

## Program at a Glance

# PowerMEMS 2011

Date	Time	Program	Location
15 Nov. (Tue)	17:00 – 20:00	<b>Registration</b>	<b>Lobby</b>
	18:00 – 20:00	Committee Meeting	Rose Hall
	17:00 – 20:00	<b>Welcome Buffet</b>	<b>Sejong Hall</b>
16 Nov. (Wed)	07:00 – 08:00	<b>Registration</b>	<b>Lobby</b>
	08:00 – 08:20	<b>Workshop Welcome &amp; Introduction</b>	<b>Sejong Hall</b>
	08:20 – 09:05	<b>Plenary Talk (Albert P. Pisano, UC Berkeley)</b>	<b>Sejong Hall</b>
	09:05 – 09:50	<b>Invited Talk I (Kunihito Koumoto, Nagoya Univ.)</b>	<b>Sejong Hall</b>
	09:50 – 10:10	Break	Lobby
	10:10 – 11:30	<b>Oral Sessions 1A/ 1B</b>	<b>Sejong/ Orchid Halls</b>
	11:30 – 13:00	Lunch	
	13:00 – 14:20	<b>Oral Sessions 2A/ 2B</b>	<b>Sejong/ Orchid Halls</b>
	14:20 – 14:40	Break	Lobby
	14:40 – 16:00	<b>Oral Sessions 3A/ 3B</b>	<b>Sejong/ Orchid Halls</b>
	16:00 – 17:20	<b>Poster Session I</b>	<b>Lilac Hall</b>
18:30 – 20:00	<b>Dinner Buffet</b>	<b>Sejong Hall</b>	
17 Nov. (Thur)	08:00 – 08:15	Workshop Announcements	Sejong Hall
	08:15 – 09:00	<b>Invited Talk II (Peter Woias, IMTEK)</b>	<b>Sejong Hall</b>
	09:00 – 09:20	Break	Lobby
	09:20 – 10:40	<b>Oral Sessions 4A/ 4B</b>	<b>Sejong/ Orchid Halls</b>
	10:40 – 12:00	<b>Poster Session II</b>	<b>Lilac Hall</b>
	12:00 – 13:30	Lunch	
	13:30 – 18:00	<b>Technical Tour I (Samsung Electro-Mechanics)</b>	<b>Lobby (1<sup>st</sup> Floor, 13:30)</b>
18:00 – 21:00	<b>Conference Banquet (Best Poster Paper Award)</b>	<b>Sejong Hall</b>	
18 Nov. (Fri)	08:00 – 08:10	Workshop Announcements	Sejong Hall
	08:10 – 08:55	<b>Invited Talk III (Sangkyun Kang, SAIT)</b>	<b>Sejong Hall</b>
	08:55 – 09:05	Break	Lobby
	09:05 – 10:25	<b>Oral Sessions 5A/ 5B</b>	<b>Sejong/ Orchid Halls</b>
	10:25 – 10:35	Break	Lobby
	10:35 – 11:20	<b>Invited Talk IV (Kaoru Maruta, Tohoku Univ.)</b>	<b>Sejong Hall</b>
	11:20 – 11:30	Break	Lobby
	11:30 – 12:50	<b>Oral Sessions 6A/ 6B</b>	<b>Sejong/ Orchid Halls</b>
	12:50 – 13:00	Conference Adjourns	Sejong Hall
	13:00 – 14:00	Lunch	
14:00 – 16:30	<b>Technical Tour II (LG Elite)</b>	<b>Lobby (1<sup>st</sup> Floor, 14:00)</b>	

## 15 (Tue) November 2011

17:00 – 20:00	Registration	Lobby (3 <sup>rd</sup> Floor)
18:00 – 20:00	Committee Meeting	Rose Hall (3 <sup>rd</sup> Floor)
17:00 – 20:00	<b>Welcome Buffet</b>	Sejong Hall (3 <sup>rd</sup> Floor)

## 16 (Wed) November 2011

07:00 – 08:00	Registration	Lobby (3 <sup>rd</sup> Floor)
08:00 – 08:20	<b>Workshop Welcome &amp; Introduction</b>	Sejong Hall (3 <sup>rd</sup> Floor)
08:20 – 09:05	<b>Plenary Talk</b> Chair: Young-Ho Cho <i>KAIST, Republic of Korea</i>	Sejong Hall (3 <sup>rd</sup> Floor)
<b>Harsh Environment MEMS for Energy &amp; Power Applications</b> Albert P. Pisano ( <i>UC Berkeley, USA</i> )		
09:05 – 09:50	<b>Invited Talk I</b> Chair: Ruud Vullers <i>Imec/Holst Centre, the Netherlands</i>	Sejong Hall (3 <sup>rd</sup> Floor)
<b>Novel Thermoelectric Materials for Photovoltaic/Thermoelectric Hybrid Power Generators</b> Kunihito Koumoto ( <i>Nagoya Univ., Japan</i> )		
09:50 – 10:10	Break	Lobby (3 <sup>rd</sup> & 4 <sup>th</sup> Floor)

Oral Session 1A Sejong Hall (3 <sup>rd</sup> Floor)	Oral Session 1B Orchid Hall (4 <sup>th</sup> Floor)
<b>Piezoelectric Energy Harvesters &amp; Conversion I (Design Issues Part I)</b>	<b>Fuel Cells &amp; Reactors I (Design Issues)</b>
Session Chair:	Session Chair:
Frank Goldschmidtboeing <i>Univ. Freiburg, Germany</i>	Luc G. Frechette <i>Univ. Sherbrooke, Canada</i>
10:10 – 10:30	
1A-1	1B-1
<b>Wide Bandwidth Piezoelectric Micro Energy Harvester based on Nonlinear Resonance</b> A. Hajati <sup>1</sup> , R. Xu <sup>2</sup> , and S.-G. Kim <sup>2</sup> <sup>1</sup> <i>FUJIFILM, USA</i> <sup>2</sup> <i>MIT, USA</i>	<b>Towards Implantable Autonomous Systems; A Low-Power Transducer Platform Powered by a Glucose-Fuel Cell</b> C. Köhler <sup>1</sup> , C. Bentler <sup>1</sup> , A. Kloke <sup>1</sup> , J. Oudenhoven <sup>2</sup> , V. Pop <sup>2</sup> , J.H.G. Op het Veld <sup>3</sup> , and S. Kerzenmacher <sup>1</sup> <sup>1</sup> <i>Univ. Freiburg, IMTEK, Germany</i> <sup>2</sup> <i>Imec/Holst Centre, the Netherlands</i> <sup>3</sup> <i>Philips Research Laboratories, the Netherlands</i>
10:30 – 10:50	
1A-2	1B-2
<b>Magnetostrictive-Piezoelectric Composite Structure for Energy Harvesting</b> T. Lafont <sup>1</sup> , J. Delamare <sup>1</sup> , G.A. Lebedev <sup>1,2</sup> , D.I. Zakharov <sup>1</sup> , B. Viala <sup>2</sup> , O. Cugat <sup>1</sup> , O. Geoffroy <sup>1</sup> , N. Galopin <sup>1</sup> , L. Garbuio <sup>1</sup> <sup>1</sup> <i>Grenoble Electrical Engineering Lab., France</i> <sup>2</sup> <i>CEA, LETI, MINATEC Campus, France</i>	<b>A Dual-Chamber Reciprocating Air Supply Device using Electromagnetic Actuation for Portable PEMFCs</b> H. Kang, K. Kwon, and D. Kim <i>Sogang Univ., Republic of Korea</i>

10:50 – 11:10	
<p>1A-3</p> <p><b>Tuning Resonant Energy Harvesters using a Variable Reluctance Link</b> A.G. Mukherjee, P.D. Mitcheson, S.W. Wright, and E.M. Yeatman <i>Imperial College London, U.K</i></p>	<p>1B-3</p> <p><b>Self-Circulation System of Insect Hemolymph for Insect-Mountable Biofuel Cell</b> K. Shoji<sup>1</sup>, Y. Akiyama<sup>1</sup>, M. Suzuki<sup>2</sup>, T. Hoshino<sup>1</sup>, N. Nakamura<sup>2</sup>, H. Ohno<sup>2</sup>, and K. Morishima<sup>1,3</sup> <sup>1,2</sup><i>Tokyo Univ. Agriculture and Technology, Japan</i> <sup>3</sup><i>Osaka Univ., Japan</i></p>
11:10 – 11:30	
<p>1A-4</p> <p><b>Low Frequency MEMS Piezoelectric Energy Harvesting</b> L. Gu<sup>1</sup> and C. Livermore<sup>2</sup> <sup>1</sup><i>MIT, USA</i> <sup>2</sup><i>Northeastern Univ., USA</i></p>	<p>1B-4</p> <p><b>Fuel Utilization in Air-Breathing Membraneless Laminar Flow-based Fuel Cell</b> S.A.M. Shaegh, N.-T. Nguyen, S.H. Chan, and W. Zhou <i>Nanyang Technological Univ., Singapore</i></p>
11:30 – 13:00 Lunch	
13:00 – 13:20	
<p><b>Oral Session 2A</b> Sejong Hall (3<sup>rd</sup> Floor)</p> <p><b>Piezoelectric Energy Harvesters &amp; Conversion II (Design Issues Part II &amp; Circuit Issues)</b></p> <p>Session Chair: Hiroki Kuwano <i>Tohoku Univ., Japan</i></p>	<p><b>Oral Session 2B</b> Orchid Hall (4<sup>th</sup> Floor)</p> <p><b>Thrusters &amp; Combustors I (Design Issues)</b></p> <p>Session Chair: Paul Ronney <i>Univ. Southern California, USA</i></p>
<p>2A-1</p> <p><b>Study of the Operation-Frequency Broadening Effect of MEMS Piezoelectric Energy Harvester for Low-Frequency Vibrations</b> H. Liu<sup>1</sup>, C. Lee<sup>2</sup>, T. Kobayashi<sup>3</sup>, C.J. Tay<sup>1</sup>, and C. Quan<sup>1</sup> <sup>1,2</sup><i>Natl. Univ. Singapore, Singapore</i> <sup>3</sup><i>AIST, Japan</i></p>	<p>2B-1</p> <p><b>Unified Practical Aero-Thermodynamic Design Approach for MEMS based Micro Combustors</b> M. Namura and T. Toriyama <i>Ritsumeikan Univ., Japan</i></p>
13:20 – 13:40	
<p>2A-2</p> <p><b>A Sub-Threshold Passive Step-up Rectifier for Vibration Energy Scavengers</b> J. Singh, C. Robert, A. Boegli, P. Janphuang, D. Isarakorn, D. Briand, N.F. de Rooij, and P.A. Farine <i>EPFL, Switzerland</i></p>	<p>2B-2</p> <p><b>Effects of Scale on Swiss-Roll Heat-Recirculating Combustors</b> C.-H. Chen and P. Ronney <i>Univ. Southern California, USA</i></p>
13:40 – 14:00	
<p>2A-3</p> <p><b>A Vibration-Powered Wireless Sensor Node for Monitoring in Railway Systems</b> M. Wischke, B. Fuchs, G. Biancuzzi, M. Kroener, and P. Woias <i>Univ. Freiburg, IMTEK, Germany</i></p>	<p>2B-3</p> <p><b>Development of Micro-Solid Propellant Thruster Array with Improved Repeatability</b> D. Seo<sup>1</sup>, G. Ahn<sup>2</sup>, and S. Kwon<sup>1</sup> <sup>1</sup><i>KAIST, Republic of Korea</i> <sup>2</sup><i>Hanwha Corp., Republic of Korea</i></p>
14:00 – 14:20	
<p>2A-4</p> <p><b>Single-Supply Pre-Biasing Circuit for Low-Amplitude Energy Harvesting Applications</b> J. Dicken, P. D. Mitcheson, and E. M. Yeatman <i>Imperial College London, U.K</i></p>	<p>2B-4</p> <p><b>Development of a Suspended, Robust, Thermally Insulated Micro Chamber of Thick Silicon Dioxide for Microthrusters and Microreactors</b> K. Palmer, V. Lekholm, H. Kratz, H. Nguyen, and G. Thornell <i>Uppsala Univ., Sweden</i></p>
14:20 – 14:40 Break	
Lobby (3 <sup>rd</sup> & 4 <sup>th</sup> Floor)	

Oral Session 3A		Sejong Hall (3 <sup>rd</sup> Floor)		Oral Session 3B		Orchid Hall (4 <sup>th</sup> Floor)	
Non-Piezoelectric Energy Harvesters & Conversion I (Electromagnetic & Thermoelectric Principle)				System Integration, Micro/nanofabrication & Materials			
Session Chair: Eric Yeatman <i>Imperial College London, UK</i>				Session Chair: Amit Lal <i>Cornell Univ., USA</i>			
14:40 – 15:00							
3A-1 <b>Airflow Energy Harvester for Wireless Sensing in Air Duct</b> D. Zhu, S.P. Beeby, M.J. Tudor, N.R. Harris, and N.M. White <i>Univ. Southampton, U.K</i>				3B-1 <b>Highly Integrated and Stiffened Micro Thermocouples Fabrication using Glass Molds Selectively Filled with Nanopowders</b> N. Kouma and O. Tsuboi <i>FUJITSU Laboratories, Japan</i>			
15:00 – 15:20							
3A-2 <b>On the Comparison, Scaling and Benchmarking of Electromagnetic Vibration Energy Harvesters</b> C. Cepnik and U. Wallrabe <i>Univ. Freiburg, IMTEK, Germany</i>				3B-2 <b>A Digitally Adjusted Power Supply for Systems-on-Chip based on CMOS Integrated Fuel Cells</b> C. Moranz <sup>1</sup> , M. Kuhl <sup>1</sup> , and Y. Manoli <sup>1,2</sup> <sup>1</sup> <i>Univ. Feiburg, IMTEK, Germany</i> <sup>2</sup> <i>HSG-IMIT, Germany</i>			
15:20 – 15:40							
3A-3 <b>Microfluidic Energy Harvesting System for High Force and Large Deflection Accommodation</b> A. Bramhanand and H. Kim <i>Univ. Utah, USA</i>				3B-3 <b>Integration of Dispenser-Printed Ultralow Voltage Thermoelectric and Energy Storage Devices</b> Z. Wang <sup>1</sup> , D. Madan <sup>1</sup> , A. Chen <sup>1</sup> , R.-C. Juang <sup>2</sup> , M. Nill <sup>1,3</sup> , J.W. Evans <sup>3</sup> , and P.K. Wright <sup>1</sup> <sup>1,3</sup> <i>UC Berkeley, USA</i> <sup>2</sup> <i>Industrial Technology Research Institute, Taiwan</i>			
15:40 – 16:00							
3A-4 <b>Development of Thermoelectric Generator used on 1800 rpm Rotating Shaft for Predictive Maintenance of Machinery</b> Z. Wang, F. Bouwens, and R.J.M. Vullers <i>Imec/Holst Centre, the Netherlands</i>				3B-4 <b>Fabrication of High Energy Density Capacitors with Micromachined Carbon Nanofiber Electrodes</b> G.J. Kim <sup>1</sup> , G.-H. Kim <sup>2</sup> , and Y.-K. Yoon <sup>1</sup> <sup>1</sup> <i>Univ. Florida, USA</i> <sup>2</sup> <i>Samsung Electronics, Republic of Korea</i>			
16:00 – 17:20		<b>Poster Session I</b>		Lilac Hall (3 <sup>rd</sup> Floor)			
18:30 – 20:00		<b>Dinner Buffet</b>		Sejong Hall (3 <sup>rd</sup> Floor)			

## 17 (Thur) November 2011

08:00 – 08:15	Workshop Announcements	Sejong Hall (3 <sup>rd</sup> Floor)
08:15 – 09:00	<b>Invited Talk II</b> Chair: Miwako Waga <i>Global Emerging Tech. Institute, Japan</i>	Sejong Hall (3 <sup>rd</sup> Floor)
<b>Micro Energy Harvesting as a Core Technology for Energy-Autonomous Embedded Systems</b> Peter Woias ( <i>IMTEK, Germany</i> )		
09:00 – 09:20	Break	Lobby (3 <sup>rd</sup> & 4 <sup>th</sup> Floor)
<b>Session 4A</b>	Sejong Hall (3 <sup>rd</sup> Floor)	<b>Session 4B</b>
<b>Piezoelectric Energy Harvesters &amp; Conversion III (Material Issues)</b>		Orchid Hall (4 <sup>th</sup> Floor)
Session Chair:		Session Chair:
Carol Livermore <i>MIT, USA</i>		Paul D. Mitcheson <i>Imperial College London, UK</i>
09:20 – 09:40		
4A-1		4B-1
<b>Thermal Energy Conversion by Coupled Shape Memory and Piezoelectric Effects</b> D.Zakharov <sup>1</sup> , G. Lebedev <sup>1,2</sup> , O. Cugat <sup>1</sup> , J. Delamare <sup>1</sup> , B. Viala <sup>2</sup> , T. Lafont <sup>1</sup> , and A. Shelyakov <sup>3</sup> <sup>1</sup> <i>CNRS-UJF-INPG, France</i> <sup>2</sup> <i>MINATEC Campus, France</i> <sup>3</sup> <i>Natl. Research Nuclear Univ., Russia</i>		<b>An Electrostatic Energy Harvester with Power-Extracting End Stops Driven by Wideband Vibrations</b> C.P. Le <sup>1</sup> , E. Halvorsen <sup>1</sup> , O. Søråsen <sup>2</sup> and E.M. Yeatman <sup>3</sup> <sup>1</sup> <i>Vestfold Univ. College, Norway</i> <sup>2</sup> <i>Univ. Oslo, Norway</i> <sup>3</sup> <i>Imperial College London, U.K</i>
09:40 – 10:00		
4A-2		4B-2
<b>Vibration Energy Harvesters of Lead-Free (K,Na)NbO<sub>3</sub> Piezoelectric Thin Films</b> I. Kanno <sup>1</sup> , T. Ichida <sup>1</sup> , H. Kotera <sup>1</sup> , K. Shibata <sup>2</sup> , F. Horikiri <sup>2</sup> , and T. Mishima <sup>2</sup> <sup>1</sup> <i>Kyoto Univ., Japan</i> <sup>2</sup> <i>Hitachi cable, Japan</i>		<b>Design and Fabrication of MEMS Electrostatic Energy Harvester with Nonlinear Springs and Vertical Sidewall Electrets</b> S.D. Nguyen <sup>1</sup> , N.-H.T. Tran <sup>1</sup> , E. Halvorsen <sup>1</sup> , and I. Paprotny <sup>2</sup> <sup>1</sup> <i>Vestfold Univ. College, Norway</i> <sup>2</sup> <i>UC Berkeley, USA</i>
10:00 – 10:20		
4A-3		4B-3
<b>The Influence of Ferroelastic Hysteresis on Mechanically Excited PZT Cantilever Beams</b> F. Goldschmidtboeing, C. Eichhorn, M. Wischke, M. Kroener, and P. Woias <i>Univ. Freiburg, IMTEK, Germany</i>		<b>Evaluation of the Electret based Energy Harvester by using Multipurpose Data Logging Device</b> T. Fujita <sup>1,2</sup> , K. Fujii <sup>1</sup> , T. Onishi <sup>1</sup> , K. Kanda <sup>1,2</sup> , K. Higuchi <sup>2</sup> , and K. Maenaka <sup>1,2</sup> <sup>1</sup> <i>Univ. Hyogo, Japan</i> <sup>2</sup> <i>JST ERATO Menaka Human-Sensing Fusion Project, Japan</i>
10:20 – 10:40		
4A-4		4B-4
<b>A Piezoelectric Generator Fabricated from the Structure of AlN/SUS</b> Z.P. Cao, J.Y. Zhang, and H. Kuwano <i>Tohoku Univ., Japan</i>		<b>Vibration-Powered Battery-less Sensor Node using MEMS Electret Generator</b> K. Matsumoto <sup>1</sup> , K. Saruwatari <sup>2</sup> , and Y. Suzuki <sup>1</sup> <sup>1</sup> <i>The Univ. Tokyo, Japan</i> <sup>2</sup> <i>TechnoDesign, Japan</i>
10:40 – 12:00	<b>Poster Session II</b>	Lilac Hall (3 <sup>rd</sup> Floor)
12:00 – 13:30	Lunch	
13:30 – 18:00	<b>Technical Tour I (Samsung Electro-Mechanics)</b>	Lobby (1 <sup>st</sup> Floor, 13:30)
18:00 – 21:00	<b>Conference Banquet</b> (Best Poster Paper Award)	Sejong Hall (3 <sup>rd</sup> Floor)

## 18 (Fri) November 2011

08:00 – 08:10	Workshop Announcements	Sejong Hall (3 <sup>rd</sup> Floor)
08:10 – 08:55	<b>Invited Talk III</b> Chair: Young-Ho Cho <i>KAIST, Republic of Korea</i>	Sejong Hall (3 <sup>rd</sup> Floor)
<b>Intermediate-Temperature Fuel Cells with Submicron Thin Proton Conducting Ceramic Electrolytes</b> Sangkyun Kang ( <i>Samsung Advanced Institute of Technology, Republic of Korea</i> )		
08:55 – 09:05	Break	Lobby (3 <sup>rd</sup> & 4 <sup>th</sup> Floor)
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<b>Oral Session 5A</b>	Sejong Hall (3 <sup>rd</sup> Floor)	<b>Oral Session 5B</b>
<b>Piezoelectric Energy Harvesters &amp; Conversion IV (Fabrication Issues)</b>		Orchid Hall (4 <sup>th</sup> Floor)
Session Chair:		Session Chair:
Ryutaro Maeda <i>AIST, Japan</i>		Shuji Tanaka <i>Tohoku Univ., Japan</i>
09:05 – 09:25		
5A-1		5B-1
<b>Multi-Layer PZT Stacking Process for Piezoelectric Bimorph Energy Harvesters</b> E.E. Aktakka, R.L. Peterson, and K. Najafi <i>Univ. Michigan, USA</i>		<b>A Study on Micro Catalytic Reactor for Autothermal Reforming using Methanol and Hydrogen Peroxide with Built-in Chrome Silicide Thermocouple</b> E.S. Jung, H. Park, and S. Kwon <i>KAIST, Republic of Korea</i>
09:25 – 09:45		
5A-2		5B-2
<b>MEMS-based PZT/PZT Bimorph Thick Film Vibration Energy Harvester</b> R. Xu <sup>1</sup> , A. Lei <sup>1</sup> , C. D.-Petersen <sup>1</sup> , K. Hansen <sup>2</sup> , M. Guizzetti <sup>2</sup> , K. Birkelund <sup>1</sup> , E.V. Thomsen <sup>1</sup> , and O. Hansen <sup>1,3</sup> <sup>1,3</sup> <i>Technical Univ. Denmark, Denmark</i> <sup>2</sup> <i>Meggitt Sensing Systems, Denmark</i>		<b>Fully Monolithically Fabricated Si One-Chip Miniature Fuel Cell</b> M. Hayase and T. Tanaka <i>Tokyo Univ. of Science, Japan</i>
09:45 – 10:05		
5A-3		5B-3
<b>Recent Improvements in the Fabrication and Performances of AlN based Piezoelectric Vibration Energy Harvesters</b> M. Renaud, R. Elfrink, M.Jambunathan, C. de Nooijer, M. Rovers, R.Vullers, and R. van Schaijk <i>Imec/Holst Centre, the Netherlands</i>		<b>Development of Pulsed Detonation Micro Thruster using Low Temperature Co-Fired Ceramic Tape Technologies</b> T.-H. Lu, P.-Y Chiu, and M.-H. Wu <i>Natl. Cheng Kung Univ., Taiwan</i>
10:05 – 10:25		
5A-4		5B-4
<b>PZT Thick Sheet on Flexible Plastic Substrate for Vibration Energy Harvesting</b> J.J. Ruan, A.V. Quintero, P. Janphuang, D. Isarakorn, D. Briand, and N.F. de Rooij <i>EPFL, Switzerland</i>		<b>Ceramic Cold Gas Microthruster with Integrated Flow Sensor</b> V. Lekholm, K. Palmer, F. Ericson, and G. Thornell <i>Uppsala Univ., Sweden</i>
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10:25 – 10:35	Break	Lobby (3 <sup>rd</sup> & 4 <sup>th</sup> Floor)
10:35 – 11:20	<b>Invited Talk IV</b> Chair: Mark Allen <i>Georgia Institute of Technology, USA</i>	Sejong Hall (3 <sup>rd</sup> Floor)
<b>Flame Chromatography in a Micro Channel with a Temperature Gradient</b> Kaoru Maruta ( <i>Tohoku Univ., Japan</i> )		
11:20 – 11:30	Break	Lobby (3 <sup>rd</sup> & 4 <sup>th</sup> Floor)

Oral Session 6A		Sejong Hall (3 <sup>rd</sup> Floor)		Oral Session 6B		Orchid Hall (4 <sup>th</sup> Floor)	
Non-Piezoelectric Energy Harvesters & Conversion III (Other Issues – Circuit, Design & Materials)				Coolers & Thermal Management Systems			
Session Chair:				Session Chair:			
Yuji Suzuki		<i>The Univ. Tokyo, Japan</i>		Jan Peirs		<i>Katholieke Univ. Leuven, Belgium</i>	
11:30 – 11:50							
6A-1 <b>Performance Improvement of a Micro Thermomechanical Generator by Incorporating Galinstan<sup>®</sup> Micro Droplet Arrays</b> S.K.T. Ravindran <sup>1</sup> , M. Roulet <sup>2</sup> , T. Huesgen <sup>3</sup> , M. Kroener <sup>1</sup> , and P. Woias <sup>1</sup> <sup>1</sup> <i>Univ. Freiburg, IMTEK, Germany</i> <sup>2</sup> <i>EPFL, Switzerland</i> <sup>3</sup> <i>ABB Schweiz AG, Switzerland</i>				6B-1 <b>Magnetocaloric Cooling of a Thermally-Isolated Microstructure</b> T. Tsukamoto, M. Esashi, and S. Tanaka <i>Tohoku Univ., Japan</i>			
11:50 – 12:10							
6A-2 <b>Microelectromechanical Inductors with High Inductance Density via Mechanical Energy Storage</b> V. Divakar, Y. Zhang, J.C. Zito, E.A. Salley, and D.P. Arnold <i>Univ. Florida, USA</i>				6B-2 <b>Noninvasive Hermetic Sealing of Degassed Liquid Inside a Microfluidic Device based on Induction Heating</b> N.S. Dhillon, M.W. Chan, J.C. Cheng, and A.P. Pisano <i>UC Berkeley, USA</i>			
12:10 – 12:30							
6A-3 <b>Powering Electric Systems using Carbon Nanotube Springs</b> F.A. Hill <sup>1</sup> , T.F. Havel <sup>1</sup> , D. Lashmore <sup>2</sup> , M. Schauer <sup>2</sup> , and C. Livermore <sup>3</sup> <sup>1</sup> <i>MIT, USA</i> <sup>2</sup> <i>Nanocomp Technologies, USA</i> <sup>3</sup> <i>Northeastern Univ., USA</i>				6B-3 <b>An Electromagnetic Valve for Two-Phase Cooling of Microelectronic Circuits</b> R. Donose, J. Peirs, and D. Reynaerts <i>Katholieke Univ. Leuven, Belgium</i>			
12:30 – 12:50							
6A-4 <b>Novel Nonlinear Spring Design for Wideband Vibration Energy Harvesters</b> M. Amri <sup>1,3</sup> , P. Basset <sup>1</sup> , F. Cottone <sup>1</sup> , D. Galayko <sup>2</sup> , F. Najjar <sup>3</sup> , and T. Bourouina <sup>1</sup> <sup>1</sup> <i>Univ. Paris-Est, France</i> <sup>2</sup> <i>Univ. Paris Sorbonne, France</i> <sup>3</sup> <i>Univ. Carthage, Tunisia</i>				6B-4 <b>Experimental Investigation of Thin-Film Evaporation in an Open-Loop Columnated Micro-Evaporator</b> N.S. Dhillon, C. Hogue, J.C. Cheng, and A.P. Pisano <i>UC Berkeley, USA</i>			
12:50 – 13:00		Conference Adjourns		Sejong Hall (3 <sup>rd</sup> Floor)			
13:00 – 14:00		Lunch					
14:00 – 16:30		Technical Tour II (LG Elite)		Lobby (1 <sup>st</sup> Floor, 14:00)			

**Poster Session**  
(Lilac Hall, 3<sup>rd</sup> Floor)

**Poster Session I:** Odd numbered papers, 16:00~17:20, 16 (Wed) Nov. 2011

**Poster Session II:** Even numbered papers, 10:40~12:00, 17 (Thur) Nov. 2011

**Energy Harvesting Microdevices and Microsystems – Piezoelectric**

- P-01     **Utilization of Different Charge Polarizations on PZT Diaphragm of Acoustic Energy Harvesters**  
K. Tsujimoto, S. Tomioka, S. Kimura, S. Ilzumi, K. Tomii, T. Matsuda, and Y. Nishioka  
*Nihon University, Japan*
- P-02     **Piezoelectric Wind Generator based on T Shape Flexible Beam Fluttering**  
X.Q. Zhao and Z.Y. Wen  
*Chongqing University, China*
- P-03     **AlN-based Piezoelectric Micropower Generator for Low Ambient Vibration Energy Harvesting**  
C. Schröder, F. Stoppel, B. Wagner, and W. Benecke  
*Fraunhofer Institute for Silicon Technology ISIT, Germany*
- P-04     **Performance of a Piezoelectric Energy Harvester under Vibrations Taken from a Helicopter**  
D. Zhu, S.P. Beeby, M.J. Tudor, N.J. Grabham, N.M. White, and N.R. Harris  
*University of Southampton, U.K*
- P-05     **Energy Harvesting from Wind Flow in Traffic Tunnels**  
M. Wischke, G. Fehrenbach, M. Kroener, and P. Woias  
*University of Freiburg - IMTEK, Germany*
- P-06     **An Optimized Magnetolectric Power Generator for Rotation Energy Harvesting**  
M. Li, Y. Wen, P. Li, and J. Yang  
*Chongqing University, China*
- P-07     **Conception of an Interdigitated Electrodes based Cantilever for Piezoelectric Energy Harvesting**  
A. Mazzalai, N. Chidambaram, and P. Muralt  
*École Polytechnique Fédérale de Lausanne EPFL, Switzerland*
- P-08     **A New Lead-Free (K, Na)NbO<sub>3</sub> Piezoelectric Material and its Microfabrication for Micro Energy Harvester**  
L.V. Minh<sup>1</sup>, F. Horikiri<sup>2</sup>, K. Shibata<sup>2</sup>, T. Mishima<sup>2</sup>, and H. Kuwano<sup>1</sup>  
*<sup>1</sup>Tohoku University, Japan, <sup>2</sup>Hitachi Cable, Ltd., Japan*
- P-09     **Assembling of Thick PZT Sheet on Silicon for Energy Harvesting Applications**  
P. Janphuang, D. Isarakorn, A.V. Quintero, R. Lockhart, J.J. Ruan, D. Briand, and N.F. de Rooij  
*École Polytechnique Fédérale de Lausanne EPFL, Switzerland*
- P-10     **Piezoelectric Impulse-Excited Generator for Low Frequency Non-Harmonic Vibrations**  
P. Pillatsch, E.M. Yeatman, and A.S. Holmes  
*Imperial College London, U.K*
- P-11     **Theoretical and Practical Limits of Power Density of Piezoelectric Vibration Energy Harvesters**  
A. Dompierre<sup>1</sup>, S. Vengallatore<sup>2</sup>, and L.G. Fréchette<sup>2</sup>  
*<sup>1</sup>Université de Sherbrooke, Canada, <sup>2</sup>McGill University, Canada*



## Energy Conversion – Piezoelectric

- P-12 **Biomimetic Acoustic Sensor using Single Crystal Piezoelectric Cantilever Array**  
S. Hur<sup>1</sup> and S.Q. Lee<sup>2</sup>  
<sup>1</sup>*Korea Institute of Machinery and Materials (KIMM), Republic of Korea*  
<sup>2</sup>*Electronic Telecommunication Research Institute (ETRI), Republic of Korea*
- P-13 **Piezoelectric Vibration Energy Harvesting using Casing Vibration of Industrial Rotating Machinery due to its Mass Imbalance.**  
K. Adachi  
*Kobe University, Japan*
- P-14 **Nonlinear Dynamics for Broadband Piezoelectric Energy Harvesting**  
G. Sebald<sup>1,2</sup>, H. Kuwano<sup>2</sup>, D. Guyomar<sup>1</sup>, and B. Ducharme<sup>1</sup>  
<sup>1</sup>*Université de Lyon, France,* <sup>2</sup>*Tohoku University, Japan*
- P-15 **Characterization of Piezoelectric Properties of ZnO Nanowire using AFM**  
S.J. Won<sup>1</sup>, W.S. Lee<sup>1</sup>, J.H. Lee<sup>2</sup>, S.G. Hong<sup>3</sup>, and S.B. Lee<sup>1</sup>  
<sup>1</sup>*Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea,*  
<sup>2</sup>*Korea Institute of Machinery & Materials (KIMM), Republic of Korea,*  
<sup>3</sup>*Korea Research Institute of Standards and Science (KRISS), Republic of Korea*
- P-16 **Fabrication and Characterization of Energy Harvesting Metglas/PMN-PT Composite Cantilevers**  
Y. Kwon, J. Lee, and B. Choi  
*Sogang University, Republic of Korea*
- P-17 **Nonlinear Behavior of Cantilever-based Piezoelectric Energy Scavengers under Large Excitations**  
I. Paprotny<sup>1</sup>, E. Halvorsen<sup>2</sup>, Q. Xu<sup>1</sup>, W.W. Chan<sup>1</sup>, R.M. White<sup>1</sup>, and P.K. Wright<sup>1</sup>  
<sup>1</sup>*University of California, Berkeley, USA,*  
<sup>2</sup>*Vestfold University College, Norway*
- P-18 **Piezoelectric Energy Harvester with Constant Stress Distribution and Direct Initial Energy Injection Interface Circuitry**  
P. Becker<sup>1</sup>, E. Hymon<sup>1</sup>, B. Folkmer<sup>1</sup>, and Y. Manoli<sup>1,2</sup>  
<sup>1</sup>*HSG-IMIT Institute of Micromachining and Information Technology, Germany,*  
<sup>2</sup>*University of Freiburg – IMTEK, Germany*
- P-19 **Energy Harvesting Device with Segmented Piezoelectric Layer**  
Z. Liu, K. Aggour, and L. Li  
*Swansea University, U.K*
- P-20 **A Two-Dimensional Vibration Energy Harvester using an Piezoelectric Bimorph Cantilever with an Asymmetric Inertial Mass**  
J.C. Park and J.Y. Park  
*Kwangwoon University, Republic of Korea*
- P-21 **Characterization of Piezoelectric Energy Scavenger based on PMN-PT Piezoelectric Single Crystal**  
S.E. Moon, W.S. Yang, and J. Kim  
*Electronics and Telecommunications Research Institute (ETRI), Republic of Korea*

### Energy Harvesting Microdevices and Microsystems – Non-Piezoelectric (Electrostatic, Electromagnetic, and Others)

- P-22 **Fabrication and Performance Test of a Poly-Si Micro Thermoelectric Generator**  
H. Kim, Y. Lee, O.J. Kim, K.H. Lee, and P.W. Heo  
*Korea Institute of Machinery and Materials (KIMM), Republic of Korea*
- P-23 **Frequency Tuning of Vibration Energy Harvesters using Compressive and Tensile Axial Loads**  
D. Zhu, M. J. Tudor, and S.P. Beeby  
*University of Southampton, U.K*
- P-24 **Design, Fabrication and Characterization of a Vibration Driven Electromagnetic Energy Harvester Based on Multi-Pole Magnet**  
A. Munaz and G.S. Chung  
*University of Ulsan, Republic of Korea*
- P-25 **Micromachined Thermogenerator for High-Temperature Applications**  
A. Ibragimov and W. Lang  
*University of Bremen, Germany*
- P-26 **Low-Cost Out-of-Plane Vibrational Electret Energy Harvester**  
Y.C. Lee and Y. Chiu  
*National Chiao Tung University, Taiwan*
- P-27 **Wirelessly Read-out Temperature Sensor Remotely Powered by a GSM Phone**  
H.J. Visser, V. Pop, and R.J.M. Vullers  
*imec / Holst Centre, the Netherlands*
- P-28 **Electrically Small Planar Antenna for Compact Electromagnetic (EM) Wireless Energy Harvesting**  
A. Nimo, D. Grgić, and L. Reindl  
*University of Freiburg – IMTEK, Germany*
- P-29 **Development of Flexible Thermoelectric Generator using FPCB**  
J.Y. Kim, K.E. Lee, and S.W. Han  
*Korea Institute of Materials and Machinery (KIMM), Republic of Korea*
- P-30 **Nonlinear Spring and SU-8 Rails with Solid Lubricant for Electrostatic Energy Harvester using Parallel-Plate Electrodes and Ferroelectric**  
T. Takahashi<sup>1</sup>, M. Suzuki<sup>1</sup>, J. Onishi<sup>1</sup>, T. Nishida<sup>2</sup>, Y. Yoshikawa<sup>2</sup>, and S. Aoyagi<sup>1</sup>  
<sup>1</sup>*Kansai University, Japan*  
<sup>2</sup>*ROHM Co. Ltd, Japan*
- P-31 **Design and Microfabrication of a New MEMS Thermoacoustic Energy Harvester (Withdrawn)**  
M. Serry<sup>1,2</sup>, A.A. Rahman<sup>2</sup>, E.A. Rahman<sup>2</sup>, and S. Sedky<sup>2</sup>  
<sup>1</sup>*King Abdullah University of Science and Technology (KAUST), Saudi Arabia,*  
<sup>2</sup>*The American University in Cairo (AUC), Egypt*
- P-32 **Low Power Energy Harvesting System IC for Tri-Plate Electrostatic Converters**  
A. Kempitiya, D.-A. Borca-Tasciuc, and M. Hella  
*Rensselaer Polytechnic Institute, USA*
- P-33 **Optimized Geometric Design of Parallelized Electrodes in a Electrostatic Energy Harvester**  
Y. Hamate<sup>1</sup>, E. Schaler<sup>2</sup>, H. Okamoto<sup>3</sup>, and H. Kuwano<sup>1</sup>  
<sup>1</sup>*Tohoku University, Japan,*  
<sup>2</sup>*University of Maryland, USA,*  
<sup>3</sup>*Akita Prefectural University, Japan*

- P-34 **Multi-Cavities MEMS Capacitive Plates for Power Harvesting**  
J. Lin, J.X. Zhu, M. Sonje, N. Yusek, Z.C. Feng, and M. Almasri  
*University of Missouri, USA*
- P-35 **Wireless Power Transmission to an Electrodynamics Energy Harvester using Low-Frequency Magnetic Fields**  
V.R. Challa<sup>1</sup>, V. Divakar<sup>1</sup>, J.O. Mur-Miranda<sup>2</sup>, and D.P. Arnold<sup>1</sup>  
<sup>1</sup>*University of Florida, USA*, <sup>2</sup>*Franklin W. Olin College of Engineering, USA*

### Energy Conversion – Non-Piezoelectric (Electrostatic, Electromagnetic, and Others)

- P-36 **Design, Fabrication and Characteristics of Low Frequency Vibration Driven an Electromagnetic Energy Harvester based on FR-4**  
B.C. Lee and G.S. Chung  
*University of Ulsan, Republic of Korea*
- P-37 **Design, Fabrication and Characterization of a Vibration Driven Multi-Frequency Electromagnetic Energy Harvester**  
A.R.M. Faisal and G.S. Chung  
*University of Ulsan, Republic of Korea*
- P-38 **A Planar Electromagnetic Vibration Energy Harvester with a Halbach Array**  
D. Zhu, S.P. Beeby, M.J. Tudor, and N.R. Harris  
*University of Southampton, U.K*
- P-39 **Design and Implementation of a Hybrid Electromagnetic Vibration to Electricity Energy Harvester for AC Power Lines Sensors**  
T. H. Mehr, A. Tabesh, and M.A. Ghadamyari  
*Isfahan University of Technology, Iran*
- P-40 **A Resonant DC/AC Inverter using an Electromechanical Device**  
S. Cheng and D.P. Arnold  
*University of Florida, USA*
- P-41 **Optimizing Liquid Water Jet on Energy Conversion Performance**  
Y. Xie, L.J. de Vreede, A. van den Berg, and J.C.T. Eijkel  
*University of Twente, the Netherlands*
- P-42 **Vacuum Dependence of Self-Powered RF Pulse Power Generator**  
S. Tin and A. Lal  
*Cornell University, USA*

### Energy Management and Microsystem Integration

- P-43 **A Self-Powered Piezoelectric Energy Harvesting Circuit with Frequency Conversion for Wireless Sensor Network**  
H. Wu, Y. Wen, P. Li, and W. Yin  
*Chongqing University, China*
- P-44 **Quantification of Thermoelectric Energy Scavenging Opportunity for a Compact Notebook**  
R. Denker<sup>1</sup>, A. Muhtaroglu<sup>1</sup>, and H. Kùlah<sup>2</sup>  
<sup>1</sup>*Middle East Technical University Northern Cyprus Campus (METU NCC), Turkey*,  
<sup>2</sup>*Middle East Technical University Main Campus (METU), Turkey*

- P-45 **Design and Performance Evaluation of CMOS-Integrated Power Processing Interface for Bending Beam Piezoelectric Energy Harvesters**  
N. Rezaei, A. Tabesh, and R. Dehghani  
*Isfahan University of Technology, Iran*
- P-46 **Search for a New Solid State Sodium-Ion Conductor**  
H. Oguchi, M. Matsuo, S. Orimo, and H. Kuwano  
*Tohoku University, Japan*
- P-47 **Electronic Resonant Frequency Tuning of a Marine Energy Harvester**  
T. T. Toh<sup>1</sup>, P.D. Mitcheson<sup>1</sup>, L. Dussud<sup>2</sup>, S.W. Wright<sup>1</sup>, and A.S. Holmes<sup>1</sup>  
<sup>1</sup>*Imperial College London, U.K.*, <sup>2</sup>*IFREMER, France*

### Micro and Nanofabrication for Energy Application

- P-48 **Homogeneity Analysis of High Yield Manufacturing Process of MEMS-based PZT Thick Film Vibrational Energy Harvesters**  
A. Lei<sup>1</sup>, R. Xu<sup>1</sup>, C.M. Pedersen<sup>1</sup>, M. Guizzetti<sup>2</sup>, K. Hansen<sup>2</sup>, E.V. Thomsen<sup>1</sup>, and K. Birkelund<sup>1</sup>  
<sup>1</sup>*Technical University of Denmark, Denmark*,  
<sup>2</sup>*Meggitt Sensing Systems, Denmark*
- P-49 **Fabrication and Characterization of Highly Miniaturized and Bio-Compatible Electrochemical Capacitor using 3D Hybrid Au-/nPts Electrodes and Nafion Separator**  
Y.J. Lee and J.Y. Park  
*Kwangwoon University, Republic of Korea*
- P-50 **Based on SU-8 Photoresist of MEMS Supercapacitor Manganese Dioxide (MnO<sub>2</sub>) Electrode Preparation and Electrochemical Characteristics**  
C.-M. Wen<sup>1</sup>, Z.-Y. Wen<sup>1</sup>, Z. You<sup>2</sup>, and X.-F. Wang<sup>2</sup>  
<sup>1</sup>*Chongqing University, China*, <sup>2</sup>*Tsinghua University, China*

### Nanostructured and Functional (Thermoelectric and Photovoltaic) Materials and Systems for Energy Management

- P-51 **The Thermal Conductivity of Thin Indium Arsenide Nanowires and Nanotubes**  
S. Yi and Y. Jung  
*Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea*
- P-52 **Quantum Transport Calculations of Thermoelectric Properties in Carbon Nanostructures**  
C. Bera, H.S. Kim, H.S. Kim, and Y.-H. Kim  
*Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea*

### Biologically-Inspired Energy Conversion and Cooling

- P-53 **Electrical Power Generation from Biochemical Energy with Self-Regulating Enzyme-Nanotube Ensemble Films**  
S. Yoshino<sup>1</sup>, K. Haneda<sup>1</sup>, T. Ofuji<sup>1</sup>, T. Miyake<sup>1,3</sup>, T. Yamada<sup>2</sup>, K. Hata<sup>2</sup>, and M. Nishizawa<sup>1,3</sup>  
<sup>1</sup>*Tohoku University, Japan*,  
<sup>2</sup>*Nanotube Institute of Advanced Industrial Science and Technology (AIST), Japan*,  
<sup>3</sup>*Core Research for Evolutional Science and Technology (CREST), Japan Science and Technology Agency (JST), Japan*

### Micro Fuel Cells and Micro Reactors for Fuel Processing

- P-54 **Velcro-Type Attachment of Black Silicon and Carbon Cloth for Improved Galvanic Contact in Micro Fuel Cells**  
G. Scotti, M. Mäkinen, P. Kanninen, T. Kallio, and S. Franssila  
*Aalto University, Finland*
- P-55 **A Passive Micro Direct Methanol Fuel Cell with Cross-Structure Cathode**  
X. Zhang, S. Zhang, Y. Zhang, and X. Liu  
*Harbin Institute of Technology, China*
- P-56 **Operation of Micro-SOFC by an Internal Micro Heater**  
F. Iguchi, K. Kubota, Y. Inagaki, and S. Tanaka, N. Sata, M. Esashi, and H. Yugami  
*Tohoku University, Japan*
- P-57 **Anode Flow Fields Structures of Micro Direct Methanol Fuel Cells**  
J. Leng, S. Huang, Q. Gai, X. Zhang, Y. Zhang, and X. Liu  
*Harbin Institute of Technology, China*
- P-58 **Micro PDMS Hydrogen Generator using Hydrolysis of Sodium Borohydride over Cobalt Nickel-Foam Catalyst and Immobilized Cobalt-Ph<sub>3</sub>PO/PDMS/SiO<sub>2</sub> Catalyst**  
E.S. Jung, T.-H. Oh, and S. Kwon  
*Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea*
- P-59 **Feasibility Study on Micro Plasma-Catalytic Methanol Reformer**  
D.H. Lee<sup>1</sup> and T. Kim<sup>2</sup>  
<sup>1</sup>*Korea Institute of Machinery and Materials (KIMM), Republic of Korea,*  
<sup>2</sup>*Chosun University, Republic of Korea*
- P-60 **Development of Meso-Scale Fuel Reformer using Low Temperature Co-Fired Ceramic Tape Technology**  
C.-M. Huang, M.-H. Wu, and Y.-C. Wang  
*National Cheng Kung University, Taiwan*
- P-61 **Micro Direct Methanol Fuel Cell Utilizing Silicon Supported Ionomer Membrane**  
J.V. Larsen<sup>1</sup>, B.T. Dalsset<sup>1</sup>, C. Kallesøe<sup>2</sup>, S. Engberg<sup>1</sup>, J. Thomsen<sup>1</sup>, and E.V. Thomsen<sup>1</sup>  
<sup>1</sup>*Technical University of Denmark, Denmark,*  
<sup>2</sup>*Danish Technological Institute (DTI), Denmark*

### Micro Thrusters, Miniature Propulsion Microsystems, Micro/Nano Catalysis, Combustion, and Heat/Mass Transfer

- P-62 **MEMS-based Solid Propellant Microthruster Design for CubeSat Application**  
K. Sathiyathan<sup>1</sup>, R. Lee<sup>1</sup>, R. Stowe<sup>2</sup>, R. Farinaccio<sup>2</sup>, C. Dubois<sup>3</sup>, and S. Ringuette<sup>2</sup>  
<sup>1</sup>*York University, Toronto, Canada,*  
<sup>2</sup>*Defence Research and Development Canada (DRDC), Canada,*  
<sup>3</sup>*Ecole Polytechnique, Canada*
- P-63 **Fabrication of LTCC based Micro Thrusters for Precision Controlled Space Flight**  
J. Larsen and J.L. Jørgensen  
*Technical University of Denmark, Denmark*

### Micro Heat Engines for Power Generation and Propulsion

- P-64 **Design and Experiment of 400,000 rpm High Speed Rotor and Bearings for 500W Class Micro Gas Turbine Generator**  
C.H. Park, S.K. Choi, and S.Y. Ham  
*Korea Institute of Machinery & Materials (KIMM), Republic of Korea*
- P-65 **Evaluation of 500W Ultra-micro Gas Turbine Compressor**  
<sup>1</sup>J.M. Seo, <sup>1</sup>J.-Y. Park, <sup>1</sup>B.-S. Choi, <sup>1</sup>M.-R. Park, and <sup>2</sup>S. Han  
<sup>1</sup>*Korea Institute of Machinery & Materials (KIMM), Republic of Korea,*  
<sup>2</sup>*Seoul National University of Science & Technology, Republic of Korea*
- P-66 **Micromachined Membrane-based Heat Engine as an Electrostatic Power Generator**  
A. Ibragimov, H. Kesuma, M. Hormann, M. Trabelsi, and W. Lang  
*University of Bremen, Germany*
- P-67 **Optimization of Heat Flow for Phase Change Thermoelectric Harvesters**  
M.E. Kiziroglou<sup>1</sup>, D. Samson<sup>2</sup>, T. Becker<sup>2</sup>, S.W. Wright<sup>1</sup>, and E.M. Yeatman<sup>1</sup>  
<sup>1</sup>*Imperial College London, U.K.,*  
<sup>2</sup>*EADS Innovation Works, Sensors, Electronics & Systems Integration, Germany*
- P-68 **High-Speed Electrical Motor/Generator Supported by Air Bearings.**  
T. Waumans<sup>1</sup>, C. Zwysig<sup>2</sup>, J. Peirs<sup>1</sup>, F. Al-Bender<sup>1</sup>, and D. Reynaerts<sup>1</sup>  
<sup>1</sup>*Katholieke Universiteit Leuven, Belgium,* <sup>2</sup>*Celeroton AG, Zürich, Switzerland*

### Micro Coolers and Other Thermal Management Technologies

- P-69 **Skin Heat Transfer Management with Contact Force Compensation for Thermal Stimulation Applications**  
J.K. Sim, S. Youn, and Y.-H. Cho  
*Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea*
- P-70 **Integrated Allele-Specific Polymerase Chain Reaction-Capillary Electrophoresis Microdevice for Single Nucleotide Polymorphism Genotyping**  
J.Y. Choi<sup>1</sup>, Y.T. Kim<sup>1</sup>, J. Ahn<sup>1</sup>, Y. Chen<sup>1</sup>, I. Song<sup>2</sup>, H.W. Kim<sup>3</sup>, S.A. You<sup>3</sup>, H.-K. Myeong<sup>3</sup>, B.S. Chun<sup>2</sup>, D.-G. Gweon<sup>1</sup>, and T.S. Seo<sup>1</sup>  
<sup>1</sup>*Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea,*  
<sup>2</sup>*Nanoscope Systems, Inc., Republic of Korea,*  
<sup>3</sup>*Institute for Molecular Genetics, Solgent, Co., Ltd., Republic of Korea*