



Preliminary Program

Conference Chair:

Einar Halvorsen

University of South-Eastern Norway, NORWAY

Technical Program Chair:

Hamed Salmani

University of South-Eastern Norway, NORWAY

TECHNICAL PROGRAM INFORMATION

Guide to Understanding Paper Numbering

Each paper in the technical program is assigned a unique number (**T1A-03**) which indicates when the paper is presented. The number of each paper is shown before the paper title.

The first letter (i.e. **T**) indicates the day of the Conference:

T = Tuesday W = Wednesday Th = Thursday

The second number (i.e., **1**) indicates the session.

The third letter (i.e., **A**) indicates which room the session is held.

The fourth number (i.e. 04) indicates the number of the paper in the session.

Guide to Understanding Poster Numbering

Each poster is also assigned a unique number (**P01a**).

The number (i.e., **01**) indicates the poster position.

The last character (i.e., **a**) shows the classification of the poster.

- a Biochemical and Bio-Inspired Power/Energy Systems
- b Energy Harvesting and Power Transfer (Mechanical, Thermal, Solar, Bio, Triboelectric, RF, Acoustic, etc.)
- c General Energy Conversion and Transfer
- d Implantable or Wearable Devices and Miniature Energy Systems
- e Materials for Miniature Energy Systems
- f Power Transfer
- g Ultra-Low- Power Sensors and Systems

Monday, 18 November

All indicated times are Central European Time (CET).

09:00 **PowerMEMS School**

16:50

09:00 - 10:00

Device/Circuit

Adrien Badel

Université Savoie Mont Blanc, FRANCE

10:05 - 11:05

Triboelectrics

Philippe Basset

ESIEE Paris, FRANCE

11:10 - 12:10

Wearables and Systems

Shad Roundy

University of Utah, USA

12:10 **Lunch**

13:40 - 14:40

Electret-Based Energy Harvester/ AI-Related Technology/ International Standardization

Yuji Suzuki

University of Tokyo, JAPAN

14:45 - 15:45

Storage

Xiaohong Wang

Tsinghua University, CHINA

15:50 - 16:50

Ryoto Yanagisawa

University of Tokyo, JAPAN

Tuesday, 19 November

All indicated times are Central European Time (CET).

08:45 **Conference Welcome**

Conference Chair:

Einar Halvorsen, *University of South-Eastern Norway, NORWAY*

Technical Program Chair:

Hamed Salmani, *University of South-Eastern Norway, NORWAY*

09:00 **Plenary Presentation I**

TPA-1 POWER MEMS AND SILICON PHOTONICS – AN ENABLING COMBINATION

Olav Solgaard
Stanford University, USA

10:00 **Session T1A - Energy Harvesting and Power Transfer I**

Chair:

10:00 - 10:20

T1A-1 WIRELESS ELECTRODYNAMIC POWER TRANSFER: MODELING AND DISCUSSION OF A DUAL-MODE RECEIVER

Adrien Ameye¹, Adrien Morel¹, Rémi Recoquillé^{1,2},
Nicolas Garraud², Pierre Gasnierand¹, and Adrien Badel¹
¹*Université Savoie Mont Blanc, FRANCE* and
²*CEA Leti, FRANCE*

10:20 – 10:40

T1A-2 OPTIMISING THE ELECTRODE CONFIGURATION TO MAXIMISE THE POWER OUTPUT OF DROPLET TRIBOELECTRIC NANOGENERATORS

Oliver D. Prendergast, Tom Reddyhoff, and Andrew Holmes
Imperial College London, UK

10:40 – 11:00

T1A-3 DEVELOPMENT OF DETACHABLE TRIBOELECTRIC NANOGENERATOR FOR TIRE

Hiroshi Tani, Shohei Kawada, Renguo Lu,
and Shinji Koganezawa
Kansai University, JAPAN

11:00 – 11:20

T1A-4 ELECTROMECHANICAL COUPLING COEFFICIENT: NEW APPROACH TO STUDY AUXETIC PIEZOELECTRIC HARVESTERS

Grégoire Forges^{1,2}, David Gibus¹, Adrien Morel¹, Adrien Badel¹,
and Hélène Debéda²
¹*Université Savoie Mont Blanc, FRANCE and*
²*Université de Bordeaux, FRANCE*

11:30 Refreshment Break

A6-Atrium

Session T2A Energy Harvesting and Power Transfer II	Session T2B Material and Fabrication I
Chair:	Chair:
12:00 - 12:20	
T2A-1 ELECTRET-BASED WIND ENERGY HARVESTER WITH ULTRA-LOW CUT-IN VELOCITY Tomoya Miyoshi ¹ , Jiaming Yao ¹ , Quentin Bruiant ² , and Yuji Suzuki ¹ ¹ <i>University of Tokyo, JAPAN and</i> ² <i>Université Savoie Mont Blanc, FRANCE</i>	T2B-1 WAFER-SCALE FABRICATION OF MESOPOROUS TUNGSTEN- BASED MICRO- SUPERCAPACITORS WITH HIGHLY ORIENTED NANOSTRUCTURE Jiyong Zhou ¹ , Jianyou Dai ¹ , Zhanpeng Shi ¹ , Yier Xia ² , Minghao Xu ² , Xiaohong Wang ² , and Sixing Xu ¹ ¹ <i>Hunan University, CHINA and</i> ² <i>Tsinghua University, CHINA</i>

12:20 – 12:40

T2A-2

ELECTRICAL CHARACTERIZATION AND MODELLING OF AN ULTRASOUND-POWERED TRIBOELECTRIC GENERATOR FOR IMPLANTABLE APPLICATIONS

Thomas Baudin¹, Armine Karami¹, Dabin Kim², Sera Jeon², Dimitri Galayko³, Jean-Marc Laheurte¹, Sang-Woo Kim², and Philippe Basset¹

¹Université Gustave Eiffel, FRANCE, ²Yonsei University, KOREA (ROK), and ³Sorbonne Université, FRANCE

T2B-2

INVESTIGATION OF STRUCTURE AND BANDGAP DEPENDENCE OF INGAAS SOLAR CELL DESIGN FOR THERMOPHOTOVOLTAIC APPLICATIONS

Xinyi Ma, Shippei Zhang, Shengyu Sun, and Xiawa Wang
Duke Kunshan University, CHINA

12:40 – 13:00

T2A-3

AN EFFICIENT ACOUSTIC POWER TRANSFER USING A SELF-BIASED ELECTROSTATIC MEMS TRANSDUCER

Paul Roche¹, Kevin Nadaud¹, Dimitri Galayko², Samuel Callé¹, Jean-Charles Lebunetel¹, Dominique Certon¹, and Guylaine Poulin-Vittrant¹

¹University of Tours, CNRS, INSA CVL, FRANCE and ²Sorbonne Université, CNRS, FRANCE

T2B-3

CHARACTERIZATION AND OPTIMIZATION OF LIGHTWEIGHT FOAMED PLA CANTILEVERS FOR LOW-VACUUM ENERGY HARVESTING APPLICATIONS

Giacomo Clementi¹, Francesco Bonacci¹, Silvia Caponi², Francesco Cottone¹, Alessandro Di Michele¹, Luca Gammaitoni¹, Maurizio Mattarelli¹, Valentin D. Paccio¹, Gabriele Perna¹, Flavio Travasso³, and Igor Neri¹

¹University of Perugia, ITALY, ²IOM-CNR, ITALY, and ³University of Camerino, ITALY

13:00

Lunch

Session T3A Energy Harvesting and Power Transfer III	Session T3B Biochemical and Bio-Inspired Power/Energy Systems & Applications and Innovations in Micro Energys
Chair:	Chair:
14:30 – 14:50	
<p style="text-align: center;">T3A-1</p> <p>IN-EAR THERMAL POWER CAPABILITY AND THERMOELECTRIC ENERGY HARVESTING APPROACHES</p> <p>Tigran Avetissian¹, David Niederhauser¹, Léa Grima¹, Aidin Delnavaz¹, Adrien Morel², Adrien Badel², and Jérémie Voix¹</p> <p>¹<i>École de Technologie Supérieure, CANADA</i> and ²<i>Université Savoie Mont Blanc, FRANCE</i></p>	<p style="text-align: center;">T3B-1</p> <p>SELF-POWERED ELECTRIC FIELD SENSOR BASED ON DROPLET ELECTRICITY GENERATOR</p> <p>Jiaxing Xu¹, Ling Bu¹, and Xiaohong Wang²</p> <p>¹<i>China University of Geosciences, CHINA</i> and ²<i>Tsinghua University, CHINA</i></p>
14:50 – 15:10	
<p style="text-align: center;">T3A-2</p> <p>MULTI-PHASE VARIABLE RELUCTANCE ENERGY HARVESTER FOR SMART BEARING HUB UNITS</p> <p>Mengfei Wu, Ye Xu, and Sebastian Bader</p> <p><i>Mid Sweden University, SWEDEN</i></p>	<p style="text-align: center;">T3B-2</p> <p>SELF-POWERED LIVING SENSOR DISPLAY IMPLANTED ON SKIN FOR LONG-TERM BIOMARKER MONITORING</p> <p>Jun Sawayama¹, Yuki Takayama^{1,3}, Shogo Nagata¹, Hoshimi Aoyagi¹, Aki Takimoto¹, Miki Takase², Miho Ogawa², Makoto Takeo², Koji Yano³, Shoji Takeuchi¹, Takashi Tsuji², and Hiroyuki Fujita^{3,4}</p> <p>¹<i>University of Tokyo, JAPAN</i>, ²<i>Riken, JAPAN</i>, ³<i>Canon Medical Systems Co., JAPAN</i>, and ⁴<i>Tokyo City University, JAPAN</i></p>

15:10 – 15:30

T3A-3

**A CONTACTLESS MAGNETIC
FREQUENCY-BOOSTING
MECHANISM FOR WIND
ENERGY HARVESTING**

Yunfei Li^{1,2}, Manjuan Huang²,
Tianyi Tang^{1,2}, Heng Zhao², Lining
Sun^{1,2}, and Huicong Liu²

¹Harbin Institute of Technology,
CHINA and ²Soochow University,
CHINA

T3B-3

**A POWER SIMULATION TOOL
FOR THE OPTIMIZATION OF
WIRELESS SENSOR NODES**

Prateek Asthana¹, Mario
Costanza¹, Eoin Ahern¹, John
Flannery¹, Paul Geoghegan²,
Andrea Ingenito³, and Mike
Hayes¹

¹Tyndall National Institute,
IRELAND, ²NetFeasa, IRELAND,
and ³CSEM, SWITZERLAND

15:30 Refreshment Break

16:00 Poster Session

a - Biochemical and Bio-Inspired Power/Energy Systems

- P01a A SCALABLE AND FLEXIBLE TWISTED YARN BATTERY
ACTIVATED BY BIOFLUIDS FOR ENERGY SYSTEM**
Sheng Yong
University of Southampton, UK
- P02a INCLINED-LEGS ACTUATOR INSPIRED BY SETARIA VIRIDIS**
Shinji Koganezawa, Takaaki Ichien, Hotaka Tsuboi, Hiroshi Tani,
Renguo Lu, and Shouhei Kawada
Kansai University, JAPAN
- P03b A MAGNETIC SOFTENING RESONATOR WITH FLAT POWER
GENERATION FOR NONLINEAR VIBRATION ENERGY
HARVESTING**
Taiga Yanase, Yu Yoshida, Nanako Miura, Motoaki Hiraga,
and Arata Masuda
Kyoto Institute of Technology, JAPAN

- P04b** **A PRECISION MEASUREMENT SYSTEM FOR TRIBOELECTRIC MATERIALS CHARACTERIZATION**
Björn N. Ewald and Peter Woias
University of Freiburg, GERMANY
- P05b** **AN ANALYTICAL SOLUTION FOR PIEZOELECTRIC ENERGY HARVESTER BEAMS WITH LINEARLY VARYING CROSS SECTION**
S.A. Hosseini Kordkheili¹, Hadis Naghian¹, and Hamed Salmani²
¹Sharif University of Technology, IRAN and ²University of South-Eastern Norway, NORWAY
- P06b** **ANALYSIS, DESIGN, AND OPTIMIZATION OF NETWORKED MULTI DOF ENERGY HARVESTERS**
Kailing Song^{1,2}, Michele Bonnin², Fabio Traversa³, and Fabrizio Bonani²
¹IUSS PAVIA, ITALY, ²Politecnico Di Torino, ITALY, and ³Memcomputing Inc, USA
- P07b** **COIL VIBRATION TYPE ELECTROMAGNETIC ENERGY HARVESTER FOR VEHICLE VIBRATION ENERGY HARVESTING**
Dae-Sung Kwon, Ilseon Yoo, Sanghyeok Yang, and Hyunsoo Kim
Hyundai Motor Company, KOREA (ROK)
- P08b** **CREATING THERMALLY STABLE P-TYPE CARBON NANOTUBES VIA COORDINATION CHEMISTRY FOR THERMOELECTRIC MATERIALS**
Kaho Kawasaki¹, Yasuko Koshiba¹, Kouki Akaike², Qingshuo Wei^{2,3}, Masahiro Funahashi¹, Kenji Ishida^{1,4}, and Shohei Horike^{1,2}
¹Kobe University, JAPAN, ²National Institute of Advanced Industrial Science and Technology, JAPAN, ³University of Tsukuba, JAPAN, and ⁴Kyushu University, JAPAN
- P09b** **DEVELOPMENT OF LOW FREQUENCY HYBRID HARVESTER FOR VEHICLE VIBRATION ENERGY HARVESTING**
Ilseon Yoo, Dae-Sung Kwon, Sanghyeok Yang, and Hyunsoo Kim
Hyundai Motor Company, KOREA (ROK)

- P10b** **LARGE FREQUENCY RANGE ELECTRODYNAMIC HARVESTER BASED ON FREQUENCY-UP RESONANT CONVERTER FOR ROTATIONAL MOVEMENTS**
Pierre Gasnier^{1,2}, Corentin Breal^{1,2}, Andy Falda^{1,2}, Baptiste Alessandri^{1,2}, Sébastien Boisseau^{1,2}, and Nicolas Garraud^{1,2}
¹CEA-Leti, University Grenoble Alpes, FRANCE and
²DAVIDSON, FRANCE
- P11b** **PERFORMANCE ENHANCEMENT OF DROPLET ELECTRICITY GENERATORS USING ROTARY MECHANISMS**
Shanghao Gu
Southern University of Science and Technology, CHINA
- P12b** **THERMOELECTRICITY TO POWER WIRELESS SENSORS: AN INDUSTRIAL APPLICATION.**
Vincent V. Boitier¹, Lionel L. Segquier¹, Bruno B. Estibals¹, Clement C. Arnaud², Thibault Anfrue², and Cedric C. Maurin²
¹Université de Toulouse, CNRS, UPS, FRANCE and
²Arcelor Mittal, Fos Sur Mer, FRANCE

b - Energy Harvesting and Power Transfer (Mechanical, Thermal, Solar, Bio, Triboelectric, RF, Acoustic, etc.)

- P13b** **TIRE PRESSURE MONITORING SYSTEM (TPMS): RECENT ADVANCEMENT AND POTENTIAL ENERGY HARVESTING SOLUTIONS**
Félix Barkoum Betra^{1,2}, Vincent Boitier², and Amine Defous¹
¹RD EE TIS Team Continental, FRANCE and
²University de Toulouse, CNRS, UPS, FRANCE

c - General Energy Conversion and Transfer

- P14c** **IMPACT-INDUCED FREQUENCY UP-CONVERSION VIBRATION ENERGY HARVESTER BASED ON METAL-SUBSTRATE PIEZOELECTRIC THICK FILM**
Kaijun Lin, Manjuan Huang, Xiaowei Feng, and Huicong Liu
Soochow University, CHINA

P15d DEVELOPMENT OF MICRO-STRUCTURAL WASTE HEAT UTILIZED POWER GENERATOR WITH SILICON AND REFRIGERANT

Minami Kaneko, Kenji Kofu, and Fumio Uchikoba
Nihon University, JAPAN

d - Implantable or Wearable Devices and Miniature Energy Systems

P16d ULTRASONIC POWER AND DATA TRANSFER USING A MINIATURE PHASED ARRAY FOR BIOMEDICAL IMPLANTS

Tianhui Li, Stephanos Theodossiades, Sotiris Korossis, and James A. Flint
Loughborough University, UK

e - Materials for Miniature Energy Systems

P17e ENHANCED ENERGY HARVESTING IN PVDF/ZNO NANOGENERATORS: A COMPARATIVE INVESTIGATION OF FABRICATION METHODS

Md. Jahirul Islam, Hyeji Lee, Jinseo Ha, Subin Lee, Songsu Kim, Young-Gun Kwon, Wolyoung Kim, Seokyu Kim, Kihak Lee, and Bonghwan Kim
Daegu Catholic University, KOREA (ROK)

P18f BISTABLE ELECTROMECHANICAL RECEIVER FOR ULTRA-LOW FREQUENCY WIRELESS POWER TRANSFER

Léo-Scott Macke¹, Adrien Morel¹, Aya Benhemou¹, Timotéo Payre², Luc Marechal¹, and Ludovic Charleux¹
¹*Université Savoie Mont Blanc, FRANCE and*
²*Cedrat Technologies, FRANCE*

f - Power Transfer

P19f COMPARATIVE ANALYSIS OF CLASS E AND CLASS $\Phi 2$ INVERTERS FOR 13.56 MHZ WIRELESS POWER TRANSFER SYSTEMS

Hieu L.Q. Nguyen, Nathis Cote, Nicolas Garraud, Leo Sterna, and Sébastien Boisseau
CEA-Leti, FRANCE

- P20g MODAL SHIFT CHARACTERIZATION OF LINBO3 THICK-FILM SURFACE ACOUSTIC WAVE TEMPERATURE SENSOR**
Yukang Shi¹, Ling Bu¹, and Xiaohong Wang²
¹China University of Geosciences, CHINA and
²Tsinghua University, CHINA

Session T4A Energy Harvesting and Power Transfer IV	Session T4B Energy Conversion and Power Transfer
Chair:	Chair:
17:00 – 17:20	
T4A-1 FIVE-TERMINAL DUAL-POLARITY MEMS ELECTROSTATIC TRANSDUCER FOR NEAR-LIMITS KINETIC ENERGY HARVESTING FROM IRREGULAR VIBRATIONS Moein Rahmani ¹ , Armine Karami ¹ , Francisco Ambia ² , Alexis Brenes ² , Dimitri Galayko ³ , Elie Lefevre ² , and Philippe Basset ¹ ¹ Université Gustave Eiffel, FRANCE, ² Paris-Saclay University, FRANCE, and ³ Sorbonne Université, FRANCE	T4B-1 MULTI-COIL-BASED INDUCTIVE POWER TRANSFER SYSTEM FOR IN-SITU SOIL SENSING APPLICATION Sheng Ding ¹ , John Sanchez ¹ , Shad Roundy ¹ , Ramesh Goel ¹ , Cody Zesiger ² , and Darrin Young ¹ ¹ University of Utah, USA and ² Utah State University, USA

17:20 – 17:40

T4A-2

INVESTIGATING THE EFFECT OF SURFACE TOPOLOGY MODIFICATIONS ON THE OUTPUT PERFORMANCE OF TENGs USING A STANDARDIZED SET-UP

Fiza Asif and Peter Woias
University of Freiburg, GERMANY

T4B-2

HIGH EFFICIENCY 2.496 GHZ CLASS E POWER AMPLIFIER FOR SPACE BASED SOLAR POWER APPLICATIONS

Nunzio Pucci¹, Martin Prusa¹, Vladimir Marinov¹, Hossein Mardani², Neil Buchanan², and Paul D. Mitcheson¹
¹Imperial College London, UK and ²Queen's University Belfast, UK

17:40 – 18:00

T4A-3

A WAVE ENERGY HARVESTER WITH VERTICAL PENDULUM AND MAG-BOOST MECHANISM

Tianyi Tang^{1,2}, Yunfei Li^{1,2}, Heng Zhao², Huicong Liu², and Lining Sun^{1,2}
¹Harbin Institute of Technology, CHINA and ²Soochow University, CHINA

T4B-3

A COMPARISON OF CURRENT-CARRYING COIL VERSUS ROTATING MAGNET TRANSMITTER FOR ELECTRODYNAMIC WIRELESS POWER TRANSMISSION

Vernon S. Crasto and David P. Arnold
University of Florida, USA

18:00 – 18:20

T4A-4

METASURFACES FOR ENHANCED ENERGY HARVESTING IN MEMS WITH LEAD-FREE PIEZOELECTRIC MATERIAL

Jacopo M. De Ponti¹, Luca Iorio¹, Michele Rosso¹, Federico Maspero¹, Annachiara Esposito², Tarek Afifi Afifi², Manuel Riani², Gabriele Gattere², Andrea Di Matteo², Alberto Corigliano¹, and Raffaele Ardito¹
¹Politecnico di Milano, ITALY and ²STMicroelectronics, ITALY

T4B-4

OPTIMIZATION OF AN ELECTROMAGNETIC HALBACH ARRAY FOR WIRELESS POWER TRANSFER

Dibin Zhu¹, Xianghe Luo¹, and Tamuno-Omie Gogo²
¹Shanghai Jiao Tong University, CHINA and ²University of Exeter, UK

Wednesday, 20 November

All indicated times are Central European Time (CET).

08:50 **Conference Announcements**

09:00 **Plenary Presentation I**

WPA-1 PRACTICAL USE OF MEMS VIBRATIONAL ENERGY HARVESTER BASED ON SOLID ION ELECTRET

Hiroyuki Mitsuya

Saginomiya Seisakusho, Inc., JAPAN

10:00 **Session W5A - Energy Harvesting and Power Transfer V**

Chair:

10:00 – 10:20

W5A-1 FULLY 3D-PRINTED ROTATIONAL ENERGY HARVESTER BASED ON BIPOLAR CHARGED PLA ELECTRETS

Dennis Flachs¹, Levin Bernhard¹, Sergey Zhukov²,
Heinz von Seggern², Alexander A. Altmann², Mario Kupnik²,
and Christiane Thielemann¹

¹*Technische Hochschule Aschaffenburg, GERMANY* and

²*Technische Universität Darmstadt, GERMANY*

10:20 – 11:30

W5A-2 DESIGN OF MEMS VIBRATIONAL ENERGY HARVESTERS USING MICRO-CAVITY STRUCTURES WITH SELF-ASSEMBLED ELECTRETS

Yuichiro Sunagawa¹, Ruichen Li¹, Kyoichi Kakuno¹,
Satoru Hosoi¹, Ayato Jingu², Aoi Ito², Yuya Tanaka²,
and Daisuke Yamane¹

¹*Ritsumeikan University, JAPAN* and ²*Gunma University, JAPAN*

12:40 – 13:00

W5A-3 CAM-DRIVEN FREQUENCY UP-CONVERSION MECHANISM FOR KINETIC ENERGY HARVESTING

Heng Zhao¹, Tianyi Tang^{1,2}, Yunfei Li^{1,2}, and Mingqi Mei¹

¹Soochow University, CHINA and ²

Harbin Institute of Technology, CHINA

11:00 Refreshment Break

Session W6A Energy Harvesting and Power Transfer VI	Session W6B Electrical Conditioning, Power Management and Energy Storage
Chair:	Chair:
11:30 – 11:50	
W6A-1 VIBRATION ENERGY CONVERTER WITH DOUBLE FREQUENCY-UP CONVERSION FOR ENHANCED SELF- POWERED HUMAN MOTION SENSING Guoliang Zhong ^{1,2} ¹ Southern University of Science and Technology, CHINA and ² Dongguan University of Technology, CHINA	W6B-1 EFFICIENT POWER MANAGEMENT OF TRIBOELECTRIC GENERATORS FOR KINETIC ENERGY HARVESTING AND SELF-POWERED SENSING IOT APPLICATIONS Hachem Mortada ¹ , Delaram Haghighi-Talab ¹ , Armine Karami ¹ , Ahmad Delbani ¹ , Dimitri Galayko ² , and Philippe Basset ¹ ¹ Université Gustave Eiffel, FRANCE and ² Sorbonne Université, FRANCE

11:50 – 12:10

W6A-2

**DOUBLE PENDULUM-BASED
NONLINEAR ROTATIONAL
ENERGY HARVESTING FROM
LOW-FREQUENCY HUMAN
MOTION FOR SELF-POWERED
SENSING**

Ziyu Wang¹, Ze Wei¹, Haopeng Xie¹, Hailing Fu¹, Nikolaos Chrysochoidis², and Fang Deng¹
¹*Beijing Institute of Technology, CHINA* and ²*University of Patras, GREECE*

W6B-2

**LOW SUPPORT-LOSS
MINIATURIZED ROSEN
TRANSFORMER ON 128° Y-CUT
LITHIUM NIOBATE**

Justin R. Phelps and Reza Abdolvand
University of Central Florida, USA

12:10 – 12:30

W6A-3

**DEMONSTRATION OF LOW
FREQUENCY AND HIGH-
POWER DENSITY ALN-BASED
PIEZOELECTRIC VIBRATION
ENERGY HARVESTERS USING
HIGH DENSITY TUNGSTEN
PROOF MASSES**

André Dompierre, Mostafa Keshavarzi, Amrid Amnache, and Luc G. Fréchette
Université de Sherbrooke, CANADA

W6B-3

**BOOST THE EFFICIENCY OF
STEP-DOWN CONVERTORS
WITH SWITCHING ORDER
OPTIMIZATION IN POWER
MANAGEMENT FOR HIGH-
VOLTAGE ENERGY
HARVESTERS**

Zerui Xu¹, Xiangyu Zhao¹, Ziyang Ou¹, Sixing Xu², and Xiaohong Wang¹
¹*Tsinghua University, CHINA* and ²*Hunan University, CHINA*

12:30 – 12:50

W6A-4

**HARVESTING OF KINETIC
ENERGY OF THE DROPLETS
BY MEMS DEVICE**

Hiroki Narita, Kensuke Kanda, and Kazusuke Maenaka
University of Hyogo, JAPAN

W6B-4

**POST-TREATMENT OF
CARBON NANOTUBES BASED
ELECTRODES TO REALIZE
LOW SELF-DISCHARGE
SUPERCAPACITORS**

Ulzhan Bassebek
University of South-Eastern Norway, NORWAY

13:00

Lunch

Session W7A Energy Harvesting and Power Transfer VII	W7B Ultra-Low- Power Sensors and Systems
Chair:	Chair:
14:30 – 14:50	
<p style="text-align: center;">W7A-1</p> <p>POTENTIAL-BASED DESIGN OF ELECTRET-DIELECTRIC ELASTOMER LAMINATED ENERGY HARVESTER</p> <p>Kenta Ichikawa, Seiya Fujino, Kenta Iitani, Wataru Hijikata, and Kohji Mitsubayashi <i>Institute of Science Tokyo, JAPAN</i></p>	<p style="text-align: center;">W7B-1</p> <p>ENHANCING SENSITIVITY USING FREQUENCY LOCALIZATION FACTOR IN GAS SENSOR ANTISYMMETRIC WEAKLY COUPLED RESONATORS</p> <p>Haythem Draoui¹, Zhengliang Fang¹, Stephanos Theodossiades¹, Antonio Di Buono², and Amal Z. Hajjaj¹ ¹Loughborough University, UK and ²National Nuclear Laboratory, UK</p>
14:50 – 15:10	
<p style="text-align: center;">W7A-2</p> <p>GRAVITY AND MAGNET-INDUCED BI-STABILITY FOR BROADBAND ROTATIONAL ENERGY HARVESTING</p> <p>Md Shamim Ahmed¹, Mark Longden², Xianghong Ma¹, and Yu Jia¹ ¹Aston University, UK and ²RL Automotive Ltd, UK</p>	<p style="text-align: center;">W7B-2</p> <p>POROUS SILICONE-BASED STRETCHABLE TRIBOELECTRIC NANOGENERATOR FOR WEARABLE SELF-POWERED BIOMOTION MONITORING</p> <p>Anamika Barua¹, Tamanna Yasmin², K. Zaman¹, and S M Sohel Rana¹ ¹Noakhali Science and Technology University, BANGLADESH and ²Korea Institute of Science and Technology, KOREA (ROK)</p>

15:10 – 15:30

W7A-3

**ELECTRODYNAMIC WIRELESS
POWER TRANSFER USING
ROTATING RESONANT
RECEIVER WITH HIGHLY
NONLINEAR BEHAVIOR**

Rémi Recoquillé^{1,2}, Nicolas
Garraud¹, Pierre Gasnier¹, and
Adrien Badel²

¹CEA-Leti, FRANCE and

²University Savoie Mont Blanc,
FRANCE

15:30

Refreshment Break

Session W8A Energy Harvesting and Power Transfer VIII	Session W8B Material and Fabrication II
Chair:	Chair:
16:00 – 16:20	
<p style="text-align: center;">W8A-1</p> <p>A WRIST-WORN ELECTRET ENERGY HARVESTER ENHANCED BY INTERMITTENT SWITCHING TO THE MOTOR MODE</p> <p>Zehan Shi¹, Tomoya Miyoshi¹, Adrien Morel², Adrien Badel², and Yuji Suzuki¹</p> <p>¹University of Tokyo, JAPAN and ²University of Savoie Mont Blanc, FRANCE</p>	<p style="text-align: center;">W8B-1</p> <p>THE HIGH OUTPUT MICROGENERATOR USING MGHFAL-N THIN FILMS</p> <p>Hiroki Kuwano^{1,2}, Hung H. Nguyen^{1,2}, Minh Van Le¹, and Yosuke Takayama^{1,2}</p> <p>¹Tohoku University, JAPAN and ²Sendai Smart Machines, JAPAN</p>

16:20 – 16:40

W8A-2

**CHALLENGES IN PRINTING
AND SHAPING SOFT
MAGNETIC FLUX GUIDES**

Steven W. Wright, Michail E.
Kiziroglou, and Eric M. Yeatman
Imperial College London, UK

W8B-2

**3D-PRINTED SOFT MAGNETIC
CORES FOR COMPACT
ELECTROMECHANICAL
DEVICES VIA MATERIAL
EXTRUSION**

Jorge Cañada and
Luis F. Velásquez-García
*Massachusetts Institute of
Technology, USA*

16:40 – 17:00

W8A-3

**TUNING NON-LINEARITY IN
CASCADED TAPERED SPRING
TOPOLOGIES OF EM-VEHS
WITH ENHANCED FIGURE OF
MERIT**

Karan Roy^{1,2}, Andreas Amann²,
and Saibal Roy^{1,2}
¹*Tyndall National Institute,*
IRELAND and ²*University College*
Cork, IRELAND

**19:00-
21:45** **Banquet & Award Ceremony**
(included in registration)

Thursday, 21 November

All indicated times are Central European Time (CET).

08:50 **Conference Announcements**

09:00 **Plenary Presentation III**

ThPA-1 THERMOELECTRICITY AT A LIQUID METAL INTERFACE

Christophe Gissinger

Ecole Normale Supérieure (ENS), FRANCE

10:00 **Session Th9A - Energy Harvesting
and Power Transfer IV**

Chair:

10:00 – 10:20

**Th9A-1 A VERSATILE MEMS ELECTROSTATIC TRANSDUCER
STRUCTURE TO ACHIEVE NEAR-ZERO STIFFNESS FOR
LOW-FREQUENCY ENERGY HARVESTING**

Shengkai Su¹, Binh Duc Truong², Snorre Aunet¹,
and Cuong Phu Le¹

*¹Norwegian University of Science and Technology, NORWAY
and ²University of Michigan, USA*

10:20 – 10:40

**Th9A-2 ENHANCED THERMOPOWER IN THERMOGALVANIC CELLS
USING D2O AS A SOLVENT**

Lixian Jiang¹, Shohei Horike², Vikas Nandal¹, Kazuhiko Seki¹,
and Qingshuo Wei¹

*¹National Institute of Advanced Industrial Science and
Technology, JAPAN and ²Kobe University, JAPAN*

10:40 **Refreshment Break**

Session Th10A Implantable or Wearable Devices	Session Th10B Actuation and Micro-Propulsion
Chair:	Chair:
11:20 – 11:40	
<p style="text-align: center;">Th10A-1</p> <p>NOVEL NI-SN ANODE/LIFEOP4 CATHODE NANOSTRUCTURES VIA ENHANCED DEPOSITION FOR ON-CHIP LITHIUM-ION MICRO BATTERIES</p> <p>Siyao Jiang, Bingmeng Hu, Zerui Xu, and Xiaohong Wang <i>Tsinghua University, CHINA</i></p>	<p style="text-align: center;">Th10B-1</p> <p>FORCE SENSING EVALUATION FOR A PIEZOELECTRIC-ACTUATED COMPLIANT ROBOT WITH ONBOARD VISUAL SERVOING</p> <p>Xu Chen¹, Linchuan Zhao^{1,2}, Michail E. Kiziroglou¹, and Eric M. Yeatman¹ <i>¹Imperial College London, UK and ²Shanghai Jiao Tong University, CHINA</i></p>
11:40 – 12:00	
<p style="text-align: center;">Th10A-2</p> <p>POWER TRANSFER AND 5D POSITION CONTROL OF AN ENDOSCOPIC CAPSULE ROBOT</p> <p>Anh-Tuan Vo and Nicolas Garraud <i>CEA-Leti, FRANCE</i></p>	<p style="text-align: center;">Th10B-2</p> <p>ELECTROMAGNETIC MICROPUMPS BASED ON MULTI-MATERIAL 3D PRINTING</p> <p>Chen Lin, Michail E. Kiziroglou, and Eric M. Yeatman <i>Imperial College London, UK</i></p>

12:00 **Lunch**

13:00 **Closing Remarks**