## 24th International Conference on Adaptive Structures and Technologies (ICAST 2013)

Aruba 6 – 9 October 2013

ISBN: 978-1-5108-5119-1

## Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2013) by Michigan Engineering All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact Michigan Engineering at the address below.

Michigan Engineering 1221 Beal Avenue Ann Arbor, MI 48109-2102 USA

Phone: +1 (734) 647-7000

engin-info@umich.edu

## Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA

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

Email: curran@proceedings.com Web: www.proceedings.com

Table of Contents	1
Session 1: Morphing Structures	+
oossaa zarraa paang saratawa sa	
Fluid-Structure Actuator Optimization Of The Fish Bone Active Camber Mechanism	6
Benjamin Woods, Micheal Friswell	
Swansea University, UK	
Experimental And Finite Element Analysis On A Sma-Based Actuator For Aerodynamic	19
Load Control On Aircraft Wings	
Adrian Lara-Quintanilla, Harald E. N. Bersee	
Aerospace Engineering, Delft University of Technology, The Netherlands	
g, starting the starting of th	
Session 2: Piezoelectric Materials and Composites	
Session 211 regeoretti e Plateriais ana composites	
On the characterization of effective properties of piezoelectric macro-fibre composites	30
Marcelo Trindade	
University of Sao Paulo, Brazil	
oniversity of sao i duto, bidzii	1
Session 3: Energy Harvesting I	+
Session 3. Energy Haivesting i	
Energy Harvesting from Flow-Induced Waving Motion of a Piezoelectric Grass Array	42
Jared Hobeck, Daniel Inman	72
Aerospace Engineering, University of Michigan, USA	
Energy Harvesting for Sensors on Smart Wind Turbine Rotors using Free Floating Flaps	54
Lars Bernhammer <sup>1</sup> , Roeland De Breuker <sup>1</sup> , Moti Karpel <sup>2</sup>	34
<sup>1</sup> Delft University of Technology	
<sup>2</sup> Technion Israel Institute of Technology	
Energy harvesting using PZT MEMS energy harvesting device with spiral cantilever	66
beam	00
Chien-Chen Wang, Shun-Chiu Lin, Ya-Shan Shih, Wen-Jong Wu	
National Taiwan University	_
Coories A. Cooriel Touries MUDI on Multifunctional Metaviele	
Session 4: Special Topics MURI on Multifunctional Materials	
A fractional calculus based strong strain hystorogic model for Ti2CiC2 and Ti2CiC2 NiTi	74
A fractional calculus based stress-strain hysteresis model for Ti3SiC2 and Ti3SiC2-NiTi	/4
composites	
Riddhiman Bhattacharya, Nakhiah Goulbourne	
Aerospace Engineering, University of Michigan, USA	
Consist F. Chana Manager Allana 1	
Session 5: Shape Memory Alloys 1	
Modeling the Street Strain Decistance Rehaviour of Shane Memory Alley for Sensorless	96
Modeling the Stress-Strain-Resistance Behaviour of Shape Memory Alloy for Sensorless Actuator Position Control	86
Brian Lynch <sup>1</sup> , Fred Nitzsche <sup>1</sup> , Alex Ellery <sup>1</sup> , Xin Xiang Jiang <sup>2</sup>	
¹Carleton University, Canada	
<sup>2</sup> Transportation Safety Board of Canada, Canada	+
	1

Session 6: Sensing and SHM	
Load Monitoring using a Rayleigh Backscattering Fibre Optic System Marcias Martinez <sup>1</sup> , J. Bussieres <sup>2</sup> , Dimitri Debruyne <sup>3</sup> , Pascal Lava <sup>3</sup> <sup>1</sup> Aerospace Engineering, Delft University of Technology, The Netherlands <sup>2</sup> Mechanical Engineering, Ecole de Technologie Superieure, Canada <sup>3</sup> Department of Mechanical Engineering, Catholic University College Ghent, Belgium	98
Time Reversal of Lamb Waves for Damage Detection in Thermoplastic Composites Maria Barroso-Romero, Darun Barazanchy, Marcias Martinez, Roger Groves, Rinze Benedictus Delft University of Technology	108
Structural Damage Identification by Means of Neural Network (An Inverse Problem Approach Based on Dynamic Characteristics) Kazuyuki Hanahara, Yukio Tada System Informatics, Kobe University, Japan	120
Session 7: Modeling, Simulations, and Design	
Study on optimum connecting points of boom-membrane structure as a basic model for larger lightweight space structure Ayako Torisaka <sup>1</sup> , M.C. Natori <sup>2</sup> , Hiroshi Yamakawa <sup>2</sup> <sup>1</sup> Aoyama Gakuin University, Japan <sup>2</sup> Waseda University, Japan	131
Session 8: Vibration Mitigation and Dynamic Systems I	
Development of Novel Seat Cushions for Helicopter Aircrew Vibration Mitigation Yong Chen, Viresh Wickramasinghe, David Zimcik Aerospace National Research Council Canada, Canada	143
Session 9: Active Polymers	
Static and dynamic thermo mechanical characterization of a bio-compatible Shape Memory Polymer Pauline Butaud, Anne Maynadier, Nicolas Brault, Vincent Placet, Morvan Ouisse, Emmanuel Foltete, Cecile Rogueda-Berriet Applied Mechanics Department, FEMTO-ST, France	158
Session 10: Active and Semi-active Control	
Control technology of transonic aerodynamic characteristic by partial bump Dawei Li, Jinhao Qiu, Rui Nei, Hongli Ji State Key Laboratory of Mechanics and Control of Mechanical Structures, Nanjing University of Aeronautics and Astronautics, China	168

Session 11: Morphing Structures II	
Variable-stiffness skin concept for camber-morphing airfoils Wolfram Raither <sup>1</sup> , Emian Furger <sup>1</sup> , Manuel Zundel <sup>1</sup> , Andrea Bergamini <sup>2</sup> , Paolo Ermanni <sup>1</sup> <sup>1</sup> ETH Zurich, Centre of Structure Technologies, Switzerland <sup>2</sup> Empa, Switzerland	176
Embeddable Variable Stiffness Multi-stable Composites Andreas Arrieta, Izabela Kuder, Tobias Waeber, Paolo Ermanni ETH, Zurich	190
Aeroelastic Control Of Non-Rotating And Rotating Wings Using The Dynamic Stiffness Modulation Principle Via Piezoelectric Actuators Fred Nitzsche <sup>1</sup> , Douglas D'Assuncao <sup>2</sup> , Carlos De Marqui Jr. <sup>2</sup> <sup>1</sup> Carleton University, Canada <sup>2</sup> EESC, University of Sao Paulo, Brazil	200
Session 12: Energy Harvesting: Modeling and Analysis	
Modeling Impact-Based Vibration Energy Harvesting with Application to Frequency Up- Conversion Adam Wickenheiser, The George Washington University, USA	217
Comparison Study Of Standard, Conventional SSHI And Self-Powered SSHI Interface Circuits In Piezoelectric Energy Conversion Bin Li¹, Jeong Ho You¹  ¹Mechanical Engineering, Southern Methodist University, USA	229
Session 13: Adaptive Structures : Applications	
Power Enhancement of Piezoelectric Transformer by Adding Thermal Dissipation Layers Yu-Hao Su <sup>1</sup> , Yuan-Ping Liu <sup>2</sup> , Dejan Vasic <sup>3</sup> , Francois Costa <sup>4</sup> , Wen-Jong Wu <sup>1</sup> , Chih-Kung Lee <sup>1</sup> ¹Department of Engineering Science & Ocean Engineering, National Taiwan University, Taiwan; SATIE, ENS Cachan, France	239
<sup>2</sup> Miezo Inc., Taiwan <sup>3</sup> SATIE, ENS Cachan, France; Universite de Cergy-Pontoise, Neuville/Oise, France <sup>4</sup> SATIE, ENS Cachan, France; IUFM, Universite Paris Est Creteil (UPEC), France	
A Dynamically Actuated Lip at a Blowing Slot for Active High-Lift Christian Behr <sup>1</sup> , Michael Sinapius <sup>1</sup> , Peter Wierach <sup>2</sup> <sup>1</sup> Technische Universitat Braunschweig, Germany <sup>2</sup> German Aerospace Center (DLR), Germany	250
Session 14: Shape Memory Alloys II	
Deployment Characteristics of Braided Coated Bi-Convex Boom partly used SMA for Deployable Membrane Structures Nobuhisa Katsumata <sup>1</sup> , Ken Higuchi <sup>1</sup> , M.C. Natori <sup>2</sup> , Hiroshi Yamakawa <sup>2</sup> <sup>1</sup> Muroran Institute of Technology, Japan <sup>2</sup> Waseda University, Japan	258

Shape Memory Alloy Column Buckling: An Experimental Study	270
Ryan Watkins, John Shaw	
Aerospace Engineering, University of Michigan, USA	
Knitted electromagnetic textile surfaces	283
<sup>1</sup> Alan Tennant, <sup>2</sup> William Hurley, <sup>2</sup> Tilak Dias	
¹The University of Sheffield, UK	
<sup>2</sup> Nottingham Trent University , UK	
Session 15: Vibration Mitigation and Dynamic Systems II	
Actuator placement for shunt damping of panel structures: numerical simulation and	290
experimental validation	
Martin Pohl, Michael Rose, Thomas Haase	
German Aerospace Center (DLR) Braunschweig, Germany	
Experimental study of composite fibre concrete floor slabs in fire condition	302
Jan Bednar, Shota Urushadze, Michal Kloiber	
Czech Technical University in Prague, Czech Republic	
Academy of Sciences of the Czech Republic, Czech Republic	