2021 IEEE 20th International Conference on Micro and **Nanotechnology for Power Generation and Energy Conversion Applications** (PowerMEMS 2021)

Exeter, United Kingdom 6 – 8 December 2021



IEEE Catalog Number: CFP21W20-POD ISBN:

978-1-6654-2219-2

Copyright \odot 2021 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP21W20-POD

 ISBN (Print-On-Demand):
 978-1-6654-2219-2

 ISBN (Online):
 978-1-6654-221:/7

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



TABLE OF CONTENTS

Monday, 6 December All times are Greenwich Mean Time / Universal Time Coordinated (GMT/UTC) 12:00 Conference Welcome 12:10 **Plenary Presentation I** 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 13:00 - 13:15 NON-LITHOGRAPHIC AND SCALABLE FABRICATION OF ONE-TURN LIKE INDUCTOR Jun Beom Pyo, Xuan Wang, Minsoo Kim, and Mark G. Allen University of Pennsylvania, USA 13:15 - 13:30 A HIGH-PERFORMANCE MICRO LITHIUM-ION CAPACITOR WITH 3D INTERDIGITAL Bingmeng Hu, Yushi Guo, and Xiaohong Wang Tsinghua University, CHINA 13:30 - 13:45 STRETCHABLE PIEZOELECTRIC TENSILE SENSOR PATTERNED VIA Mayue Shi, Andrew S. Holmes, and Eric M. Yeatman Imperial College London, UK

13:00 - 13:15

13:00

Oral Session 2

Kinetic Energy Harvesting

13:15 - 13:30
APPLICATION OF TWO DEGREE-OF-FREEDOM VIBRATIONAL ENERGY HARVESTING THEORY TO REAL ENVIRONMENTAL VIBRATION
13:30 - 13:45
SELF-SUSTAINED ARBITRARY MOTION SENSING SYSTEM FOR WIRELESS AUTONOMOUS CONTROL APPLICATION
13:45 Transition
13:50 Invited Speaker 1
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
14:30 – 14:45
HYDRAULIC VALVES DESIGN FOR THE OPERATION OF AN IN-EAR ENERGY HARVESTING SYSTEM 24 Tigran Avetissian ¹ , Fabien Formosa ¹ , Michel Demuynck ² , Aidin Delnavaz ² , Jérémie Voix ² , and Adrien Badel ¹ **Iniversité Savoie Mont Blanc, FRANCE and **ÉTS Montréal, CANADA**
14:45 – 15:00
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.
15:00 – 15:15
TEXTILE-BASED RADIO FREQUENCY ENERGY HARVESTING AND STORAGE USING ULTRA-COMPACT RECTENNAS WITH HIGH EFFECTIVE-TO-PHYSICAL AREA RATIO 32 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
14:30 Oral Session 4 Wireless Power Transfer
14:30 – 14:45
HIGHLY COUPLED HYBRID TRANSDUCTION FOR LOW-FREQUENCY ELECTRODYNAMIC WIRELESS POWER TRANSFER 40 Adrien Ameye ¹ , Nicolas Garraud ¹ , Pierre Gasnier ¹ , David Gibus ² , and Adrien Badel ² **Inniversity Grenoble Alpes, FRANCE and **Université Savoie Mont Blanc, FRANCE**
14:45 – 15:00
COMPLEX IMPEDANCE MATCHING FOR FAR-FIELD ACOUSTIC WIRELESS POWER TRANSFER
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 52 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
All times are Greenwich Mean Time / Universal Time Coordinated (GMT/UTC)

12:00	Plenary Presentation II			
	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			
	12:50 – 13:05			
ELEC Adriar	-GAIN AC-DC STEP-UP CONVERTER USING HYBRID PIEZO/MAGNETIC ETROMECHANICAL TRANSFORMER In A. Rendon-Hernandez, Miah A. Halim, Spencer E. Smith, and David P. Arnold In A. Rendon-Hernandez, USA	56		
0	This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.			
	13:05 – 13:20			
EFFE Vishal	LF-POWERED WEARABLE DEVICE USING THE PHOTOVOLTAIC CT FOR HUMAN HEATH MONITORING I Gyanchandani, Sayed Nahiyan Masabi, and Hailing Fu nborough University, UK	60		
	This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.			
	13:20 – 13:35			
SENS Xinge ¹ Natio	GI-FUNCTIONAL HYBRIDIZED UNITS FOR SELF-SUSTAINABLE IOT SING AND ULTRA-LOW FREQUENCY ENERGY HARVESTING Guo ¹ , Fei Wang ² , Huicong Liu ³ , and Chengkuo Lee ¹ and University of Singapore, SINGAPORE, ² Southern University of Science and Technology, CHINA, and Chow University, CHINA	64		
(This paper will also be presented in Tuesday's PowerMEMS-in-Action Session.			
12:50	Oral Session 6 Broadband Energy Harvesting			
	12:50 – 13:05			
HARV David	RONG ELECTROMECHANICALLY COUPLED AND LOW-DAMPED /ESTER FOR RESONANT FREQUENCY TUNING Gibus ¹ , Pierre Gasnier ² , Adrien Morel ¹ , Adrien Ameye ² , and Adrien Badel ¹ ersité Savoie Mont Blanc, FRANCE and ² Université Grenoble Alpes, FRANCE	68		

	13:05 – 13:20	
VERTICAL N Nathan Jacks	RY IMPACT BANDWIDTH EFFECTS USING EMBEDDED MOVING MASS ENERGY HARVESTER ISSON F New Mexico, USA	72
	13:20 – 13:35	
MEMS ENER Shengkai Su	E AND WIDE-RANGE TUNING TECHNIQUE FOR LOW-FREQUENCY RGY HARVESTERS 1, Binh Duc Truong ² , Snorre Aunet ¹ , and Cuong Phu Le ¹ University of Science and Technology, NORWAY and ² University of Utah, USA	76
13:35	Transition	
13:40	Invited Speaker 2	
	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				
	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			
	12:50 – 13:05			
Naida Hodž	DOUBLER WITH DOUBLE CAPACITIVE TENG FOR KINETIC ENERGY HARVESTING 80 ić ¹ , Ahmad Delbani ¹ , Armine Karami ¹ , Dimitri Galayko ² , and Philippe Basset ¹ Gustave Eiffel, FRANCE and ² Sorbonne Université, FRANCE			
	13:05 – 13:20			
Keenan Cha	NTAL ANALYSIS OF ROTARY FREESTANDING TRIBOELECTRIC NANOGENERATORS			
	13:20 – 13:35			
WITHDRAV	VN			
12:50	Oral Session 8 Piezoelectric and Electret Energy Harvesting			
	12:50 – 13:05			
Jia Lu and \	TON ENERGY HARVESTER WITH ULTRA-SOFT ALL-POLYMER PIEZOELECTRET			
	13:05 – 13:20			
PIEZOELEO Bogdan Par ¹ Chalmers U	DECTIVE DESIGN OPTIMIZATION OF FRACTAL-BASED CTRIC ENERGY HARVESTER 96 mfil ¹ , Richard Palm ¹ , Agin Vyas ¹ , Henrik Staaf ² , Cristina Rusu ² , and Peter D. Folkow ¹ University of Technology, SWEDEN and earch Institutes of Sweden AB, SWEDEN			

13:20 – 13:35		
WITH ELEC Kentaro Ta	RATION OF NON-CONTACT TYPE VIBRATIONAL ENERGY HARVESTER CTRIC DOUBLE LAYER ELECTRETS mura ¹ , Keigo Nota ¹ , Kazumoto Miwa ² , Shimpei Ono ² , and Daisuke Yamane ¹ an University, JAPAN and ² Central Research Institute of Electric Power Industry, JAPAN	100
13:35	Transition	
13:40	Invited Speaker 3	
	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	
	14:20 – 14:35	
ORGANIC Yuya Koba	IAL EXPERIMENT OF MEMS TURBINE FOR MINIATURE RANKIN CYCLE GENERATOR yashi, Yuya Niki, Kenji Takeda, Megumi Aibara, Minami Kaneko, and Fumio Uchikoba ersity, JAPAN	104
	14:35 – 14:50	
MICROGEI Denise Esti Iñigo Martír	NG PERFORMANCE OF A PLANAR THERMOELECTRIC NERATOR WITH A COMPACT DESIGN rada-Wiese ¹ , Jose-Manuel Sojo ² , Marc Salleras ¹ , Joaquín Santander ¹ , Marta Fernández-Regúlez ¹ , n-Fernández ¹ , Alex Morata ² , Luis Fonseca ¹ , and Albert Tarancon ² r Microelectronics of Barcelona, SPAIN and ² Catalonia Institute for Energy Research (IREC), SPAIN	108
	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	
FOR DYNA Markus R. I	ARTING SWITCHED INDUCTOR BIPOLAR POWER MANAGEMENT AMIC THERMOELECTRIC HARVESTER Pollak ¹ , Michail E. Kiziroglou ² , Steven W. Wright ² and Peter Spies ¹ r Institute for Integrated Circuits (IIS) Nürnberg, GERMANY and ² Imperial College London, UK	116

1	1	•	ว	n
	_	٠.	_	u

Oral Session 10 Power Conditioning and Storage

14:20 – 14:35	
TEXTILE-BASED HYBRID ENERGY STORAGE SYSTEM Sheng Yong, Nicholas Hillier, and Stephen Beeby University of Southampton, UK	120
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 **Aston University, UK, **2RL Automotive Limited, UK, and **3University of Chester, UK	124
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	128
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	132
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 - Electri	cal Conditioning, Management, Storage and Transfer Systems for Energy Harvesting	
b - Electro	on, Ion, Photon and Radiation Energy Transduction	
c - Genera	al Physics for Micro Energy Transduction	
d - Kineti	c Energy Transduction, Including Energy Harvesting	
e - Materi	al Science, Multiferroic Materials and Advanced Functional Materials for Micro Energy Trans	sduction
f - Mecha	nics and Mechanisms of Energy Harvesting and Actuation	
g - Medic	al Sensors or Implants Using Energy Harvesting, Wearables	
h - Power	MEMS In-Action (Concept, Prototype or Product)	
i - RF Ene	ergy Harvesting and Wireless Power Transfer	
j - Therma	al, Chemical, Fuel Cells, Propulsion and Cooling	
k - Triboe	lectric Energy Transduction, Including Energy Harvesting	
I - Late No	ews	
	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	136
	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	140
	Zhe Zhao and Kai Tao Northwestern Polytechnical University, CHINA	
	Northwestern Folyteen mean on worstly, or my	
	b - Electron, Ion, Photon and Radiation Energy Transduction	
P-03.b	TOWARDS 3D PRINTED COMPACT QUADRUPOLE MASS SPECTROMETER	
	WITH MEMS COMPONENTS	144
	Piotr Szyszka, Jakub Jendryka, Marcin Bialas, and Tomasz Grzebyk Wrocław University of Science and Technology, POLAND	
	Wiodaw Offiversity of Science and Technology, FOLAND	
P-04.b	IDENTIFICATION OF A GAS COMPOSITION BASED ON AN OPTICAL SPECTRUM	
	OF PLASMA GENERATED IN MEMS ION SPECTROMETER	148
	Tomasz Grzebyk, Piotr Szyszka, and Jan Dziuban Wrocław University of Science and Technology, POLAND	
	The state of the following of the following of the first	
P-05.b	MINIATURE TOF MASS SPECTROMETER WITH AN INTEGRATED	4.00
	GLOW-DISCHARE ION SOURCE Marcin Bialas, Jakub Jendryka, Jan Sobków, Szymon Zakrent,	152
	Piotr Szyszka, and Tomasz Grzebyk	
	Wrocław University of Science and Technology, POLAND	

c - General Ph	veice for N	Micro Energy	Transd	luction
c - General Fil	ysics for it	MICIO EHEIGY	Hallou	luction

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	156
	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	160
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 **University of Chester, UK, **2Aston University, UK, and **Tohoku University, JAPAN	164
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.	168
P-10.d	SPATIAL OPTIMIZATION OF PIEZOELECTRIC ENERGY SCAVENGER FROM CURRENT-CARRYING WIRE Omar Aragonez and Nathan Jackson University of New Mexico, USA	172
P-11.d	PASSIVE FREQUENCY TUNING OF PIEZOELECTRIC ENERGY HARVESTER USING EMBEDDED MASSES Rahul Adhikari and Nathan Jackson University of New Mexico, USA	176
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	180
	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	184
	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	188

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	192
	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	196
	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	200
	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.	204
	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	208
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	212
	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	216

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	220
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	224
I - Late News		
P-24.I	3D PRINTED MULTI-FREQUENCY VIBRATIONAL ENERGY HARVESTER Bartosz Kawa and Rafał Walczak Wrocław University of Science and Technology, POLAND	228
P-25.I	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	232
P-26.I	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	236
P-27.I	ROTATION-INDUCED-TUNABLE STOCHASTIC RESONANCE FOR STABILIZING SUSTAINABILITY OF ENERGY HARVESTING Yunshun Zhang¹, Xiangshuai Zhao¹, and Wanshu Wang² ¹Jiangsu University, CHINA and ²University of Tsukuba, JAPAN	240