Technical Program

We would like to take this opportunity to thank and welcome everyone to 2014 CI/CS Spring Technical Meeting. Your effort, participation, and 85 papers have finally paid off! We hope that you have a wonderful time in the Southernmost city of Canada, and we look forward to welcome you back for another CI/CS in a few years time.

The Organizing Committee
University of Windsor

Website
Please refer to http://www.uwindsor.ca/cics2014 for updates and details.

The banquet on Wednesday May 14 will include hors d'oeuvres, soup, salad, entree and desert. A cash bar will be available before dinner and table wine will be served during dinner. Please indicate your choice of entree in your email to cics2014@uwindsor.ca:

1. Mustard & Herb Encrusted Chicken, Gratin Potatoes, Wild Mushroom Jus
2. Pan-Seared Atlantic Salmon Filet, Chive Mashed Potatoes
3. Grilled Vegetable Napolean, Portobello, Red Peppers, Eggplant, Spinach & Goat Cheese, Balsamic Reduction

Additional banquet tickets for companions may be purchased for $100. Please mail your cheque to

CICS2014/D. Ting
MAME
University of Windsor
401 Sunset Avenue
Windsor, Ontario, Canada N9B 3P4

Monday, May 12	
16:00–17:00	**Informal Board Meeting** **Centre for Engineering Innovation (CEI) Room 3001**
17:00–20:00	**Registration & Cocktail Reception** **Centre for Engineering Innovation (CEI) Green Roof (Atrium if weather does not cooperate)**

* = Student Presenter

Tuesday, May 13		
08:00–08:15	**Welcome and Opening Remarks (Room 1100 CEI)** Andrzej Sobiesiak	
08:15–09:00	**Plenary Lecture #1 (Room 1100 CEI)** Evaluating Fire Performance of Protective Clothing: From Initial Design Tools to Non-destructive Tests of In-use Garments David Torvi, U of Saskatchewan	
09:00–09:20	Coffee Break	
	Fire, Room 1101 **Co-Chairs: L.W. Kostiuk & E.J. Weckman**	**Engine Combustion I, Room 1102** **Co-Chairs: C. Devaud & M.J. Thomson**
09:20–09:40	✓7-1 Effects of wall material on energy transport of laboratory-scale methanol pool fire Alireza Vali, David S. Nobes, Larry W. Kostiuk U of Alberta	✓3-1 Shock ignition of n-heptane with supplemental hydrogen J. Maclean*, G. Ciccarelli Queen's U
09:40–10:00	✓7-2 Finite difference model of heat transfer in small-scale models of generic wall assemblies C. T. Aire, D. A. Torvi, E. J. Weckman U of Saskatchewan, U of Waterloo	✓3-2 An investigation of the optimal post injection timing for diesel engine exhaust after-treatment Marko Jeftic*, Zhenyi Yang, David S-K. Ting, Ming Zheng U of Windsor
10:00–10:20	✓7-3 Burning behaviour of untreated heavy gas oil from the Canadian oil sands P. M. Mulherin*, E. J. Weckman U of Waterloo	✓3-3 Enabling of low temperature combustion via active injection control in a diesel engine Xiaoye Han*, Prasad Divekar, Ming Zheng, Usman Asad, Xiang Chen U of Windsor
10:20–10:40	✓7-4 Effects of distilled water, sodium chloride solution, and hydrochloric acid solution on particulate emission of flares Mohsen Kazemimanesh*, Darcy Corbin, Ramin Dastanpour, Steven N. Rogak, Matthew R. Johnson, Larry W. Kostiuk, Jason S. Olfert U of Alberta, Carleton U, U of British Columbia	✓3-4 Limiting contractions for starting a two-shock-type intake via an overboard spillage at small attack angle Niloofar Moradian* McGill U
10:40–11:00	Coffee Break	

Tuesday, May 13		
	Modelling & Chemical Kinetics I, Room 1101 **Co-Chairs: S. Dworkin & P. Henshaw**	**Heterogeneous Combustion I, Room 1102** **Co-Chairs: F. Liu & G. Ciccarelli**
11:00–11:20	✓2-1 Autoignition and speciation studies of trans-hexene isomers in a RCF Scott W. Wagnon*, Margaret S. Wooldridge U of Michigan	✓11-1 Particle shape effects in packed bed combustion William Hallett, Jeremiah O'Neil U of Ottawa
11:20–11:40	✓2-2 Detailed modelling of soot oxidation by O_2 and OH in laminar diffusion flames Ali Khosousi*, Seth Benjamin Dworkin Ryerson U	✓ 11-2 Discrete flame propagation under normal gravity conditions Alex Wright*, Samuel Goroshin, Andrew Higgins McGill U
11:40–12:00	✓2-3 The effects of methane impurities on syngas combustion Andrew B. Mansfield*, Margaret S. Wooldridge U of Michigan	**Fire II** ✓7-5 Heat flux conditions in flash fire and simulated flash fire for evaluation of protective clothing Stephen A. Paskaluk & Mark Y. Ackerman U of Alberta
12:00–12:20	✓2-4 A compressible LEM-LES strategy (CLEM-LES) for modeling supersonic and turbulent combustion Brian Maxwell*, Matei Radulescu, Sam Falle, Gary Sharpe U of Ottawa, U of Leeds, Blue Dog Scientific Ltd	
12:20–14:00	Lunch (Room 1100 CEI) **CI/CS Board of Directors Meeting (Room 1102 CEI)**	

Tuesday, May 13		
	Soot & Particulate I, Room 1101 **Co-Chairs: D. Torvi & B. Zhou**	**Turbulent Flame, Room 1102** **Co-Chairs: W. Hallett & A. Sobiesiak**
14:00–14:20	✓12-1 A Study of the effects of ester moiety on soot formation in a laminar coflow diffusion flame of a surrogate for B100 biodiesel Mohammad Reza Kholghy*, Jason Weingarten, Murray Thomson U of Toronto	✓6-1 Evaluation of Lagrangian particle tracking algorithms for quantitative analysis of 4D experimental data Sarah A. Ramji*, Adam M. Steinberg, Bruno R. Coriton, Jonathan H. Frank U of Toronto, Sandia National Laboratories
14:20–14:40	✓12-2 Instantaneous soot volume fraction and morphology measurements in turbulent, buoyant, non-premixed flames Brian M. Crosland, Kevin A. Thomson, Matthew R. Johnson Carleton U, National Research Council	✓6-2 Influence of combustion on principal strain-rate transport in turbulent premixed flames A. M. Steinberg, B. R. Coriton, J. H. Frank U of Toronto, Sandia National Laboratories
14:40–15:00	✓12-3 A soot particle concentration estimator for industrial combustion applications S. Bozorgzadeh*, A. Khosousi, S. B. Dworkin Ryerson U	✓6-3 Doubly conditional source-term estimation model for the simulation of turbulent lifted jet flames D. Dovizio*, J. Labahn, C.B. Devaud U of Waterloo
15:00–15:20	✓12-4 Numerical and Experimental Study of the Influence of CO2 and N2 Dilution on Soot Formation in Laminar Coflow C2H4/Air Diffusion Flames between 5 and 20 atm Fengshan Liu, Ahmet E. Karataş, Ömer L. Gülder National Research Council, U of Toronto	✓6-4 Large Eddy Simulation of Sandia Flames D through F with conditional source-term estimation Graham R. Hendra*, M. Mahdi Salehi, W. Kendal Bushe U of British Columbia
15:20–15:40	Coffee Break	

Tuesday, May 13		
	Detonation & Explosion, Room 1101 **Co-Chairs: Ö.L. Gülder & A. deChamplain**	**Diagnostics, Room 1102** **Co-Chairs: P. Henshaw & M.J. Thomson**
15:40–16:00	✓1-1 Influence of hydrodynamic instabilities on the propagation mechanism of fast flames Logan Maley*, R. Bhattacharjee, S. Lau-Chapdelaine, M.I. Radulescu U of Ottawa	✓10-1 Experimental characterization of the flowfield and flame structure in a rocket combustor using OH PLIF Abhinav Dasari*, Logan W. White, Yasin M. Abul-Huda, Mirko Gamba U of Michigan
16:00–16:20	✓1-2 Propagation mechanisms of supersonic combustion waves M. Kellenberger*, G. Ciccarelli Queen's U	✓10-2 Synthesis and characterization of YAG:Dy, YAG:Dy:Er, and YABNG:Dy for high temperature thermographic phosphor thermometry W. Y. Kwong*, A. M. Steinberg, Y.-H. Chin U of Toronto
16:20–16:40	✓1-3 DDT and detonation propagation limits in an obstacle filled tube Mitchell Cross*, Gaby Ciccarelli Queen's U	✓10-3 Aerosolized iron nanoparticles size measurements using time resolved laser induced incandescence N.R. Singh*, T.A. Sipkens, K.J. Daun, N. Bizmark, M. Ioannidis U of Waterloo
16:40–17:00	✓1-4 Linear Burn Rate of Ammonium Nitrate and water based Emulsion Explosives S. Goldthorp, C.M Badeen, R. Turcotte, C. Iyogun, A. English Natural Resources Canada	✓10-4 Measurement of high temperature water vapour using terahertz absorption spectroscopy Rachel Song*, Zhenyou Wang, Murray J. Thomson U of Toronto
	6:30 PM Dine-around (optional). Group reservations at selected local restaurants at own cost. See Registration table for details.	

Wednesday, May 14			
08:00–08:15	**Announcements (Room 1100 CEI)** Andrzej Sobiesiak		
08:10–09:00	**Plenary Lecture #2 (Room 1100 CEI)** Leveraging the best Features of the next generation of fuels: And avoiding the tiger traps along the way – Margaret S. Wooldridge, U of Michigan		
09:00–09:20	Coffee Break		
	Laminar Flame, Room 1101 **Co-Chairs: F. Liu & L.W. Kostiuk**	**Biofuel, Room 1102** **Co-Chairs: A. Sobiesiak & M. Birouk**	**Engine Combustion II, Room 1100** **Co-Chairs: J. Wallace & M. Zheng**
09:20–09:40	✓5-1 Experimental and Numerical Study of Soot Formation in Gasoline/Ethanol Diffusion Flames Ali Khosousi, Seth Benjamin Dworkin, Fengshan Liu, Nick Anthony Eaves, Murray John Thomson, Xu He, Yujie Dai, Shijin Shuai, Jianxin Wang Ryerson U, National Research Council, U of Toronto, Beijing Institute of Technology, Tsinghua University	✓8-1 Combustion of organic solvent in supercritical water Sivamohan N. Reddy, Sonil Nanda, Janusz A. Kozinski, Michael Hicks, Uday Hegde York U, National Aeronautics Space Administration	✓3-5 Morphology and Volatility of Particulate Matter Emitted from a Natural Gas Direct-Injection Compression-Ignition Engine Brian Graves*, Jason Olfert, Bronson Patychuk, Ramin Dastanpour, Steven Rogak U of Alberta, Westport Innovations, U of British Columbia
09:40–10:00	✓5-2 Criteria for a flame to propagate between neighboring pockets of reactive gas La Flèche M.*, Manoubi M., Radulescu M.I., Liang Z. U of Ottawa, Atomic Energy Canada Limited	✓8-2 Ignition delay time measurements and high-speed imaging of ethanol-air mixtures in a rapid compression facility Cesar Barraza-Botet*, Scott W. Wagnon, Margaret S. Wooldridge (U of Michigan)	✓3-6 Characterize a flush wall scramjet combustor equipped with strut/wall fuel injection Jichao Hu*, Wen Bao, John Wen Harbin Institute of Technology, U of Waterloo
10:00–10:20	✓5-3 A two-dimensional numerical investigation of laminar diffusion flame sheet position and its interaction with the flow and gravitational fields in counterflow geometry Weichao Wang*, Clinton P.T. Groth, Ömer L. Gülder (U of Toronto)	✓8-3 Improving cold weather combustion performance of biodiesel fuel M. Birouk*, A.I. Chowdhury, S.L. Toth, D. Levin, K. Dubicki, M. Sailer, J. L. Sorensen U of Manitoba	✓3-7 Effect of port delivered ethanol on the heat release rate and combustion performance of a high compression ratio diesel engine Tongyang Gao*, Xiaoye Han, Jimi Tjong, Ming Zheng (U of Windsor)
10:20–10:40	✓5-4 An experimental and numerical study of the effect of nozzle separation distance on the extinction strain rate in counterflow laminar diffusion flame burners Weichao Wang*, Ahmet. E. Karatas, Clinton P.T. Groth, Ömer L. Gülder (U of Toronto)	✓8-4 Comparisons of NO formation in premixed flames of C1 to C4 alcohols and alkanes Graeme M. G. Watson, Philippe Versailles, Antonio Lipardi, Jeffrey M. Bergthorson McGill U	✓3-8 Reduction of methane emissions in duel-fuel compression ignition engines Andrew House*, Gaby Ciccarelli , David McCann Queen's U, Discovery Fuel Technologies

Wednesday, May 14			
10:40-11:00	Coffee Break		
	Modelling & Chemical Kinetics II, Room 1101 **Co-Chairs: A. deChamplain & A. Sobiesiak**	**Soot & Particulate II, Room 1102** **Co-Chairs: M.R. Johnson & M. Birouk**	**Engine Combustion III, Room 1100** **Co-Chairs: J. Wallace & G. Ciccarelli**
11:00–11:20	✓2-5 Numerical modeling of flames propagating in small heat-recirculating tubes subjected to heat loss George P. Gauthier *, Jeffrey M. Bergthorson McGill U	✓12-5 Demonstration of the CPMA-electrometer system for calibrating black carbon particulate mass instruments Matthew Dickau*, Tyler Johnson, Kevin Thomson, Greg Smallwood, Jason Olfert U of Alberta, National Research Council	✓3-9 Variability of particulate matter emission from a GDI engine at steady-state conditions Manuel Ramos*, Phillip Mireault, James S. Wallace U of Toronto
11:20–11:40	✓2-6 Influence of the outlet opening area on the flame propagation in a straight rectangular duct Z. Movahedi*, I. Gallage, A. Sobiesiak U of Windsor	✓12-6 Development of a soot model for gas turbine applications B. Shahriari*, M. J. Thomson, S. B. Dworkin U of Toronto, Ryerson	✓3-10 Optimization of shell ignition model and its application to the prediction of ignition performance of renewable fuels in an HCCI engine Hongsheng Guo, W. Stuart Neill National Research Council
11:40–12:00	✓2-7 Application of high-order CENO finite volume scheme to the LES of premixed Bunsen flames Luiz Tobaldini Neto*, Clinton P.T. Groth U of Toronto	✓12-7 Influence of nitrogen dilution on soot yield and temperature field of a laminar ethylene-air diffusion flame at 10 atm Adriana Daca*, Ahmet E. Karatas, Ömer L. Gülder U of Toronto	✓3-11 Design of a hot surface assisted diesel cycle natural gas engine Dan Chown*, James S. Wallace U of Toronto
12:00–12:20	✓2-8 Comparing thermodynamic property formulae in Large Eddy Simulation of Sandia Flame D Graham R. Hendra*, M. Mahdi Salehi, W. Kendal Bushe U British Columbia	✓12-8 Soot formation and velocity field of a turbulent non-premixed flame in a swirl–stabilized model combustor Sandipan Chatterjee*, Christopher Halmo, Ömer L. Gülder U of Toronto	✓3-12 Numerical simulation of intake temperature and EGR effects on HCCI combustion with diesel-like fuels Tuan-Anh Nguyen, Biao Zhou, Andrzej Sobiesiak U of Windsor
12:20–13:30	Lunch (**Room 1100 CEI; Sponsored by FORD**)		
13:30–14:00	**Optional Lab Tour (Meet at CEI Atrium)**		

Wednesday, May 14			
	Modelling & Chemical Kinetics III, Room 1101 **Co-Chairs: W.K. Bushe & M.S. Wooldridge**	**Turbulent Flame II, Room 1102** **Co-Chairs: P. Henshaw & Ö.L. Gülder**	**Engine Combustion IV, Room 1100** **Co-Chairs: M. Zheng & A.M. Steinberg**
14:00–14:20	✓2-9 Control of ignition temperature in hybrid thermite -intermetallic reactive materials Christian Poupart*, Geoff Maines, Matei Radulescu U of Ottawa	✓6-5 Investigation of the premixed flame propagation across the varied composition field on a rectangular duct I. Gallage*, Z. Mohavadi, X. Zhao, D. Haggith, A. Sobiesiak U of Windsor	✓3-13 Ignition flame kernel development of premixed mixture by spark and corona discharge Shui Yu, Kelvin Xie, Qingyuan Tan, Meiping Wang, Ming Zheng U of Windsor
14:20–14:40	✓2-10 Linear-Eddy Model Formulated Probability Density Function And Scalar Dissipation Rate Models at Various Turbulent Premixed Combustion Regimes Hong Tsui*, Kendal Bushe U of British Columbia	✓6-6 Structure of methane inversed diffusion flames with simulated pre-heated co-flow combustion products Z. Movahedi, X. Zhao*, A. Sobiesiak U of Windsor	✓3-14 Investigation of the combustion characteristics and performance in a compression injection engine fuelled with neat n-butanol Tadanori Yanai, Shouvik Dev, Xiaoye Han, Ming Zheng, Jimi Tjong U of Windsor, Ford Motor Company Canada
14:40–15:00	✓2-11 On the development of a rapid compression facility CFD model to complement the analysis of experimental studies. Dimitris Assanis*, Margaret S. Wooldridge U of Michigan	✓6-7 Simulation of MILD combustion using the Conditional Source-term Estimation Approach J.W. Labahn*, D. Dovizio, C.B. Devaud U of Waterloo	✓3-15 Effects of Asymmetric Valve Timing with Constant NVO Duration on HCCI Engine Combustion Characteristics Khashayar Ebrahimi*, Alex Schramm, Charles Robert Koch U of Alberta
15:00–15:20	✓2-12 Efficient Control-oriented Combustion Modelling of Internal Combustion Engines Hadi Adibi Asl, Roydon Fraser, John McPhee U of Waterloo	✓6-8 Experimental investigation of burning velocity and flame stretch factor of premixed turbulent Bunsen flames Parsa Tamadonfar*, Ömer L. Gülder U of Toronto	**Spray & Droplet** ✓9-1 Method for adaptive combustion control and optimal operation for a liquid-fueled industrial heater Cody L. Prodaniuk*, Garett Cupples, Kyle J. Daun U of Waterloo, GenTex Oilfield Manufacturing Inc
15:20–15:40	Coffee Break		

Wednesday, May 14			
	Gas Turbine, Room 1101 **Co-Chairs: W.K. Bushe & M.S. Wooldridge**	**Turbulent Flame III, Room 1102** **Co-Chairs: M.M. Salehi & Ö.L. Gülder**	**Heterogeneous Combustion II, Room 1100** **Co-Chairs: J. Wallace & A.M. Steinberg**
15:40–16:00	✓4-1 Thermo-acoustic Velocity Coupling in a Swirl Stabilized Gas Turbine Model Combustor: Phase Analysis Vincent Caux-Brisebois, Adam M. Steinberg, Christoph M. Arndt, Wolfgang Meier U of Toronto, Deutsches Zentrum für Luft- und Raumfahrt	✓6-9 Flame surface density in counter-gradient and gradient diffusion regimes of turbulent premixed combustion Sina Kheirkhah*, Ömer L. Gülder U of Toronto	✓11-3 Fabrication and characterization of micro-structure Al/CuO thermite foils John Rawlins*, Jinhee Kang, Sanam Atashin, John Wen U of Waterloo
16:00–16:20	✓4-2 Determination of thermo-acoustic energy transfer in a model gas turbine combustor using OH* chemiluminescence Maxwell G. Adams*, Benjamin Geraedts, Vincent R. Caux-Brisebois, Adam M. Steinberg U of Toronto	✓6-10 On the hysteresis phenomenon of turbulent non-premixed lifted methane flame Mohsen Akbarzadeh, Madjid Birouk U of Manitoba	✓11-4 Counterflow flames in dense suspensions of reacting particles Sam Whiteley*, Philippe Julien, Michael Soo, Samuel Goroshin, David L. Frost, Jeffrey M. Bergthorson McGill U
16:20–16:40	✓4-3 Transient simulation of the heat soak-back phenomenon in a gas turbine combustor Ali Ghazlani*, Alain deChamplain, Bernard Paquet, Smail Kalla, Nigel Davenport U Laval, Pratt & Whitney Canada	✓6-11 Statistics of flame front curvature in turbulent premixed V-shaped flames Sina Kheirkhah*, Ömer L. Gülder U of Toronto	**Laminar Flame II** ✓5-5 Rate ratio asymptotic analysis of the influence of hydrogen on the structure and mechanisms of extinction of methane flames in laminar nonpremixed flows Kalyanasundaram Seshadri, Xue-Song Bai, Forman A. Williams UC San Diego, Lund University
16:40–17:40	**CI/CS Annual Business Meeting (Room 1100 CEI)**		
17:45 18:00–21:00	**Buses Depart @ 5:45 PM & 5:50 PM from CEI to Banquet** Please let us know ahead of time if you wish to be picked up from your hotel, i.e., other than CEI **Banquet at Caesars Room TBC (Sponsored by AUTO21)** **Reception & Cocktail: 6:00-7:00 PM** **Dinner: 7:00-9:00 PM** **Bus leaves Caesars at 9:00 PM & 9:30 PM** (Please inform the Bus Driver if you wish to be dropped off other than CEI)		

Thursday, May 15		
08:00–08:15	**Announcements (Room 1100 CEI)** Andrzej Sobiesiak	
08:15–09:00	**Plenary Lecture #3 (Room 1100 CEI)** Clean Diesel Combustion and Biofuel Impact – Ming Zheng, U of Windsor	
09:00–09:20	Coffee Break	
	Biofuel II, Room 1101 **Co-Chairs: W. Hallet & A. Sobiesiak**	**Soot & Particulate III, Room 1102** **Co-Chairs: M.R. Johnson & K. Seshadri**
09:20–09:40	✓8-5 Effect of fuel nozzle geometry on the stability of a low swirl non-premixed turbulent biogas flame Meghdad Saediamiri, Madjid Birouk, Janusz A. Kozinski U of Manitoba, York U	✓12-9 Modeling Soot particle nucleation as a rare event N.A. Eaves*, S. B. Dworkin, M. J. Thomson U of Toronto, Ryerson U
09:40–10:00	✓8-6 Effect of biogas composition on the stability limits of a low-swirl flame Meghdad Saediamiri, Madjid Birouk*, Janusz A. Kozinski U of Manitoba, York U	✓12-10 Effect of nucleation reversibility on predicting soot particle size distributions in premixed flames A. Veshkini*, N. Eaves, S. Dworkin, M.J. Thomson U of Toronto, Ryerson U
10:00–10:20	✓8-7 Experimental study of biogas flame blow-off in a swirl-stabilized combustor Qiang An*, Benjamin D. Geraedts, Adam M. Steinberg U of Toronto	✓12-11 Investigation of the effect of gas dynamics on soot temperature decay in laser induced incandescence F. Memarian, F. Liu, D.R. Snelling, K.A. Thomson, G.J. Smallwood, K.J. Daun National Research Council Canada, U of Waterloo
10:20–10:40		
10:20–10:40	Coffee Break – Thank You for Your Participation & Support	

We are indebted to the three elite plenary lecturers.

Plenary Lecture #1 – Tuesday May 13

David Torvi, Ph.D., P.Eng.
Professor, Department of Mechanical Engineering, University of Saskatchewan

David Torvi holds Ph.D. and M.Sc. degrees from the University of Alberta and a B.Sc. from the University of Calgary. Professor Torvi has also worked in NRC's Fire Research Program and the HVAC industry, and is an Adjunct Professor at the University of Waterloo.

Title: Evaluating Fire Performance of Protective Clothing: From Initial Design Tools to Non-destructive Tests of In-use Garments

Abstract
One of the challenges in evaluating the fire performance of many products, including protective clothing, is the fact that it is difficult to completely assess this performance over a product's entire life, from initial design to retirement. While there are a number of standard bench top and full-scale tests for fabrics and complete garments, these tests may not completely represent the wide range of conditions faced in the field. Standard tests are used to evaluate new products, while end users are also interested in how their clothing continues to perform over time, and when to replace their clothing.
This presentation will provide an overview of research at the University of Saskatchewan aimed at developing methods to evaluate the performance of protective clothing over its entire useful lifetime. This research includes the development of numerical models of heat and moisture transfer for design, and improved small and full-scale tests for regulatory purposes. As standard test methods are typically destructive, efforts to develop non-destructive tests to monitor performance of in-use protective clothing will be also discussed.

Plenary Lecture #2 – Wednesday May 14

Margaret S. Wooldridge, Ph.D.
Arthur F. Thurnau Professor, Mechanical Engineering, Professor, Aerospace Engineering, University of Michigan, Ann Arbor

Professor Margaret Wooldridge is an Arthur F. Thurnau Professor in the Departments of Mechanical Engineering and Aerospace Engineering at the University of Michigan, Ann Arbor. She is a fellow of the American Society of Mechanical Engineers (ASME), the Society of Automotive Engineers (SAE), and the recipient of numerous honours.

Title: Leveraging the best Features of the next generation of fuels: And avoiding the tiger traps along the way

Abstract
Clean energy remains a global challenge. Recent efforts focus on new and alternative fuel feed stocks to support the transportation and stationary power sectors.At the University of Michigan, the Wooldridge research group has developed unique strategies to experimentally interrogate complex chemically reacting systems and to provide quantitative understanding of the fundamental mechanisms limiting energy solutions. This presentation will focus on the effects of different fuels on fundamental and applied ignition systems, spanning chemically controlled reactors to production internal combustion engines. These fuel characterization studies provide a critical pathway to successful integration of sustainable fuels into the ground and air transportation infrastructure

Plenary Lecture #3 – Thursday May 15

Ming Zheng, Ph.D., P.Eng.
Professor and Canada Research Chair in Clean Diesel Engine Technology, Mechanical, Automotive & Materials Engineering, University of Windsor

Ming Zheng: PhD 1993 Univ. Calgary; NSERC-JSPS PDF 1995, AFS Calgary Senior Engineer 1996, Univ. Tennessee Asst. Prof. 2000, Univ. Windsor Prof. 2002 –present; Research areas - Clean combustion control, Exhaust emissions, Active flow after-treatment, Alternative fuel engines, High efficiency engine, Combustion diagnostics, Fuel injection control, IC engine modeling.

Title: Clean Diesel Combustion and Biofuel Impact

Abstract
Worldwide efforts have been made with cutting-edge technologies to develop ultra-clean combustion engines targeting an energy efficiency of ~60%. Emission controls face a moving target that gets tougher once an existing standard is about met. A fully homogeneous cylinder charge usually produces little dry particles in the exhaust, despite of lean or stoichiometric, while a lean and diluted local mixture often lowers the production of nitrogen oxides. In practice, the fuel-efficiency is compromised by the high levels of hydrocarbon and carbon monoxide emissions, which is partially caused by fuel condensation and flame quenching on the combustion chamber surfaces. The use of biofuel further compounds the challenges. Advanced control strategies including adaptive corona ignition are developed at our group to enable the ultra-clean and efficient combustion with fuels from renewable and sustainable sources.

Special Thanks go to the Chairs:

M. Birouk ×2	W.K. Bushe ×2		
G. Ciccarelli ×2	A. deChamplain ×2	C. Devaud	S. Dworkin
Ö.L. Gülder ×3	W. Hallett ×2	P. Henshaw ×3	M.R. Johnson ×2
L.W. Kostiuk ×2	F. Liu ×2		
M.M. Salehi	K. Seshadri	A. Sobiesiak ×4	A.M. Steinberg ×2
M.J. Thomson ×2	D. Torvi		
J. Wallace ×3	E.J. Weckman	M.S. Wooldridge ×2	
M. Zheng ×2	B. Zhou		