

2009 Combustion Institute Canadian Section Spring Technical Meeting

**Overall Program at a Glance**

**SUNDAY, May 10, 2009**

14:00 – 17:00	Board of Directors Meeting (Board members only) – Université de Montréal, Pavillon André-Aisenstadt, Room 5166
17:00 – 20:00	Registration and Reception – Université de Montréal, Salon Maurice-L'abbé, Room 6245

**MONDAY, May 11, 2009**

8:30 – 9:00	Registration – McGill University, Faculty Club	
8:45 – 9:00	Opening Welcome – McGill University, Faculty Club, Ballroom	
9:00 – 9:40	Invited Lecture 1: Dr. Murray J. Thomson, Department of Mechanical Engineering, University of Toronto Location: McGill University, Faculty Club, Ballroom	
9:50 – 10:30	SESSION A1: <b>Engines I</b> , McGill University, Faculty Club, Ballroom	SESSION A2.1: <b>Fire Studies</b> , McGill University, Faculty Club, Heritage Room
10:30 – 10:50	BREAK	
10:50 – 12:10	SESSION A1: <b>Engines I</b> , McGill University, Faculty Club, Ballroom	SESSION A2.2: <b>Combustion Emissions and Pollutants</b> , McGill University, Faculty Club, Heritage Room
12:10 – 14:00	LUNCH & Board of Directors Meeting	
14:00 – 15:20	SESSION A3: <b>Modeling and Numerical Simulation I</b> , McGill University, Faculty Club, Ballroom	SESSION A4.1: <b>Laser Diagnostics</b> , McGill University, Faculty Club, Heritage Room
15:20 – 15:40	BREAK	
15:40 – 16:20	SESSION A3: <b>Modeling and Numerical Simulation I</b> , McGill University, Faculty Club, Ballroom	SESSION A4.2: <b>Flammability</b> , McGill University, Faculty Club, Heritage Room
16:20 – 16:40	Annual Business Meeting of the Canadian Section , McGill University, Faculty Club, Ballroom	

**TUESDAY, May 12, 2009**

9:00 – 9:40	Invited Lecture 2: Dr. Pierre Q. Gauthier, Rolls-Royce Canada Location: McGill University, Faculty Club, Ballroom	
9:50 – 10:30	SESSION B1: <b>Engines II</b> , McGill University, Faculty Club, Ballroom	SESSION B2: <b>Soot and Particulates</b> , McGill University, Faculty Club, Heritage Room
10:30 – 10:50	BREAK	
10:50 – 12:10	SESSION B1: <b>Engines II</b> , McGill University, Faculty Club, Ballroom	SESSION B2: <b>Soot and Particulates</b> , McGill University, Faculty Club, Heritage Room
12:10 – 13:20	LUNCH	
14:00 – 15:20	SESSION B3: <b>Detonations</b> , McGill University, Faculty Club, Ballroom	SESSION B4.1: <b>Modeling and Numerical Simulation II</b> , McGill University, Faculty Club, Heritage Room
15:20 – 15:40	BREAK	
15:40 – 16:20	SESSION B3: <b>Detonations</b> , McGill University, Faculty Club, Ballroom	SESSION B4.2: <b>Kinetics and Solid Fuels</b> , McGill University, Faculty Club, Heritage Room
18:30 – 22:00	Banquet – McGill University Faculty Club, Banquet Room	

**WEDNESDAY, May 13, 2009**

9:00 – 9:40	Invited Lecture 3: Dr. Andrew J Higgins, Department of Mechanical Engineering, McGill University Location: McGill University, Faculty Club, Ballroom	
9:50 – 10:30	SESSION C1.1: <b>Alternative Fuels</b> , McGill University, Faculty Club, Ballroom	SESSION C2.1: <b>Turbulent Combustion</b> , McGill University, Faculty Club, Heritage Room
10:30 – 10:50	Break	
10:50 – 11:10	SESSION C1.1: <b>Alternative Fuels</b> , McGill University, Faculty Club, Ballroom	SESSION C2.1: <b>Turbulent Combustion</b> , McGill University, Faculty Club, Heritage Room
11:10 – 12:00	SESSION C1.2: <b>Explosions and Detonations</b> , McGill University, Faculty Club, Ballroom	SESSION C2.2: <b>Flame Synthesis</b> , McGill University, Faculty Club, Heritage Room

## TECHNICAL PROGRAM

**MONDAY, May 11, 2009**

9:00 – 9:40	Invited Lecture 1: Dr. Murray J. Thomson, Department of Mechanical Engineering, University of Toronto Location: McGill University, Faculty Club, Ballroom
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	<b>SESSION A1: Engines I</b> , McGill University, Faculty Club, Ballroom Chair: M. Zheng	<b>SESSION A2.1: Fire Studies</b> , McGill University, Faculty Club, Heritage Room Chair: W. Hallett
9:50 – 10:10	Efficiency Improvement and Emissions Reduction Potential of Hydrogen-Fueled IC Engines in Small Electric Generator Sets, <i>M. Foster, J.S. Wallace, H. Jääskeläinen</i>	Observations of Burning Characteristics of Laminated Polyurethane Foams, <i>D. Adeosun, J. Rigg, E. Weckman, D. Torvi, B. Epling</i>
10:10 – 10:30	Unregulated Emissions from an HCCI Engine Operated with N-Heptane / Iso-Octane Blends, <i>Cosmin E. Dumitrescu, Vahid Hosseini, W. Stuart Neill, Wallace L. Chippior, Trevor Connolly, Lisa Graham, Hailin Li</i>	Full-Scale Fire Modeling of Polyurethane Foams Using Cone Calorimeter Data, <i>J.U. Ezinwa, D.A. Torvi, E.J. Weckman</i>
10:30 – 10:50	<b>BREAK</b>	
	<b>SESSION A1: Engines I</b> , McGill University, Faculty Club, Ballroom Chair: M. Zheng	<b>SESSION A2.2: Combustion Emissions and Pollutants</b> , McGill University, Faculty Club, Heritage Room Chair: Ö. Gülder
10:50 – 11:10	Numerical Study on Combustion and Emissions Characteristics of a Direct Injection (DI) Diesel Engine, <i>Y. Ren, X. Li</i>	Nitric Oxide Emission from Inverse Diffusion Flames with Co-flowing Air and Combustion Products, <i>M. B. Johnson, A. Sobiesiak</i>
11:10 – 11:30	Efficiency and Emissions Study of a Stirling-Engine-Based Residential Microgeneration System Run on Diesel, Biodiesel and Ethanol, <i>N. Farra, A.A. Aliabadi, T. Tzanetakis, M.J.</i>	Spectroscopic Sensor for Industrial Flame Monitoring, <i>P. Geddis, M.J. Thomson, M. Eisner</i>

	<i>Thomson</i>	
11:30 – 11:50	Diesel EGR Cooler Fouling: Shell-and-tube vs. Fin-type Coolers, <i>A. Sobhl, J. Sylvester, C. Kelly, M.C. Mulenga, D. Chang, J. Tjong, M. Zheng</i>	In-situ Mercury Continuous Emission Monitor in a 200 MW Coal-fired Power Plant, <i>J. Thiebaud, M.J. Thomson, R. Mani, W.H. Morro, E.A. Morris, C.Q. Jia</i>
11:50 – 14:00	LUNCH (Board of Directors Meeting)	
	<b>SESSION A3: Modeling and Numerical Simulation I</b> , McGill University, Faculty Club, Ballroom Chair: G. Ciccarelli	<b>SESSION A4.1: Laser Diagnostics</b> , McGill University, Faculty Club, Heritage Room Chair: G. Smallwood
14:00 – 14:20	Chemical Kinetic Modeling of Biodiesel Combustion, <i>S.M. Sarathy, M.J. Thomson</i>	Equivalence Ratio Gradient Effects on Locally Stoichiometric Stratified Isooctane/Air Turbulent V-Flames, <i>P.C. Vena, B. Deschamps, G.J. Smallwood, M.R. Johnson</i>
14:20 – 14:40	Effects of CO <sub>2</sub> /N <sub>2</sub> /Ar Addition on Liftoff of a Laminar CH <sub>4</sub> /Air Diffusion Flame, <i>H. Guo, C. Galizzi, D. Escudie</i>	Tikhonov Reconstruction for Laser-Based Infrared Species Tomography, <i>K J. Daun</i>
14:40 – 15:00	Investigation of Turbulent Mixing Models in Conditional Moment Closure for Autoignition, <i>A.E. Milford, C.B. Devaud</i>	Instantaneous, Quasi -Two-Dimensional Measurement of Soot Volume Fraction in an Ethylene Diffusion Flame via Two-Colour Laser-Induced Incandescence, <i>B.M. Crosland, K.A. Thomson, M.R. Johnson</i>
15:00 – 15:20	Mixing Rates of Transient Fuel Jets with Air in Tumbling or Swirling Motion, <i>N. Gharib, A. Sobiesiak</i>	A Calibration Method for PLIF Measurements for Use in Scalar Mixing Studies Using Water Jets, <i>L.A. Torres, B.A. Fleck, D.J. Wilson, D.Nobes</i>
15:20 – 15:40	BREAK	
	<b>SESSION A3: Modeling and Numerical Simulation I</b> , McGill University, Faculty Club, Ballroom Chair: K. Bushe	<b>SESSION A4.2: Flammability</b> , McGill University, Faculty Club, Heritage Room Chair: E. Weckman
15:40 – 16:00	A Doubly Conditional Moment Closure Method for the Modeling of Ignition and Extinction in Turbulent Non-Premixed Combustion, <i>A. El</i>	Experiments and Modeling of Premixed Flames Stabilized in a Narrow Tube with a Wall Temperature Gradient, <i>G.M.G. Watson, J.M. Bergthorson</i>

	<i>Sayed, C.B. Devaud</i>	
16:00 – 16:20	Gas Turbine Combustor Emissions Predictions Using LES, <i>S. E. Jella, P. Q. Gauthier, M. Paraschivoiu</i>	An Experimental Study of the Flammability of Fuel Tank Headspace Vapours from High Ethanol Content Fuels, <i>D.P. Gardiner, M.F. Bardon, G. Pucher, D.B. Horne, W. Clark</i>
16:20 – 16:40	<b>Annual Business Meeting of the Canadian Section</b> , McGill University, Faculty Club, Ballroom	

## TUESDAY, May 12, 2008

9:00 – 9:40	Invited Lecture 2: Dr. Pierre Q. Gauthier, Rolls-Royce Canada Location: McGill University, Faculty Club, Ballroom
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	<b>SESSION B1: Engines II</b> , McGill University, Faculty Club, Ballroom Chair: A. Sobiesiak	<b>SESSION B2: Soot and Particulates</b> , McGill University, Faculty Club, Heritage Room Chair: M. Johnson
9:50 – 10:10	The Effect of Operating Conditions on HCCI Exhaust Gas Temperature, <i>M. Shahbakhti, A. Ghazimirsaid, C.R. Koch</i>	Soot Formation in Co-flow and Counterflow Laminar Diffusion Flames of Fuel Mixtures, <i>A. E. Karatas, Ö.L. Gülder</i>
10:10 – 10:30	Partial-Burn Crankangle Limit Criteria Comparison on an Experimental HCCI Engine, <i>A. Ghazimirsaid, M. Shahbakhti, C.R. Koch</i>	A Sampling Protocol for Overfire Soot Emissions from Lab-scale Flares, <i>J.D. McEwen, K.A. Thomson, M.R. Johnson</i>
10:30 – 10:50	<b>BREAK</b>	
10:50 – 11:10	Effect of Initial and Operating Conditions on Soot Emissions from an HCCI Engine, <i>V.Hosseini, W.S. Neill, K.A. Thomson, W.L. Chippior</i>	Investigation of Soot Aggregate Size Distributions by Multi-Angle Elastic Light Scattering, <i>O. Link, B. Tulloch, D. Snelling</i>
11:10 – 11:30	Investigation of Biomass Gas Fuelled HCCI Engine, <i>D. Haggith, G. Przybyla, G. Gnanam, A. Sobiesiak</i>	Time Effect of the Loading of Diesel Particulate Filters Using ULSD and B20 Biodiesel Fuel Blends, <i>P. Charbonneau, J.S. Wallace</i>
11:30 – 11:50	Effect of Oil Sands Processing Severity on the Combustion and Emissions of An HCCI Engine, <i>V. Hosseini, W.S. Neill, W.L. Chippior, C.</i>	Development of a Spark Discharge Sensor for Measurement of Engine-Out Soot Emissions, <i>D.P. Gardiner, G. R. Pucher, W.D. Alla, M. LaViolette</i>

	<i>Fairbridge, K. Mitchell</i>	
11:50 – 12:10		Light Absorption Properties of Cooled Soot, <i>A.R. Coderre, K.A. Thomson, D.R. Snelling, M.R. Johnson</i>
12:10 – 13:20	LUNCH	
	<b>SESSION B3: Detonations I</b> , McGill University, Faculty Club, Ballroom Chair: A. Higgins	<b>SESSION B4.1: Modeling and Numerical Simulation II</b> , McGill University, Faculty Club, Heritage Room, Chair: M. Thomson
13:20 – 13:40	Near-Limit Behavior and Failure of Unstable Detonations in Thin Annular Channels, <i>A. Jesuthasan, A. Camargo, J.-S. Grondin, J. Chao, H.D. Ng, J.H.S. Lee</i>	Numerical Simulation of a Turbulent Premixed Methane-Air Flame, <i>M.M. Salehi, W.K. Bushe</i>
13:40 – 14:00	Measurement of Critical Energy for Direct Initiation of Spherical Detonations in High-Pressure H <sub>2</sub> -O <sub>2</sub> Mixtures, <i>V. Kamenskihs, H.D. Ng, J.H.S. Lee</i>	Second Law Analysis of a Hydrogen-Oxygen Flame, <i>S.I.A. Shah, L.W. Kostiuk</i>
14:00 – 14:20	Examination of The Pulsating Detonation Instability in a Two-Step Model Using Characteristics, <i>C. Leung, M.I. Radulescu, G.J. Sharpe</i>	Numerical Study of the Effects of Pressure and Gravitational Acceleration on Soot Formation in Laminar Axisymmetric Coflow Methane Diffusion Flame: examining the $p^2g$ scaling, <i>F. Liu, G.J. Smallwood</i>
14:20 – 14:40	The Investigation of Shock-Flame Interactions on Flame Acceleration in an Obstructed Channel, <i>C. Johansen, G.Ciccarelli</i>	Parallel Solution Adaptive Method for Prediction of Sooting Laminar Diffusion Flames, <i>M.R.J. Charest, C.P.T. Groth, Ö.L. Gülder</i>
14:40 – 15:00	Break	
	<b>SESSION B3: Detonations I</b> , McGill University, Faculty Club, Ballroom Chair: A. Higgins	<b>SESSION B4.2: Kinetics and Solid Fuels</b> , McGill University, Faculty Club, Heritage Room Chair: L. Kostiuk
15:00 – 15:20	The Origin of The Cellular Substructure in Detonations, <i>P. Mach, S. Lau-Chapdelaine, M.I. Radulescu</i>	Shock Tube Ignition Studies of Methyl Formate, <i>B. Akih-Kumgeh, J. Berghorson</i>
15:20 – 15:40	Simulation of Ignition Between a Contact Surface and a Shock, <i>J. Melguizo-Gavilanes, N. Rezaeyan, L.</i>	Particle Size Effects in Packed Bed Combustion, <i>B. Green, W. Hallett,</i>

	<i>Bauwens</i>	
15:40 – 16:00	Interacting Ensemble of Blast Waves as a Model for Detonation, <i>N. Mehrjoo, F.-D. Tang, A. Higgins</i>	
18:30 – 22:00	Banquet, McGill University, Faculty Club, Banquet Room	

### WEDNESDAY, May 13, 2008

9:00 – 9:40	Invited Lecture 3: Dr. Andrew J Higgins, Department of Mechanical Engineering, McGill University Location: McGill University, Faculty Club, Ballroom
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	<b>SESSION C1.1: Alternative Fuels</b> , McGill University, Faculty Club, Ballroom Chair: J. Bergthorson	<b>SESSION C2.1: Turbulent Combustion</b> , McGill University, Faculty Club, Heritage Room Chair: F. Liu
9:50 – 10:10	Structure of Glycerol/Air Flames in a Wick-Burner, <i>R. Mills, M.J. Thomson</i>	Study on the Blowout Mechanism of Turbulent Non-Premixed Jet Flames Using High-Speed PIV, <i>T. Leung , I. Wierzba</i>
10:10 – 10:30	Hydrothermal Process for Hydrogen Energy Production, <i>P. E. Bocanegra, M.M. Barsan, I.S. Butler, I. Gokalp, J.A. Kozinski</i>	On the Liftoff of a Non-premixed Swirling Methane Flame, <i>C.O. Iyogun , M. Birouk</i>
10:30 – 10:50	Emissions From a Gas Turbine Sector Rig Operated with Synthetic Aviation and Bio-Diesel Fuel Blends, <i>G. Pucher, W.D.Allan</i>	Development of Partially Oxidized Liquid Fuel Burner, <i>S.W. Kim, M.C. Shin, C.Y. Lee</i>
10:50 – 11:10	Break	
	<b>SESSION C1.2: Explosions and Detonations II</b> McGill University, Faculty Club, Ballroom Chair: C. Devaud	<b>SESSION C2.2: Flame Synthesis</b> , McGill University, Faculty Club, Heritage Room Chair: G. Smallwood
11:10 – 11:30	Influence of Physical Characteristics on the Measurement of Minimum Burning Pressures in Ammonium Nitrate Emulsions, <i>S. Goldthorp, C.M. Badeen, C. Johnson, H. Feng, R. Turcotte,</i>	A Detailed Surface Growth Model for Single Walled Carbon Nanotube Formation in Combustion, <i>J.Z. Wen</i>

	<i>S.K. Chan</i>	
11:30 – 11:50	The Spontaneous Ignition of High Pressure Hydrogen During an Accidental Release Into Air, <i>B. M. Maxwell , M. I. Radulescu</i>	The Future of Internal Combustions Engines in Vehicles, <i>A. K. Koch, H. H. Nguyen, L. C. Tong, R. A. Fraser, M. W. Fowler</i>
11:50 – 12:10	Photographic Observation of the Transition from Deflagration to Detonation in Highly Argon Diluted Mixtures, <i>J.-S. Grondin, G. Simard, J.H.S. Lee</i>	
12:10 –12:20	Closing Remarks	