
THERMOCOUPLE**
E.S. Jung
Pusan National University, KOREA
- PT-38j** **USEFULNESS AND PERFORMANCE COMPARISON OF COMPLEX
ENZYME-TYPE BIOFUEL CELL USING ELECTRODE MODIFIED WITH TWO
DET-TYPE ENZYMES BY COVALENT BONDING**
H. Fujita, Y. Nishioka, and S. Imai
Nihon University, JAPAN

K – Late News

- PT-39k** **A PROOF-OF-CONCEPT 70 NA ECG PROCESSOR FOR REAL-TIME
R-WAVE AND NN50 DETECTION**
H. Töreyn
San Diego State University, USA
- PT-40k** **LOW-VOLTAGE-DRIVEN ELECTROSTATIC MICROSPEAKERS WITH
POTASSIUM-ION-ELECTRETS**
C. Sano¹, V. Menon¹, H. Honma¹, G. Hashiguchi², and H. Toshiyoshi¹
¹University of Tokyo, JAPAN and ²Shizuoka University, JAPAN
- PT-41k** **THEORETICAL AND EXPERIMENTAL INVESTIGATION OF A MULTI-
STABLE ENERGY HARVESTER FOR ROTATION MOTION**
X. Mei¹, S. Zhou², T. Kaizuka¹, and K. Nakano¹
¹University of Tokyo, JAPAN and ²Northwestern Polytechnical University, CHINA

I – Commercial Posters – Table Top Exhibitors

- PT-42I** **LET NOVA WORK FOR YOU**
M. Lightfoot and A. Maclin
Nova Electronic Materials, LLC, USA
- PT-43I** **RECENT ACHIEVEMENTS IN REACTIVE SPUTTERING OF PIEZOELECTRIC
ALN AND SCALN FILMS**

V. Felmetsger
OEM Group, LLC, USA