2005 CI/CS Spring Technical Meeting – Final Program

Sunday, May 15, 2005

REGISTRATION AND RECEPTION

6:00 pm – 9:00 pm Alumni/Student Lounge (Ground Floor, B-Building)

CI/CS BOARD OF DIRECTORS MEETING

8:00 pm – 10:00 pm Dean's Boardroom (Room A-108, Ira MacNab Building)

Monday, May 16, 2005

REGISTRATION

8:00 am – 8:30 am H-19 (Architecture Building)

WELCOME

8:15 am – 8:30 am H-19 (Architecture Building)

M.G. Satish, Associate Dean of Engineering, Dalhousie University

E.J. Weckman, CI/CS Chair

PLENARY SESSION 1: Prof. Gerard M. Faeth Memorial Lecture

8:30 am – 9:20 am H-19 (Architecture Building)

Advances in Diagnostics for the Study of Soot Formation

G. J. Smallwood, National Research Council of Canada

SESSION 1: Soot and Particulates I Room: H-19 (Architecture Building) Chair: D.A. Torvi	
9:30 – 9:50	*Temperature and Soot Field in Laminar Diffusion Flames at Super-Atmospheric Pressures* D.S. Bento, K.A. Thomson & Ö.L. Gülder
9:50 – 10:10	*A Comprehensive Study of Soot Inception and Growth Processes in the Pyrolysis of C_6H_6* J.Z. Wen, M.J. Thomson & M.F. Lightstone
10:10 – 10:30	*Influence of Pyrolysis Parameters on the Formation of an Aerosol from Ethane* G. Alemán Milán, A.W. Rae & P.D. Pacey

10:30 am – 10:50 am BREAK

	SESSION 2: Engines I Room: B-227 Chair: A. Sobiesiak	**SESSION 3: Fire Studies** Room: B-228 Chair: E.W. Grandmaison
10:50 – 11:10	*Development of a Novel Uniflow-Scavenged Two-Stroke GDI Engine* D. Ohlmann & G. Ciccarelli	*Design of a Flash Fire Simulator – An Update* J.D. Dale, M.Y. Ackerman & E.M. Crown
11:10 – 11:30	*Numerical Investigation into Scavenging Efficiency of Prototypical Two-Stroke Engine* D. Rival & G. Ciccarelli	*Effects of Inclination on Fabric Flammability and Expected Skin Burn* J. M. Cavanagh, D.A. Torvi & K.S. Gabriel

11:30 – 11:50	*S.I. Engine Operation on Lean Mixtures* H. Li, G.A. Karim & W.S. Neill	*Use of Video Analysis in Large-Scale Fire Testing* M. Gibbons, D. Shaw, E. Randsalu, C.S. Lam & E.J. Weckman
11:50 – 12:10	*Development of an Anemometry Technique Using Constant Current Sparks* D.P. Gardiner, G. Wang & M.F. Bardon	*Temperature Measurements in Full-Scale Fire Tests of Mattresses* T.G. Threlfall & D.A. Torvi

12:10 pm – 1:30 pm LUNCH

	SESSION 4: Engines II Room: B-227 Chair: Ö.L. Gülder	**SESSION 5: Detonations/Explosions** Room: B-228 Chair: M.J. Pegg
1:30 – 1:50	*Combustion On-Set Control Utilizing Fuel Reforming and EGR in a HCCI Engine – A Computational Study* G. Gnanam, M. Johnson, A. Sobiesiak & G. Reader	*A Hybrid Equation-of-State Detonation Model for Homogeneous Explosives* R.C. Ripley, L. Donahue & F. Zhang
1:50 – 2:10	*Application of Conditional Source-Term Estimation to Turbulent Autoignition Problems* R. Grout & W.K. Bushe	*Effect of Chain-Branching on Detonation Structure* Z. Liang & L. Bauwens
2:10 – 2:30	*Oscillating Plates Turbulence in a Constant Volume Turbulent Chamber* C. Xia & A. Sobiesiak	*Oscillating Flames in Tubes – Analysis and Simulation* C.R.L. Bauwens, L. Bauwens & I. Wierzba
2:30 – 2:50	*Design of a Burner for DRDC Valcartier's Airbreathing Propulsion Test Facility* R. Vaivads, R. Stowe, P. Gosselin, A. deChamplain, M. LaViolette, M. St.Onge & A. Roy	*Models for Offshore Fire and Explosion Consequence Analysis* R. Pula, F.I. Khan, B. Veitch & P.R. Amyotte

2:50 pm – 3:10 pm BREAK

SESSION 6: Modelling and Numerical Simulation Room: B-311 Chair: L. Bauwens	
3:10 – 3:30	*Large Eddy Simulation of Scalar Transport in Turbulent Premixed Flames* S. Tullis & R.S. Cant
3:30 – 3:50	*Conditional Source-term Estimation in Large Eddy Simulation of a Turbulent Non-premixed Flame* M. Wang & W.K. Bushe
3:50 – 4:10	*Parallel Adaptive Mesh Refinement Algorithm for Turbulent Non-Premixed Combusting Flows* X. Gao & C.P.T. Groth
4:10 – 4:30	*Burning Velocity Enhancement of Turbulent Flamelets in the Thin Reaction Zone Regime by Small Scale Turbulence* Ö.L. Gülder
4:30 – 4:50	*A Three-Dimensional Model for the Strong-jet/Weak-jet Problem* Y.J. Lee, E.W. Grandmaison and M.D. Matovic

Tuesday, May 17, 2005

PLENARY SESSION 2

8:30 am – 9:20 am H-19 (Architecture Building)

Packed Bed Combustion: An Overview

W.L.H. Hallett, University of Ottawa

SESSION 7: Soot and Particulates II Room: H-19 (Architecture Building) Chair: M.J. Thomson	
9:30 – 9:50	*Sooting Propensity of Binary Fuel Mixtures Under Constant Flame Temperature Condition* S. Trottier, H. Guo, G.J. Smallwood & M.R. Johnson
9:50 – 10:10	*Relative Optical Density Analysis on TEM Images for Morphology Determination of Flame Generated Soot* K. Tian, K.A. Thomson, F. Liu, M. Yang, D.R. Snelling, G.J. Smallwood & D. Wang
10:10 – 10:30	*A Soot Formation Model for Multidimensional Simulation of Diesel Engine Combustion* J. Boulanger, F. Liu, W.S. Neill & G.J. Smallwood

10:30 am – 10:50 am BREAK

	SESSION 8: Engines III Room: B-227 Chair: G. Ciccarelli	**SESSION 9: Combustion Emissions and Pollutants I** Room: B-228 Chair: W.L.H. Hallett
10:50 – 11:10	*Numerical Simulation of Flow Characteristics for Natural Gas Injected into a Combustion Bomb* S.X. Cheng & J.S. Wallace	*Tunable Diode Laser Measurements of Combustion CO_2* Z. Hong & M.J. Thomson
11:10 – 11:30	*Experimental Study and Numerical Simulation of Initial Conditions for a Combustion Bomb* S.X. Cheng, M.A. Fabbroni & J.S. Wallace	*Experimental Characterization of Structure of Lean Premixed Turbulent Methane-Air Flames: Strain, Curvature and Thickness* D. Pavé, C. Chauveau, D. Davidenko, I. Gökalp, I.G. Shepherd & Ö.L. Gülder
11:30 – 11:50	*Effects of Diesel Engine Combustion Chamber Deposits on Exhaust Temperature Profiles* M. LaViolette, D.P. Gardiner, G. Wang, C. Desormeaux & M.F. Bardon	*Solar Radiation Based Plume Transmissivity Measurements* K. Thomson & M. Johnson
11:50 – 12:10	*Further Development of a Smoke Sensor for Diesel Engines* W.D. Allan, M. LaViolette, D. Gould & D.P. Gardiner	*Emissions of Greenhouse Gases from the Off-Road Sector* R. Vaivads, J. Maillette, M. Tushingham & B. Taylor

12:10 pm – 1:30 pm LUNCH

	SESSION 10: Diagnostics/ Droplet and Spray Combustion Room: B-227 Chair: R. Vaivads	**SESSION 11: Alternative Fuels** Room: B-228 Chair: J.S. Wallace
1:30 – 1:50	*Application of Arc-Lamp Based TLAF Technique to Temperature Measurement in a Laminar CH_4/Air Diffusion Flame* K. Tian, D.R. Snelling & G.J. Smallwood	*Biomass as an Alternative for Mitigation of Greenhouse Gases in the Blast Furnace* A. Gagné, F. Eldabbagh, W. Hutny & J.A. Kozinski
1:50 – 2:10	*Planar Temperature Imaging Using Thermally Assisted Laser Induced Fluorescence of OH in a Methane-Air Flame* C. Copeland, J. Friedman & M. Renksizbulut	*Conversion of Biomass to Hydrogen: Gasification, Reactivity and Phase Behavior* R. Hashaikeh, Z. Fang, I.S. Butler, J. Hawari & J.A. Kozinski
2:10 – 2:30	*Investigation of Fuel Spray Patterns Under Combusting Conditions* P.R. Underhill, G. Pucher, W. Allan, G. Wang, S. Guy & B. Caekaert	*Modelling of Particle Pyrolysis in a Packed Bed Combustor* A.R.C. Tuck & W.L.H. Hallett
2:30 – 2:50	*Visualization of Fuel Spray from a Pilot Ignited High-Pressure Natural Gas Injector at Atmospheric Condition* N. Wu, M.H. Davy, S.N. Rogak, W.K. Bushe, J. Mikawoz & J. Huang	*Experimental and Numerical Study of Coflow Laminar DME/Air and Methane/Air Diffusion Flames* F. Liu, Y. Ju & G.J. Smallwood

2:50 pm – 3:10 pm BREAK

SESSION 12: Fire and Flammability Room: B-311 Chair: J.D. Dale	
3:10 – 3:30	*Behaviour of Pool Fires in a Crosswind: Comparison of Experimental and Computational Results* M. Gibbons, C. Devaud & E.J. Weckman
3:30 – 3:50	*Comparison of Heat Release Rate from Experiments Against Numerical Predictions and Evaluation of Life Safety in Residential Houses* A. Bounagui, N. Bénichou & A. Bwalya
3:50 – 4:10	*Effects of Moisture and Incident Heat Flux on Smoke Production and Heat Release Rates of Vegetation* E.K. Enninful & D.A. Torvi
4:10 – 4:30	*Flammability Limits and NO_x Formation of Reformate Gas Enriched Lean Counterflow CH_4/Air Premixed Flames* H. Guo & G.J. Smallwood
4:30 – 4:50	*Flame Quenching Performance of Ceramic Foam* H.I.P. Joo & G. Ciccarelli

CI/CS ANNUAL BUSINESS MEETING
5:00 pm – 5:30 pm Room: B-311

BANQUET
6:30 pm – 10:00 pm Waegwoltic Club
Buses depart Sexton Campus at 6:30 pm and return at 10:00 pm.

Wednesday, May 18, 2005

PLENARY SESSION 3

8:30 am – 9:20 am H-19 (Architecture Building)

Safety Evaluation and Control Measure Design for Offshore Process Facilities

F.I. Khan, Memorial University of Newfoundland

SESSION 13: Combustion Processes Room: H-19 (Architecture Building) Chair: K. Thomson	
9:30 – 9:50	*A Study on Destruction of PCB in Contaminated Soils and Wastes Using Fluidized Bed Combustion Technology* D.L. Desai, E.J. Anthony & J. Wang
9:50 – 10:10	*Flames in Water: Destruction of Organics* A. Sobhy, M.M. Barsan, Z. Fang, H. Assaaoudi, I.S. Butler & J.A. Kozinski
10:10 – 10:30	*High Temperature Oxidation of Steel in an Oxygen-enriched Low NO_x Furnace Environment* D. Poirier, E.W. Grandmaison, M.D. Matovic, K.R. Barnes & B.D. Nelson

10:30 am – 10:50 am BREAK

SESSION 14: Combustion Emissions and Pollutants II Room: H-19 (Architecture Building) Chair: E.J. Weckman	
10:50 – 11:10	*Studies of Pollutant Formation in a Bio-Diesel Flame* S.A. Syed, S.M. Sarathy, S. Gail & M.J. Thomson
11:10 – 11:30	*Pathways to Aromatics from Acetylene* X. Xu & P.D. Pacey
11:30 – 11:50	*Application of Recently Revised Model for Continuous Shoreline Fumigation* M. Nazir, F.I. Khan & P.R. Amyotte