

CANSMART 2008
International Workshop
SMART MATERIALS AND STRUCTURES
Montreal, Quebec, Canada
Thursday - 23 October 2008

- 800 Registration
850 Welcome & Opening address: **George Akhras**
900 **Session # 1**: Moderator: **Nancy Johnson**

Keynote speaker: **Janet Sater**
Institute for Defense Analyses, Alexandria, VA, USA
Plants and Mechanical Motion –
A Synthetic Approach to Nastic Materials and Structures

945 *Coffee Break*

1015 Session # 2: Moderator: **Darius Nikanpour**

- 1015 A Reversibly Deployable Air Dam: A Bending Approach Based on Embedded Shape Memory Alloy Actuators - Part I: Design Approaches
G. P. McKnight¹, A. L. Browne², N. L. Johnson²
¹HRL Laboratories LLC, Malibu CA
²GM Research Lab, MC 480-106-256, Warren, MI
- 1035 Semi-Active Engine Mount Development for Variable Displacement Engine Applications
S. Arzanpour¹, M.F. Golnaraghi¹, A.M. Parameswaran²
¹Mechatronic Systems Engineering, Simon Fraser University, BC
²Institute of Micromachine and Microfabrication Research, Simon Fraser University, BC
- 1055 A Smart Cooling Garment Using Thermoresponsive Phase-Change Materials
Alexandra Bishop^{1,2}, Sumitra Rajagopalan^{1,2}
¹Department of Mechanical Engineering, McGill University, Montreal, QC.
²BioASTRA Technologies Inc., Montreal, QC
- 1115 Verification of a Smart Wing Design for a Micro-Air-Vehicle through Simulation
V. Wickramasinghe¹, Y. Chen¹, M. Nejad-Ensan¹, M. Martinez¹, F. Wong², K. Kraemer³
¹Institute for Aerospace Research, National Research Council Canada, Ottawa
²Defence Research & Development Canada – Valcartier, QC
³Directorate of Technical Airworthiness and Engineering Support-DND, Ottawa1
- 1135 On the Development of MEMS Based Pressure Sensors for Gas Turbine Engine
Nezih Mrad¹, Gino Rinaldi¹, Ion Stiharu², Muthukumaran Packirisamy²
¹Air Vehicles Research Section, Defence R&D Canada, Ottawa, ON
²Optical Microsystems Lab, CONCAVE Research Centre, Concordia U, Montreal, Q

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1155 Session # 3: Poster & Booth Presentation

Moderator: **George Akhras**

- * Use of Impedance Measurements for Crack Detection in Moderately Soft Piezoelectric Ceramics
H.W. King¹, S.H. Ferguson¹, N. Mrad², N. Somayajula³, G. Gokeda³, R. Blacow³, S.E. Prasad³
¹University of Victoria, Department of Mechanical Engineering, Victoria, BC
²Air Vehicles Research Section, Department of National Defence, Ottawa, ON
³Sensor Technology Ltd. Collingwood, ON
- * Application of Magneto-Rheological Dampers to Control the Dynamic Response of Buildings
Ferdous Iqbal¹, Ashutosh Bagchi¹, Ramin Sedaghati²
¹Dept of Building, Civil and Environmental Engineering, Concordia University, QC
²Dept of Mechanical and Industrial Engineering Concordia University, QC
- * Sound Shielding Control of Piezoelectric Sheets with Negative Capacitors
H. Kodama, Y. Yasuno, M. Date, E. Fukada
Kobayasi Institute of Physical Research, Tokyo, Japan
- * Application of Statistical Pattern Recognition Techniques in Structural Health Monitoring
Sajjadul Islam, Ashutosh Bagchi
Department of Building, Civil and Environmental Engineering, Concordia U, QC
- * About the Sensitivity of Fibre Bragg Grating Sensors
Nezih Mrad¹, Alexei Ivanov², Jacques Albert², Tony Marinca³
¹Air Vehicles Research Section, Defence R&D Canada, Ottawa, ON
²Carleton University, Department of Electronics, Ottawa, ON
³Institute for Aerospace Research, National Research Council Canada, Ottawa, ON

- **Booth Presentations**

1245 **Lunch**

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1350 **Session # 4:** Moderator: **Cheng-Kuei Jen**

1350 Generalized Dynamic Thermopiezoelectric Response of a Rod to a Moving Heat Source

M. H. Babaei, Z. T. Chen

Department of Mechanical Engineering, University of New Brunswick, Fredericton, NB.

1410 Tailoring Electro-Optical Properties of RF Sputtered Vanadium Dioxide with Dopant for Smart Infrared Modulation

S. Paradis

Defence R&D Canada, Québec, QC

1430 The Characterization of Thermally Induced Minor Hysteresis Loops of Shape Alloys Memory using DSC Techniques

Guanghan Wang, Xin Xiang Jiang, Darius Nikanpour

Advanced Materials & Thermal Group, Canadian Space Agency, St-Hubert, QC

1450 CBCM, a New Smart Material for Active Composite Structures

H. Drobez¹, G. L'Hostis², K. Gautier², F. Laurent¹, B. Durand²

¹CETIM-CERMAT, Mulhouse, France

²Lab de physiques et de mécanique textile, Université de Haute Alsace, Mulhouse, France

1510 Characterization of Conductive Polymer Trilayer Actuators for Biomimetic Robotics

A.D. Price, C.C. Liu, C.A. O'Shaughnessy, H.E. Naguib

Smart and Adaptive Polymers Lab, Dept of Mechanical and Industrial Eng, U. of Toronto, ON

1530 Epitaxial Multiferroic Thin Films and Heterostructures

O. Gautreau, R. Nechache, C. Harnagea, A. Pignolet

INRS Énergie, Matériaux et Télécommunications, Varennes, QC

1550 **Coffee Break**

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1620 **Session # 5:** Moderator: **Leon Cheng**

1620 Electro-Mechanical Effect on Resonances in Fan-Folded Piezoelectric Beam Structures

T. Reissman, E. Garcia

Sibley School of Mechanical and Aerospace Engineering, Cornell University

1640 Energy Harvesting Using Piezoelectric Thick Films Fabricated by a Sol-Gel Process

J.-L. Shih¹, M. Kobayashi², J.-F. Moisan², C.-K. Jen²

¹Department of Electrical and Computer Engineering, McGill University, Montreal, QC

²Industrial Materials Institute, National Research Council of Canada, Boucherville, QC

1700 The Effects of Electromechanical Coupling on Transient Charging Behavior in Piezoelectric Power Harvesting

A. Wickenheiser¹, T. Reissman¹, E. Garcia¹, W. Wu²

¹Sibley School of Mechanical & Aerospace Engineering, Cornell University, NY, US

²Dep of Eng Science and Ocean Eng, National Taiwan University, Taiwan

1720 Proposal of a New Method for Sound and Vibration Shielding by Piezoelectric Materials Coupled With Negative Capacitors

E. Fukada, H. Kodama, Y. Yasuno, M. Date

Kobayasi Institute of Physical Research, Tokyo, Japan

1740 Analysis of a Multi-Layer Beam with Magnetorheological Fluid

Vasudevan Rajamohan, Ramin Sedaghati, Subhash Rakheja

Dept of Mechanical and Industrial Eng, CONCAVE Research Centre, Concordia University, QC

1800 **Posters, Booth & Reception**

1945 **Dinner**

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830 **Registration**

900 **Session # 6:** Moderator: **David Zimcik**

Keynote speaker: **Dale M. Pitt**

The Boeing Company, Phantom Works, St. Louis, MO, USA

**An Overview of Adaptive Structure Research and Development
at the Boeing Company**

Keynote speaker: **Wolfgang Lubner**

EADS MAS, Military Air Systems MEG, Germany

Smart Material Concepts for Morphing Structures

1000 *Coffee Break*

1030 **Session # 7:** Moderator: **Leon Cheng**

1030 Damping of a Simple Structure with Piezoelectrical Materials and Negative Capacitance Electrical Circuits: Application with a Cantilever Beam-Analytical, Experimental and ATILA FEM Results

Jean Claude Debus¹, Christian Granger², Anne-Christine Hladky-Hennion²

¹Institut Supérieur de l'Electronique et du Numérique, Lille, France

²Institut d'Électronique, de Microélectronique et de Nanotechnologie, ISEN, Lille, France

1050 Effect of the Sensor Location on Damage Detection in a Plate like Structure using Acousto-Ultrasonic Technique

M. R. Mofakhami¹, C Boller²

¹Department of Mechanical Engineering, University of Sheffield, Sheffield, UK

²Saarland University & Fraunhofer Institute for NDT, Germany

1110 Structural Control using Smart Control Devices

Kung-Chun Lu, Chin-Hsiung Loh

Department of Civil Engineering, National Taiwan University, Taipei, Taiwan

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1130 Fully Automated Modal Parameter Identification for Smart SHM Systems

C. Rainieri¹, G. Fabbrocino¹, E. Cosenza²

¹Structural and Geotechnical Dynamic Lab *StreGa*, University of Molise, Termoli, Italy

²Department of Structural Engineering, University of Naples Federico II, Naples, Italy

1150 Application of Wireless Sensors in Structural Health Monitoring of Civil Infrastructure

Sepideh Zakikhani¹, Amin Hammad², Ashutosh Bagchi¹

¹Dept of Building, Civil and Environmental Engineering, Concordia University, QC

²Concordia Institute of Information Systems Engineering, Concordia University, QC

1210 Structural and Geotechnical Seismic Monitoring by Smart SHM Systems

G. Fabbrocino, C. Laorenza, C. Rainieri, F. Santucci de Magistris

Structural and Geotechnical Dynamic Lab *StreGa*, University of Molise, Termoli, Italy

1245 **Lunch**

1350 **Session # 8: Moderator: Darius Nikanpour**

1350 NDT of Bonded Composite Patches on Aluminium Beams Using Integrated Ultrasonic Transducers

K.-T. Wu¹, N. Mrad², M. Kobayashi³, C.-K. Jen³

¹Department of Electrical and Computer Engineering, McGill University, Montreal, QC

²Air Vehicles Research Section, Defence R&D Canada, Ottawa, ON

³Industrial Materials Institute, National Research Council of Canada, Boucherville, QC

1410 Impact Loading Determination in Composite Plates using the Impedance-Based Method

K.M.Tsuruta¹, J.R.V.Moura Jr.¹, L.V.Palomino¹, R.S.L.Rade², D.A.Rade¹, V.Steffen Jr.¹

¹School of Mechanical Eng, Federal University of Uberlandia, MG, Brazil.

²Institute of Physics, Federal University of Uberlândia, MG, Brazil.

1430 Modeling and Compensation of Hysteresis in Piezoceramic Actuators

Mohammad Al Janaideh, Chun-Yi Su, Subhash Rakheja

Dept of Mech and Indust Eng, CONCAVE Research Centre, Concordia University, QC

1450 A Bonded Patch Repair Integrity Assessment Approach

Nezih Mrad¹, Gino Rinaldi¹, Marc Genest²

¹Air Vehicles Research Section, Defence R&D Canada, Ottawa, ON

²Non-Destructive Evaluation Group, Institute for Aerospace Research, NRC, ON

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1510 *Coffee Break*

1530 **Session # 9**: Moderator: **Eswar Prasad**

1530 Experiments and Modeling of Magnetic Shape Memory Alloys

Heidi P. Feigenbaum, Constantin Ciocanel

Dept of Mechanical Engineering, Northern Arizona University, Flagstaff, AZ, USA

1550 Experimental Investigation on the Seismic Performance of SMA-FRP RC Smart Beam-Column Joint

M. Shahria Alam, Moncef Nehdi, Maged A. Youssef

Department of Civil & Environmental Engineering, University of Western Ontario, ON

1610 Development and Assessment of a Piezoworm Stage for use in an XY Configuration

S. Salisbury¹, R. Ben Mrad², D. Waechter³, E. Prasad⁴

¹Department of Mechanical & Materials Eng, University of Western Ontario, London, ON

²Department of Mechanical & Industrial Engineering, University of Toronto, Toronto, ON

³Nerac Inc., Tolland, CT, USA

⁴Sensor Technology Limited, Collingwood, ON

1630 *Wrap up*