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. Golnaraghí¹, 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 Bishop¹,², Sumitra Rajagopalan¹,²
  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, Ottawa

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
**Session # 3: Poster & Booth Presentation**

Moderator: **George Akhras**

* Use of Impedance Measurements for Crack Detection in Moderately Soft Piezoelectric Ceramics
  
  H.W. King\(^1\), S.H. Ferguson\(^1\), N. Mrad\(^2\), N. Somayajula\(^3\), G. Gokeda\(^3\), R. Blacow\(^3\), S.E. Prasad\(^3\)
  
  \(^1\)University of Victoria, Department of Mechanical Engineering, Victoria, BC
  
  \(^2\)Air Vehicles Research Section, Department of National Defence, Ottawa, ON
  
  \(^3\)Sensor Technology Ltd. Collingwood, ON

* Application of Magneto-Rheological Dampers to Control the Dynamic Response of Buildings
  
  Ferdous Iqbal\(^1\), Ashutosh Bagchi\(^1\), Ramin Sedaghati\(^2\)
  
  \(^1\)Dept of Building, Civil and Environmental Engineering, Concordia University, QC
  
  \(^2\)Dept 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 Mrad\(^1\), Alexei Ivanov\(^2\), Jacques Albert\(^2\), Tony Marincak\(^3\)
  
  \(^1\)Air Vehicles Research Section, Defence R&D Canada, Ottawa, ON
  
  \(^2\)Carleton University, Department of Electronics, Ottawa, ON
  
  \(^3\)Institute for Aerospace Research, National Research Council Canada, Ottawa, ON

- **Booth Presentations**

1245 **Lunch**
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**
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. Shih\(^1\), M. Kobayashi\(^2\), J.-F. Moisan\(^2\), C.-K. Jen\(^2\)*
\(^1\)Department of Electrical and Computer Engineering, McGill University, Montreal, QC
\(^2\)Industrial Materials Institute, National Research Council of Canada, Boucherville, QC

1700 **The Effects of Electromechanical Coupling on Transient Charging Behavior in Piezoelectric Power Harvesting**
*A. Wickenheiser\(^1\), T. Reissman\(^1\), E. Garcia\(^1\), W. Wu\(^2\)*
\(^1\)Sibley School of Mechanical & Aerospace Engineering, Cornell University, NY, US
\(^2\)Dep 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**
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 Luber**
 _EADS MAS, Military Air Systems MEG, Germany_

**Smart Material Concepts for Morphing Structures**

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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
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 Indus 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
Coffee Break

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