

23rd Canadian Congress of Applied Mechanics 2011

(CANCAM 2011)

**Vancouver, BC, Canada
5-9 June 2011**

Volume 1 of 2

ISBN: 978-1-61839-177-3

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© (2011) by University of British Columbia
Department of Mechanical Engineering
All rights reserved.

Printed by Curran Associates, Inc. (2011)

For permission requests, please contact University of British Columbia
Department of Mechanical Engineering
at the address below.

University of British Columbia
Department of Mechanical Engineering
6250 Applied Science Lane
Vancouver BC V6T 1Z4
Canada

Phone: (604) 822-2781
Fax: (604) 822-2403

reception@mech.ubc.ca

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

SESSION INDEX

Session: MA1 Chairs: Gergis William and Ben M. Chen

Engineering Design and Analysis I

Applying Dynamic Relaxation Method In Bending Analysis Of Multi-layer Composite Plates With Different Geometrical Circular Shapes.....1

Atefeh Einafshar, Mehran Kadkhodayan and Jalil Rezaee Pazhand

Multiaxial Fatigue Life Prediction Of Az31b Extrusion.....5

Jafar Albinmousa, Hamid Jahed and Steve Lambert

Performance Comparison Of Evolutionary And Surrogate Based Global Optimization Algorithms.....9

Adel Younis and Zuomin Dong

Lightweighting Design Concepts For Chasis Of Light Duty Vehicules.....13

Gergis William, Samir Shoukry, Jacky Prucz and Mark Shoukry

Cancam 2011 Global Engineering Design Competition : Solar Hotplate.....17

Jeff English and Paul Werden

Session: MA2 Chairs: Ryozo Nagamune and Meeko Oishi

Advanced Control and Estimation Theory and Its Applications

Switching Gain-scheduling Control For Linear Time-varying Plants.....21

Ehsan Azadi Yazdi and Ryozo Nagamune

Modeling And Control Of A Powered Wheelchair: Wall-following Around A Corner With Infrared.....25

Meeko Oishi, Pouyan Taghipour Bibalan, Alexis Cheng and Ian Mitchell

Feedback And Feedforward Tracking Control For Networked Control Systems.....29

Hui Zhang and Yang Shi

An Attitude And Heading Reference System Design For Indoor Uav Testing.....33

Martin Barczyk and Alan F. Lynch

An Algorithm For Fault Isolation In Stochastic Non-linear State-space Models Using Particle Filters.....37

Bhushan Gopaluni, Feras Alrowaie and Ezra Kwok

Session: MA3 Chairs: Boris Stoeber and Sushanta Mitra

Invited session : Microfluidics 1 - Applications

Microfluidic-scale Biofuel Production And Carbon Management.....41

Matthew Ooms and David Sinton

Hydrogel-based Microfluidic Cell Culture Systems For Drug Screening.....	45
<i>Linfen Yu and Karen C. Cheung</i>	
Wicking Flow Through Microchannels.....	49
<i>Hadi Mehrabian and James J. Feng</i>	
Local Micelle Concentration Changes In Microfluidic Flows And The Relation To Structure Formation.....	53
<i>Neville Dubash, Perry Cheung and Amy Shen</i>	
Session: MA4 Chairs: Marcelo H. Ang Jr and Justin Pang	
Mechatronic Systems and Control Applications I	
Flexible Spacecraft Jitter And Its Suppression By Stewart Platform.....	57
<i>Lei Liu, Kok Kiong Tan, Wenyu Liang, Sunan Huang and Tong Heng Lee</i>	
Projection Of Achievable Track Density And Bit Aspect Ratio For 4 Tb/in2 Bit Patterned Media On Hard Disk Drives.....	61
<i>Chee Kiang Pang, Wai Ee Wong, Fan Hong, Jul Nee Teoh and Eng Hong Ong</i>	
Composite Nonlinear Feedback Control For An Underactuated Gantry Crane System.....	65
<i>Xiao Yu and Weiyao Lan</i>	
Development Of An Instantaneous Powertrain Optimal Control Method For E-cvt Based Hybrid Electric Vehicles.....	69
<i>Leon Zhou and Zuomin Dong</i>	
Haptic Telemanipulation With Impedance Control And Its Application In Homecare Robotics.....	73
<i>Yanjun Wang and Clarence De Silva</i>	
Session: MA5 Chairs: Arun Misra and Farrokh Sassani	
Solid Mechanics and Materials I	
Direct Photoelastic Measurement Of All In-plane Stress Components.....	77
<i>Sui Gao and Gary Schajer</i>	
Hole-drilling Residual Stress Measurement In An Intermediate Thickness Specimen.....	81
<i>Colin Abraham and Gary Schajer</i>	
Vibration Analysis Of The Piezoelectric Annular Sandwich Plates.....	85
<i>Roshanak Banan and Yashar Afarin</i>	
Development Of Heavy Truck Front Underride Protection Device.....	89
<i>Moustafa El-gindy, Ali Atahan and Manuel Castellanos</i>	
Development Of An Analytical Model To Predict Midpalatal Suture Behavior During Maxillary Expansion Treatment.....	93
<i>DI Romanyk, Mo Lagravere, R. W. Toogood, Pw Major and Jp Carey</i>	

Session: MA6 Chairs: Markus Timusk and James Yang	
Machine Condition & Monitoring	
Vibration Analysis Of Internal Gear Planetary Transmissions.....	97
<i>Jianming Yang and Ping Yang</i>	
Wavelet Analysis Of Planetary Gearbox Vibration Data For Fault	
Detection And Diagnostics.....	101
<i>Jing Yu and Viliam Makis</i>	
Balloon Altitude And Effect Of Earth Infrared Radiation.....	105
<i>Christopher Cho</i>	
Vibration- And Acoustic-emissions Based Novelty Detection Of Fretted Bearings.....	109
<i>Jordan Mcbain and Markus Timusk</i>	
An Evolving Classification System For Gear Fault Detection.....	113
<i>Ofelia Jianu and Wilson Wang</i>	
Session: MP1 Chairs: David Naylor and Yang Shi	
Engineering Design and Analysis II	
The Design And Analysis Of A New Fixture To Convert A Three Axis Cnc	
Mill To Have Five Axis Capabilities.....	117
<i>Mariam Fatima, Marnie Ham and Ruth Milman</i>	
Effect Of Pcm Thermal Conductivity On Energy Demand And Temperature	
Of The Net-zero Building In Toronto.....	122
<i>M. Ebrahim Poulad, Alan S. Fung and David Naylor</i>	
Dome Design Of Composite Pressure Vessels Using Particle Swarm	
Optimization Algorithm.....	127
<i>Ali Paknahad, Mohammad Hojjati and Alireza Fathi</i>	
A Toolpath Generation Method For Five Axis Cnc Mill Using Spif Technology.....	131
<i>Mariam Fatima, Marnie Ham and Ruth Milman</i>	
Design Parameters For A Continuous Solar Disinfection Unit For	
Drinking Water Purification.....	136
<i>Kristian Dubrawski, Andrea Macdonald, Ian Muri, Sylvia Green, Julia Wu, Julia Stafford, Lok Tin Lam, Julian Dubrawski and Bradley Pierik</i>	
Session: MP2 Chairs: Arun Misra and Srikanth Phani	
Civil Engineering	
Equivalent Angle Of Dilation For The Analysis Of Underground Openings	
In Rock Mass Obeying Hoek-brown Plasticity.....	140
<i>Shailendra Sharan and Rashida Naznin</i>	
Interaction Of The Wake Of A Bluff Body With A Wall Jet In An Open Channel Flow.....	144
<i>Arindam Singha, Abdullah Faruque and Ramaswami Balachandar</i>	
Quadrant Decomposition To Extract Reynolds Shear Stress Of Turbulent	
Bursting Events In An Open Channel Flow.....	148
<i>Abdullah Faruque and Ramaswami Balachandar</i>	

Struvite Recovery From Wastewater For Use As An Agriculture Fertilizer	152
<i>Belinda Li, Sara Mohammad Pour, Hannah Chiew and Hui Zhang</i>	
A Vibration-free Trajectory Generation Approach For Two-link Flexible Manipulator	156
<i>Jinjun Shan and Michael Stachowsky</i>	
Session: MP3 Chairs: Boris Stoeber and Sushanta Mitra	
Invited session : Microfluidics 2 – Microflow Physics	
Microfabrication Of Anisotropic Media For Particle Separation Devices	160
<i>Raghavendra Devendra, Boris Stoeber and German Drazer</i>	
Dynamics Of Evaporating Microdroplets In Digital Microfluidic Biochips	164
<i>Ali Ahmadi and Mina Hoorfar</i>	
Interfacial Flows In Micro-channels: Flow Regimes And Hysteresis	168
<i>Majid Ahmadiouydarab and James J. Feng</i>	
Simple Views On Cornered Contact Lines Near Instability	172
<i>Jacco H. Snoeijer, Ivo Peters, Laurent Limat and Adrian Daerr</i>	
Session: MP4 Chairs: Marcelo H. Ang Jr and Justin Pang	
Mechatronic Systems and Control Applications II	
Integrated Vehicle Yaw Moment Control System Active Momentum Wheel And Differential Braking	175
<i>Fereydoon Diba and Ebrahim Esmailzadeh</i>	
Active Trailer Steering For Improving Maneuverability Of Long Combination Vehicles With B-train Double Configuration	179
<i>Xuejun Ding and Yuping He</i>	
Search And Rescue: A Uav Aiding Approach	183
<i>Fei Wang, Swee King Phang, Jinqiang Cui, Ben M. Chen and Tong H. Lee</i>	
Compensation Of Hysteresis Nonlinearities In Smart Actuators	187
<i>Omar Alianaideh, Mohammad Al Janaideh, Lutfi Al-sharif and Ahmed El-shaer</i>	
Electromagnetoelastic Solution Of A Rotating Functionally Graded Piezoelectric Hollow Cylinder	190
<i>Hamid Akbarzadeh and Zengtao Chen</i>	
Session: MP5 Chairs: A. Srikantha Phani and Farrokh Sassani	
Solid Mechanics and Materials II	
Flame-sprayed Nanostructured Tio2 Coatings Exposed To Astm G65 Abrasion Testing	194
<i>Navid Pourjavad, Gary Fisher and Andre Mcdonald</i>	
Resistance Of Nanostructured Thermal Barrier Coatings To Molten Salt And High-temperature Boiler Flue Gases	198
<i>Shishir Rao, Andre Mcdonald and Douglas Singbeil</i>	

Effects Of A Vacancy Defect On Strength Of Graphene Sheet And Carbon Nanotube.....	202
<i>M. A. N. Dewapriya, A. Srikantha Phani and R.k.n.d. Rajapakse</i>	
Prediction Of Osteoporotic Fractures By Dxa-based Finite Element Procedure.....	206
<i>Pei Zhang, Chuannan Wu and Yunhua Luo</i>	
Finite Element Analysis Of Human Bone (femur) Remodeling Using Ansys.....	210
<i>Zannatul Ferdous, Yunhua Luo and Qiang Zhang</i>	
Session: MP6 Chairs: David Naylor and Robert Bauer	
Computational Mechanics	
Numerical Study Of An Atrium Integrated With Hybrid Ventilation System.....	214
<i>Shafqat Hussain, Patrick H. Oosthuizen and Abdulrahim Kalendar</i>	
Dynamic Terramechanic Model For Grouser Wheels On A Planetary Rover In Sandy Soil.....	218
<i>Rishad Irani, Robert Bauer and Andrew Warkentin</i>	
Thermomechanical Analysis Of A Functionally Graded Rectangular Plate Based On Shear Deformation Theories.....	222
<i>Amin Komeili, Hamid Akbarzadeh and Seyed Kasra Hosseinizad</i>	
Stress Analysis On The Failure Of A Hvac Module.....	227
<i>A. K. M. Shafiullah, Stephen Cull, Olanrewaju Ojo and Christine Qiong Wu</i>	
Finite Element Modeling Of Thermal Stresses And Deformation In Steel Strips Under Water Jet Impingement Cooling.....	231
<i>Soheyl Vakili and Mohamed Gadala</i>	
Session: ME1 Chairs: Ben M. Chen and James Olson	
Engineering Design and Analysis III	
Thermal Optimization Of An Electric Vehicle Battery Cooling Plate.....	235
<i>Anthony Jarrett and Il-yong Kim</i>	
Experimental Study Of Direct Methanol Fuel Cell (dmfc) System.....	239
<i>Amir Kianimanesh, Qinwen Yang, Theo Freiheit, Deyi Xue and Simon Park</i>	
On The Effect Of Surface Roughness On Contact Stress Between Involute Spur Gears.....	243
<i>Soheil Saadati, Mohammad Hojjati and Ali Goudarzi</i>	
Complex-shaped Mandrel Modeling For Braiding And Filament-winding.....	247
<i>Rifat Hossain, Jason Carey and Pierre Mertiny</i>	
Development Of A Symbolic Computer Algebra Toolbox For 2d Fourier Transforms In Polar Coordinates.....	251
<i>Edem Dovlo and Natalie Baddour</i>	
Session: ME2 Chairs: Davood Younesian and Alokendu Bhattacharya	
Fluid-Solid Interactions	
Development Of A Dynamic Variable Measurement System For Use In Wind Powered Yachts.....	256

Alexandre Bergeron and Natalie Baddour

Control Of Oscillations Of A Cantilever Structure Subject To Unsteady Subsonic Aerodynamic Load	260
<i>Tahereh Mirmohammadi, Arun K. Misra and Dan Mateescu</i>	
Linear Dynamics And Stability Of A Towed Flexible Cylinder	264
<i>Mojtaba Kheiri and Michael P. Paidoussis</i>	
Experimental Investigation Of Flow Induced Vibration Of A 43-element Simulation Candu Fuel Bundle Under Confined Axial Flow	268
<i>Alokendu Bhattacharya, Shudong Yu and Greg Kawall</i>	
Session: ME3 Chairs: Boris Stoeber and Sushanta Mitra	
Invited session : Microfluidics 3 - Technology	
Microneedles For Transdermal Drug Delivery: Simulation, Fabrication And Experimental Testing	272
<i>Colin Dalton, Rumi Zhang and Graham A Jullien</i>	
Bubbles No More: In-plane Trapping And Removal Of Bubbles In Elastomeric Microfluidic Devices	276
<i>Axel Guenther</i>	
Ultra Low-cost Microfluidic Fabrication Technologies	280
<i>Bernard Coquinco and Eric Lagally</i>	
Flexible Microfluidics Technologies: Complying With The Compliancy	284
<i>Bonnie Gray</i>	
Computational Fluid Dynamics Analysis For Optimization Of [11c]raclopride Synthesis On A Microfluidic Chip	288
<i>Samar Haroun, Paul C.h. Li and Thomas J. Ruth</i>	
Session: ME4 Chairs: Marcelo H. Ang Jr and Justin Pang	
Mechatronic Systems and Control Applications III	
Development Of An Inexpensive Ubiquitous Health Monitoring System For The Elderly	291
<i>Jian Yuan, Kok Kiong Tan and Tong Heng Lee</i>	
Effects Of Different Motion-data Fitering Methods On Robot Dynamic Model Identification	295
<i>Ngoc Dung Vuong and Marcelo H. Ang Jr</i>	
Robust Trajectory Tracking For A Small-scale Hybrid Aircraft	300
<i>Alireza Partovi, Xinhua Wang and Hai Lin</i>	
Soft Soil Parameter Estimation And Traction Control Of A Gas Powered Rover For Environmental Monitoring Of Oil Sands	304
<i>Nicolas Alejandro Olmedo, Stephen Christopher Dwyer, James Daniel Yuen and Michael George Lipsett</i>	

Modeling Of One-dimensional Distributed System Using Linear Graph	308
<i>Shahram Alipourazadi and Clarence De Silva</i>	
Session: ME5 Chairs: Farrokh Sassani and Tarun Kant invited: Solid Mechanics and Materials III	
An Elasto-strain Gradient Viscoplastic Analysis Of Indentation Size Effects	312
<i>Suman Guha, Sumit Basu and Sandeep Sangal</i>	
Continuum Mechanical Model Of The Cardiac Muscle	316
<i>Andrey Melnikov and Salvatore Federico</i>	
Wear Analysis Of Total Knee Replacement By Finite Element Simulation	320
<i>S. O'brien, Y. Luo, C. Wu and J. Brandt</i>	
Composite Mechanics In The Last Five Decades - A Personal View	324
<i>Tarun Kant</i>	
Periodontal Ligament Orthodontic Simulator Adaptor: Analytical Model Biomechanical Characterization	328
<i>Ted Fill, Jason Carey, Roger Toogood and Paul Major</i>	
Session: ME6 Chairs: Chris Mechefske and Christine Wu Structure Dynamics	
Unconstrained-layer Damping Layouts Of General Shell System Using Topology Optimization	332
<i>Sun Yong Kim, Chris Mechefske and Il Yong Kim</i>	
Experimental Validation Of Topological Damping Treatments In An Unconstrained-layer Structure	336
<i>Sun Yong Kim, Chris Mechefske and Il Yong Kim</i>	
Discrete Dynamic Modelling And Analysis Of A Beam With A Nonlinear Fatigue Crack	340
<i>S.I. Mahmood and G. Rideout</i>	
Critical Speeds Of Guided Circular Saws A Sensitivity Analysis To Design Variables	344
<i>Ahmad Mohammadpanah, Stanley G. Hutton and M. Ramin Khorasany</i>	
Development Of A Mathematical Method For Automatic Field-test-event Identification With The Application To Accelerated Durability Testing Of Ground Vehicles	349
<i>Ke Xu, Yan Wu, Stephen Cull and Christine Qiong Wu</i>	
Session: TM1 Chairs: Zengtao Chen and Chongqing Ru Fracture Symposium I	
A New Probabilistic Method For Microstructure-dependent Fatigue Notch Factor	353
<i>Gbadebo Owolabi, Benedict Egboiyi, Li Shi and Horace Whitworth</i>	
Non-local Lower-bound Damage Based Material Model	357
<i>Michael Landry and Zengtao Chen</i>	

A General Method For Optimizing The Bending Stiffness Of Symmetric Three-ply Paperboard.....	361
<i>Han Wang, Kecheng Li, Zengtao Chen, Xiaobo Zhao and Jinxing Liu</i>	
Investigation Of Different Cross Sections Of Thin-walled Tubes At Car Front Structures For Damage Reduction In Frontal Collision.....	365
<i>Mehdi Piltan, Reza Ghodsi, Mehrdad Izadi and Ali Alavinia</i>	
Finite Element Analysis Of Speed-dependent Dynamic Fracture Toughness Of High Strength Steel Pipelines.....	369
<i>Zhong-jun Ren, Chong-qing Ru and Da-ming Duan</i>	
Session: TM3 Chairs: Dana Grecov and David James	
Invited Session : Non-Newtonian Flow	
Macroscopic Vs Local Rheology Of Pulp Fibre Suspensions.....	373
<i>Babak Derakhshandeh, Savvas G. Hatzikiriakos and Chad P.j. Bennington</i>	
Effect Of Liquid Elasticity And Static Contact Angle On Liquid Jet Impaction On A High Speed Moving Surface.....	377
<i>Purushotam Kumar, Sheldon Green, Bavand Keshavarz and Don Eadie</i>	
Flow Modeling And Rheological Characterization Of Nematic Liquid Crystals Between Concentric Cylinders.....	381
<i>Nader Noroozi and Dana Grecov</i>	
Slow Flow Of Viscoelastic Fluids Past A Circular Cylinder.....	385
<i>Edwin Wang and David. F. James</i>	
Visco-plastic Lubrication Of Flow In Channel Geometry.....	389
<i>S. Hormozi, K.wielage-burchard Wielage-burchard and Ian Frigaard</i>	
Session: TM4 Chairs: Yusuf Altintas and Marek Balazisnki	
NSERC CANRIMT Theme I: Machining Process Mechanics and Dynamics	
Identification Of 3d Joint Dynamics.....	393
<i>Majid Mehrpouya and Simon Park</i>	
Application Of Virtual Machining In Five-axis Flank Milling Of An Integrally Bladed Rotor (ibr).....	397
<i>Will Ferry, Fuat Atabey and Serafettin Engin</i>	
Generalized Modeling Of Metal Cutting Mechanics And Stability.....	401
<i>M. Kaymakci, Z. M. Kilic and Y. Altintas</i>	
Virtual Turning.....	405
<i>A. Gencoglu and Y. Altintas</i>	
Prediction Of Cutting Forces In Inclined Surface Ball-end Milling.....	409
<i>O. Tuysuz, Y. Altintas and H. Y. Feng</i>	

Session: TM5 Chairs: Martin Jun and Reza Ghodsi
Intelligent Manufacturing Systems

Analysis Of Potential Failure Modes In An Assembly Line By Fuzzy Expert Systems.....	413
<i>Reza Ghodsi, Seyed Farid Ghaderi, Foad Quarashi and Mehdi Piltan</i>	
Design And Fabrication Of A Three Dimensional Commemorative Artistic Plaque.....	417
<i>Maxym Rukosuyev, Junghyuk Ko, Martin Jun and Laura Dutton</i>	
A Fuzzy Controller For Automatic Press Production Line.....	421
<i>Hamed Shakouri and Reza Ghodsi</i>	
Flexible Flow Shop Scheduling Using Memetic Algorithm.....	425
<i>Jafar Razmi and Reza Ghodsi</i>	
Condition Monitoring For Dry Friction Buildup In An Industrial Hydraulic System Using Unscented Kalman Filter.....	429
<i>Behnam Razavi and Clarence De Silva</i>	
Session: TM6 Chairs: Tom Oxland and Steven Rogak	
Special Session : Constitutive Modelling of Soft Biological Tissues	
Effects Of Preconditioning Protocols On Mechanical Behavior And Constitutive Modelling Of Soft Biological Tissues.....	433
<i>Elizabeth Clarke</i>	
A Continuum Mechanics Approach For Modeling The Annulus Fibrosus Using Experimental Data.....	434
<i>Christian Puttlitz</i>	
Computational Study Of Biomechanical Response Of The Human Abdominal Wall.....	435
<i>Muhammad Amir Siddiq</i>	
Correlation Of Strain Pattern With Spinal Cord Tissue Damage In A Rat Cervical Spine Model.....	436
<i>Colin Russell</i>	
Development Of A Computational Approach To Model Axon Mechanics In White Matter.....	437
<i>David Shreiber</i>	
Session: TA1 Chairs: Zengtao Chen and Alan Plumtree	
Fracture Symposium II	
Application Of The Notch Stress Intensity Factor Concept To Components Containing Sharp V-notches.....	440
<i>Michael Heinzelmann</i>	
Thermal Stress Field And Thermal Fatigue Resistance Of Ni Base Alloy Composite Coating.....	444
<i>Jian Zheng, Xinhua Ni, Baofeng Li and Tao Sun</i>	
Fatigue Of Crackable Shot-peened Steel.....	448
<i>Alan Plumtree</i>	

A Statistical Method For Predicting The Probability Of Formation Of Microstructurally Small Crack For Notched Components.....	451
<i>Gbadebo Owolabi, Li Shi, Benedict Egboiyi and Horace Whitworth</i>	
Gradient Dependent Constitutive Laws For A Model Of Micro-cracked Bodies.....	455
<i>Malika Bongué Boma, Les Sudak and Salvatore Federico</i>	
Session: TA2 Chairs: Orest Cochkanoff and Yang Shi	
Lattice Materials and Engineering Education	
Teaching Dynamics.....	459
<i>Orest Cochkanoff</i>	
An Innovative And Integrative Approach Teamwork Learning In Engineering Education: More Than Just Doing.....	462
<i>Dorothy Missingham, David Whitman and Colin Kestell</i>	
Remediation Of A Course In Dynamics Using Collaborative Learning.....	467
<i>Jacek Uziak, M. Tunde Oladiran and Marian Gizejowski</i>	
Bandgaps In Octet Truss Lattices.....	471
<i>Manan Arya and Craig Steeves</i>	
Effective Mechanical Properties Of Lattice Materials: A Comparative Study.....	475
<i>Prateek Chopra and Srikantha Phani</i>	
Session: TA3 Chairs: Harish Dixit and Kamran Alba	
Capillary and Multi-fluid Flows	
Numerical Investigations Of Liquid Bridge Rupture In The Presence Of Gravity.....	479
<i>Pirooz Darabi, Konstantin Pougatch, Martha Salcudean and Dana Grecov</i>	
Transient Two-layer Channel Flow.....	483
<i>Kamran Alba, Roger Khayat and Patrice Laure</i>	
Resonance Behavior Of Spherical Gas Bubbles Used As Contrast Agent In Medical Ultrasound.....	487
<i>Abdolreza Fazeli, Jila Samadi, Mohammad-sadegh Karimi, Soheil Sadeqi, Amir Nejat and Kayvan Sadeghy</i>	
Weakly-inertial Buoyant Displacement Flows In Near-horizontal Channels.....	491
<i>Seyed Mohammad Taghavi, Kamran Alba and Ian Frigaard</i>	
Capillary Attraction Between Floating Cylinders.....	495
<i>Harish Dixit and George Homsy</i>	
Session: TA4 Chairs: Ahmet Alpas and Stephen Veldhuis	
NSERC CANRIMT Theme I: Machining Tribology	
Chip Morphology Study Of Titanium Metal Matrix Composites.....	499
<i>Roland Bejjani, Maryam Aramesh, Marek Balazinski, Hossam Kishawy and Helmi Attia</i>	
Metallographic Analysis Of The Deformation Microstructure Of Ti-6al-4v Alloy Subjected To Orthogonal Cutting Of Ti-6al-4v Alloy Subjected To Orthogonal Cutting.....	503
<i>Md. A. Islam, S. Bhowmick and A. T. Alpas</i>	

Comparison Of Hard Coatings And Tool Geometries For Milling Of Superclean Steel.....	507
<i>Simon Oomen-hurst, Maneesh Khanna and Stephen C. Veldhuis</i>	
Prediction Of Coating Performance In Metal-cutting Applications By Means Of Tribometer-based Simulations.....	511
<i>Jeremy Boyd and Stephen Veldhuis</i>	
Simulation Of The Tribological Behaviour Of Metal-cutting Tools And Analysis Of The Friction Contact Region.....	514
<i>Manuel D. Abad, Andrew Biksa and Stephen C. Veldhuis</i>	
Session: TA5 Chairs: Yongsheng Ma and Bruce Minaker	
Modeling and Simulation I	
Knowledge Driven Generic Drill String Modeling.....	518
<i>Shah Md Rajjur Rahman and Yongsheng Ma</i>	
Thermodynamics And Statistical Mechanics Of Water Near Fluid-phase Transitions.....	522
<i>Robert L. Varty</i>	
Bifurcations And Boundary Layers In Plane-strain Elasticity.....	526
<i>Ciprian Coman and Xiang Liu</i>	
Cloud Based Vehicle Anti-idling, Diagnostics And Emissions Monitoring System.....	530
<i>Kenneth Lam, Vincent Huynh, Luke O'neill and Moksh Khurana</i>	
Dynamic Behaviour Of A Narrow Tilting Vehicle.....	535
<i>Bruce Minaker and Robert Rieveley</i>	
Session: TA6 Chairs: Mathew Bussiere and Ian Frigaard	
Unsteady and High Speed Flows	
Time-domain Unsteady Aerodynamics Of Thin Lifting Configurations Via The Boundary Element Method.....	539
<i>Meisam Mohammadi-amin, Behzad Ghadiri, Mostafa Abdalla and Roeland De Breuker</i>	
The Oscillatory Behavior Of A Symmetric Airfoil Hinged At Its Aerodynamic Centre In The Wake Of A Circular Cylinder.....	543
<i>Mathew Bussiere, David Nobes and Charles Robert Koch</i>	
Unsteady Numerical Simulation Of An Oscillating Jet Inside A Concave Cavity.....	548
<i>Andre Babineau, Gerard Poitras and Gilles Roy</i>	
Effect Of Free-stream Turbulence On The Near-wake Of A Circular Cylinder.....	552
<i>Imed Khabbouchi, Mohsen Ferchichi and M. Sadok Guellouz</i>	
Turbulent Boundary Layer Separation In Adverse Pressure Gradient.....	557
<i>Ghasem Behfarshad and Noor-e-alam Ahmed</i>	
Session: TP1 Chairs: Xuanhong Cheng and Ash Parameswaran	
Invited : BioMEMS/NEMS: Design, Fabrication and Application	
Plastic Mesm And Microfluidics Technology And Applications.....	561

Avneet Bajwa, Suman Chhina, Mona Rahbar, Behraad Bahreyni and Ash Parameswaran

Surface Plasmon Resonance For Dynamic Analysis Of Cell Secretion.....565
Shu Han Wu, Arthur Chiou, Pei Kuen Wei and Xuanhong Cheng

Collapse Of Double Cantilever Beam Due To Capillary Forces.....569
Shawn Lavoie and Tian Tang

**Modified Bernoulli Equation For Use With Combined Electro-osmotic And
Pressure-driven Microflows.....573**
Thomas Adams and Aditya Raghunandan

Session: TP2 Chairs: Arun Misra and Tarun Kant
Finite Element Method
Study Of Three-dimensional Confined Laminar Flows.....577
Dan Mateescu, Araz Panahi and Valentin Roy

**On The Effects Of Grain-grain Interactions In Twin Nucleation And
Growth In Hcp Materials.....581**
Hamidreza Abdolvand and Mark R. Daymond

**Hybrid Electric Vehicle Powertrain And Fuel Selections -A Comparion
Based On Well-to-wheel Studies.....585**
Leon Zhou and Zuomin Dong

Numerical And Experimental Analysis Of High-speed Scratching.....589
D. Anderson, A. Warkentin and R. Bauer

Development Of A Snowmobile Simulator For Ride Assessment.....593
P.a. Hebert, M. J. Richard and S. Rakheja

Session: TP3 Chairs: Ben Nadler and Walied Moussa
Micro-Bioengineering
Micropipette Aspiration Of An Inflated Fluid-filled Spherical Membrane.....597
Touqeer Sohail, Tian Tang and Ben Nadler

**Comparative Analysis Of The Bridged Finite Element-molecular Dynamics
And Quasicontinuum Methods In The Nanoindentation Of Copper.....601**
Vincent Iacobellis and Kamran Behdian

**The Separation Of Bending And Twisting Motions In Inner Helices
During Nak Channel Gating.....605**
Cheng Cen and Wanlin Guo

Splitting Of Microtubules Under Axial Compression.....609
Mingzhao Jin and Chongqing Ru

**Flexible Structures For Generating Higher Electrical Power By
Mems-based Polymer Energy Harvesters.....612**
Mehdi Rezaeisaray, Don Raboud and Walied Moussa

Session: TP4 Chairs: Eugene Ng and Hossam Kishawy NSERC CANRIMT Theme I: Material Behaviour Modeling and Analysis in Machining	
A Unique Methodology To Determine Coefficient Of Friction For Modeling Orthogonal Cutting.....	616
<i>Silvie Maria Tanu Halim and Eu-gene Ng</i>	
On Enhancing Machined Surface Quality Using Magnetic Damping Effect.....	620
<i>Ibrahim Deiab and Hossam Kishawy</i>	
An Acoustic Emission-based Surface Detection For Micromachining.....	624
<i>Chan-seo Goo and Martin B.g. Martin</i>	
Evaluation Of Atomized Based-vegetable Oil-based Cutting Fluid.....	628
<i>Chan-seo Goo and Martin B.g. Jun</i>	
Prediction Of Cutting Forces In Micro-milling Process Using Finite Element Method.....	632
<i>Xiaoliang Jin and Yusuf Altintas</i>	
Session: TP5 Chairs: Stephen Veldhuis and Reza Ghodsi Optimization of Manufacturing Systems	
High Volume Closed Loop Machining Simulation.....	636
<i>Brian Perry and Stephen Veldhuis</i>	
Multi-objective Mixed Model Assembly Line Sequencing Optimization Using Interactive Fuzzy Algorithm.....	640
<i>Reza Ghodsi, Neda Manavizadeh, Jafar Razmi and Babak Javadi</i>	
Introducing An Interactive Mathematical Models In A Web-based Environment.....	644
<i>Shima Mohebi and Jafar Razmi</i>	
Green Manufacturing And Recovery Network Design Using Multi-objective Mixed Integer Programming.....	648
<i>Mir Saman Pishvae and Jafar Razmi</i>	
Reliability Centered Cost Effective Preventive Maintenance.....	652
<i>Reza Ghodsi and Atefe Yahyaipour</i>	
Session: TP6 Chairs: Ryozo Ngamune and Derek Koop Intelligent Mechatronics	
Nonlinear Adaptive Observer Design For An Electromechanical Rotative Plant.....	656
<i>Karim Khayati and Jiang Zhu</i>	
Artificial Neural Network Based Nonlinear Dynamic Modelling Of The Twin Rotor Mimo System.....	661
<i>B.g.d.achintha Madhusanka and W.r.de Mel</i>	
Experimental Study On Passive Dynamic Bipedal Walking: Effects Of Parameter Change On Gait Pattern.....	665
<i>Kazi Rushdi, Derek Koop and Christine Qiong Wu</i>	

Experimental Study Of Passive Dynamic Bipedal Walking: Comparing Test Platforms.....	669
<i>Derek Koop and Christine Qiong Wu</i>	
Bandwidth Widening Of Vibration Energy Harvesters Using A Two-stage Design.....	673
<i>Joseph Fernando and Qiao Sun</i>	
Session: TE1 Chairs: Srikar Vengallatore and Po Ki Yuen	
Invited : Sensors and Actuators	
Structural Design Of Micro- And Nano-mechanical Resonators: Role Of Thermoelastic Damping And Internal Friction.....	677
<i>Srikar Vengallatore</i>	
Microporous Poly(dimethylsiloxane) Microfluidic Devices.....	681
<i>Po Ki Yuen, Hui Su, Vasiliy N. Goral and Katherine A. Fink</i>	
Adhesive Bonding Characterization Using An Acoustic Wave Mems Sensor.....	685
<i>Mohamed El Gowini and Walied Moussa</i>	
Electrostatically Actuated 2-dimensional Mems Micromirror.....	689
<i>Hasan Imam and Yuan Ma</i>	
Three Dimensional Scanner Using Laser Traingulation Technology.....	693
<i>Lutfi Al-sharif</i>	
Session: TE2 Chairs: Kok-Kiong Tan and Tahir Khan	
Structural Tesing	
Wrinkling Around An Inclusion Line On Thin Film Structures.....	699
<i>Masoud Noroozi and Liying Jiang</i>	
On The Contact And Stability Of A Spherical Membrane-fluid Structure With Rigid Parallel Planes.....	703
<i>Ben Nadler</i>	
Multi-scale Non-equilibrium Molecular Dynamics Formulation For Casimir Energy.....	707
<i>Farbod Khoshnoud, Houman Owhadi, Clarence De Silva and Shaofan Li</i>	
Multi-scale Design Of An Actuator With Thermal-mechanical Energy Conversion And Coupling.....	711
<i>Farbod Khoshnoud, Clarence De Silva and Houman Owhadi</i>	
Determining Optimal Non-uniform Damping Coefficients For Adjacent Buildings Via A Nelder-mead Approach.....	715
<i>Kasra Bigdeli, Warren Hare and Solomon Tesfamariam</i>	
Session: TE3 Chairs: Kevin McTaggart and Dan Mateescu	
Newtonian flows and Aerodynamics	
Steady And Unsteady Low Reynolds Number Flows Past Fixed And Oscillating Airfoils.....	719
<i>Manuel Munoz and Dan Mateescu</i>	
Investigation Of Approach Conditions For Very Low Head (vlh)	

Water-turbine Performance	723
<i>Wes Dick, Paul Kemp, David Rival, Brenda Tackaberry, Colin Hartloper, Alex Yuen, Matias Sessarego, Jaimie Wong and John Vertz</i>	
Numerical Investigation Of Low-reynolds-number External Aerodynamic Flows Using A Transitional Turbulence Model	727
<i>Joshua Nathaniel Noel Counsil and Kiari Goni Boulama</i>	
Coherent Structures In A Jet In The Vicinity Of The Free Surface	731
<i>Jiahao Tian, Vesselina Roussinova and Ram Balachandar</i>	
Robust Computation Of Ship Hydrodynamic Coefficients At Moderate Forward Speed	735
<i>Kevin Mctaggart</i>	
Session: TE4 Chairs: Hossam Kishawy and O. Remus Tutunea-Fatan	
Manufacturing Process Modeling	
Analytical Modelling Of Sticking-sliding Zones At The Chip-tool Interface	739
<i>Lei Pang, Hossam Kishawy and Ibrahim Deiab</i>	
An Interpolation Technique For Compensation Of Geometry-based Errors In Five-axis Surface Machining	743
<i>Md Shafayet H. Bhuiya and O. Remus Tutunea-fatan</i>	
Integrated Process Planning For Multi-axis Laser Polishing	747
<i>Abdullah M.k. Hafiz, Michael T.c. Chow, Evgueni V. Bordatchev, O. Remus Tutunea-fatan and George K. Knopf</i>	
Thermal Stress Analysis Of 304 Stainless Steel Joints By Spot Laser Keyhole Welding	751
<i>Jun Zhou and Amir Khalilollahi</i>	
Session: TE5 Chairs: Tom Oxland and Walied Moussa	
Musculoskeletal Biomechanics	
Study On Crack Propagation And Strain Energy Distribution In Artificial Bone Tissue With Carbon Nanotubes Instead Of Collagen Fibers	755
<i>Kaveh Pourakbar Saffar and Les Sudak</i>	
Finite Element Study Of Partial Medial Meniscectomy Under Combined Loading- A Porous Media Contact Analysis	759
<i>Mojtaba Kazemi and Leping Li</i>	
Dynamic Response Of A 2d Human Head Model During A Shock. Fluid-structure Interaction Approach	763
<i>Adil El Baroudi, Jean Charles Gesbert, Fulgence Razafimahery and Lalaonirina Rakotomanana</i>	
Three-dimensional Bone Remodeling Simulation Of The Human Proximal Femur Using Topology Optimization	767
<i>Il Yong Kim and Chris Boyle</i>	
Finite Element Analysis Of The Lumbar Spine Under Posterior-anterior Static And Dynamic Loads	771
<i>Aliaa Nabih, Jason Carey, Walied Moussa and Greg Kawchuk</i>	

Session: TE6 Chairs: Ryozo Ngamune and Alireza Mohammadi	
Robotics and Mechatronics	
A Mems Three-dimensional Stress Sensor For Structural Health Monitoring.....	775
<i>Hossam Gharib, Walied Moussa and Edmond Lou</i>	
Disturbance Observer-based Trajectory Following Control Of Nonlinear Robotic Manipulators.....	779
<i>Alireza Mohammadi, Horacio J. Marquez and Mahdi Tavakoli</i>	
A State-based Model Implementation Of The Triangular Formation Algorithm Using Model Driven Development With Real Time Object Oriented Modeling Language.....	783
<i>Dany Ouellet, Sidney Givigi and Alain Beaulieu</i>	
Phansim : A Simulink Toolkit For The Sensable Phantom Haptic Devices.....	787
<i>Alireza Mohammadi, Mahdi Tavakoli and Ali Jazayeri</i>	
Controlled Evolution Of Engineering Systems Using Bond Graph And Genetic Programming.....	791
<i>Buddhika Samarakoon, Lalith Gamage and Clarence De Silva</i>	
Session: WM1 Chairs: David Naylor and Kok-Kiong Tan	
MEMS Applications	
Piezoelectric Energy Conversion By Thermocapillary Pumping In A Closed Microchannel.....	795
<i>Adedoyin Odukoya and G. F. Naterer</i>	
Opto-microfluidic System For Analysis Of Contaminants In Engine Lubricants.....	801
<i>Hamid Aghayan, Evgueni Bordatchev and Jun Yang</i>	
Energy Harvesting From Ambient Vibration For Remote Vibration Monitoring With A Self-powered Nanotube Based Sensor.....	805
<i>Farbod Khoshnoud, Clarence De Silva, Houman Owhadi, Weidong Zhu and Carlos Ventura</i>	
Modelling And Simulation Of A Clamped-clamped Type Mems Resonator Filter For Radio Frequency Electronics.....	809
<i>Ibrahim Gadala, Anas Bsoul and Clarence De Silva</i>	
A Swimming Mems Device.....	813
<i>Madalina Wierzbicki-neagu</i>	
Session: WM4 Chairs: J.R.R. Mayer and Simon Park	
NSERC CANRIMT THEME II: Machine-Tool Modeling and Analysis	
Five-axis Machine Tool Link Errors With Uncertainty Estimation.....	817
<i>Melissa Cote, Tibet Erkan and Rene Mayer</i>	
Three Axis Machine Using Laser Interferometry: Impact Of The Number Of Measurement Directions.....	821
<i>Anna Los, Abdelhak Nafi and René Mayer</i>	
Experimental Evaluation Of Errors During Five Axis High-speed Machine Tool Motion.....	825

L. Andolfatto, J.r.r. Mayer and S. Lavernhe

Effect Of Control Output Jitter On Precision Positioning.....829

Kristofer Smeds, Irfan-ur-rab Usman and Xiaodong Lu

Robust Tracking Control For Micro Machine Tools With Load Uncertainties.....833

Shixun Fan and Ryoza Nagamune

Session: WM6 Chairs: Abbas Ghaei and A. Srikantha Phani

Sheet Metal Forming

Identification Of Material Constants For Accurate Simulation Of Sheet

Metal Forming.....837

Abbas Ghaei and Daniel Green

Integrated Inspection And Tool Path Planning For Manufacturing Of

Freeform Surfaces.....841

A. Lasemi, D. Xue and P. Gu

Nanoscale Properties Of Implantable Biomaterials.....845

Federico Rosei

High Strain Rate Studies Of Armor Metals.....846

Ghaznafar Nazimuddin, Ioannis Polyzois, M. Bolduc and M. Bassim

Session: WA1 Chairs: Yang Shi and Marie-France Barriol Dandine

Advanced Control and Mechatronic Applications I

Cooperative Navigation For Autonomous Underwater Vehicles.....850

Wenbai Li, Mingyong Liu, Jian Wu and Yang Shi

An Inversion Based Model Predictive Control On Piezoelectric Actuators.....854

Yu Cao, Daniel Chen and Long Chen

Lmi-based Distributed H-infinity Control Of Dynamically-decoupled

Segmented Telescope Mirrors.....858

Baris Ulutas, Daniel Kerley, Jennifer Dunn, Afzal Suleman and Edward J. Park

Finite Element Analysis Of The Cogging Force In The Linear

Synchronous Motor Array For The Thirty Meter Telescope.....862

Gabriele Gilardi, Edward Park, Steve Huard and Kei Szeto

Interaction D'un Capteur Avec Un Systeme: Transparence(finesse) D'un Capteur.....866

Marie-france Barriol Dandine and Roger Barriol

Session: WA2 Chairs: Ian Frigaard and Amir Nejat

Combustion and Multiphase

Numerical Investigation Of Clocking In A Two-stage Gas Turbine.....868

Amir Nejat and Hossein Hamedi

The Effect Of Division Of The Burned Gas Region For Realistic

In-cylinder No Predictions - An Experimental And Thermodynamic Study.....872

Omid Asgari, Siamak Kazemzadeh Hannani and Reza Ebrahimi

Monitoring Of Contaminants In Engine Lubricants Using Surface Plasmon Resonance Measurement.....	876
<i>Hamid Aghayan, Evgueni Bordatchev and Jun Yang</i>	
Numerical Simulation Of Two-phase Flow Charectreistics Of Hfc-134a Through Short-tube Orifices.....	880
<i>Masoud Zareh and Hossien Shokouhmand</i>	
Session: WA3 Chairs: Nicolas Galanis and Nabeel Al-Rawahi	
Modeling and Optimization	
Optimisation D'une Centrale À Fluide Organique Alimentée Par Une Source De Chaleur À Basse Température.....	884
<i>Mohammed Khennich and Nicolas Galanis</i>	
Co-optimization For Thin Film On Substrate: Materials, Structure And Processes.....	888
<i>Abraham Tesfamicael, Yongan Huang and Zhouping Yin</i>	
Novel Design Of A Planar Crank-rocker.....	892
<i>Mahya Shariatfar and Paul Zsombor-murray</i>	
Application Of Different Models For The Prediction Of Hourly Solar Radiation On Horizontal And Inclined Surfaces.....	896
<i>Nabeel Al-rawahi, Yousef Zurigat and Nassir Al-azri</i>	
Evaluate The Advantages Of Using Intuitionistic Approach For Modeling Architectural Design Requirements.....	900
<i>Madalina Wierzbicki and Clarence De Silva</i>	
Session: WA4 Chairs: Hsi-Yung Feng and A. Spence	
NSERC CANRIMT Theme III: Machining Process Planning and Validation	
Modeling Of Uncertainties In Freeform Surface Reconstruction.....	904
<i>V. Mehrad, D. Xue and P. Gu</i>	
Geometric Aspects Of Virtual Machining.....	908
<i>Ian Mackenzie and Allan Spence</i>	
Identifying Linear And Non-linear Segments In Highly-complex Curvilinear Profiles From Discrete Coordinate Measurement Data.....	912
<i>M. Nahid I. Razive, Hsi-yung Feng, Felix-etienne Delorme and Serafettin Engin</i>	
Milling Of Weld Fillets With Variable Assembly Geometry.....	916
<i>Yu Pin Lin, D. Alan Sawula, Allan D. Spence and Robert V. Fleisig</i>	
Profile Reconstruction Of Pressure And Suction Sides Of Airfoil Sections For Geometric Error Evaluation.....	920
<i>Rashmi Bhadauria, Hsi-yung Feng, Felix-etienne Delorme and Serafettin Engin</i>	

Session: WA5 Chairs: Hugh Liu and Steven Waslander

Mobile Robotics and Applications I

Modular Mobile Robotics: Obstacle Management Through Reconfiguration.....924

Sean Phillips, Vinodhkumar Muniappan, Steven Waslander, Jan Huissoon and Hamidreza Karbasi

**Adaptive Nonlinear Model Predictive Controller For Visual Servoing Of
Mobile Manipulation.....928**

Haoxiang Lang and Clarence De Silva

Graph Based Path Planning In Unknown Environments Using Voronoi Diagrams.....932

Arun Das, Prasenjit Mukherjee, Carlos Wang, Gerardo Salas, Sanjeev Bedi and Steven Waslander

Optimal Persistent Surveillance Using Ground Robot With Level Of Interest.....936

Peng Zhang, Hugh Liu and Yu Yao

Session: WA6 Chairs: Gary Burgess and Oumar Barry

Vibration Analysis and Control I

**A Computational Study Of The Influence Of Short Magnetorheological
Dampers On The Steady State Lateral Vibration Of A Flexibly Supported Rigid Rotor.....940**

Jaroslav Zapomel and Petr Ferfecki

Free Vibration Analysis Of A Single Conductor With A Stockbridge Damper.....944

Oumar Barry, Donatus Oguamanam and Der Chyan Lin

Vertical Forced Vibration Of A Rigid Disk In A Transversely Isotropic Full-space.....947

Morteza Eskandari, Hossein Mohammadi Shodja and Arash Hassani

Response To Random Vibration.....951

Enayat Mahajerin and Gary Burgess

Effet Des Sollicitations De La Route Sur Les Pièces De Suspension En Aluminium.....954

Saihi Mostepha, Mohamed Bouazara and Marc Richard

Session: WP1 Chairs: Yang Shi and Yu Chao

Advanced Control and Mechatronic Applications II

**Modeling Of Piezoelectric Actuators Based On A New Rateindependent
Hysteresis Model.....958**

Jinyang Peng, Yu Cao and Daniel Chen

**Stabilization Of Observer-based Actuator Fault-tolerant Control
Systems With Uncertainties, Actuator Saturation And Disturbances: An Lmi Approach.....962**

Jinhua Fan, Zhiqiang Zheng and Youmin Zhang

In-wheel Piezoelectric Wireless Rpm Sensor.....966

Noaman Makki and Remon Pop-iliev

**Fault Detection And Classification Of An Electrohydrostatic Actuator
Using A Neural Network Trained By The Smooth Variable Structure Filter.....970**

Ryan Ahmed, Stephen Andrew Gadsden, Mohammed El Sayed and Saeid Habibi

The Continuous-time Smooth Variable Structure Filter.....974

Stephen Andrew Gadsden, Mohammed El Sayed and Saeid Habibi

Session: WP2 Chairs: Ian Frigaard and Richard Lozowy

Heat Transfer and Complex Flow

Heat Transfer Enhancement In Ventilated Brake Disc Using Airfoil Vanes.....978

Amir Nejat, Ehsan Mirzakhaili, Mohammad Aslani and Reza Najjan Asl

Effect Of Dielectric Properties Variation And Inlet Velocity On Heat

Transfer In Microwave Heating Of Continuous Flow Of Water982

Tooraj Yousefi and Arash Mousavi

Simulation Of Two Phase Flow In Porous Media Using Lattice Boltzmann Method.....986

Alireza Akhgar, Mohammad Rahnama, Saeed Jafari and Mohammad Normohammadzadeh

Cfd Analysis Of Abdominal Aortic Aneurysm Growth.....990

Richard Lozowy, David Kuhn and April Boyd

Thermal Conductivity Enhancement Of Phase Change Materials Using Metal Foams.....994

Pathik Vadwala and Sanjeev Chandra

Session: WP3 Chairs: Katrin Rohlf and Choon-Lai Tan

Optimization

Autonomous Impact Force Estimation And Localization Using A Modified

Neural Network.....998

Danut Tabacaru and Zheng Hong Zhu

Evaluation Of Interior Point Solutions In A 3d Generally Anisotropic

Elastic Solid Using The Boundary Element Method.....1002

Yui-chuin Shiah and Choon-lai Tan

Scheduling Trains As A Fuzzy Multi-objective Blocking Parallel Job Shop Problem.....1006

Reza Ghodsi and Masoumeh Taslimi

Forecasting Petroleum Price Using The Methods Of Artificial Neural Networks.....1010

Ehsan Mollasalehi, Milad Khasian and Hossein Sadati

Flow With Slip Through An Aneurysm Using Particle-based Methods.....1015

Prakash Paudel and Katrin Rohlf

Session: WP4 Chairs: James Mills and Beno Benhabib

NSERC CANRIMT Theme IV: Reconfigurable Modular Machine Tools (RmMT)

Conceptual Design Of A Reconfigurable Fixture With Embedded Sensors

For Meso-milling.....1020

Chen Liu, Gelareh Namdar, James Mills and Beno Benhabib

Configuration Design Of A Meso-milling Machine.....1024

H. Azulay, C. Hawryluck, J. K. Mills and B. Benhabib

Design Concepts Of Motors For A Reconfigurable Meso-milling Machine Tool.....1028

Jacky Lau, Sergey I. Gubarenko and Ridha Ben-mrad

An Active Dynamic Model For A Parallel-mechanism-based Meso-milling Machine Tool.....	1032
<i>Masih Mahmoodi, Yi Le, James Mills and Beno Benhabib</i>	
Sensing Requirements For A Meso-scale Milling Machine.....	1036
<i>Roy Wang, Fu Shao and Goldie Nejat</i>	
Session: WP5 Chairs: Hugh Liu and Steven Waslander	
Mobile Robotics and Applications II	
On Point-based Computational Mechanics For Haptic Rendering.....	1040
<i>Shahram Payandeh and Wen Shi</i>	
H2 Optimal Output Feedback With Guaranteed Stability Margins.....	1044
<i>Julian Ehlers and Jeff Pieper</i>	
Design Optimization Of Articulated Heavy Vehicles Using Genetic Algorithms And Multibody Vehicle Models.....	1048
<i>Dhruv Oberoi, Md. Manjurul Islam and Yuping He</i>	
Optimized Dynamic Task Allocation In Cooperative Multi-robot Search And Rescue Operations.....	1052
<i>Muhammad Khan, Saeed Behbahani, Quinn Hsu, Jerome Li and Clarence De Silva</i>	
Localization And Obstacle Avoidance Using Fuzzy Logic And Neural Network.....	1056
<i>Chi Kai Hui, Feriyonika Feriyonika, Raras Tyasnurita, Pendry Alexandra and Min-fan Ricky Lee</i>	
Session: WP6 Chairs: Jean Zu and Roshanak Banan	
Vibration Analysis and Control II	
Meshless Discretization Of Nonlinear Vibrations Of Cylindrical Panels With Complex Shapes By The R-functions Method.....	1060
<i>Galyna Pilgun and Marco Amabili</i>	
Vibration Behaviour Of A Single Pem Fuel Cell For Stationary Applications.....	1064
<i>Roshanak Banan, Jean W. Zu and Aimy Bazylak</i>	
New Design Of Aluminum Bus Frame: Vibration Study.....	1068
<i>Fatma Rebame, Mohamed Bouazara and Marc . J Richard</i>	
Application Of Gdq Method For Nonlinear Equations Of Motion Of Flexible Manipulators.....	1072
<i>Majid Mohammadi Moghaddam and Mohammad Reza Fazel</i>	
Multipulse Chaotic Dynamics Of The Laminated Composite Piezoelectric Shell.....	1076
<i>Ming-hui Yao, Wei Zhang, Jean Zu and Qian Wang</i>	