PowerMEMS 2021

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Monday, 6 December

All times are Greenwich Mean Time / Universal Time Coordinated (GMT/UTC)

12:00 **Conference Welcome**

General Chair
Dibin Zhu, University of Exeter, UK

Technical Program Chair
Yu Jia, Aston University, UK

12:10 **Plenary Presentation I**
Chair – Tomasz Grzebyk, *Wrocław University of Science and Technology, POLAND*

3D PRINTING OF ENERGY CONVERTING MICROSYSTEMS
Rafal Walczak
Wrocław University of Science and Technology, POLAND

12:55 Transition

13:00 **Oral Session 1**
Fabrication Techniques for Energy Harvesting Devices
Xiaohong Wang, *Tsinghua University, CHINA*

13:00 - 13:15

A HIGH-PERFORMANCE MICRO LITHIUM-ION CAPACITOR WITH 3D INTERDIGITAL ELECTRODES FOR ON-CHIP ENERGY STORAGE
Bingmeng Hu, Yushi Guo, and Xiaohong Wang
Tsinghua University, CHINA

13:15 - 13:30

NON-LITHOGRAPHIC AND SCALABLE FABRICATION OF ONE-TURN LIKE INDUCTOR HAVING LAMINATED NiFe CORE FOR POWER CONVERTERS OPERATING AT HIGH FREQUENCY
Jun Beom Pyo, Xuan Wang, Minsoo Kim, and Mark G. Allen
University of Pennsylvania, USA

13:30 - 13:45

STRETCHABLE PIEZOELECTRIC TENSILE SENSOR PATTERNED VIA ULTRAVIOLET LASER CUTTING
Mayue Shi, Andrew S. Holmes, and Eric M. Yeatman
Imperial College London, UK

13:00 **Oral Session 2**
Kinetic Energy Harvesting
Chair: Einar Halvorsen, *University College Southeast Norway, NORWAY*

13:00 - 13:15

A ROTATIONAL ELECTROMAGNETIC ENERGY HARVESTER FOR THE ULTRA-LOW FREQUENCY VIBRATION
Xinyu Ma, Xingyu Tang, Ziyue Zhang, Anxin Luo, and Fei Wang
Southern University of Science and Technology, CHINA

13:15 - 13:30

APPLICATION OF TWO DEGREE-OF-FREEDOM VIBRATIONAL ENERGY HARVESTING THEORY TO REAL ENVIRONMENTAL VIBRATION

Noriko Shimomura[1], Tomoya Miyoshi[2], Hisayuki Ashizawa[1], Hiroyuki Mitsuya[1], Gen Hashiguchi[3], Yuji Suzuki[2], and Hiroshi Toshiyoshi[2]
[1]Saginomiya Seisakusho, Inc., JAPAN, [2]University of Tokyo, JAPAN, and [3]Shizuoka University, JAPAN

13:30 - 13:45

SELF-SUSTAINED ARBITRARY MOTION SENSING SYSTEM FOR WIRELESS AUTONOMOUS CONTROL APPLICATION

Trilochan Bhatta, Pukar Maharjan, Kumar Shrestha, Sang Hyun Lee, Chani Park, and Jae Yeong Park
Kwangwoon University, KOREA

13:45 Transition

13:50 **Invited Speaker 1**
Chair: Tomoya Miyoshi, *University of Tokyo, JAPAN*

DEVELOPMENT OF CERAMIC ELECTRETS FOR VIBRATIONAL POWER GENERATOR

Yumi Tanaka
Tokyo University of Science, JAPAN

14:25 Transition

14:30 **Oral Session 3**
Wearable Energy Harvesting
Chair: Shad Roundy, *University of Utah, USA*

14:30 – 14:45

INVESTIGATION OF SELF-OSCILLATION PIEZOELECTRIC ENERGY HARVESTING MECHANICS FOR LOWER-LIMB MOTION

Shan Gao[1], Tianyiyi He[2], Hongrui Ao[1], and Chengkuo Lee[2]
[1]Harbin Institute of Technology, CHINA and [2]National University of Singapore, SINGAPORE

This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

14:45 – 15:00

HYDRAULIC VALVES DESIGN FOR THE OPERATION OF AN IN-EAR ENERGY HARVESTING SYSTEM

Tigran Avetissian[1], Fabien Formosa[1], Michel Demuynck[2], Aidin Delnavaz[2], Jérémie Voix[2], and Adrien Badel[1]
[1]Université Savoie Mont Blanc, FRANCE and [2]ÉTS Montréal, CANADA

15:00 – 15:15

TEXTILE-BASED RADIO FREQUENCY ENERGY HARVESTING AND STORAGE USING ULTRA-COMPACT RECTENNAS WITH HIGH EFFECTIVE-TO-PHYSICAL AREA RATIO

Mahmoud Wagih, Nicholas Hillier, Alex S. Weddell, and Steve Beeby
University of Southampton, UK

15:15 – 15:30

WIRELESS POWER TRANSFER BY SELF-BIASED MAGNETOELECTRIC LAMINATE FOR BIOMEDICAL IMPLANTS
Orpita Saha, Erik Andersen, and Shad Roundy
University of Utah, USA

14:30 **Oral Session 4**
Wireless Power Transfer
Chair: Paul Mitcheson, *Imperial College London, UK*

14:30 – 14:45

HIGHLY COUPLED HYBRID TRANSDUCTION FOR LOW-FREQUENCY ELECTRODYNAMIC WIRELESS POWER TRANSFER
Adrien Ameye[1], Nicolas Garraud[1], Pierre Gasnier[1], David Gibus[2], and Adrien Badel[2]
[1]University Grenoble Alpes, FRANCE and [2]Université Savoie Mont Blanc, FRANCE

14:45 – 15:00

COMPLEX IMPEDANCE MATCHING FOR FAR-FIELD ACOUSTIC WIRELESS POWER TRANSFER
Akshayaa Y.S. Pandiyan, Michail E. Kiziroglou, and Eric M. Yeatman
Imperial College London, UK

15:00 – 15:15

PIEZOELECTRIC STACKS TO INCREASE THE TRANSMITTED POWER OF ACOUSTIC POWER TRANSFER THROUGH METAL WALLS
Olivier Freychet, Sébastien Boisseau, François Frassati, Nicolas Garraud, Pierre Gasnier, and Ghislain Despesse
Université Grenoble Alpes, FRANCE

15:15 – 15:30

EXTENDING WIRELESS POWER TRANSFER DISTANCE USING ELECTROMAGNETIC HALBACH ARRAY
Tamuno-omie Gogo, Cristina Alexandru, and Dibin Zhu
University of Exeter, UK

This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

15:30 End of Day 1

Tuesday, 7 December

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12:00 **Plenary Presentation II**
Chair: Stephen Beeby, *University of Southampton, UK*

ACOUSTIC ENERGY HARVESTING AND WIRELESS POWER TRANSFER LEVERAGING METAMATERIALS
Alper Erturk
Georgia Institute of Technology, USA

12:45 Transition

12:50 **Oral Session 5**
PowerMEMS-In-Action
Chair: Hailing Fu, *Loughborough University, UK*

12:50 – 13:05

HIGH-GAIN AC-DC STEP-UP CONVERTER USING HYBRID PIEZO/MAGNETIC ELECTROMECHANICAL TRANSFORMER
Adrian A. Rendon-Hernandez, Miah A. Halim, Spencer E. Smith, and David P. Arnold
University of Florida, USA

This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

13:05 – 13:20

A SELF-POWERED WEARABLE DEVICE USING THE PHOTOVOLTAIC EFFECT FOR HUMAN HEATH MONITORING
Vishal Gyanchandani, Sayed Nahiyan Masabi, and Hailing Fu
Loughborough University, UK

This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

13:20 – 13:35

MULTI-FUNCTIONAL HYBRIDIZED UNITS FOR SELF-SUSTAINABLE IoT SENSING AND ULTRA-LOW FREQUENCY ENERGY HARVESTING
Xinge Guo[1], Fei Wang[2], Huicong Liu[3], and Chengkuo Lee[1]
[1]National University of Singapore, SINGAPORE, [2]Southern University of Science and Technology, CHINA, and [3]Soochow University, CHINA

This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

12:50 **Oral Session 6**
Broadband Energy Harvesting
Chair: Sindhu Preetham Burugupally, *Wichita State University, USA*

12:50 – 13:05

A STRONG ELECTROMECHANICALLY COUPLED AND LOW-DAMPED HARVESTER FOR RESONANT FREQUENCY TUNING
David Gibus[1], Pierre Gasnier[2], Adrien Morel[1], Adrien Ameye[2], and Adrien Badel[1]
[1]Université Savoie Mont Blanc, FRANCE and [2]Université Grenoble Alpes, FRANCE

13:05 – 13:20

SECONDARY IMPACT BANDWIDTH EFFECTS USING EMBEDDED VERTICAL MOVING MASS ENERGY HARVESTER
Nathan Jackson
University of New Mexico, USA

13:20 – 13:35

A RELIABLE AND WIDE-RANGE TUNING TECHNIQUE FOR LOW-FREQUENCY MEMS ENERGY HARVESTERS
Shengkai Su[1], Binh Duc Truong[2], Snorre Aunet[1], and Cuong Phu Le[1]
[1]Norwegian University of Science and Technology, NORWAY and [2]University of Utah, USA

13:35 Transition

13:40 **Invited Speaker 2**
Chair: David Arnold, *University of Florida, USA*

THERMOELECTRIC APPLICATIONS
Jonathan Siviter
TE Conversion Systems Ltd, UK

14:15 **Interactive Poster Session and PowerMEMS-In-Action Session**

See page 10 for the listing of poster presentations

See page 14 for the listing of PowerMEMS-in-Action presentations

15:30 End of Day 2

Wednesday, 8 December

All times are Greenwich Mean Time / Universal Time Coordinated (GMT/UTC)

12:00 **Plenary Presentation III**
Chair: Fei Wang, *Southern University of Science and Technology, CHINA*

SELF-POWERED SMART ELECTRONICS BASED ON THE EMERGING MATERIAL OF SILK FIBROIN
Xiaosheng Zhang
University of Electronic Science and Technology of China, CHINA

12:45 Transition

12:50 **Oral Session 7**
Triboelectric Energy Harvesting
Chair: Philippe Basset, *University Gustave Eiffel, FRANCE*

12:50 – 13:05

BENNET'S DOUBLER WITH DOUBLE CAPACITIVE TENG FOR KINETIC ENERGY HARVESTING
Naida Hodžić[1], Ahmad Delbani[1], Armine Karami[1], Dimitri Galayko[2], and Philippe Basset[1]
[1]University Gustave Eiffel, FRANCE and [2]Sorbonne Université, FRANCE

13:05 – 13:20

EXPERIMENTAL ANALYSIS OF ROTARY FREESTANDING TRIBOELECTRIC NANOGENERATORS
Keenan Chatar, Shu Uehara, Hiroki Kojima, Asuka Miura, Tomohide Yabuki, and Koji Miyazaki
Kyushu Institute of Technology, JAPAN

13:20 – 13:35

TRIBOELECTRIC NANOGENERATORS INTEGRATED SELF-ENERGY HARVESTING FLEXIBLE WINGS FOR BIPLANE FLAPPING-WING MICRO AIR VEHICLES
Hao Zheng, Zhonglai Wang, and Pengpeng Zhi
University of Electronic Science and Technology of China, CHINA

12:50 **Oral Session 8**
Piezoelectric and Electret Energy Harvesting
Chair: Yu Jia, *Aston University, UK*

12:50 – 13:05

PUSH-BUTTON ENERGY HARVESTER WITH ULTRA-SOFT ALL-POLYMER PIEZOELECTRET
Jia Lu and Yuji Suzuki
University of Tokyo, JAPAN

13:05 – 13:20

MULTI-OBJECTIVE DESIGN OPTIMIZATION OF FRACTAL-BASED PIEZOELECTRIC ENERGY HARVESTER
Bogdan Pamfil[1], Richard Palm[1], Agin Vyas[1], Henrik Staaf[2], Cristina Rusu[2], and Peter D. Folkow[1]
[1]Chalmers University of Technology, SWEDEN and
[2]RISE, Research Institutes of Sweden AB, SWEDEN

13:20 – 13:35

DEMONSTRATION OF NON-CONTACT TYPE VIBRATIONAL ENERGY HARVESTER WITH ELECTRIC DOUBLE LAYER ELECTRETS
Kentaro Tamura[1], Keigo Nota[1], Kazumoto Miwa[2], Shimpei Ono[2], and Daisuke Yamane[1]
[1]Ritsumeikan University, JAPAN and [2]Central Research Institute of Electric Power Industry, JAPAN

13:35 Transition

13:40 **Invited Speaker 3**
Chair: Abderraouf Boucherif, *Université de Sherbrooke, CANADA*

MEMS FOR CONTROLLING, HARVESTING AND MEASURING THERMAL RADIATION AT THE NANOSCALE
Raphael St-Gelais
University of Ottawa, CANADA

14:15 Transition

14:20 **Oral Session 9**
Thermoelectric Energy Harvesting
Chair: Abderraouf Boucherif, *Université de Sherbrooke, CANADA*

14:20 – 14:35

ROTATIONAL EXPERIMENT OF MEMS TURBINE FOR MINIATURE ORGANIC RANKIN CYCLE GENERATOR
Yuya Kobayashi, Yuya Niki, Kenji Takeda, Megumi Aibara, Minami Kaneko, and Fumio Uchikoba
Nihon University, JAPAN

14:35 – 14:50

HARVESTING PERFORMANCE OF A PLANAR THERMOELECTRIC MICROGENERATOR WITH A COMPACT DESIGN
Denise Estrada-Wiese[1], Jose-Manuel Sojo[2], Marc Salleras[1], Joaquín Santander[1], Marta Fernández-Regúlez[1], Iñigo Martín-Fernández[1], Alex Morata[2], Luis Fonseca[1], and Albert Tarancon[2]
[1]Institute of Microelectronics of Barcelona, SPAIN and [2]Catalonia Institute for Energy Research (IREC), SPAIN

14:50 – 15:05

DEVELOPMENT OF MANUFACTURING PROCESSES FOR VERTICAL MICRO-THERMOELECTRIC GENERATORS BASED ON PRINTED CIRCUIT BOARDS
Negin Sherkat, Swathi Krishna Subhash, Timo Gerach, Uwe Pelz, and Peter Woias
University of Freiburg, GERMANY

15:05 – 15:20

COLD-STARTING SWITCHED INDUCTOR BIPOLAR POWER MANAGEMENT FOR DYNAMIC THERMOELECTRIC HARVESTER
Markus R. Pollak[1], Michail E. Kiziroglou[2], Steven W. Wright[2] and Peter Spies[1]
[1]Fraunhofer Institute for Integrated Circuits (IIS) Nürnberg, GERMANY and [2]Imperial College London, UK

14:20 **Oral Session 10**
Power Conditioning and Storage
Chair: Andrew S. Holmes, *Imperial College London, UK*

14:20 – 14:35

TEXTILE-BASED HYBRID ENERGY STORAGE SYSTEM
Sheng Yong, Nicholas Hillier, and Stephen Beeby
University of Southampton, UK

14:35 – 14:50

TOWARDS POWER NEUTRAL WIRELESS SENSORS:
A REAL-TIME WHEEL ALIGNMENT MONITORING SYSTEM
Xiaoli Tang[1], Mark Longden[2], Yu Shi[3], Boyue Chen[3], Rabiya Farooq[2], Harry Lees[2], and Yu Jia[1]
[1]Aston University, UK, [2]RL Automotive Limited, UK, and [3]University of Chester, UK

14:50 – 15:05

HIGH PERFORMANCE GREEN HYDROGEN GENERATION SYSTEM
Khalifa Aliyu Ibrahim, Minkyung Kim, Daniel Kinuthia, Zaharaddeen Ali Hussaini,
Fergus Crawley, and Zhenhua Luo
Cranfield University, UK

15:05 – 15:20

PROBABILITY DISTRIBUTION OF GMPP UNDER DIFFERENT IRRADIATION AND TEMPERATURE CONDITIONS FOR GMPP TRACKING ALGORITHM
Kha Bao Khanh Cao and Vincent Boitier
Université de Toulouse, FRANCE

15:20 Transition

15:25 **Award Ceremony and Closing Comments**

15:35 Conference Adjourns

Interactive Poster Session

Tuesday, 7 December 14:15 - 15:30

Greenwich Mean Time / Universal Time Coordinated (GMT/UTC)

Classification Chart (last character of poster number)

a - Electrical Conditioning, Management, Storage and Transfer Systems for Energy Harvesting
b - Electron, Ion, Photon and Radiation Energy Transduction
c - General Physics for Micro Energy Transduction
d - Kinetic Energy Transduction, Including Energy Harvesting
e - Material Science, Multiferroic Materials and Advanced Functional Materials for Micro Energy Transduction
f - Mechanics and Mechanisms of Energy Harvesting and Actuation
g - Medical Sensors or Implants Using Energy Harvesting, Wearables
h - PowerMEMS In-Action (Concept, Prototype or Product)
i - RF Energy Harvesting and Wireless Power Transfer
j - Thermal, Chemical, Fuel Cells, Propulsion and Cooling
k - Triboelectric Energy Transduction, Including Energy Harvesting
l - Late News

a - Electrical Conditioning, Management, Storage and Transfer Systems for Energy Harvesting

P-01.a **AN EFFICIENT MAXIMUM POWER POINT TRACKING ARCHITECTURE FOR WEAKLY COUPLED PIEZOELECTRIC HARVESTERS BASED ON THE SOURCE I-V CURVE**
Nicolas Decroix[1], Pierre Gasnier[1], and Adrien Badel[2]
[1]Université Grenoble Alpes, FRANCE and [2]Université Savoie Mont Blanc, FRANCE

P-02.a **SYSTEMATIC INVESTIGATION OF BIPOLAR-CHARGED ELECTRET/TRIBOELECTRIC POWER GENERATOR: MODELING, EXPERIMENTS AND APPLICATIONS**
Zhe Zhao and Kai Tao
Northwestern Polytechnical University, CHINA

b - Electron, Ion, Photon and Radiation Energy Transduction

P-03.b **TOWARDS 3D PRINTED COMPACT QUADRUPOLE MASS SPECTROMETER WITH MEMS COMPONENTS**
Piotr Szyszka, Jakub Jendryka, Marcin Bialas, and Tomasz Grzebyk
Wrocław University of Science and Technology, POLAND

P-04.b **IDENTIFICATION OF A GAS COMPOSITION BASED ON AN OPTICAL SPECTRUM OF PLASMA GENERATED IN MEMS ION SPECTROMETER**
Tomasz Grzebyk, Piotr Szyszka, and Jan Dziuban
Wrocław University of Science and Technology, POLAND

P-05.b **MINIATURE ToF MASS SPECTROMETER WITH AN INTEGRATED GLOW-DISCHARE ION SOURCE**
Marcin Bialas, Jakub Jendryka, Jan Sobków, Szymon Zakrent, Piotr Szyszka, and Tomasz Grzebyk
Wrocław University of Science and Technology, POLAND

c - General Physics for Micro Energy Transduction

P-06.c **MAGNETIC FLUX GUIDANCE USING H STRUCTURES FOR MINIATURE TRANSDUCERS**
Steven W. Wright, Michail E. Kiziroglou, and Eric M. Yeatman
Imperial College London, UK

d - Kinetic Energy Transduction, Including Energy Harvesting

P-07.d **COMPARISONS OF ELECTROMAGNETIC TRANSDUCERS FOR ROTATIONAL ENERGY HARVESTING**
Dibin Zhu and Tamuno-omie Gogo
University of Exeter, UK

P-08.d **MULTIFUNCTIONAL COMPOSITES FOR ENERGY HARVESTING BASED ON PIEZOELECTRIC MICROGENERATOR**
Boyue Chen[1], Yu Jia[2], Xiaoli Tang[2], Fumio Narita[3], Kanjuro Makihara[3], and Yu Shi[1]
[1]University of Chester, UK, [2]Aston University, UK, and [3]Tohoku University, JAPAN

P-09.d **A ROTATIONAL WIND ENERGY HARVESTER AND SELF-POWERED PORTABLE WEATHER STATION**
Kumar Shrestha, Pukar Maharjan, Trilochan Bhatta, Sudeep Sharma, Sang Hyun Lee, and Jae Yeong Park
Kwangwoon University, KOREA

 This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

P-10.d **SPATIAL OPTIMIZATION OF PIEZOELECTRIC ENERGY SCAVENGER FROM CURRENT-CARRYING WIRE**
Omar Aragonez and Nathan Jackson
University of New Mexico, USA

P-11.d **PASSIVE FREQUENCY TUNING OF PIEZOELECTRIC ENERGY HARVESTER USING EMBEDDED MASSES**
Rahul Adhikari and Nathan Jackson
University of New Mexico, USA

P-12.d **POWER AND BANDWIDTH ENHANCEMENT THROUGH ASYMMETRIC BI-STABLE DESIGN FOR PIEZOELECTRIC ENERGY HARVESTERS**
Qingzhao Li, Xinbao Hou, Zhiwei Wang, Lanxing Qin, and Ling Bu
China University of Geosciences, CHINA

e - Material Science, Multiferroic Materials and Advanced Functional Materials for Micro Energy Transduction

P-13.e **A NEW APPROACH FOR OBTAINING PDMS FERROELECTRETS WITH RANDOM VOIDS**
Mingming Zhang, Junjie Shi, and Steve P. Beeby
University of Southampton, UK

f - Mechanics and Mechanisms of Energy Harvesting and Actuation

P-14.f **EVALUATION PLATFORM FOR MEMS-ACTUATED 3D-PRINTED COMPLIANT STRUCTURES**
Xu Chen, Michail E. Kiziroglou, and Eric M. Yeatman
Imperial College London, UK

P-15.f **THE ANALYSIS OF MAGNETIC COUPLING FORCE TO AN ENERGY HARVESTER WITH ROTATIONAL FREQUENCY UP-CONVERSION STRUCTURE**
Weihan Xu, Anxin Luo, and Fei Wang
Southern University of Science and Technology, CHINA

g - Medical Sensors or Implants Using Energy Harvesting, Wearables

P-16.g **DESIGN SPACE EXPLORATION OF A FULLY AUTONOMOUS HEALTH MONITORING WBAN NODE WITH HYBRID ENERGY HARVESTING**
Molly Sharone and Ali Muhtaroğlu
Middle East Technical University Northern Cyprus Campus, TURKEY

h - PowerMEMS In-Action (Concept, Prototype or Product)

P-17.h **EXPLORATION OF MULTI-DIMENSIONAL SENSING IN HUMAN MACHINE INTERACTIONS**
Minglu Zhu, Zhongda Sun, and Chengkuo Lee
National University of Singapore, SINGAPORE


This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

P-18.h **DEVELOPMENT OF A CHIP-LEVEL ULTIMATE SECURITY DEVICE USING REACTIVE COMPOSITES**
Florent Sevely, Tao Wu, Sylvain Pelloquin, Lionel Seguier,
Fabien Mesnilgrente, and Carole Rossi
University of Toulouse, FRANCE


This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.

i - RF Energy Harvesting and Wireless Power Transfer

P-19.i **INTERMEDIATE LAYER TO IMPROVE THE PERFORMANCES AND THE FREQUENCY CONTROL OF ACOUSTIC POWER TRANSFER SYSTEMS**
Olivier Freychet, François Frassati, Sébastien Boisseau, Nicolas Garraud,
Pierre Gasnier, and Ghislain Despesse
Université Grenoble Alpes, FRANCE

P-20.i **A DYNAMIC TRANSMIT COIL FOR WIRELESSLY POWERING SMALL ME TRANSDUCER BASED BIOMEDICAL IMPLANTS**
Erik Andersen, Orpita Saha, and Shad Roundy
University of Utah, USA

j - Thermal, Chemical, Fuel Cells, Propulsion and Cooling

P-21.j **FABRICATION OF ALL-SOLID-STATE AMORPHOUS THIN-FILM LITHIUM-ION BATTERIES**
Kenta Tsuji, Masayasu Yoshida, and Isaku Kanno
Kobe University, JAPAN

k - Triboelectric Energy Transduction, Including Energy Harvesting

P-22.k **CONTACT-SEPARATION MODE ELECTRET GENERATOR SUPPORTED BY MAGNETS**
Shuangshuang Yang, Yao Chu, Kangkang Dong,
Ruixing Han, Xuanchen Tian, and Fei Tang
Tsinghua University, CHINA

P-23.k **COMPARATIVE STUDY OF FREQUENCY RESPONSE OF TRIBOELECTRIC AND PIEZOELECTRIC ENERGY HARVESTERS**
Sourav Naval, Nadeem Tariq Beigh, Ankesh Jain, and Dhiman Mallick
Indian Institute of Technology, Delhi, INDIA

I - Late News

P-24.l **3D PRINTED MULTI-FREQUENCY VIBRATIONAL ENERGY HARVESTER**
Bartosz Kawa and Rafał Walczak
Wrocław University of Science and Technology, POLAND

P-25.l **AN INVESTIGATION ON THE MAGNETIC INTERACTION FOR FREQUENCY UP-CONVERTING PIEZOELECTRIC VIBRATION ENERGY HARVESTERS**
Michele Rosso, Alberto Corigliano, and Raffaele Ardito
Politecnico di Milano, ITALY

P-26.l **OPPORTUNITIES FOR ELECTRICALLY-BASED FREQUENCY TUNING OF PIEZOELECTRIC VIBRATION ENERGY HARVESTERS**
Adrien Morel[1], David Gibus[1], Gaël Pillonnet[2], Adrien Badel[1]
[1]Université Savoie Mont Blanc, FRANCE and [2]Université Grenoble Alpes, FRANCE

P-27.l **ROTATION-INDUCED-TUNABLE STOCHASTIC RESONANCE FOR STABILIZING SUSTAINABILITY OF ENERGY HARVESTING**
Yunshun Zhang[1], Xiangshuai Zhao[1], and Wanshu Wang[2]
[1]Jiangsu University, CHINA and [2]University of Tsukuba, JAPAN

Interactive PowerMEMS-In-Action Presentations

Tuesday, 7 December 14:15 - 15:30

Greenwich Mean Time / Universal Time Coordinated (GMT/UTC)

A ROTATIONAL WIND ENERGY HARVESTER AND SELF-POWERED PORTABLE WEATHER STATION

Kumar Shrestha, Pukar Maharjan, Trilochan Bhatta, Sudeep Sharma, Sang Hyun Lee, and Jae Yeong Park

Kwangwoon University, KOREA

This paper is poster presentation P-09.d

A SELF-POWERED WEARABLE DEVICE USING THE PHOTOVOLTAIC EFFECT FOR HUMAN HEATH MONITORING

Vishal Gyanchandani, Sayed N. Masabi, and Hailing Fu

Loughborough University, UK

This paper is presented in Oral Session 5 - PowerMEMS-In-Action.

DEVELOPMENT OF A CHIP-LEVEL ULTIMATE SECURITY DEVICE USING REACTIVE COMPOSITES

Florent Sevely, Tao Wu, Sylvain Pelloquin, Lionel Seguier, Fabien Mesnilgrente, and Carole Rossi

University of Toulouse, FRANCE

This paper is poster presentation P-18.h

EXPLORATION OF MULTI-DIMENSIONAL SENSING IN HUMAN MACHINE INTERACTIONS

Minglu Zhu, Zhongda Sun, and Chengkuo Lee

National University of Singapore, SINGAPORE

This paper is poster presentation P-17.h

EXTENDING WIRELESS POWER TRANSFER DISTANCE USING ELECTROMAGNETIC HALBACH ARRAY

Tamuno-omie Gogo, Cristina Alexandru, and Dibin Zhu

University of Exeter, UK

This paper is presented in Oral Session 4 - Wireless Power Transfer.

HIGH-GAIN AC-DC STEP-UP CONVERTER USING HYBRID PIEZO/MAGNETIC ELECTROMECHANICAL TRANSFORMER

Adrian A. Rendon-Hernandez, Miah A. Halim, Spencer E. Smith, and David P. Arnold

University of Florida, USA

This paper is presented in Oral Session 5 - PowerMEMS-In-Action.

INVESTIGATION OF SELF-OSCILLATION PIEZOELECTRIC ENERGY HARVESTING MECHANICS FOR LOWER-LIMB MOTION

Shan Gao[1], Tianyiyi He[2], Hongrui Ao[1], and Chengkuo Lee[2]

[1]Harbin Institute of Technology, CHINA and [2]National University of Singapore, SINGAPORE

This paper is presented in Oral Session 3 - Wearable Energy Harvesting.

MULTI-FUNCTIONAL HYBRIDIZED UNITS FOR SELF-SUSTAINABLE IOT SENSING AND ULTRA-LOW FREQUENCY ENERGY HARVESTING

Xinge Guo[1], Fei Wang[2], Huicong Liu[3], and Chengkuo Lee[1]
[1]National University of Singapore, SINGAPORE, [2]Southern University of Science and Technology, CHINA, and [3]Soochow University, CHINA

This paper is presented in Oral Session 5 - PowerMEMS-In-Action.